RETINA TIMES

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SPECIAL EDITION:
30th Anniversary Issue

3 Decades of Retinal Care
The experts weigh in on our evolution

Meeting 2012
Issue 45

45

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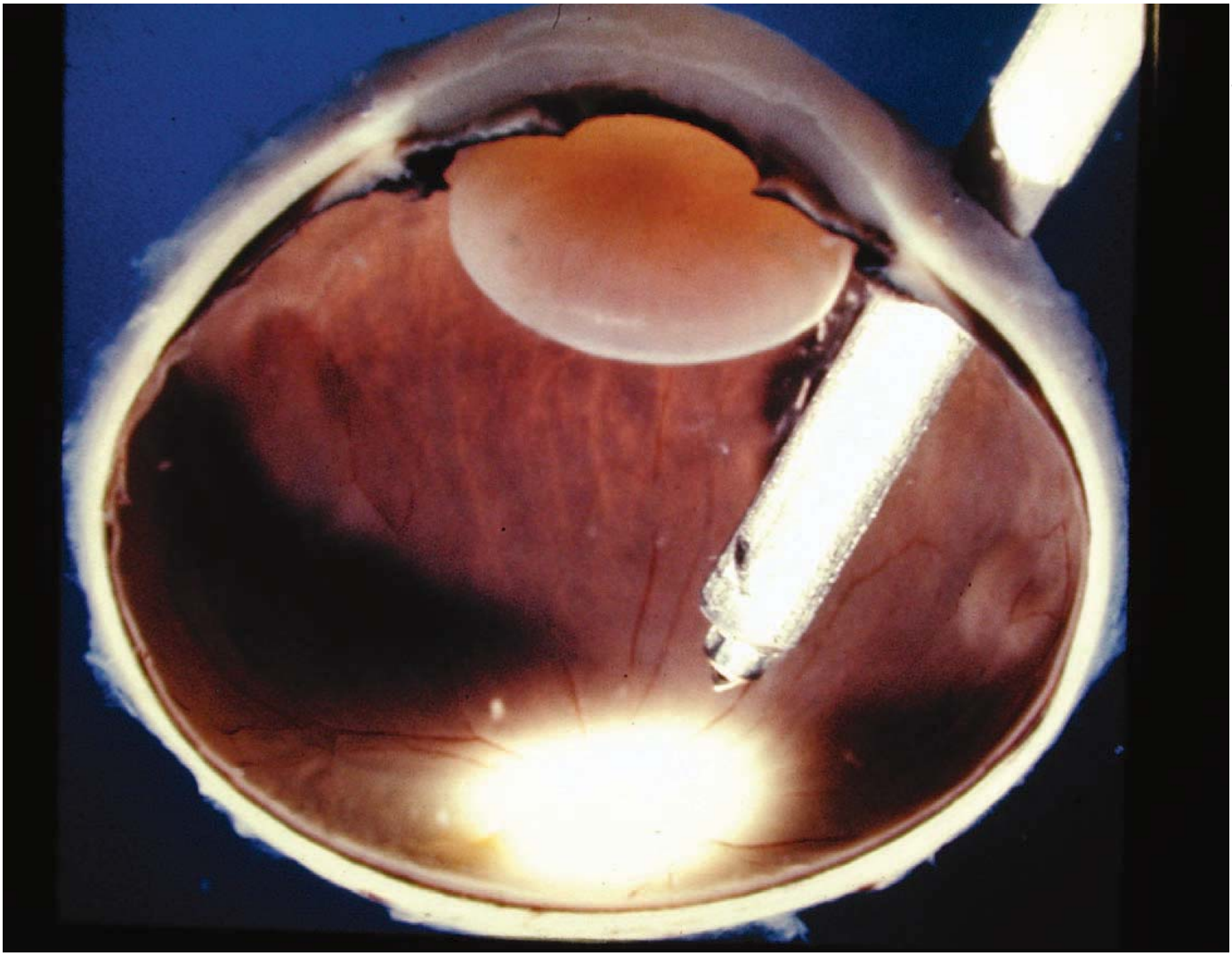


Photo courtesy of Brooks W. McGuen II, MD.

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Suber S. Huang, MD, MBA
President, ASRS
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American Society of Retina Specialists



Thirty Years: The Journey Continues

'The journey is the treasure.'
—Lloyd Alexander (1924-2007)

The ASRS has come a long way since Jerry Bovino, Roy Levit, and Allen Verne launched the Vitreous Society as enthusiastic young retina specialists in 1982. Their spirit of inclusiveness and the joy of sharing knowledge are firmly imbued in our Society's culture—a legacy of which we can all be proud.

The last 30 years have been marked by tremendous growth and change—in the Society as well as in the science of retina. You'll find much more about this evolution in the special 30th anniversary section of this issue, beginning on page 26.

ASRS's latest chapter started in 2010 when we moved our international headquarters to Chicago. This move was driven by the Society's thoughtful strategic plan, which called for hiring our first executive vice president, building an experienced professional staff, developing the infrastructure of the Society, and forging new synergy with the Foundation of the ASRS. Our goals are to expand our programs to become your trusted source for all things retina and to define a specialty that is growing with astonishing speed.

'ASRS's latest chapter started in 2010 when we moved our international headquarters to Chicago.'

Our executive vice president, Jill Blim, came on board just as I began my term as your president. She and I have worked closely—along with the Society's leadership team and staff—to guide the Society forward according to our strategic plan. I deeply appreciate the continued commitment of the Board and committee chairs, and the members who make the ASRS an extraordinary organization. Here are some highlights of what we have accomplished in the last 2 years.

ASRS American Society of Retina Specialists | The Foundation American Society of Retina Specialists

Our new logos visually reflect the close relationship between the Society and the Foundation.

The Society and Foundation get a new look

In 2011, the ASRS developed new, complementary logos for the Society and the Foundation that visually reflect their close relationship. This new graphic identity was carried through in the Society's completely redesigned website, www.asrs.org, which we launched in February 2012.

This project is more than just a new look—it is part of a granular communication plan that features the ASRS and its Foundation as the trusted voice for retinal education, treatments, and innovative discovery. Limited-edition ASRS neckties and scarves made exclusively for the Society by Vineyard Vines are available at the Annual Meeting. Wear our new look with pride.

New website offers expanded functionality

By 2010, ASRS had clearly outgrown its old website. A key part of our communication plan was to develop a new site that would be much easier to navigate, and would keep you informed on the latest clinical and Society news. To this end, we involved you, our members, in every step of developing the new site.

Our new, user-friendly website allows you to easily submit abstracts, register for the Annual Meeting, complete the annual ASRS Preferences and Trends (PAT) Survey, participate in RetinaTalk Forum, pay your ASRS dues, create and edit your member profile, and much more.

New information is continually being added to the site. I urge you to visit www.asrs.org frequently for the latest clinical updates, CME opportunities, and socioeconomic news affecting retina practices—as well as Spotlight cases and quick-response PAT Survey polls. Our website represents a real-time, dynamic, interactive medium for you to comment and share your experiences with your fellow ASRS members.

Retina FYI e-newsletter debuts

When the 2011 member communications survey showed that 79% of respondents wanted an ASRS e-newsletter, we developed *Retina FYI*. This monthly e-newsletter debuted in February 2012. Of course, ASRS will continue to send you email alerts whenever there is breaking news.

Taking the PAT Survey to the next level

Since 1999, the ASRS PAT Survey has offered a snapshot of retina specialists' practice patterns. A number of the questions are repeated from year to year—which has produced longitudinal data allowing us to report 10-year trends on key issues. For more information on the PAT Survey's evolution, please see page 35.

ASRS iPad app helps the Annual Meeting go paperless

This year marks the first time the ASRS Annual Meeting Scientific Program is being presented on an iPad app, as well as on the ASRS website. With a fingertip touch, the new app allows you to vote

on Film Festival videos, rank e-posters, and learn more about exhibitors. This is just one more way ASRS is embracing technology to give you a better experience—and it's better for the environment as well. It seems fitting that ASRS is creating its own iPad app—after all, Apple named its new iPad display *Retina*.

Retina Image Bank—sharing the vision

One of our newest initiatives is being launched at the 30th Annual Meeting. The Retina Image Bank is an online resource destined to become the world's largest and best open-access repository of retinal images and video. With a dynamic media platform displaying the newest and best content, and ICD keyword Boolean search logic, the Retina Image Bank will serve as a flexible database for education and research.

> 'The ASRS, its members, and the specialty of retina are on a historic trajectory of growth and innovation.'

Imagine being able to learn from the collective experience of retina specialists around the world. Each year, we will publish a "best of the best" album to showcase transcendental pictures that reveal the beauty of the retina and the artistry of those who capture these images. I am honored to serve as the Retina Image Bank's curator.

We thank Allergan, Inc, the exclusive sponsor of the Retina Image Bank for 2012. Their leadership has pledged a long-term commitment to the ASRS and to helping retina specialists provide excellence in clinical care. The board of the Ophthalmic Photographers' Society has voted to share its unique expertise in retinal imaging as our colleagues. Other industry stakeholders will also partner in this project, and I am especially proud that some of our field's legendary pioneers have pledged their entire slide collections to the Retina Image Bank.

The Retina Image Bank will include retina case conferences, case series, videos, diagrams, and figures. It will also feature other imaging modalities including fundus photos and wide-angle imaging, fluorescein angiography, OCT, ultrasound images, MRIs, CTs, electron microscopy, photomicroscopy, and immunofluorescence. We are fortunate to have a slate of world-class editors and senior editors who have helped educate generations of ophthalmologists. If every ASRS member contributes just 10 images a year, we'll have 25,000 at the end of the first year. Each of us has something to contribute, and I urge you to participate.

Therapeutic Surveillance Committee monitors patient safety issues

One of the Society's most serious obligations is to keep you informed on issues that can affect your patients' safety. The ASRS Therapeutic Surveillance Committee (TSC) is constantly working with the FDA and the CDC to monitor these issues; you are encouraged to report any adverse events to the TSC by emailing therapeuticsurveillance@asrs.org.

The TSC will continue to keep you informed on the latest clinical developments, such as the recent cases of endophthalmitis resulting from contaminated Brilliant Blue G and triamcinolone acetonide. (For more information on the TSC's activities, please see the article on page 18.)

RAFA advocates for you and your patients

Today, scope-of-practice battles are a growing threat to our patients and our profession. The Society's Retina Advocacy and Federal Affairs (RAFA) task force will place active member representatives in every U.S. state and region. Their mission: To serve on issues that affect practicing retina specialists and patients.

State and national optometric associations are pushing hard for legislation expanding optometrists' scope of practice. I urge you to get involved in RAFA and advocate for our patients' safety and well-being.

ASRS—It's all about you

The ASRS, its members, and the specialty of retina are on a historic trajectory of growth and innovation. Our destination is not simply a targeted goal, but a journey undertaken with the desire to achieve our own personal best. Continued success will come by adhering to our founding principles of collegiality, openness, and steadfast advocacy for our patients.

The ASRS is committed to the aspirations and interests of its extraordinarily talented members. The Young Physicians Section, Women in Retina, Fellows in Training, International members, and the faculty of our Annual Meeting and Practice Management Issues Seminar all bring dynamic energy, ideas, and collaborative innovation that bode well for our journey onward. Each passing year reminds us of our evanescent mortality. Legendary pioneers Ronald Michels, Donald Gass, Edward Norton, Robert Machemer, Nicholas Douvas, Sanderson "Sandy" Grizzard, and many other friends have paved the way.

> 'Our destination is not simply a targeted goal, but a journey undertaken with the desire to achieve our own personal best.'

Each of us carries the responsibilities and privilege of being a retina specialist. I will be asking for your support of our Foundation so we may continue this incredible journey. We are all candles, giving of ourselves to improve the lives of our families, patients, students, friends, and colleagues. Together we illuminate the world and create a brighter future for those who follow.

It's been a great honor to carry the torch, to have run hard and swiftly, and to pass the baton to trusted teammates. Continue to make each day your masterpiece. I wish you enduring health and success.

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J. Michael Jumper, MD
Editor-in-Chief

Celebrating 30 Years of *Our* Society

This 30th anniversary *Retina Times* issue is a tribute to the trailblazing vision of 3 young retina specialists. What began in the Vitreous Society as an audacious disruption of the norm has become the voice of the retina subspecialty in the ASRS.

The founders, Jerry Bovino, Roy Levit, and Allen Verne, envisioned an egalitarian society to allow greater interchange and dissemination of information worldwide. (See their story on page 26.) No matter how much 1982 Château Prieuré-Lichine that Jerry, Roy, and Allen drank that night at Poppies Bistro Cafe, they could not have predicted that their idea would become the largest professional organization of vitreoretinal specialists in the world, with more than 2400 members—nearly 400 of whom are from 55 countries outside of the United States.

'What began in the Vitreous Society as an audacious disruption of the norm has become the voice of the retina subspecialty in the ASRS.'

The ideals of our Society reflect the greatest attributes of the founders of the retina subspecialty. Robert Machemer is a prime example. With the encouragement of his mentor, Ed Norton, he and others proceeded to defy convention and develop instrumentation and techniques of vitreous gel removal.

Machemer then graciously helped train the first generation of vitreoretinal surgeons in these new techniques, many of whom are contributors to this issue. (See Steve Charles' article on page 29 summarizing the last 30 years in retinal science, as well as the Block Time article on page 38 with retina leaders' thoughts on how their approaches have changed since 1982.)

As Steve Charles states in his 30-year retrospective of vitreoretinal surgery, Machemer's revolution led to a rapid evolution of the instrumentation and techniques that continues today. The evolution comes from ASRS members everywhere: in private practices and at universities, in the United States and abroad.

The founders' vision of having a strong international component to our Society remains. On page 17, we introduce the International Corner, edited by Kourous Rezaei. Kourous is also chair of the new ASRS International Affairs Committee that will provide a greater link between our Society and others around the world.

One way that ASRS members have shared information since 1999 has been through the annual Preferences and Trends (PAT) Survey. On page 35, the survey's co-founders and original editors, John Pollack and Kirk Packo, discuss the evolution of the survey and share some trend data in vitreoretinal surgery—more evidence that the evolution continues.

We also welcome 2 new members of the *Retina Times* editorial staff. Prithvi Mruthyunjaya and Omesh Gupta will serve as co-editors of the Retina Education Section. They are both heavily involved in resident and fellow education, and we look forward to their contributions. Thanks to Mandeep Dhalla and Sunil Srivastava who have served as Education Section editors.

What will our specialty be like 30 years from now? On page 41, our KOL Corner contributors offer their thoughts on the future of drug delivery, stem cell therapy, nanobots and jetpacks. Whatever may lie ahead, if the past 30 years are any gauge, one can assume that the changes will be dramatic and will most likely come from ASRS members somewhere in this world.

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Dr. Jumper – COVALENT MEDICAL, INC: Founder, Royalty

PEARLS !

It's Our Pearl Anniversary

If the 25th anniversary is silver, and the 50th is gold, what's the 30th? Pearls! (Who knew?) What better theme for our 30th anniversary issue?

The cover image of intraocular cysticerosis was chosen not only for its clinical significance, but for its pearl-like quality.

And what better time to launch a new feature: Retina Practice Pearls? We asked some retina legends and leaders to share some pithy thoughts with us, and they didn't disappoint. Please see page 10 for their wit and wisdom.

Send us your Retina Practice Pearls

In upcoming issues, we'll feature more Retina Practice Pearls. If you have any pearls you'd like to share, please email them to retinatimes@asrs.org. You and the person you attribute the pearl to will be recognized.

Leaders, Legends Share Their Wit, Wisdom

'You'll be remembered for how you treated people and for the lives you touched long after we're gone. Always remember that.'

—Credited to Edward Norton, MD,
Legendary retina leader and founder of Bascom Palmer Eye Institute
Submitted by Suber S. Huang, MD, MBA

'Be cautious in recommending surgery—there's nothing so bad that the doctor can't make it worse.'

—Credited to Jerry Bovino, MD. Submitted by Roy Levit, MD, and Paul Tornambe, MD

'Don't be a putz—know the literature.'

—Credited to Paul Henkind, MD (acerbic, pioneering retina MD and legendary ocular pathologist on the importance of building an argument based on fact). Submitted by Suber S. Huang, MD, MBA

'Our specialty's future is built on the clinical/research accomplishments and generous teaching of its past great leaders—we must now continue this process by unselfish, imaginative education if we are to develop similar leaders for the future.'

— Tom Aaberg Sr, MD, MSPH

'The definition of minor surgery is surgery on someone else.'

—Allen Verne, MD

'Take that extra day or 2 of vacation. If you died today, your patients would have another physician in 5 minutes if needed.'

—Roy Levit, MD

'The enemy of good is better—a well-known statement, especially useful during surgery when you have everything good and you want it to be perfect. Of course, that last bit done to make it perfect results in a disaster.'

—Allen Verne, MD

'Excellence is a commitment to doing things the right way—not just a few things, everything in one's life.'

—Suber S. Huang, MD, MBA

'I'm not sure that I would treat this, but someone ought to.'

—Credited to J. Donald M. Gass, MD, father of medical retina, author of the seminal *Stereoscopic Atlas of Macular Diseases*, and never too proud to acknowledge the many mysteries of the human condition. Submitted by Suber S. Huang, MD, MBA

'You probably will not be in the same practice with which you started. The experience will make you a better businessperson and a better competitor.'

—Paul Tornambe, MD

'The most important fertilizer is the shadow of the farmer.'

—Submitted by Jerry Bovino, MD

"On a slow day, the tendency is to leave a satellite office early and get home before the traffic. However, once the doctor leaves the office, things can deteriorate quickly as the secretaries, techs, and nurses lack appropriate direction. Therefore, I would tell my colleagues to stick around during regular office hours because this old agricultural adage applies to other disciplines."

'The amount of pre-op preparations done just before surgery is directly proportional to the time one has been in practice.'

—Roy Levit, MD

'There is no sense in having better judgment if you don't use it.'

—Credited to Jerry Bovino, MD. Submitted by Allen Verne, MD

'Nobody got where they are by themselves. Somewhere along the line, someone took an interest, someone went out on a limb. We can never repay that person for what they did for us. We can only try and do the same for someone else.'

—Credited to Alex Irvine, MD. Submitted by H. Richard McDonald, MD

Chirag P. Shah, MD, MPH
Section Co-Editor



Jeffrey S. Heier, MD
Section Editor



Will Year-2 CATT Results Change Practice Patterns?

The recently published year-2 results of the Comparison of Age-Related Macular Degeneration Treatment Trials (CATT)[1] show that bevacizumab (Avastin®) is equivalent to ranibizumab (Lucentis®) in treating wet AMD. How will these results affect retina specialists' practice patterns?

We each view the world through our personal spectacles, nicked and tainted from our own experiences. From our individual perspectives, we form biases and preferences that not only shape our modus operandi, but also alter our perceptions and interpretations.

Sox or Yanks? Pro-life or pro-choice? Bevacizumab or ranibizumab? It appears as though we gravitate inherently toward one or the other, and this same force subjectively distorts our objective interpretation of data.

Year-1 CATT data did not affect treatment choices

Case in point: Bevacizumab subscribers interpreted the year-1 CATT results[2] as equivalency between bevacizumab and ranibizumab, and continued their bevacizumab bias.

Ranibizumab subscribers, on the other hand, felt their drug had an anatomic edge, and perhaps a safety advantage, and continued their ranibizumab bias. Indeed, three-quarters of respondents to the ASRS 2011 Preferences and Trends (PAT) Survey[3] reported that the year-1 CATT results did not affect their drug of choice for wet AMD.

Will the year-2 CATT results have a greater impact, or will we each use them to justify our preconceived decisions?

CATT: A noninferiority trial

CATT is a large, multicenter trial of more than 1100 patients randomized to either bevacizumab or ranibizumab, and to monthly or as-needed treatment. Patients had treatment-naïve wet AMD with 20/25 to 20/320 vision. During the first year, patients were randomized to 1 of 4 groups:

- Ranibizumab monthly
- Bevacizumab monthly
- Ranibizumab as needed
- Bevacizumab as needed

During the second year, both groups treated with monthly injections were randomized to either continued monthly injections or as-needed treatment with the originally assigned drug (the *switched-regimen* subgroup). Patients initially assigned to the as-needed groups retained their assignments during the second year. As-needed groups were retreated for fluid on OCT, new or persistent hemorrhage, decreased vision, or fluorescein dye leakage.

Investigators used time-domain OCT during the first year; they used spectral-domain OCT for 22.6% of scans during the second year. In the as-needed arms, treating ophthalmologists accurately diagnosed fluid on OCT and retreated about 70% of the time; almost all of the inconsistencies between ophthalmologists and the reading center resulted in missed treatments.

Little visual change in year 2

Most visual change occurred during the first year of treatment, with relatively minor change reported during year 2. The ranibizumab monthly group gained a mean of 8.8 letters compared with 7.8 letters in the bevacizumab monthly group ($P = .21$). In the as-needed arm, the ranibizumab group gained 7.8 letters compared with 5.0 letters with bevacizumab ($P = .046$).

Overall, patients treated with bevacizumab had a similar outcome to those treated with ranibizumab (-1.4 letter difference in mean improvement). Patients treated as needed gained fewer letters than those treated monthly (-2.4 letter difference in mean improvement). The mean visual acuity was similar among the 4 treatment groups with the same dosing regimen for 2 years, measuring about 20/40.

The proportion of eyes with 20/20 or better and with 20/200 or worse vision was similar among the treatment groups. The average number of injections in the as-needed arms was higher for bevacizumab than for ranibizumab (14.1 vs 12.6, $P = .01$). The estimated 2-year drug cost varied greatly per treatment regimen, ranging from $705 in the bevacizumab as-needed group to $44,800 in the ranibizumab monthly group.

'Monthly or as needed, ranibizumab or bevacizumab, the mean visual acuity is about 20/40 at 2 years.'

Anatomically, mean retinal thickness was 29 microns less in patients treated monthly compared with those treated as needed. The proportion without fluid on OCT ranged from 13.9% in the bevacizumab as-needed group to 45.5% in the ranibizumab monthly group. The mean change in lesion area from baseline was lowest in the ranibizumab monthly group (-0.4 mm^2) and ranged to 3.0 mm^2 in the bevacizumab as-needed group.

More geographic atrophy developed in eyes treated monthly compared with those treated as needed. The ranibizumab monthly group had the highest proportion of eyes developing atrophy, with 21% developing nonfoveal atrophy and 4.7% developing foveal atrophy.

There was little visual change in patients who continued monthly treatment in year 2. However, the groups switched from monthly to as-needed lost a few letters (-1.8 in ranibizumab and -3.6 in bevacizumab switched-regimen subgroups). For both drugs, the average number of letters gained was similar between those treated as needed for 2 years and those switched to as-needed after a year of monthly treatment.

About 5 injections were administered during the second year in this switched-regimen group.

OCT thickness remained stable in monthly patients, but increased among those switched from monthly to as needed (+31 microns for ranibizumab and +19 microns for bevacizumab).

Adverse effects also comparable

Major adverse effects were similar between ranibizumab and bevacizumab groups, including death (5.3% vs 6.1%), arteriothrombotic events (4.7% vs 5.0%), and venous thrombotic events (0.5% vs 1.7%). When compiled, serious systemic adverse events were less likely in those treated with ranibizumab compared with bevacizumab (32% vs 40%, $P = .004$).

> ‘[N]ot too long ago, the treatment for [wet AMD] was a handshake and a pat on the back.’

When including only adverse events previously associated with systemic anti-VEGF therapy (arteriothrombotic events, systemic hemorrhage, congestive heart failure, venous thrombotic events, hypertension, and vascular death), there was a nonsignificant lower risk with ranibizumab compared with bevacizumab (7.5% vs 10.6%, $P = .07$). Gastrointestinal disorders (eg, hemorrhage, hernia, nausea, and vomiting) were less common with ranibizumab (1.8%) compared with bevacizumab (4.8%).

There was no difference in endophthalmitis rate between patients treated with ranibizumab (0.7%) or bevacizumab (1.2%), though 10 of 11 cases occurred in patients treated monthly.

Viewing results through the lens of values

Return our spectacles to our noses and apply our values and judgments. Monthly or as needed, ranibizumab or bevacizumab, the mean visual acuity is about 20/40 at 2 years. That’s pretty impressive, considering that not too long ago, the treatment for this blinding condition was a handshake and a pat on the back. Monthly treatment did have a 2.4-letter advantage over as-needed, but with concerns of increased geographic atrophy and endophthalmitis risk.

Ranibizumab and bevacizumab had similar effects on visual acuity when the dosing regimen was the same. There is a dramatic 40-fold difference in cost, favoring bevacizumab. Though rates of death, myocardial infarction, and stroke were similar between the 2 drugs, there was a higher risk of serious adverse effect with bevacizumab.

We have good objective data that provides some answers while raising a few questions. The clinical impact of CATT boils down to our seemingly inherent values—the same values that influence the weight we each place on efficacy, anatomy, cost, and safety—that in turn shape the decisions we make and the opinions we hold.

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Financial Disclosures

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Kourous A. Rezaei, MD
Chair, International Affairs Committee



International Affairs Committee Links ASRS with Retina Societies Worldwide

Globalization is synonymous with the 21st century. Recent advances in communications technology have expanded the worldwide sharing of information like never before—offering valuable opportunities for collaboration among retina specialists. Through our new International Affairs Committee, ASRS is taking the lead in establishing a communication forum linking our Society and its members with retina societies and their members around the world.

The International Affairs Committee will establish connections between ASRS and international retina societies to set up this communication forum. The committee will work with these retina societies to enable their interested members to attend the ASRS Annual Meeting, where they can share information and expertise with ASRS members.

Our goal is to improve education among retina specialists worldwide, leading to better eye care for patients. High-speed Internet access makes it faster and easier for ASRS members and members of retina societies around the world to learn from one another. As we move forward, the ASRS website will provide links to information about international retina societies and their members.

Five leading retina specialists from around the world have agreed to serve as ASRS International Liaison Leaders, linking the ASRS International Affairs Committee and retina societies around the globe.

Meet Our International Liaison Leaders

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More than 20 societies have nominated international delegates

In the past year, ASRS's International Liaison Leaders have contacted retina societies in their regions to nominate international delegates to represent their societies at ASRS. So far, these efforts have received an enthusiastic response; more than 20 societies have nominated international delegates and alternate delegates to ASRS.

These delegates have undergone a membership application process similar to all international ASRS members and will serve as a link between their societies and ASRS and its members. A list of these societies, their delegates, and their contact information will soon be available on the ASRS website.

Identifying educational needs worldwide

With the help of international delegates, the International Affairs Committee will identify areas around the world in need of better education. The committee then will bring this information to the attention of ASRS members, the Foundation of the American Society of Retina Specialists, and other international societies.

Watch for our new International Corner column in which we will share the progress made on the international front. This new column will introduce the international retina societies with ASRS delegates and will keep you informed on global issues in retina.

We would like to thank the ASRS leadership for their foresight and conviction in improving education, sharing knowledge and information, and most importantly, working to improve patient care globally. And on behalf of all ASRS members, we welcome the new international delegates to the Society.

How to nominate an international delegate

- Are you from a country without an ASRS international delegate? Would you like to have your country's retina society nominate international delegates to ASRS? Please ask the International Liaison Leader for your region to contact your country's retina society to initiate the nomination process.
- Does your country *not* have a retina society? Please ask your International Liaison Leader to request that your country's ophthalmological society nominate a retina specialist to represent your retina community.

ASRS is an inclusive society and would like to streamline sharing of information among all retina specialists around the world.

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Pravin U. Dugel, MD
Section Editor

Considerations for Chromovitrectomy: Implications of Endophthalmitis Outbreak Associated with Brilliant Blue G

The pathogenesis of rare events is difficult to find. Recently, ASRS has formed a Therapeutic Surveillance Committee to help investigate these events. This will be particularly useful as new drugs and technologies emerge. The following information is offered to shed light on the recent outbreak of fungal endophthalmitis following intravitreal injections.

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For the ASRS Therapeutic Surveillance Committee (TSC)

Chromovitrectomy (the use of vital staining dyes) has become an increasingly common method for identifying difficult-to-recognize, semitransparent structures in vitreoretinal surgery, specifically in the setting of vitreo-retinal traction syndromes, macular holes, epiretinal membranes (ERMs), and chronic cystoid macular edema (CME).[1,2] A variety of internal limiting membrane (ILM) and ERM-staining dyes have been previously utilized, including indocyanine green (ICG), trypan blue, triamcinolone acetonide (TA), autologous blood, patent blue, crystal violet and Brilliant Blue G (BBG).[2,3]

The use of these dyes, particularly ICG in high concentrations, has been limited by their potential to damage the retinal pigment epithelium (RPE)—directly in the case of full-thickness macular hole repair, or indirectly due to dye diffusion through the neurosensory retina.[2] An ideal dye is one that is minimally toxic and achieves appropriate staining of membranes at low concentrations.[4]

ICG is used in staining and visualization of the ILM; it is packaged as a lyophilized powder which does not dissolve into intraocular irrigating solutions and requires combination with a small amount of distilled water, dilution with balanced salt solution, and filtering—factors which make it difficult to prepare and use.[4,5] It is also is difficult to remove ICG from the eye compared with other dyes; however, ICG has a strong affinity for staining the ILM.[3,5]

The use of intravitreal ICG in chromovitrectomy is off-label, as the only FDA-approved indication is for intravenous injection during angiography.

Although it is effective and safe at low doses, ICG in high concentrations has been associated with several side effects including:

- Prolonged persistence
- Toxicity to retinal cells
- Photosensitization
- Optic nerve atrophy
- Potential anatomical and functional postoperative complications[1,5]

Trypan blue stains ERMs and the ILM and is prepared without dilution or is sometimes mixed with 0.1 mL glucose 5% for better ERM identification.[5] Trypan blue may be injected following fluid-air exchange to enhance its staining properties, as it targets intraocular tissues with high rates of cellular proliferation.[4,5] No signs of retinal or RPE toxicity have been reported, but visualization of ILM can be variable.[5]

> 'The use of these dyes, particularly ICG in high concentrations, has been limited by their potential to damage the RPE ...'

TA, typically used at a concentration of 40mg/mL (4%) in a dose range from 0.1-0.3mL, has a strong affinity for the vitreous gel and enables visualization with good contrast between empty vitreous and vitreous fibers; this allows complete detachment and removal

of the posterior vitreous cortex.[5,6] In addition to these vitreous visualization properties, TA's anti-inflammatory properties are helpful in reducing fibrin reaction and proliferative vitreoretinopathy (PVR) after vitrectomy.[5]

While TA has been used to assist in ILM peeling, the clumps of TA particles make visualization and initiation of ILM peeling challenging at times. Furthermore, the crystals of TA may persist postoperatively and affect healing following macular hole closure surgery; in these cases, preservative-free TA may be more useful.[6] Following the use of TA-assisted pars plana vitrectomy (PPV), 2 cases of bacterial endophthalmitis (*Pseudomonas species, Staphylococcus epidermidis*) and a single case of *Fusarium* species-related endophthalmitis have been reported.[7,8,9]

BBG (C47N48N3O7S2Na, Coomassie G250, acid blue 90), also known as food blue 2 (E133), triphenylmethane biostain, Brilliant Peel® (Geuder AG, Heidelberg, Germany), Coomassie® (Imperial Chemical Industries, London, England) or acid blue, has been previously used as a food color and in soaps, shampoos, and cosmetics.[1,2] Its use as a food color has been banned in many European countries.[1]

BBG is a water-soluble dye that binds nonspecifically to all proteins and can be used to detect proteins separated by polyacrylamide gel electrophoresis.[1,4] Its ophthalmic use was first recognized in 2006 due to its staining ability of porcine anterior lens capsule. BBG was approved for intravitreal use in the European Union in 2007, applied at a concentration of 0.25mg/mL, pH=7.40.[1,2] At this concentration, it has an osmolarity of 299 mOsm/kg H_2O, which is similar to that of irrigating solutions and less than that of ICG (271 mOsm/kg H_2O at 5mg/mL concentration) or trypan blue (316 mOsm/kg H_2O at 1mg/mL concentration).[4]

Osmolarity is an important factor in cell survival.[4] In the context of chromovitrectomy, BBG granules are easily dissolved into intraocular irrigating solutions and are then sterilized with a 0.22µm syringe filter. Unlike ICG, BBG is not fluorescent, so the potential for light toxicity is minimal, and it requires 1/10 to 1/20 less concentration to achieve ILM staining.[4] BBG is not yet approved for intravitreal use in the United States.

In a rat model study by Enaida et al, high doses of BBG 1.0mg/mL and 10mg/mL induced vacuolization in inner retinal cells, but no apoptosis was detected.[10] In another rat model study by Ueno et al, BBG in comparison with ICG and trypan blue was found to have no cytotoxic effect on the retina or RPE.[11] In vitro analysis done by Mennel et al showed that the use of BBG is safe and without RPE barrier function disruption in fluid-filled eyes, and less so in air-filled eyes due to lack of immediate dilution provided by fluid-filled eyes.[2] They additionally concluded, based on their eye model experiments, that short application time reduces potential toxicity.[2]

Potential therapeutic applications of BBG may include its ability to suppress retinal ganglion cell death and Müller cell growth in vitro, through P2X7 receptor blockade. If proven in vivo, postoperative benefits of fibroblast inhibition may be useful.[4]

In human studies conducted by Enaida et al and Cervera et al (total n = 26), BBG was reported to stain the ILM selectively and with high affinity.[12,13] Enaida et al also found that BBG does not stain ERMs.[12] In a study by Shukla et al, 50 patients with idiopathic macular holes underwent PPV with ILM peeling (MP) using either BBG (n = 15), trypan blue (n = 20), or ICG (n = 15); the researchers concluded that BBG was superior to trypan blue and similar to ICG in staining intensity and ease of ILM removal.[3]

> 'Endophthalmitis following PPV has an incidence of roughly 0.01% to 0.05%.'

Shukla et al also found that patients who underwent PPV/MP with BBG and trypan blue had better final visual acuity with a smaller percentage of visual decline compared with the ICG group and achieved similar anatomical closure rates. No patients developed postoperative complications.[3]

In another series reported by Henrich et al, BBG was used for ILM staining in 17 patients for macular holes, ERMs, vitreoretinal traction syndrome, and CME. They concluded that ILM staining was less intense with BBG than with average ICG chromovitrectomy, but successful ILM removal was achieved in 15/17 patients without use of additional ICG. No visual field defects or adverse events were reported.[1]

In another study by Enaida et al, 20 patients who underwent ILM staining with BBG during macular hole or ERM surgery found that injection of 0.25mg/mL BBG into the vitreous cavity, followed by immediate washout, was sufficient to improve ILM visualization and appropriately facilitate peeling. However, in ERM cases, ERM staining could not be confirmed at this concentration and BBG solution was reinjected, followed by repeat irrigation; the ILM of the area where ERM had been removed was well-stained with BBG, while the area with residual ERM/posterior vitreous did not stain.[12] In this series as well, no adverse effects were observed postoperatively.

Fukuda et al described 53 patients with macular holes, 31 of whom underwent chromovitrectomy with BBG and 22 with ICG. They reported early restoration of the IS/OS junction in the BBG group, which is important for better long-term visual acuity. No adverse effects related to dye usage were observed in either group.[14]

Endophthalmitis after PPV is rare

Endophthalmitis following PPV has an incidence of roughly 0.01% to 0.05%.[3,15,16,17] The most commonly cultured organisms include *Staphylococcus aureus, Proteus mirabilus*, *Staphylococcus epidermidis*, and *Pseudomonas aeruginosa*. Many cases are also culture-negative.[15,16] In affected patients, visual acuity following treatment for endophthalmitis is typically poor, although this is often confounded by the already poor visual acuity potential in patients with significant posterior segment pathology.[16]

Visual acuity may be better in patients infected with less-virulent organisms such as coagulase-negative *Staphylococcus* and *Propionibacterium acnes (P. acnes)*.[16] Predisposing factors to PPV-associated endophthalmitis may include:

- Sclerotomy wound construction
- Absence of subconjunctival antibiotics
- Less vitreous removal during small-gauge PPV
- Lower infusion rates in 25-gauge PPV
- Patients with relative immune compromise[17,18,19]

Fungal endophthalmitis can be exogenous (keratitis, trauma, intraocular surgery) or endogenous (systemic fungemia, typically with predisposing factors such as immune compromise, malignancy, intravenous drug abuse, chemotherapy, prolonged corticosteroid therapy, alcoholism, or diabetes).[20] Causative organisms typically vary by mode of inoculation; *Fusarium* species are commonly associated with fungal keratitis, *Aspergillus* species commonly follow postoperative or penetrating injury cases, and *Candida* species are most common in endogenous cases.[20]

Compounding pharmacies should adhere to strict safety standards

To help ensure patient safety, compounded sterile preparations must be prepared according to aseptic practices recommended by organizations such as the United States Pharmacopeia (USP), as stated in USP National Formulary General Chapter 797.[1]

Certified compounding pharmacy personnel should follow state and federal guidelines, and submit to site inspections. Quality-assurance guidelines for pharmacy-prepared sterile products can also minimize the risk of contamination.[2]

Obtain compounded drugs from pharmacies that employ best practices

- Certified ISO 5 hood located in a Class 100 cleanroom[3]
- Adherence to USP-71 standards for testing[4]
- Every lot quarantined and not released until testing results are received
- Sterility reports from an independent lab sent out with each order
- Viable air sampling performed regularly as specified in USP Chapter 797[1]
- All employees have extensive aseptic training with yearly review

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Often, a high index of suspicion is necessary in these cases as the presentation may be indolent; polymerase chain reaction (PCR) testing can be helpful in differentiating bacterial from fungal etiologies. Patients with fungal endophthalmitis secondary to *Fusarium* species can be treated with intravitreal amphotericin B, voriconazole, and posaconazole. However final visual outcome often depends on the degree of involvement at presentation, virulence of the organism, and timing of treatment interventions.[20]

Authorities investigate endophthalmitis outbreak

In late 2011 and early 2012, the use of BBG in chromovitrectomy supplied from a single compounding pharmacy was associated with an outbreak of fungal endophthalmitis. The California Department of Public Health was notified on March 5, 2012, of 9 cases of clinically diagnosed fungal endophthalmitis at a single California ambulatory surgical center.

> 'In late 2011 and early 2012, the use of BBG in chromovitrectomy supplied from a single compounding pharmacy was associated with an outbreak of fungal endophthalmitis.'

The initial investigation, led by the Los Angeles County Department of Public Health, determined that in all cases, patients had undergone vitrectomy with ERM peeling using BBG from Franck's Compounding Lab in Ocala, Florida.[21]

This investigation later expanded to involve intravitreal injection of triamcinolone-containing products from Franck's—a combined total of 33 cases in 7 states. The Centers for Disease Control and Prevention (CDC) and the FDA, as well as state and local health departments, collaborated in the investigation.[21]

Franck's Compounding Lab recalls BBG and TA

On March 9, 2012, Franck's Compounding Lab issued an urgent product recall of BBG, citing reports that some patients treated with it had experienced fungal infections in the eye.[22] Franck's also experienced a fungal issue with one lot of triamcinolone acetonide PF 80mg/ml and instituted a recall on March 31, 2012.[23] The second recall involved 5 physicians and 7 prescriptions.

Practitioners were advised to discontinue use of BBG and triamcinolone-containing products from this pharmacy while an investigation was pursued. Twenty-one of these cases were associated with the use of BBG during retinal surgery and several were associated with *Fusarium* growth.[24] Following this outbreak, the cases were compiled and analyzed by the ASRS Therapeutic Surveillance Committee and all involved physicians were contacted and asked to contribute data regarding their affected patients.

Results of 17 cases presented

Seventeen cases occurring in 3 states have been investigated. All patients underwent surgery between October 31, 2011 and December 27, 2011, using BBG obtained from Franck's Compounding Lab, lots 10112011@82, OT1119, and OT1113-6. Patients underwent chromovitrectomy for a variety of reasons: epiretinal membrane (6), macular hole (4), macular edema (2), DME/epiretinal membrane (1), and unknown (4).

The average age of affected patients was 69 years, and the series included 10 females, 3 males, and 4 patients for whom gender is unknown. The table on page 21 summarizes available information regarding these patients. A recall warning letter by Franck's Compounding Lab noted 4 BBG lot numbers suspected of contamination: 08232011@80, 10132011@6, 10112011@82, and 10192011@125.[22]

> 'Following this outbreak, the cases were compiled and analyzed by the ASRS Therapeutic Surveillance Committee and all involved physicians were contacted and asked to contribute data ...'

Patients in this series presented with variable persistent postoperative inflammation several weeks after surgery; conditions ranged from mild anterior chamber inflammation to classic endophthalmitis with hypopyon and vitritis, and presented an average of 17.6 days following initial surgery. Cultures were obtained in 8 patients, of which 1 grew *Fusarium* and another grew both *Fusarium* and *P. acnes*; 5 cultures were negative; and 1 is unknown.

Investigated Endophthalmitis Cases Involving BBG from Franck's Compounding Lab

Eye Treated	Age	Sex	Diagnosis	No. of Days to Presentation	Lot
unknown	64	unknown	unknown	indolent	10112011@82
unknown	68	unknown	unknown	indolent	10112011@82
unknown	63	unknown	unknown	unknown	10112011@82
unknown	61	unknown	unknown	indolent	10112011@82
OS	78	M	MH	30	OT1119
OD	69	F	ERM	17	OT1119
OD	69	F	MH	23	OT1119
OD	75	F	MH	19	OT1113-6
OD	73	M	ERM	32	OT1113-6
OD	87	F	MH	36	OT1113-6
OD	56	F	ERM	7	OT1113-6
OS	71	M	ERM	15	OT1113-6
OD	69	F	DME/ERM	14	OT1113-6
OS	73	F	ERM	6	OT1113-6
OS	63	F	ME	14	OT1113-6
OD	73	F	VMT/ERM	6	OT1113-6
OD	59	F	ME	10	OT1113-6

All patients underwent surgery between October 31, 2011 and December 27, 2011, using BBG obtained from Franck's Compounding Lab, Ocala, Florida. (MH = macular hole. ERM = epiretinal membrane. DME = diabetic macular edema, VTM = vitreomacular traction. ME = macular edema.)

Initial patient management ranged from topical steroids to vitreous tap and antibiotic injection. To our knowledge, 9 patients underwent second or third surgical procedures and 11 patients received 1 or more intravitreal injections of voriconazole. Most patients had initial improvement even with drops alone, yet over time the inflammation progressed in all patients.

Two consistent clinical characteristics occurred several weeks after presentation:

- Both phakic and pseudophakic patients began to develop a white plaque-like material behind the lens.
- All patients were severely hypotonous.

Once *Fusarium* fungal infection related to BBG was suspected, patients were immediately treated with intravitreal and oral voriconazole, in conjunction with consultation with infectious disease specialists. Clinically, the inflammation improved following antifungal treatment; however the plaque-like material in some patients continued to progress, suggesting that the fungus may have a predilection for the lens and lens capsule.

Phakic patients developed advanced cataract with weakened lens capsule, with 1 patient having a spontaneous dislocation of the crystalline lens. In patients with these findings, lensectomy or intraocular lens removal was completed in subsequent vitrectomy procedures. Even "quiet" eyes had significant membranes and plaques on the IOL and capsular bag on inspection following removal, perhaps indicating that the fungus was inhibited, but not fully eradicated, by the antifungal medications.

Even after vitrectomy with removal of the IOL or crystalline lens, many patients developed continued progression of active membranes. Several patients subsequently developed retinal detachment with PVR and required further surgery with silicone oil. The membranes associated with these detachments seemed extremely tightly adherent or even integrated with the retina, making membrane peeling nearly impossible in some cases.

Because of the ongoing hypotony, the surgical procedures were often complicated by serous choroidal detachment. The visual prognosis for these patients is guarded, with several resulting in NLP or LP vision.

Conclusions

The use of vital dyes such as BBG evolved from the need to visualize semitransparent tissues, and from the potential toxicity and inconvenience of use and removal of ICG. Until this epidemic, no cases of endophthalmitis had been reported. Although all cases reported here originated from a single compounding pharmacy, the off-label use of dyes such as BBG should be carefully considered prior to use, as the majority of patients involved did not recover vision and required multiple additional procedures.

> 'Patients seen in this series presented with variable persistent postoperative inflammation several weeks after surgery ...'

A high index of suspicion and early intervention for possible postoperative fungal endophthalmitis should be considered for patients presenting with features similar to those described in this series, including persistent inflammation, hypotony, and retrolental plaque formation.

It is essential to realize that these important cases would have gone unreported, perhaps endangering many more patients,

Continued on page 57

Please report adverse events

The ASRS urges you to continue monitoring for adverse events of all treatments and to report unexpected events to:

- The manufacturer
- MedWatch, an anonymous service of the FDA (http://www.fda.gov/Safety/MedWatch/HowToReport/DownloadForms/default.htm)
- The ASRS TSC. Email: therapeuticsurveillance@asrs.org

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What to Do When the Government Asks for Records
The Answer Depends on Who Is Asking

The summer 2012 *Retina Times* (available at www.asrs.org/retina-times) featured an article headlined "Government Turns up the HEAT on Medicare Fraud," which discussed the growing odds of being the subject of a government audit.

Attorney Alan Reider stressed the importance of knowing which billing issues the government is looking at, and realizing whether your practice is an outlier. In this issue, Alan Reider addresses what to do if you are singled out for a Medicare audit. —*Reginald J. Sanders, MD*

For many years, a Medicare carrier's request for records meant that a practice was subject to a chart audit, which could lead to an overpayment determination. Often the audit would be triggered by:

- An unusual practice pattern
- A particularly high volume of services
- A complaint
- A simple random selection

The ultimate threat of such an audit typically was a repayment of funds the Medicare carrier determined were paid inappropriately; usually this was based on a lack of documentation to support the medical necessity of the service billed. Those days are largely over.

'[B]ecause the RACs are paid a bounty based on the amount of the overpayments recovered, they have a significant incentive to issue denials wherever possible.'

With the ever-increasing pressure to control costs, and with additional tax dollars invested in new enforcement personnel, a physician practice is more likely than ever to be subject to some form of review. For the same reasons, the stakes today are much higher—and the resulting liability may be greater than a simple repayment of funds.

To what forms of review could your practice be subject—and what are the implications? When your practice is subject to a review, what are your rights and responsibilities? How can you minimize the likelihood of a review, and reduce the risk of an unwanted result? Following is some practical guidance.

What are the types of Medicare reviews?

Medicare Administrative Contractor (MAC)

The Medicare carrier system has been replaced by the Medicare Administrative Contractor (MAC) structure to enhance administrative efficiency and aid in detecting aberrant practices. Each MAC covers a greater geographic area than was covered by a carrier, and is responsible not only for Medicare Part B, but for Part A as well, thus enhancing the ability of the MACs to detect billing inconsistencies.

Like the carriers, MACs perform post-payment reviews and issue requests for records with the potential for an overpayment determination. These determinations are subject to appeal, with no change in the appeal process.

Recovery Audit Contractor (RAC)

The highly controversial RAC program compensates contractors based on a percentage of overpayment dollars recovered. The program began as a pilot in 5 states between 2005 and 2008, during which RACs generated approximately $1 billion in Medicare overpayment recoveries. The pilot program drew heavy criticism for RACs' conduct; one RAC was so aggressive in denying claims and finding overpayments that a Center for Medicare & Medicaid Services (CMS) audit found more than 40% of the denials were inappropriate.

However, because of the significant financial recovery generated for Medicare, Congress deemed the RAC program a success and authorized its expansion nationwide. Four RAC contracts have been awarded, each covering a region of the United States.

We are now beginning to see physician practices receive requests for records by RACs. In many ways, a request for records from a RAC is no different than one from a MAC—the worst result will generally be a claim denial and overpayment determination.

But because the RACs are paid a bounty based on the amount of the overpayments recovered, they have a significant incentive to issue denials wherever possible. Thus, the denial rates resulting from a RAC review are likely to be much higher than the historical denial rates from MAC reviews.

There is a silver lining: RACs must obtain prior approval from CMS on the specific areas and claims they review, and this information is available on the CMS website at www.cms.hhs.gov/RAC. This allows you to identify whether your region's RAC is focused on particular services your

practice provides. If so, you would be well-served to scrutinize your claims corresponding to those in the RAC work plan to avoid being a target.

Zone Program Integrity Contractor (ZPIC)

The ZPIC program—the new term for the restructured Program Safeguard Contractor Program— is designed to detect and deter potential Medicare fraud, waste, and abuse. Unlike the RACs or the MACs, ZPICs are concerned about fraudulent or abusive activity, and their reviews go well beyond claims analysis.

A letter from a ZPIC may contain a request for records, but often will also include:

- A request for contractual relationships between the physician practice and referral sources
- Information relating to the practice's employees and their credentials
- Details on any equipment owned or leased by the practice and the serial number of such equipment
- Information concerning the practice's location, particularly if it has multiple offices

> 'Practices are often concerned when they see requests for information they do not have. This is not cause for alarm.'

The focus of the ZPIC is not simply to determine whether the medical record justifies the service billed; it is to establish whether the practice maintains the personnel, credentials, and equipment necessary to perform the services billed. If a practice fails to document its ability to perform these services, it risks an allegation that it has filed a false claim—an allegation that carries liability well beyond a simple repayment.

Under a variety of statutory authorities, a finding that a practice has submitted a false claim may result in triple damages, plus a penalty of between $5500 and $11,000 *per claim*. Thus, responding to a request for information from a ZPIC should be taken very seriously.

As noted, ZPICs also are interested in business relationships between physicians and potential referral sources. Often they will request written agreements and information about payments made between the parties. Improper referral relationships may trigger a violation of the federal Anti-Kickback Statute, which can carry criminal as well as severe civil penalties.

ZPICs may also conduct on-site visits at medical practices without notice. Several ophthalmology practices have been visited by ZPICs recently, and some have reported that the ZPIC representatives have conducted themselves less than professionally. Be very cautious with these visits, as ZPICs coordinate with law enforcement agencies; any lack of cooperation could result in a charge of obstruction of justice.

At the same time, however, your practice is free to contact counsel to advise you, even when the ZPIC is on site. We have heard reports that some ZPICs have warned practices not to contact counsel or suffer sanctions. Such statements are entirely inappropriate and unauthorized.

ZPICs do not have independent enforcement authority, ie, they cannot impose penalties, nor can they prosecute cases. Nevertheless, ZPICs coordinate with enforcement agencies and are authorized to obtain information from practices. Failure to cooperate with the ZPIC can lead to serious consequences.

Receipt of a subpoena

While there are several types of subpoenas, there are 2 principal categories: civil and criminal. Both types of subpoenas must be taken seriously and addressed properly. Any practice receiving a subpoena should contact legal counsel for guidance.

A civil subpoena can be issued by the Office of the Inspector General (OIG) or by a US Attorney's office. The subpoena generally will be addressed to the custodian of records and direct that individual to appear in court to produce documents on a designated date. However, there is almost never a requirement to produce documents in court; instead, documents may be submitted by mail. The subpoena will require producing a list of documents, both hard copy and electronic, usually within 30 days from the date it was received.

Despite the seriousness of a subpoena, it is possible to obtain extensions to respond as well as to reduce the scope of the documents requested. Realize that when issuing a subpoena, the government does not know the nature or extent of the documentation retained by a practice. Practices are often concerned when they see requests for information they do not have. This is not cause for alarm. Practices are obligated only to provide documentation in their custody and control.

If your practice does not maintain the information requested, there is no requirement to create and produce it. In fact, unless specifically advised by counsel, *never* develop documents you do not have to respond to a subpoena. Even more important, *never* destroy any documents that are the subject of a subpoena. If a subpoena is received, immediately discontinue your practice's document destruction policy. And never alter documents subject to a subpoena.

Unlike a civil subpoena, a criminal subpoena is issued by a grand jury and may require either the production of documents or that an individual appear personally to provide testimony. While receipt of such a subpoena is extremely troubling, the individual who receives a grand jury subpoena is almost certainly not the target of the government investigation, as the government almost never issues a subpoena to the target of an investigation to testify before a grand jury.

However, a grand jury subpoena indicates that the government is conducting a criminal investigation and it has reason to believe that the individual subpoenaed has information that may be helpful in its investigation. This is a very serious matter and any individual who receives a grand jury subpoena should immediately seek legal counsel.

Receipt of a civil or criminal subpoena, either for documents or for a personal appearance, may not reflect a government investigation of a particular practice. Often, the government will issue a subpoena to a third party, ie, an individual or an entity not subject to a government investigation, because the government believes this individual or entity may have information relevant to an investigation of someone else.

Generally, this information can be obtained by a discussion with the prosecutor, although such discussions should be undertaken only by experienced counsel on your behalf. While such subpoenas still must be taken very seriously, knowing that the government's interests lie with another party should provide some comfort.

Execution of a search warrant

The last, and most traumatic, form of a "document request"—a search warrant—is really not a document *request;* it is a document

seizure. The execution of a search warrant is an extremely serious matter, and requires approval from a magistrate judge, based on justification presented by enforcement authorities. Generally, a search warrant is justified only if there is a reasonable basis to believe that documents will be hidden, altered, or destroyed if the request is made through issuance of a subpoena. The target of the search warrant is most likely the target of the investigation.

While certainly not typical, execution of a search warrant is by no means uncommon. Many physician practices, including ophthalmology practices, have been visited by a team of agents presenting a search warrant and seizing the identified documents. There is little that anyone can do, other than cooperate and get out of the way. If a search warrant is executed, counsel should be called immediately.

'[U]nless specifically advised by counsel, *never* develop documents you do not have to respond to a subpoena. Even more important, *never* destroy any documents that are the subject of a subpoena.'

Often during the execution of a search warrant, agents will attempt to speak with employees, patients, and anyone else who may be in the office. Never attempt to prevent such conversations from taking place, but advise that there is no obligation to speak to an agent and that it is the choice of the individual.

To be the target of a search warrant is an extraordinarily frightening and disturbing experience. And while its execution suggests that the government has significant concerns about certain practices, not every target of a search warrant becomes the target of a prosecution.

We have worked with several physicians and practices who have suffered through the execution of a search warrant, only to learn much later that the government decided not to pursue the case. While the anxiety and cost of going through this experience may have been completely unnecessary, certainly that is a better result than if the government had continued to pursue its case and threatened prosecution.

What can you do to protect yourself?

While there is virtually nothing a retina practice can do to insulate itself entirely from any of the actions described, there are steps to reduce the risk, as well as the potential liability should a review be undertaken.

- **Institute a compliance program.** Until recently, a compliance program was voluntary; as a result of the Affordable Care Act, any physician practice wishing to enroll in the Medicare and Medicaid programs will be required to implement an effective compliance program.

  This requirement will not become effective until CMS issues final regulations, but there is no reason to delay the inevitable. Guidance for such programs can be found on the OIG website (www.oig.hhs.gov) under "Compliance Guidance"— specifically, an October 5, 2000 Federal Register Notice entitled "Final Compliance Program Guidance for Individual and Small Group Physician Practices."

- **Initiate a regular coding and billing review with an outside coding expert.** The complexities of Medicare billing and coding require guidance from experts. Aberrant billing practices create a significant risk that a physician practice will be the target of a review.

- **Follow the trends.** As noted, the RACs must publish details on the specific areas they are reviewing. Be sure to keep up with this information, as well as enforcement trends available from other government publications, such as the OIG Work Plan and the OIG Semiannual Report to Congress, both available at www.oig.hhs.gov.

- **Know where you stand.** The government is using sophisticated data-mining resources to identify areas of potential liability for physician practices. This makes it important to understand whether your practice patterns are consistent with those of your peers, or whether you are an outlier. Some MACs issue education letters providing information about certain services for which you bill and noting where you are different from your peers. Take those letters seriously.

  Consulting firms have access to CMS's database and can help you to analyze where you stand. If you are an outlier, it does not necessarily mean you are billing incorrectly, but it does mean you should be prepared to justify your billing patterns compared with those of your peers.

There is little you can do to prevent a review, but by educating yourself on potential risk areas and having experts help you confirm you are billing correctly, you should be able to reduce that risk as well as that of any potential liability.

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Dr. Sanders – None.

Mr. Reider – None.

Alan Reider is the author of *Model Compliance Program for Ophthalmologists* and *Legal Issues in Ophthalmology—A Review for Surgeons and Administrators,* both published by the American Society of Ophthalmic Administrators, and *Compliance Issues in Ophthalmology*, published by SLACK Books. He serves as the Regulatory and Legislative Section Editor for *Ocular Surgery News*. Contact him at alan.reider@aporter.com.

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Jerald A. Bovino, MD


Roy A. Levit, MD


Allen Z. Verne, MD

ASRS's Founding Fathers Recall the Birth of the Society

Actor Burt Lancaster (1913-1994) once remarked,
"When an irresistible force meets an immovable object, my money is on the irresistible force."

As ASRS marks its 30th anniversary, we celebrate the irresistible force of our founders—Jerry Bovino, Roy Levit, and Allen Verne—who led the way around the immovable object of exclusive retina societies in 1982. Jerry, Roy, and Allen bucked tradition, took a leap of faith, and boldly created what other societies wouldn't offer practicing retina specialists. Their chutzpah raised more than a few eyebrows—and changed the face of organized medicine. Here, in their own words, is the ASRS founders' story.

THIRTY YEARS AGO, most societies for retina specialists required an invitation to join, and they strictly limited the number of new members. The latest clinical information wasn't readily available to the practicing retina surgeon. If you weren't in one of these elite, by-invitation-only societies—which you could be blackballed from—you were essentially shut out. It was a throwback to another era.

To gain admission, you had to have published several articles in peer-reviewed journals, and you had to know somebody. There were no specialty society meetings where a nonmember could register and learn about the current changes in retina. This led to an increasing number of young, enthusiastic, well-trained vitreoretinal surgeons finding themselves without a professional society to serve their needs.

There obviously was a stimulus to change the paradigm. The 3 of us had gone to an Aspen Retinal Detachment Society meeting, where you had to be invited. Well, 2 of us were invited and Jerry wasn't, but thought he'd be able to go just because he was a full-time retina practitioner.

And that was a mistake. Jerry got in because we said, "OK, let's push for him to get in," and he talked to somebody and he got in, but they gave him a hard time. It was ridiculous.

Jerry's wife, Ester deserves the credit for the idea to start the Society. When Jerry was grousing about the fact that he couldn't get into a meeting or a society, she asked, "Well, why don't you start your own? Why don't you start a retina society?"

"There already is one," Jerry told her.

Then Ester asked, "Then why don't you start a macular society?"

And Jerry said, "They already have that, too."

Then Ester asked, "Well, who does the vitreous society?" And that was the spark.

Soon after that, when the 3 of us and our wives had dinner at Poppies Bistro Cafe in Aspen, Colorado, Jerry brought Ester's idea to the table. That's when everybody's wheels started turning. By the time dinner was over, each of us had agreed to take on a different function and try to make the Vitreous Society happen.


The founders and their wives launched the idea for the Society over dinner at Poppies Bistro Cafe in Aspen, Colorado, in 1982. (l-r): Rachel and Roy Levit, Ester and Jerry Bovino, Barbara and Allen Verne.

When we left Aspen and went back to our practices, Jerry started making some phone calls. Roy contacted his brother-in-law, a lawyer in Texas, and asked him if he could set up a nonprofit, and he said, "Absolutely." Allen had some charter memberships printed, and we developed a small core of interested people.

In the beginning, we didn't know what we were doing. We had an idea, we knew it was a good one and that there was a need for it. We just didn't know how big a need there really was. The smart thing was that we were very open-minded and were not into self-aggrandizement.

We invited a lot of people to join. Many were very supportive of the idea because they didn't want to be left out; they wanted to see where it was going.

The 3 of us weren't into it to make ourselves famous or to make money—we just thought it was a good idea. We didn't know *how* good

an idea this form of society we were going to create was, because we took a lot of ridicule from the so-called establishment.

We took a lot of risk—it was similar to the colonists who rebelled against the king of England, but on a much smaller scale. We stuck our heads out at a time when Whac-A-Mole was in full force and many people were taking shots at us. We took a lot of flak for doing something that was, in essence, impertinent—like who *are* these guys?

As soon as we launched the Society as a Texas corporation, we set up the phone number for the budding society in Roy's office. Every so often, Roy would get a call—a famous retina physician who everybody knew would be on the phone, demanding "What do you think you're doing? Who do you think you are? Who gave you permission? We'll bury you!"

Roy would say, "I'm sorry you feel this way. You're more than welcome to be a member, but we're going to continue with this because we think it's the right thing to do."

Most people who were so antagonistic eventually became members. One guy said, "Thanks, but no thanks" when we offered him a membership. Subsequently, of course, he wanted to join because it became politically untenable *not* to be a member.

'We stuck our heads out at a time when Whac-A-Mole was in full force and many people were taking shots at us.'

But there was a small group of people who were very interested and very active. William Sanderson "Sandy" Grizzard, who passed away recently, was one of the early ones. He was very supportive and came up with a lot of good ideas.

Nick Zakov was really helpful along the way—and George Williams and Kirk Packo. Steve Charles joined the Society and gave us his support. They all became innovators because they saw the potential; we'd opened it up and we became very egalitarian.

We have a large board—much larger than a lot of organizations should have, but that was the spirit of what we did. As a result, we were able to incorporate all kinds of talent with lots of energetic ideas. We welcomed European and other international members from our earliest days. And, consistent with our desire to evolve past the era of "old boys' networks," we gave a greater voice to female retina specialists.

At the time, other medical society meetings would be held at an airport hotel; people would get together for a day or a day and a half and be sitting for 10 hours a day hearing lectures and that was it. We decided that it was OK to enjoy yourself and learn at the same time.

We set up our meetings so that the scientific session would be a half a day and the afternoons would be free—and we'd try to have the meetings in resort settings so people would sit around the pool and get to know each other and talk about their practices.

You learn an awful lot about the practice of medicine and how to run an office by talking to other people and seeing how they do it. It wasn't just scientific issues that were important; it was the issues of life. Each



Centurians flank the Society's founders (l-r) Allen Verne, Roy Levit, and Jerry Bovino at the 1999 Annual Meeting in Rome, Italy.

of us has made long-time friends, starting around the pool at the old Vitreous Society meetings.

The previous societies' presentations were configured in a way where the professor was lecturing to the other doctors. Our concept was different. We wanted each of the doctors to participate, even those in private practice who may not have published any papers, but might have things to contribute from their own experience.

That turned out to be a very powerful formula because a lot of the advances in our specialty were first discussed at the Vitreous Society. We were open to new ideas—even ideas that sounded sort of off the wall. We let people explain their idea, and some of them turned out to be very valuable.

Another innovation was that between the presentations, we set aside a 5-minute period where people from the audience could ask questions. There was a great discussion after each paper.

These discussions were relaxed; people could just get up and speak. Now the meetings are obviously so large, it's very hard to do; you have timed papers and timed discussions. But in the early days, the meetings were smaller and more intimate. A lot of us older guys miss that aspect of it.

'We decided that it was OK to enjoy yourself and learn at the same time ... It wasn't just scientific issues that were important; it was the issues of life.'

It's been very satisfying to see the Society grow the way it has; the idea was there and it grew on its own, just like a child. From the beginning, we have been conscious of trying to get new blood in—and we've consistently acknowledged that this is our child, and at some point you have to let children do their own thing. So that has been our philosophy.

We became permanent Board members not because we want to control where the Society goes, but at least to have institutional memory. Some things that have been done, frankly, have not been

wonderful ideas, but people have to find that out for themselves. You kind of have to let it happen.

Harry Truman said there's no limit to what you can accomplish in life if you don't worry about who gets the credit. It wasn't one person who made the Society; the efforts of scores of hard-working people got us to where we are today.

Thirty years ago, we couldn't have envisioned where retina science and everyday practice would be in 2012. The field of retina has changed completely. The area of fixing retinal detachment was the main aspect.

We thought that having a strong international component was a very good idea to get the input of retina specialists from around the world. We also decided to put an international member on the Board. And we thought that having international members would enable us to go overseas for meetings, which hadn't been done.

The things the Vitreous Society did forced the other societies to become more open; they realized they were becoming antiquated and top-heavy with the old guard. They also realized that it was important for them to also grow, and now they have a much larger membership.

'[A] lot of the advances in our specialty were first discussed at the Vitreous Society. We were open to new ideas ...'

The establishment was strong in the United States, but it was way stronger abroad. Some of the so-called young Turks from other countries came to us and asked, "Can you help us? We want to emulate what you did because we have the same problem, but it's even worse." Didier Ducournau and Frank Koch co-founded the European Vitreo-Retinal Society, and other retina societies were formed in Europe.

The 3 of us were concerned about the name change from the Vitreous Society to the ASRS because international participation was always a very important component of the society. We didn't want the international members to feel as if this were not their society, so that was always a concern to us. The truth is that many foreign members *do* like to be members of American organizations.

If the name "Vitreous Society" weren't available at the time, we wouldn't have had an obvious society name, since *macular* and *retina* were taken. By serendipity, the field of retina was evolving into vitreous surgery. Vitrectomy didn't exist when the original Retina Society was formed. There were people who did scleral buckle, traditional surgery for retinal detachments. At just the time when we started, the vitrectomy technology was gaining traction and changed the face of our specialty.

We learned as we went along. At the first meeting, we felt like people who had moved into a new neighborhood and were giving a party—we were afraid none of the neighbors would show up. The 3 of us had a white oak tag and Magic Marker and we made a little "Vitreous Society" sign to put in the lobby. Roy's brother-in-law volunteered to run the slide projector.



Founders Roy Levit, Allen Verne, and Jerry Bovino attend the gala dinner at the 2002 Annual Meeting in San Francisco.

We've had a lot of good meetings—the 1999 Annual Meeting in Rome stands out. The Society's president, Larry Avins, entered the dining hall standing in a horse-drawn chariot. The chariot scene from *Ben-Hur* was playing on a giant screen and everybody was dressed in togas.

Everybody got a toga when they checked into the hotel. Some people took down the drapes from their room and wrapped them like a giant sash around their toga.

What's our legacy? We've all practiced medicine, but the 3 of us starting the Society served to disseminate information to thousands of people. It's like the Peace Corps concept; you give a guy a fish, you feed him for a day. You teach him to fish, you feed him for a lifetime. Knowledge wants to be free and we've pushed that forward at every level of the Society.

'By serendipity, the field of retina was evolving into vitreous surgery. Vitrectomy didn't exist when the original Retina Society was formed.'

It's a force multiplier. The legacy is that 3 ordinary guys who had nothing going for them other than their desire to bring doctors together for a common good accomplished something that lasted—and that anything is possible.

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Dr. Verne – None.

Steve Charles, MD, FACS, FICS
Charles Retina Institute
Memphis, Tennessee



Thirty Years of Retinal Surgery: Surgical Revolutions Lead to Evolution

Over the past 30 years, few medical specialties have advanced as much as the field of vitreoretinal surgery. The revolutionary development of pars plana vitrectomy was followed by evolutionary contributions by many in our field, and the evolution continues.

This article is adapted from a presentation by Steve Charles, MD, at the April 30, 2010 memorial service for Robert Machemer, MD, developed at the request of the Duke University Eye Center faculty.

The science of retina has evolved to its present-day sophistication thanks to revolutionary contributions that began well before the ASRS was founded in 1982. Robert Machemer, MD, (1933-2009) is best known for developing pars plana vitrectomy (PPV), with key contributions from Jean-Marie Parel, PhD, in late 1969 and early 1970.

These pioneers took the initial, high-risk steps that led to key developments in vitreoretinal surgery techniques and technology. Machemer, emeritus professor of ophthalmology at Duke University Eye Center, created the specialty of vitreoretinal surgery and trained many excellent surgeons, researchers, and teachers.

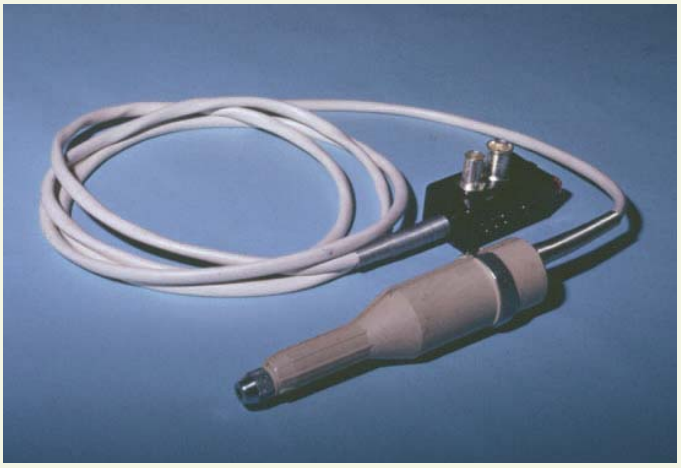


Figure 1. VISC (Machemer, Parel). Rotary, DC Electric Motor.

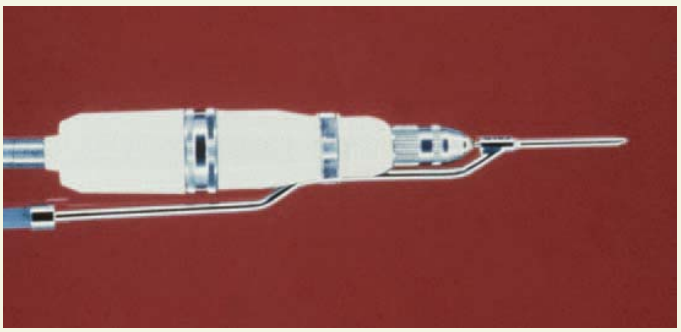


Figure 2. The VISC featured coaxial fiber-optic illumination.

Cutting-action evolution

Machemer and Parel developed the VISC (vitreous infusion suction cutter)—a large-diameter, full-function, electrically driven, continuous rotary motion cutter (Figures 1-3) and reported on their findings in a series of articles beginning in 1971. Over the next 3 years, Conor C. O'Malley, MD, and Ralph M. Heintz Sr, developed the Ocutome; it had reciprocating axial motion and was a pneumatic, bellows-driven, reusable, 20-gauge cutter designed for the first 3-port vitrectomy system.

Gholam A. Peyman, MD, and Rudolf Klöti, MD, independently developed so-called guillotine cutters as well in 1971. Carl Wang, PhD, and I developed the MicroVit®—the first disposable, axial pneumatic cutter, in 1983. The MicroVit, which became the Alcon MVS, was the first hourglass-shaped cutter as well as the first diaphragm-driven cutter.

In 1989, I invented the Alcon Innovit®, the first dual-actuation cutter; it is pneumatically actuated, is disposable, utilizes limited rotary motion, and is hourglass-shaped. The Alcon Constellation Ultravit® cutter was developed by Alcon engineers in 2002 and is the first dual-actuation, axial, pneumatic, disposable cutter.

Dual actuation eliminates the spring return used in all other diaphragm-driven cutters, allowing higher cutting rates without shortening the duty cycle or significantly affecting the flow rates. It also permits variable-duty cycle control.

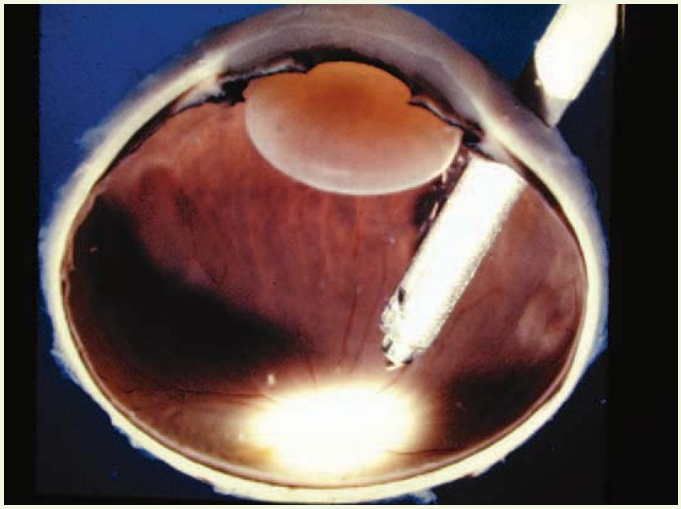


Figure 3. VISC vitrectomy probe with coaxial illumination (courtesy of Brooks W. McCuen II, MD).

Aspiration fluidics evolution

The Machemer-Parel VISC utilized a surgical assistant-operated syringe to produce aspiration force. I developed a rack-and-pinion syringe drive which the surgeon held in one hand while holding a full-function probe such as the Douvas Roto-Extractor (developed by Nicholas G. Douvas, MD, in 1968) in the other hand. Surgeon control of aspiration fluidics is far superior to using an assistant-operated syringe.

'The Accurus utilized a real-time operating system and distributed processing which resulted in much faster response time to foot-pedal command.'

The next major advance was the foot pedal-controlled aspiration system developed by O'Malley and Heintz for the Ocutome 8000 in 1971. This system had relatively slow response time and the foot pedal-control of aspiration was on or off without vacuum or flow control; vacuum levels were preset. I developed a linear, or proportional, aspiration system for the Ocutome 8000 with Wang and CooperVision engineers in 1981.

The Alcon MVS system, first called the MicroVit, was developed by Wang and me in 1983; it had a much smaller aspiration cassette than the Ocutome and therefore faster response to foot-pedal commands. I then developed the OCM with the engineering team at my company, InnoVision, in 1989; this machine had a continuously emptying cassette and much faster response time than the MVS. The OCM technology was sold to Alcon and became the forerunner of both the Accurus® (Figure 4) and Constellation® Vision System (Figure 5).

The Accurus utilized a real-time operating system and distributed processing which resulted in much faster response time to foot-pedal command. The Alcon Constellation Vision System aspiration module utilizes 3 proportional valves (vacuum, vacuum boost, and pressure), redundant pressure/vacuum sensing, and a very small, continuously emptying aspiration chamber. The fluid level is optically sensed, which drives a feedback loop providing an accurate measure of flow rate as well as input for flow limiting and nonpulsatile flow control.

Fluid-air and air-gas exchange

Machemer injected gas after PPV using sequential fluid-gas exchange with a single needle on a syringe with a 3-way stopcock. Disadvantages of this technique include intraoperative hypotony, having a sharp needle in a collapsed eye, and subtotal filling. I developed simultaneous fluid-air exchange, fluid-gas exchange, and air-gas exchange to address the problems with the Machemer method.

Brooks W. McCuen II, MD, developed the air pump, which eliminated the hypotony caused by infusing air with a syringe. Gary W. Abrams, MD, developed the iso-expansive air-gas mixture concept to address the problem of unknown vitreous volume and bubble expansion or contraction. Estimating how much pure gas to inject in an air-filled eye is dangerous because it can lead to bubble expansion and very high IOP, resulting in central retinal artery occlusion. Conversely, this imprecise method can also lead to ineffective small bubbles.



Figure 4. The Alcon Accurus incorporates systems integration, real-time O/S, a dedicated fluidics controller, a small auto-empty cassette, global functions, and smart keys.



Figure 5. The Alcon Constellation® Vision System replaces everything in this photo.

Drainage of subretinal fluid

Machemer combined vitrectomy with conventional, trans-scleral, cut down drainage of subretinal fluid. Trans-scleral drainage complications include bleeding and retinal incarceration. I developed internal drainage of subretinal fluid through retinal breaks or drainage retinotomies. Initially I used my nontapered flute needle, and later switched to tapered and angulated metal cannulas.

O'Malley developed the extrusion method, which utilizes foot pedal/console-controlled vacuum rather than fingertip control as on the flute needle. I immediately adopted his method and never used the flute needle again. Some years later, around 1980, W. Sanderson "Sandy" Grizzard, MD, and Harry Flynn Jr, MD, independently developed flexible cannulas to replace rigid metal cannulas; these are safer and can be insinuated through the retinal break into the subretinal space.

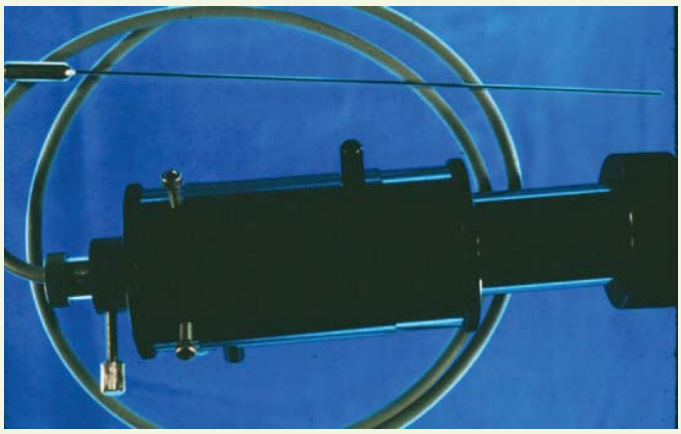


Figure 6. First endophotocoagulator (Charles). First fiber delivery of therapeutic energy for medicine.

> 'In 1971, Machemer and Parel developed single-port vitrectomy utilizing large-diameter, so-called full-function probes.'

In the late 1980s, Stanley Chang, MD, developed perfluorocarbon for giant-break management and retinal stabilization during epiretinal membrane (ERM) dissection, but it is also used for drainage of subretinal fluid in rhegmatogenous retinal detachment cases. Liquid perfluorocarbon is indispensable for giant breaks and may provide more complete removal of subretinal fluid than is possible with internal drainage using soft-tip cannulas, albeit with higher cost and the potential for subfoveal PFCL droplets.

Single-port vs 3-port vitrectomy

In 1971, Machemer and Parel developed single-port vitrectomy utilizing large-diameter, so-called full-function probes. O'Malley developed 3-port vitrectomy, which provided less turbulence, less fluid throughput, and much greater surgical flexibility; this is because infusion, illumination, and a variety of tools use separate ports. Because the infusion is always present, forceps, scissors, and the endophotocoagulation probe do not require coaxial infusion.

I adapted my techniques of fluid-air exchange, air-gas exchange, air-silicone exchange, internal drainage of subretinal fluid, forceps membrane peeling, scissors segmentation/delamination, endophotocoagulation, and aspirating pars plana lensectomy to a 3-port system. In 1976, I developed the microvitreoretinal (MVR) blade, which created the 0.89 wounds required for 20-gauge tools in a single step.

Eugene de Juan Jr, MD, developed 25-gauge sutureless, transconjunctival vitrectomy in 2002 and incorporated inventor Dyson W. Hickingbotham, MD's trocar cannula concepts.

Retinopexy and panretinal photocoagulation

Machemer used trans-scleral cryopexy in conjunction with vitrectomy, which required a peritomy and rectus muscle traction sutures. In the 1970s, Machemer and others developed endocryopexy, which produced significant mechanical trauma, adherence to the retina, and bleeding, and which utilized a large-diameter probe. I developed endophotocoagulation (Figure 6) for retinopexy, hemostasis, and endopanretinal photocoagulation. The endolaser scales to 27-gauge without difficulty.

ERM management

In 1972, only 2 years after Machemer introduced pars plana vitrectomy, he peeled an epiretinal membrane with a bent needle. Soon thereafter, O'Malley developed the pic, a rounded instrument less likely to damage the retina than a bent needle or MVR blade. Pics were used in an outside-in manner unless an MVR blade was used to slit the ERM and create a so-called edge.

After the ERM was somewhat lifted away from the retina surface, forceps or the vitreous cutter were used to remove the membrane from the vitreous cavity. In 1978, I developed forceps membrane peeling to address several problems with existing methods. End-grasping forceps with a narrow (front to back) gripping surface are ideal for pinch peeling (inside-out, en face), which does not require an edge and is safer because the ERM is always between the forceps and retina. Conformal forceps and internal limiting membrane (ILM) forceps evolved from this concept.

> 'In 1972, only 2 years after Machemer introduced pars plana vitrectomy, he peeled an epiretinal membrane with a bent needle.'

Membrane peeling is possible only if the ERM is not too adherent to the retina; typically this is the case with epimacular membranes, macular holes, macular schisis, vitreomacular traction syndrome, and proliferative vitreoretinopathy (PVR). ERM is far more adherent in diabetic traction retinal detachment cases; clearly, peeling would not be safe in this situation.

In 1976, I developed ERM scissors segmentation to relieve tangential traction by dividing the ERM into so-called epicenters by placing one blade of vertical scissors under the ERM and the other blade on top. Although scissors segmentation is effective in many cases, it results in residual ERM with cut edges that bleed postoperatively, leading to glial recurrence sites in some instances.

Continued on page 49



Kirk H. Packo, MD
ASRS Past-President, 2001-2002

A 30-Year Retrospective on the Founding of the ASRS

'We the Doctors…'

On July 4, 1776, America's Founding Fathers gathered to sign a document that gave birth to the United States. The cornerstone on which the U.S. was founded is the famous preamble of the Declaration of Independence: *We hold these truths to be self-evident, that all men are created equal.*

ALTHOUGH THE WORDS were penned more than 200 years ago, the philosophy still serves as the mettle of what makes the United States a great, powerful country. The vision and foresight of those Founding Fathers provided the backbone on which our entire government was founded and from which it evolved. Though our government is now much more complex, the original philosophy of equality for all remains at its heart.

The founding of the ASRS shares many qualities with the birth of the United States. Prior to 1982, if a retina specialist wanted to become a member of an established subspecialty society—be it the Retina Society, the Macula Society, or Club Jules Gonin—he or she had to apply and meet strict standards of academic productivity, paper publications, and/or meeting presentations. Each applicant then needed to be voted on for potential admittance.



We the doctors hold these truths to be self-evident, that all fellowship-trained retina specialists are created equal, and all are welcome in our Society.

Induction was not a guarantee. This restrictive application process made it obvious that all retina specialists were *not* created equal. If one wished to attend the annual meeting of one of the societies, there were restrictions, such as the need to be sponsored by a member, or only being able to attend every other year. In 1982, the opportunities for retina specialists changed with the founding of The Vitreous Society.

The founding fathers of the Vitreous Society—Jerry Bovino, Roy Levit, and Allen Verne— established a philosophy identical to the Founding Fathers of the original colonies: All retina specialists *are* equal. The Vitreous Society had no requirement for publications. No academic reputation was needed, and no university address on an applicant's paycheck stub was mandated.

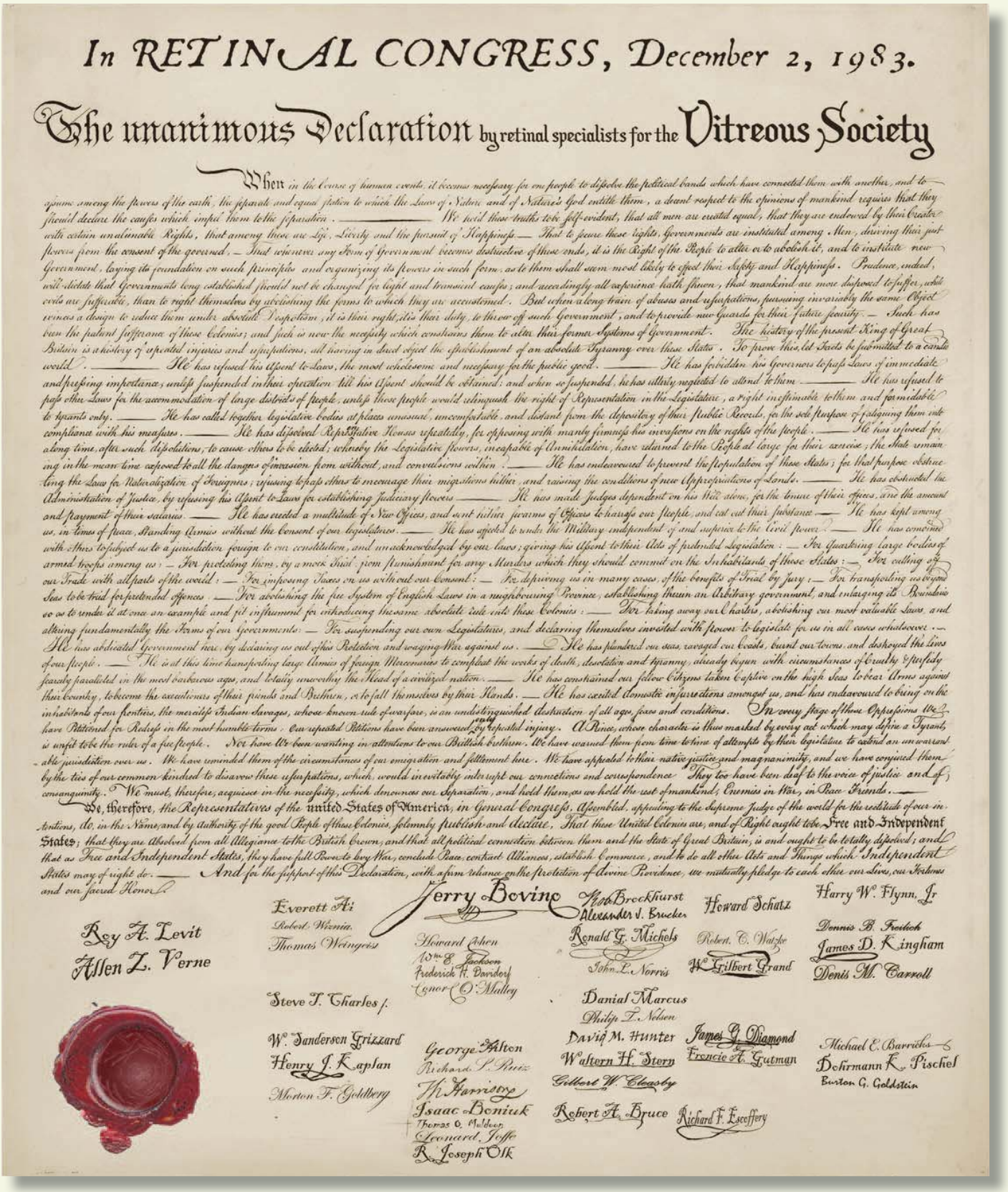
If an ophthalmologist was a practicing, *fellowship-trained* retina specialist, his or her application was accepted. Anyone, regardless of private practice or university employment, was welcome at the podium or the microphone. Importantly, anyone with a primary interest in retina was encouraged to attend the meeting to *learn*—without the restriction of attending only every other year.

When the U.S. had its first birthday, there were only 13 colonies. But, driven by its open philosophy, the colonies became states and more were quickly annexed. What was truly amazing was how the principle of equality and freedom spread like wildfire around the world. As the Statue of Liberty stood proudly in New York Harbor, hundreds of thousands of immigrants poured into the country through Ellis Island. All were seeking a life in which they would be respected as an equal. The U.S. embraced everyone. The population exploded, and the U.S. rapidly became one of the world's superpowers.

In 1983, the 3 founding fathers of the Vitreous Society were joined by only 44 charter members during the first scientific meeting in Palm Springs, California. Although it was 2700 miles from New York Harbor, it may just as well have had a statue at its registration desk announcing, "Give me your huddled masses yearning to breathe free!" The open philosophy allowed the Vitreous Society's membership to virtually explode. Last year, the membership topped 2400, representing more than 90% of practicing U.S. retina specialists and international members from 55 countries. Ben Franklin would have been proud!

When America's Founding Fathers met in Philadelphia to sign that famous declaration, they probably never imagined what kind of a superpower they were starting. From a small collection of 13 colonies, a powerful, complex federal government representing more than 300 million people in 50 states, as well as territories and possessions, now flourishes. But through it all, the founding principle of "all men are created equal" still shines. "We the People" rings true.

The Vitreous Society started as a small group, "colonists" whose main mission in the early 1980s was to host an annual scientific meeting—and not a whole lot more. But as the Society's membership continued to expand, fueled by the open philosophy of its founding fathers, so too, its mission evolved and expanded.



With apologies to our country's Founding Fathers, we offer this Declaration of Independence parody. Note that the signers are the 44 charter members of the Vitreous Society in 1983.

As the Vitreous Society was unique in that it was open to all retina specialists, it was natural that the Society would evolve into a *representative voice* for all retina practitioners. The complexity of its annual meeting expanded, and more and more programs outside of the annual meeting were added to its structure.

It was my privilege and honor to have served the Society's board as vice president and president during a pivotal time in the organization's evolution from 1999 to 2002. In 1997, membership broke the 1000 mark. During the 1999 Annual Meeting in Rome, Italy, the board allowed me to introduce a variety of new experimental elements, including an exhibit floor, expanded instructional courses, a new Film Festival with in-room viewing and an Oscar look-alike award, a now annual survey called the Preferences and Trends (PAT) Survey, a Research and Development Report, an expanded syllabus, and a Young Physicians Section.

A meeting-planning organization led by Karen Baranick began working with the Society the following year, adding more structure and oversight. My next contribution included the launching of *Retina Times*, which continued to evolve into a brilliant and highly regarded publication due to the vision of its subsequent editors, Brett Foxman, Tom Chang, Gaurav Shah, and now Mike Jumper.

'The founding of the ASRS shares many qualities with the birth of the United States.'

During this time, the Society began to foster its presence on the Internet, under the direction of Reed Pavan, and subsequently John Pollack, both contributing to the website's evolution into an outstanding and user-friendly resource. Nick Zakov and Phil Matthews started the annual Practice Management Issues Seminar. Paul Tornambe launched the Masters Meetings. Roy Levit was the first director of the Society's charitable foundation arm. The Fellows Forum was begun by Carl Awh, David Chow, and Tarek Hassan. The Society was no longer a small collection of "colonists" putting on an annual meeting.

One of the Society's most important evolutionary changes came in its representative voice on behalf of members. Retina specialists needed a voice in Washington. Someone needed to speak on our behalf to the RVS Update Committee and to Medicare. A retina organization needed to step forward to speak on behalf of *all* retina specialists. Given our philosophy and evolution, it was only natural for t*his* society to be that voice. Various crises such as photo dynamic therapy, Medicare coverage, and Avastin access were typical examples of where an organized voice for retina proved critical.

To be truly effective in speaking for retina specialists, particularly in Washington, one final, critical evolutionary change needed to take place: the Society's name. The word *vitreous* was unknown outside of ophthalmology. *American* seemed a prudent calling card for Washington. I introduced this concept in 2000, and after several years of debate, the Vitreous Society officially became The American Society of Retina Specialists in 2002.

Just as there is typically heated debate on the congressional floor in Washington for any important decision, there was vigorous deliberation on the Society's name change. Some board members embraced the idea, others did not, and some outright hated the concept. In the end, democracy prevailed and the change took place. Now, in retrospect, the name change is heralded as a vital element in the Society's growth as the representative voice for retina worldwide, and particularly in the U.S.

When the Declaration of Independence was written in 1776, not everyone in the world agreed with its concepts. England had a slightly different view on the subject: "What arrogance! How can these upstarts hope to govern themselves?!" And a little difference of opinion called the Revolutionary War ensued to settle the issue.

Likewise, our name change sparked enormous controversy, not only within the Society board, but also from other retina societies. I personally recall some heated discussions with colleagues from other societies who were incensed by the "arrogance" of the proposed name change. "Why should *this* society attempt to speak officially for retina when all the top people are in the other societies?"

To me, a strong argument in favor of this evolution was that each society has its own niche. One society is not any better than another—just different in philosophy. Just as the American Ophthalmological Society (AOS) was established as an *academic* society requiring a thesis for membership and appealing to members for whom publishing is a career priority, organizations like the Retina Society, Macula Society, and Club Jules Gonin follow a similar philosophy.

These are academic societies—terrific ones. Limiting membership to those who are academically productive makes sense. But recall how the AOS is different in philosophy from the American Academy of Ophthalmology (AAO). The AAO is open to *all* ophthalmologists. No thesis is required, and as such, the AAO has naturally taken its place as the representative voice of ophthalmology, while the AOS has not.

As the ASRS includes members from around the world, its representative duty is not only natural—it's vital to our specialty's survival. England could not rule India because it couldn't represent everyone in the population. A society must be open to all it seeks to represent to truly speak for that group. That vision was present when Jerry Bovino, Roy Levit, and Allen Verne started our Society in 1982, and it remains so today.

As I reflect back on the past 30 years, I am filled with pride in what this Society has become. Prior to my presidency, each year's administration added important building blocks to the structure. I was honored to have made my contributions. Since my term of office, even more spectacular changes have evolved.

A great many people contributed to our evolution, too numerous to list here. Most recently, David Williams and Suber Huang deserve special recognition for their efforts in guiding the Society into a brilliant organization that is truly watching out for the interests of retina specialists at many levels. Just as John Adams, Ben Franklin, and colleagues would be proud had they lived to see the modern U.S., I as a retired board member view the current evolution of the ASRS with pride.

My eyes have never lost sight of what has always made the ASRS the great society it is—the original vision of its founding fathers to recognize that "all retina specialists are created equal." As a practicing retina specialist, I will be forever grateful for that vision. I look forward to the next 30 years with excitement and with pride.

Financial Disclosures

Dr. Packo – ALCON SURGICAL, INC: Advisory Board, Grants, Consultant, Honoraria, Speaker, Salary; ALLERGAN, INC: Investigator, Grants; OD-OS, INC: Investigator, Grants; GENENTECH: Other, Grants.

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ASRS PAT Survey Celebrates Its 14th Year

The Annual ASRS Preferences and Trends (PAT) Survey concept was developed in 1999 by Kirk Packo and John Pollack over a bottle of fine single-malt scotch and a copy of Dave Leaming's annual 24-question survey of members of the American Society of Cataract and Refractive Surgeons (ASCRS). From the beginning, the mission of the ASRS PAT Survey was clear: to identify new and evolving therapies and surgical techniques, controversies, preferences, and trends.

The PAT Survey would:

- Help retina specialists know if they were practicing along the lines of other specialists in their region, throughout the United States, and around the world
- Lead retina specialists to ponder whether they were ahead of their time, on time, or behind the times
- Allow the ASRS to take and share the "pulse" of retina specialists around the world—an unprecedented concept at the time

Although the 1999 PAT Survey's first draft contained approximately 250 questions, the survey was eventually honed to 126 questions in 17 categories. There was curiosity about how our colleagues were doing everything! The survey explored differences among members practicing in various regions of the United States, as well as those in other countries.

Members had the option of filling out a paper survey and mailing it in or taking the survey online. More than 400 members responded—representing approximately 30% of the membership at that time. This was, and is, considered a strong response rate.

Then came the enormous work of putting all the data in a graphic form to present 126 individual 16" x 20" posters at the 1999 Annual Meeting. (This was before the days of printing large posters on a single sheet.)

1990s technology = laborious poster production

All of the posters for the first PAT Survey were hand-produced using a large-format printer and a dry-mounting press we purchased. The first task was to convert the data into 126 separate color bar and pie charts—all with individual labels, colors, etc.

More than 50 color photographs to illustrate the survey sections were hunted down, and 17 different colored backgrounds were chosen to distinguish different topics. Twenty experts were recruited to comment on interesting results and controversial topics. The process took hundreds of evening and weekend hours, often extending well past midnight.

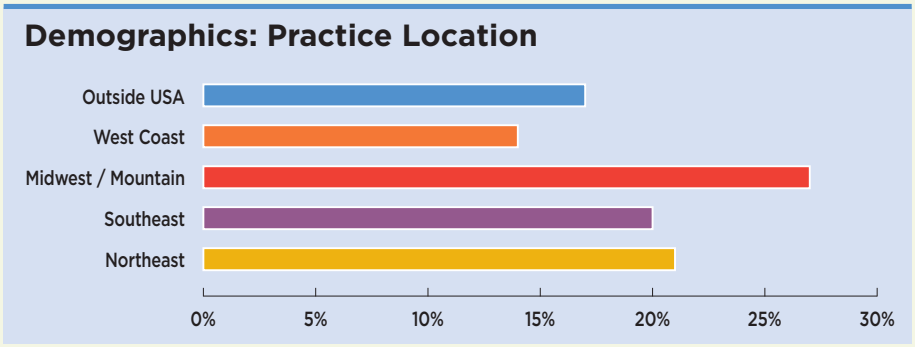


FIGURE 1. PAT Survey data 2002–2012 (averages)

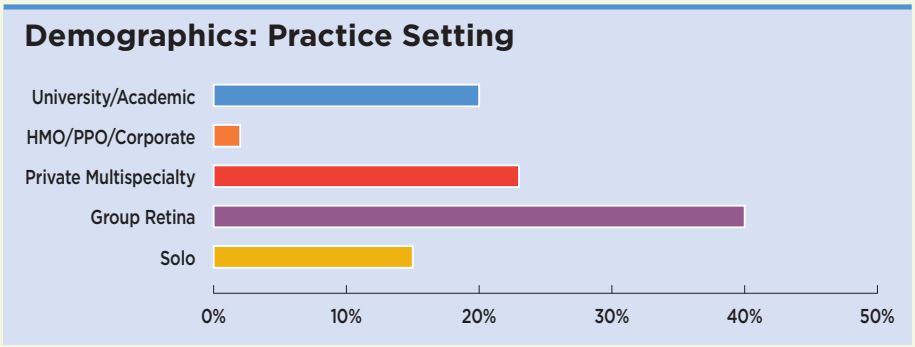


FIGURE 2. PAT Survey data 2002–2012 (averages)

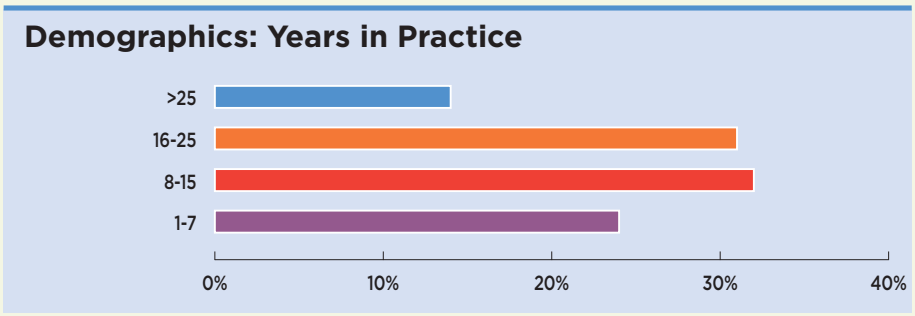


FIGURE 3. PAT Survey data 2002–2012 (averages)

PAT Survey debuts in Rome

The initial PAT Survey was presented at the 1999 Annual Meeting in Rome, Italy. In addition to being presented in poster format, the survey results were also incorporated into the program as PAT Survey panel discussions; these were woven into the scientific sessions throughout the Annual Meeting, reinforcing the theme of each symposium.

To ensure maximum exposure, we loaded the entire database into a computer used during the Rome scientific sessions, allowing ad lib displays of individual responses during the paper discussion periods and other panel discussions. Survey responses that varied based on the respondent's age were discussed further during the newly introduced "Club VR" Young Physicians Symposium. The inaugural PAT Survey was very well-received and was a great success.

Streamlining the PAT Survey production process

After the 1999 Annual Meeting, we took advantage of the relatively new print production technology that would allow us to display 10 survey questions per canvas poster and have the posters printed off-site and shipped to the meeting location. These changes, combined with the fact that we were no longer starting from scratch, significantly streamlined the production of future PAT Surveys.

In 2000, a PAT Survey Committee was formed to provide the editors with advisors and contributors offering fresh ideas and perspectives. Standing members would include the PAT Survey editors, the ASRS president, and chairs of the Communications, Program, and Continuing Medical Education Committees. A Young Physicians Section representative was invited to provide perspective and insight from younger ASRS members, and an at-large member provided us with a mechanism for involving ASRS members who do not hold official positions in the organization.

Survey question submissions were solicited from the ASRS's worldwide membership. Industry input also was sought to identify questions needed to foster effective retinal R&D developments. In 2003, we began publishing the annual PAT Survey results in *Retina Times,* and in 2006 it became a freestanding annual supplement.

Tracking trends in retinal practice

One of the most interesting aspects of the PAT Survey data is the ability to assess gradual trends—which are difficult to spot when looking at surveys as snapshots of preferences in a given year. Tracking trends requires that the editors identify questions they believe will have long-term significance, and that those questions be repeated periodically over time. Certain questions, such as demographics, rarely if ever change (Figures 1-3), while others require more discipline from the editors to be sure they are repeated periodically.

For example, we continue to monitor retina surgeons' preferences for the repair of phakic and pseudophakic inferior retinal detachments (RDs); a trend shows a gradual change in preference away from scleral buckle and toward vitrectomy (Figures 4 and 5).

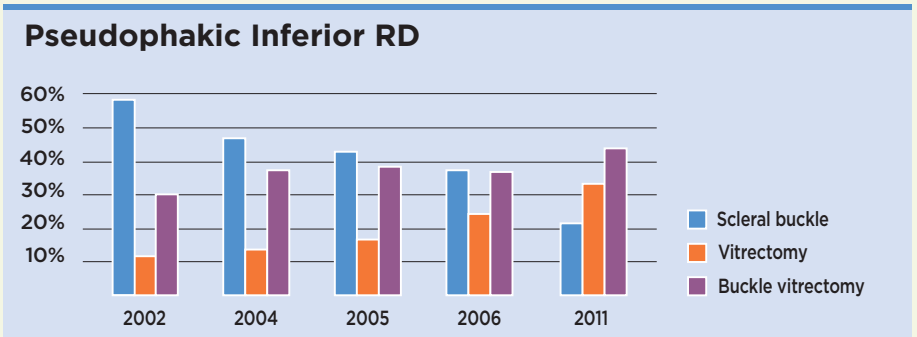


FIGURE 4

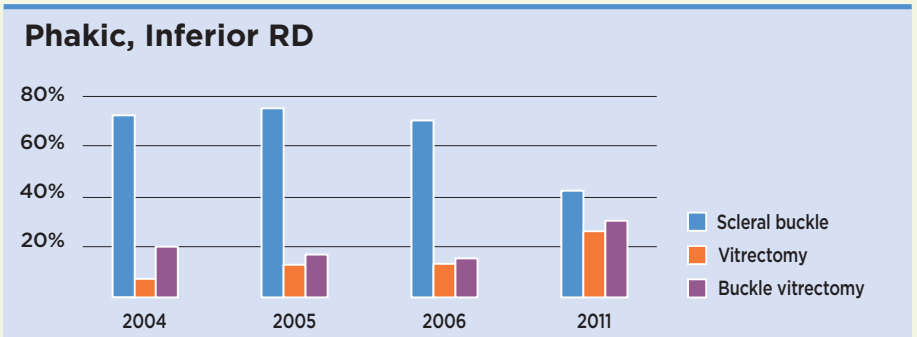


FIGURE 5

> **'From the beginning, the mission of the ASRS PAT Survey was clear: to identify new and evolving therapies and surgical techniques, controversies, preferences, and trends.'**

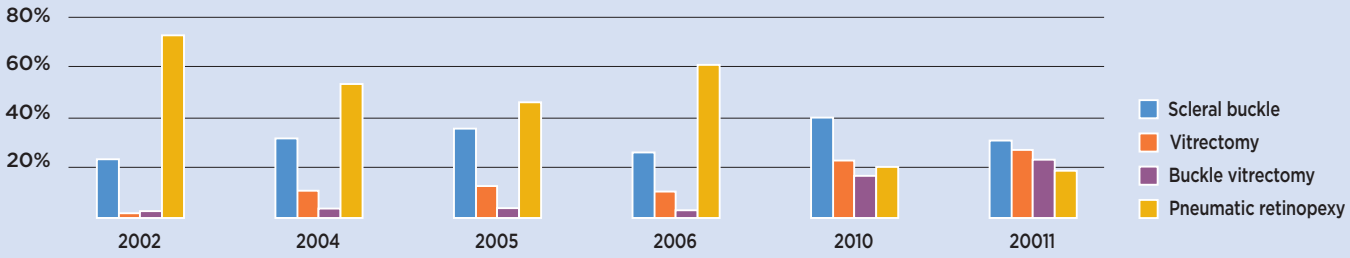
It is similarly fascinating to see that for phakic superior RDs, there is a definite trend away from pneumatic retinopexy and toward combined vitrectomy and scleral buckle over the last decade (Figure 6).

While it comes as no surprise that the adoption of small-gauge surgery for management of epiretinal membranes is now nearly universal (Figure 7), you might not have expected that one-third of respondents routinely observe symptomatic patients with 20/50 vision secondary to inner lamellar holes, while the other two-thirds treat (Figure 8).

Many have given their time to the PAT Survey

There have been many key contributors to the PAT Survey over the years. John Pollack and Kirk Packo served as co-editors from 1999 to 2004, and John Pollack continued to serve as co-editor with Robert Mittra until 2009.

Phakic Myopic, Superior RD

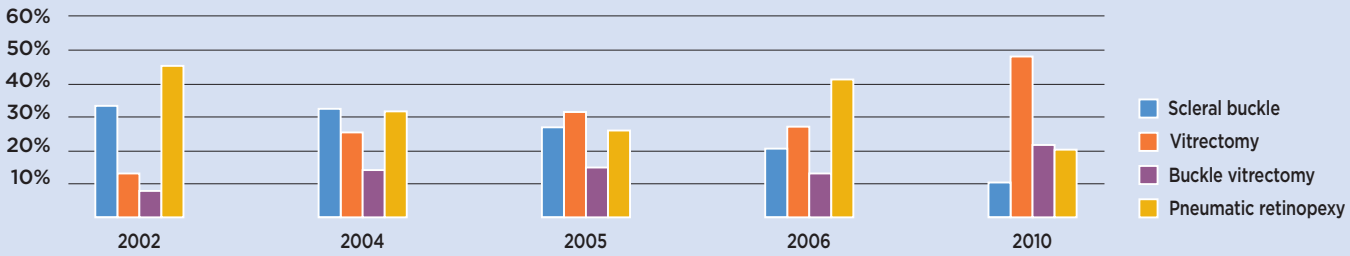


A 47-year-old (-10) myope develops a **macula-off** rhegmatogenous retinal detachment involving the superior half of the retina with one large superior break superotemporally. He has extensive lattice degeneration and a clear lens. What is your usual management?

A. Scleral buckle
B. Pneumatic retinopexy
C. Pars Plana vitrectomy
D. A and C
E. Other

FIGURE 6

Pseudophakic, Superior RD



A 67-year-old pseudophakic patient develops a macula off rhegmatogenous retinal detachment involving the superior half of the retina with extensive lattice degeneration. He has a single small tear superotemporally. What is your usual management?

A. Scleral buckle
B. Pneumatic retinopexy
C. Pars plana vitrectomy
D. Buckle vitrectomy
E. Other

FIGURE 7

Robert Mittra served as the PAT Survey Committee at-large member from 2000 to 2004, as editor from 2005 to 2010, and as co-editor from 2011 to 2012. Michael Jumper became co-editor in 2010 and ultimately editor from 2011 to 2012.

Numerous committee members and administrative assistants have provided invaluable help that has allowed the survey to succeed. But the most valuable contributors to the PAT Survey have been the ASRS members who have responded to the survey every year. For without you, there would be no survey.

The PAT Survey has taken on a life of its own, as it is now routinely referenced in refereed clinical journal articles, scientific talks, trade journals, newspaper articles, and online discussion boards. It has been very satisfying for all of us involved with the PAT Survey to watch it develop into a highly valued benefit for ASRS members throughout the world.

Lamellar macular hole, no evidence of ERM, Va=20/50

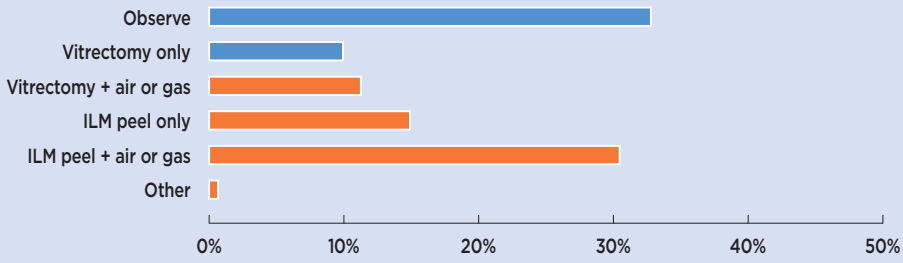


FIGURE 8. PAT Survey 2010

Financial Disclosures

Dr. Jumper – COVALENT MEDICAL: Founder, Royalty.

Dr. Mittra – COVALENT MEDICAL: Stockholder, Stock.

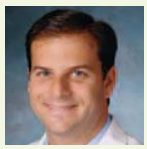
Dr. Pollack – ALIMERA SCIENCES: Consultant, Honoraria; ABBOTT MEDICAL OPTICS, INC: Advisory Board, Honoraria; CLARUS ACUITY GROUP: Stockholder, Stock; COVALENT MEDICAL: Stockholder, Stock.

Dr. Packo – ALCON SURGICAL, INC: Advisory Board, Grants, Consultant, Honoraria, Speaker, Salary; ALLERGAN, INC: Investigator, Grants; OD-OS, INC: Investigator, Grants; COVALENT MEDICAL: Stockholder, Stock; GENENTECH: Other, Grants.

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PART 1

A Look Back at the Development of Retina As a Subspecialty

A new generation of retina specialists has been born since the founding of ASRS in 1982. How far has the subspecialty of retina come since the early days? Block Time asked 6 veteran retina educators for their perspectives on how the retina subspecialty has progressed from its inception in the 1960s and 1970s.



Thomas Aaberg Sr, MD, MSPH
Former Chair, Department of Ophthalmology
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Jay Federman, MD
Professor of Ophthalmology
Wills Eye Institute
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Gary Abrams, MD
Former Chair
Kresge Eye Institute
Wayne State University
Detroit, Michigan



Lov Sarin, MD
Professor of Ophthalmology
Wills Eye Institute
Philadelphia, Pennsylvania



William Benson, MD
Former Director
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Wills Eye Institute
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Pennsylvania



William Tasman, MD
Professor and Emeritus Chairman
Wills Eye Institute
and Jefferson
Medical College
Philadelphia, Pennsylvania

When you first entered the field of retina, was it as dynamic as it is now, or was retina considered a fringe specialty in ophthalmology?

Lov Sarin: When I arrived at Wills Eye Institute in 1960, everyone was doing everything: glaucoma, cataracts, retina, and muscles. There were no defined services. As I was interested in retina, Irving Leopold, MD, the chairman, suggested I should become a retina fellow.

The Retina Consulting Service was started at Wills at the same time, in 1961. We were the second retina department in the United States (after Charles Schepens, MD's service in Boston). It was thought that having a separate retina service was becoming a trend. However, it was not easy to create a retina department, as other ophthalmologists were concerned that they would lose patients.

> **'[In 1961] it was not easy to create a retina department, as other ophthalmologists were concerned that they would lose patients.'**
>
> —Lov Sarin, MD

Thomas Aaberg Sr: At the time I completed my residency in early 1966, the "subspecialty" of retinal diseases was limited to repair of retinal detachment (RD) with scleral buckling, treatment of proliferative diabetic retinopathy (PDR) with the ruby-red or xenon-beam photocoagulators, and diagnostic medical evaluations of a variety of infectious/inflammatory retinal maladies.

> **'[In 1966] there was no effective treatment for AMD, and the thought of interfering with the vitreous body was taboo.'**
>
> —Thomas Aaberg Sr, MD, MSPH

There was no effective treatment for AMD, and the thought of interfering with the vitreous body was taboo. The acceptance and widespread use of fluorescein angiography, followed by mechanical closed-eye pars plana vitrectomy (PPV), added dynamic vigor to retinal practice.

Jay Federman: When I began in ophthalmology in 1964 in the Air Force, there were very few ophthalmologists in the U.S. solely devoted to retina. Even during my residency from 1967 to 1970, there were very few retina specialists. P. Robb McDonald, MD, who founded the Wills Retina Service, still practiced some general ophthalmology and had a large cataract practice in 1967.

Gary Abrams: I entered the field near the beginning of the vitrectomy era in 1973. Tom Aaberg Sr, MD, was one of the earliest retina

specialists to do vitreous surgery; I was lucky enough to work with Tom as a pre-residency fellow soon after he started doing vitrectomies. I was enthralled with the excitement and newness of what he was doing.

I was able to do my fellowship with Robert Machemer, MD, and I experienced the thrill of advances at Miami; however, within 2 years of completing my training, we had completely changed nearly everything we were doing. The rate of change was staggering! It was incredibly dynamic then and continues so today.

> **'[W]ithin 2 years of completing my training, we had completely changed nearly everything we were doing. The rate of change was staggering!'**
>
> —Gary Abrams, MD

William Tasman: When I started, retina was dynamic because of Charles Schepens, MD, and Paul Cibis, MD, both of whom were doing very complicated cases. Schepens, of course, refined scleral buckling and popularized binocular indirect ophthalmoscopy, which raised the success rate for retinal detachment repair to nearly 90%. However, there were still difficult cases that could not be reattached with scleral buckling. In the early 1960s, Paul Cibis was very imaginative and did a lot of very interesting things, including using an intravitreal probe. I've often thought that had he lived, he might have been one of the real continuing pioneers in vitreoretinal surgery.

William Benson: When I entered retina, it was a prestigious specialty because the great Robert Machemer had just invented pars plana vitrectomy. I was among his first fellows. Machemer was inventing all kinds of revolutionary surgical procedures, and the chance to work with him was a large part of the reason I went into retina. It was a very exciting time in ophthalmology because there were armies of diabetic patients who had developed vitreous hemorrhages years before and were still blind. They then had vitrectomies and suddenly they could see again. It was a great moment in ophthalmology!

Were there retinal detachment cases that couldn't be fixed with scleral buckling?

Lov Sarin: Yes. There was no vitrectomy when I started—we did every case with a buckle. When there were early fixed folds, we put a lot of cryo around it and would put a high buckle to support it. Cases now described as proliferative vitreoretinopathy (PVR) were very tough. The advent of explants allowed us to create really high buckles. The eyes would end up with an hourglass shape, but at the time we were delighted with a 50% success rate for those types of cases.

Thomas Aaberg Sr: The success rate of PVR was less than 30%, and eyes with combined vitreous opacification and retinal detachment or giant retinal tears had a similarly poor success rate.

Jay Federman: Of course there were retinal detachments that couldn't be fixed with scleral buckling! Traction RDs and PVR cases were a disaster. PDR with traction RDs had traction released with large 360° scleral resections or infoldings.

Gary Abrams: We were doing vitrectomies for very complicated cases (giant tears, PVR, severe traction retinal detachments), but we usually failed in the 1970s. There were several advances that enabled success in complicated retinal detachments. The first 2 were the air pump and the endolaser in the early 1980s. Prior to that, we had difficulty doing a fluid-air exchange and treating breaks intraoperatively.

The next great advances that enabled management of complicated detachments were long-acting gases (C3F8) and silicone oil in the mid-1980s. We learned from Relya Zivojnovic, MD, how to do relaxing retinectomies to manage the most complex detachments. The introduction of perfluorocarbon liquids by Stanley Chang, MD, allowed us to easily manage giant tears and retinectomies in the late 1980s.

The 1970s marked the development of basic vitrectomy, while the 1980s saw the introduction of tools and techniques that set the stage for the sophistication that developed in the 1990s and has further matured in the 2000s. Have we solved all the problems? Unfortunately not, but it remains fun to continue the development of vitreoretinal surgery.

William Tasman: Robert Machemer had not yet developed vitrectomy, which was obviously an atom-smashing event. A lot of the cases that did fail with buckling, I think today would have been cured with vitrectomy and the use of gases and oils, so it's been a constantly changing process ever since I first started my 1961-1962 fellowship with Dr. Schepens.

William Benson: By far, the most common reason that a retinal detachment couldn't be repaired was severe PVR; at least that has never changed. The other detachments that couldn't be repaired before vitrectomy were giant tears—they often failed because the retina would slip back off the buckle.

Giant tears were especially difficult to repair. You tried your best with gas to get the retina to flatten out. We put patients facedown on a Stryker frame while under anesthesia. The surgeon would sit on the floor, wearing an indirect ophthalmoscope, and try to inject gas up into the eye to unroll the retina. Sometimes it worked and sometimes it didn't—but even when it worked, it didn't work very well.

Was indirect ophthalmoscopy commonly used to fix RD in the 1960s and 1970s?

Lov Sarin: While doing my residency in Boston in the 1950s, I was fortunate to work with Robert Brockhurst, MD, who, along with Charles Schepens, MD, and I.D. Okamura, MD, were the members of the Massachusetts Eye and Ear Retina Service. Dr. Brockhurst taught me about indirect ophthalmoscopy.

> **'I've often thought that had [Paul Cibis] lived, he might have been one of the real continuing pioneers in vitreoretinal surgery.'**
>
> —William Tasman, MD

When I arrived at Wills in 1960, they had indirect ophthalmoscopes, but the surgeons primarily used the direct ophthalmoscope to find the retinal holes. With buckles, localization is critical and localizing breaks with direct ophthalmoscopy is very hard. This affected how we performed RD repairs.

Often a scleral bed was fashioned overlying the extent of the detachment, and the entire bed was diathermized to make sure the breaks were treated. As the Schepens group was training 2 or 3 fellows a year, the graduating fellows took their indirect ophthalmoscopy skills

back to their institutions. The dissemination was quite rapid, as it made surgery easier and more successful.

Jay Federman: At Wills, where a service dealing with only retinal diseases was just established under the leadership of Dr. McDonald, they were managed with indirect ophthalmoscopy during surgery. However, at smaller programs that did not have subspecialty facilities (such as Jefferson Medical College Hospital, where I trained in 1967), the detachment surgery was managed with a direct ophthalmoscope. This was very difficult and imprecise and sometimes resulted in recurrent RDs.

'[T]here were armies of diabetic patients who had developed vitreous hemorrhages years before and were still blind. They then had vitrectomies and suddenly they could see again.'

—William Benson, MD

Thomas Aaberg Sr: When I was a financially strapped resident at the Massachusetts Eye and Ear Infirmary, Dr. Schepens ordered an American Optical indirect ophthalmoscope for me, which I reimbursed him for over a long time period, and still have today as a functional, but heavy, scope. It was used in surgery, and still is, when doing scleral buckles and a very few surgeons used it when doing vitrectomy (with the vast majority using the operating microscope).

Gary Abrams: I can speak only for the 1970s; indirect ophthalmoscopy was the standard for identifying retinal breaks. We became expert in use of the indirect, finding the smallest retinal breaks and making retinal drawings.

William Tasman: In the early 1960s, few people were well-versed in indirect ophthalmoscopy—a fact that handicapped otherwise-skilled ophthalmologists. Many, including the famous and wonderful ophthalmologist Dohrmann Pischel, MD, in San Francisco, still used the direct ophthalmoscope. Clearly, he was an exceptional man, and because of his experience, he got good results.

A problem with direct ophthalmoscopy was that you couldn't find the breaks readily, and often breaks were missed. There was a big disparity in results between those who used indirect and those who continued to use direct, such that it really forced everyone to switch to indirect ophthalmoscopy.

Subspecialties were just emerging at this time, and retina was one of the first, thanks to Schepens; he established fellowships, and then they began to spring up in other subspecialties as well. Prior to the early 1960s, ophthalmologists did anything they felt capable of doing.

Thinking back on some of the things I witnessed in retina—in localizing retinal breaks, residents were sometimes asked to find the breaks, and because they were learning indirect ophthalmoscopy, they got pretty good at it. So the residents would tell the attending physicians where the breaks were. And then the residents would get a Schweigger perimeter, which could be used at the bedside. They were instructed to localize the meridian of the breaks so the attending would have an idea of where they were when he got into the OR. It sounds like prehistoric times when you think about it now.

'[With scleral buckling] Traction RDs and PVR cases were a disaster. PDR with traction RDs had traction released with large 360° scleral resections or infoldings.'

—Jay Federman, MD

In the fall issue of Retina Times, *part 2 of this series will explore the treatment of diabetic patients before vitrectomy, as well as how vitrectomy has changed the practice of retina.*

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Section Editor



How Will the Science of Retina Advance in the Next 30 Years?

Major advances have been made in the treatment of many retinal conditions since 1982. When the ASRS was founded 30 years ago, it would have been hard to fathom how successfully we now treat most retinal conditions.

This Issue's Key Opinion Leaders



Carl C. Awh, MD
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Nashville, Tennesse



J. Timothy Stout, MD, PhD, MBA
Oregon Health and Science University
Portland, Oregon



Mark S. Humayun, MD, PhD
Doheny Eye Institute
Los Angeles, California



Gaurav K. Shah, MD
The Retina Institute
St. Louis, Missouri

'We asked several opinion leaders to help us predict where we will be in 2042, when the ASRS celebrates its 60th anniversary.'

- Perfluorocarbon liquid has obviated the need for surgeons to operate lying on their backs with the patient facedown in a Stryker frame to fix a giant retinal tear.
- Anti-VEGF agents like bevacizumab, ranibizumab, and aflibercept have improved visual outcomes far beyond what could have been imagined in the early laser treatment era.
- OCT has enabled us to visualize retinal structures in vivo in ways never before possible.
- Digital angiography has allowed us to visualize vascular structures immediately without having to process film.

Yet even today, there are many retinal conditions we cannot effectively treat.

- Hereditary retinal degenerations like retinitis pigmentosa often cause patients to lose substantial vision.
- Patients with geographic atrophy await any medical advance that may save their sight.
- A significant minority of patients with retinal detachments still develop proliferative vitreoretinopathy and redetach.
- Some macular holes fail to close.

Looking forward 30 years is not easy. We asked several opinion leaders to help us predict where we will be in 2042, when the ASRS celebrates its 60th anniversary.

Over the next 30 years, what do you think will be the greatest challenges to be overcome in vitreoretinal diseases and surgery?

Carl Awh: Consider "high tech" life in 1982: Polaroid instant cameras, the first-generation IBM PC (with 64 kb RAM and a floppy disc drive: $3000). No cell phones, but in another year, the Motorola DynaTAC 8000 (to be memorably wielded by Gordon Gekko in the 1987 movie *Wall Street*) would be available for only $3995.

In 1982, who could have predicted the interconnected world of 2012? Who among us even recognized the need for the wireless devices we now consider essential?

With that in mind, I offer the following predictions:

First, economic pressures and increasingly effective diagnostic and therapeutic technologies will lead non-retina-trained ophthalmologists to continually encroach on the traditional realm of the retina specialist.

Our position will not be helped by the results of SCATT7 (**S**earch for **C**heaper **A**dequate **T**reatment **T**rial No. 7), which will demonstrate that intravitreal injections performed by trained technicians in a day-spa setting are noninferior to injections administered by retina specialists in the office.

This, or similar events, will cause retina specialists to demand subspecialty accreditation. Unfortunately, the timing of their demands will seem linked to self-interest rather than to patient-interest. Too little, too late. Thankfully, femtosecond cataract and refractive surgery will be easy to do.

Second, consider the host of pathologies caused by the aging vitreous: floaters, macular hole, macular pucker, retinal detachment—perhaps even cataract. Can we prevent the vitreous from aging? Can we repair damaged vitreous? Will we replace native vitreous with synthetic or "recombinant" vitreous? Perhaps the ASRS will one day revert to its original name: The Vitreous Society!

Timothy Stout: From the biologic perspective, I think there are 3 key areas that will need exploration over the next 30 years if we hope to better treat disease—informatics, immunology, and epigenetics. These needs transcend the retinal and ophthalmic arenas and involve all of medicine.

1. **Informatics.** We will have the ability to "know" our patients' genomes way before we will be able to understand what all of that information means. While we know that genetic polymorphisms/mutations influence our patients' health, very few of the diseases we treat are monogenic. The consequence of any one polymorphism will be understood only in the context of the hundreds of other genetic polymorphisms that might affect pertinent biologic pathways.

> **'All future improvements should be guided by the principle of improving our patients' vision with the least possible burden for them.'**
>
> —Mark S. Humayun, MD, PhD

In poker, it's not the "high card" that wins, but rather a collection of cards taken in context with each other. Three billion base pairs of DNA encoding 20,000 to 25,000 genes makes for a pretty big deck, and understanding all of those contextual changes in millions of patients is an enormous task.

2. **Immunology.** It's remarkable that the genes whose polymorphisms are most closely associated with AMD risk don't code for "retinal" or "blood vessel" genes, but do code for proteins associated with the immune system or metabolic pathways. The same is holding true for other diseases like diabetes. Understanding how our immune system can chronically tolerate or erode normal structure/function relationships is key.

   There are 10 times more bacteria in each of us than human cells—changes in this "microbiome" have profound consequences for our immune system and likely play an important role in the balance between symbiosis and pathology. We are just beginning to understand how important this is, and much of the work over the next 30 years will need to focus on these interactions.

3. **Epigenetics.** What in our environment affects how genes are expressed? We need to better understand how what we eat, breathe, and are exposed to can change our patterns of gene expression.

Mark Humayun: Vitreoretinal surgery has undergone tremendous transformation in the first 40 years. What the future holds for the field is indeed interesting and exciting to think about. All future improvements should be guided by the principle of improving our patients' vision with the least possible burden for them.

For example, we have made great strides toward repairing macular holes and retinal detachments, but in the future, can we:

- Improve on the visual outcomes?
- Obviate having to position our patients facedown?
- Not use laser to destroy a large part of the retina?
- Avoid cataract formation after vitrectomy?
- Make surgical procedures simpler and/or enable surgeons to perform procedures beyond current human limits?
- Implant sophisticated bioelectronic devices to restore sight or prevent loss of sight?

And how can we merge pharmacological, biological, and surgical therapies to address our patients' needs? The list seems almost endless.

As Abraham Lincoln said, "The best way to predict the future is to create it." These words encourage us to work hard to improve vitreoretinal surgery, a field that has already given so much to our patients and to us, the practitioners—and yet has so much more to give. The future of vitreoretinal surgery is indeed very bright.

Gaurav Shah: I think the challenges for our specialty will be on several fronts.

First is educating the next generation of vitreoretinal fellows. Education in today's economic environment with our current practice pattern continues to be difficult and will evolve as the dollars for teaching dwindle in the health care system. Accreditation will also play a part in how training takes place and is financed. This will eventually affect the process of education for the next generation.

The second challenge will be to have fiscally viable retinal practices in times of decreasing reimbursement and increasing overhead costs—rent, utilities, employee salaries, etc.

From a clinical perspective, the other challenges will continue to be obtaining better outcomes, not only from an anatomical basis but also from the functional and physiological changes in the disease stage we currently treat. This may include things such as prevention of subretinal fibrosis, photoreceptor death, and geographic atrophy.

In what capacity do you think stem cells and gene therapy will be utilized in 30 years?

Carl Awh: The era of retinal gene therapy has arrived. Treatment of monogenic inherited eye diseases, such as Leber's congenital amaurosis, with gene therapy will likely become routine. Similarly, stem cell therapy has shown early promise.

Keep in mind, however, that the "war on cancer" was declared in 1971—40 years later, the overall mortality rate from cancer remains virtually unchanged. Ongoing experience with gene and stem cell therapies will reveal unintended consequences, both good and bad.

> **'I suspect that the best use of stem cell technology to "treat" diabetic retinopathy will involve the pancreas, not the retina.'**
>
> — J. Timothy Stout, MD, PhD, MBA

Timothy Stout: Successful ocular gene therapy studies have taught us at least 2 important things:

- Therapeutic genes in viral vectors can be safely introduced into the eye.
- In the case of monogenic diseases, this can be therapeutic.

The next steps will reveal whether therapeutic genes—or combination of genes—can regulate angiogenesis, cell proliferation and differentiation, cytokine pathways, and the immune response. The work with stem cells has also shown that intraocular delivery of stem cells can be made safe. These cells may

have protective/restorative benefits, as they can secrete therapeutic materials and can influence the local microenvironment.

It is less clear whether these cells can become terminally differentiated functional cells, and how to regulate that process. The next 30 years may show that these cells can be therapeutic—more as complex, biologically responsive "drug delivery devices" than as a source of cells that can terminally differentiate into connected neurons. (That might happen in 50 years!) I suspect that the best use of stem cell technology to "treat" diabetic retinopathy will involve the pancreas, not the retina.

Gaurav Shah: Utilization of both the cells and their therapy will ultimately be determined not only by their results, but by how the therapy is delivered to the patient. An in-office procedure that will deliver cells or a family of cells that can restore vision may be preferable to an intraoperative procedure.

Vitreoretinal surgical techniques have evolved greatly over the last several decades. In what ways will surgical techniques evolve over the next 30 years? Do you envision a role for robotic surgery?

Carl Awh: The precision and tremendous stability of current robotic surgery devices (eg, the DaVinci surgical system) actually limits their use during vitreoretinal surgery. Why? Because our patients are only minimally sedated and are capable of unexpected movements. Although it is possible to engineer an articulated robotic system that anticipates and adjusts to patient movement, it is not the best solution. Instead, we will develop miniature robots that crawl within the eye—the robot will move *with* the eye!

These drone devices may be surgeon-piloted or may work autonomously, identifying and removing abnormal tissue from the retinal surface, opening blocked vessels, and finding and sealing retinal breaks. The surgeon's most challenging task may be to place the robot in the appropriate location and to remove it at the end of the case.

Timothy Stout: Vitreoretinal surgery in the future will continue to be used to solve mechanical/anatomic problems (retinal detachment, misplaced lens) or deliver therapeutic materials. It is possible that electromechanical assistance may provide incremental benefit and safety, but I don't think that systemically introduced "nanobots" will make vitreoretinal surgery obsolete in the next 30 years.

Intraoperative OCT will be useful in defining tissue planes and instrument location. Delivery of drugs into the suprachoroidal space and controlled vitreolysis hopefully will obviate the need for some surgeries and reduce the risk of neovascularization and traction.

Gaurav Shah: I think as technology evolves, robotic surgery like the DaVinci system used for urologic surgery may play a role both in terms of education of vitreoretinal techniques and for performing these techniques. Human intervention will still be needed for robotic surgery; this intervention will be necessary for long-term surgical successes, and will not eliminate the role of the vitreoretinal surgeon.

Surgical techniques have evolved over the last 10 years and will continue to evolve with better instrumentation, but more importantly with different types of anesthesia allowing us perform surgery less invasively. Not only will the techniques evolve, but surgical performance will continue to escalate in the ambulatory care center. Hospital-based retina surgery will cease to exist in the next 10 years—or sooner, depending on economics.

What do you think the fate of macular and panretinal laser treatments will be?

Carl Awh: There are millions of patients with diabetes and vascular diseases already well down the path of retinopathy. Laser will remain useful for many years, particularly because SCATT22 (**S**earch for **C**heaper **A**dequate **T**reatment **T**rial #22) will demonstrate that traditional 532 nm laser systems are noninferior to new tunable diode laser photoactivated microsphere therapies.

> **'Intravitreal injections will remain necessary for decades, but will employ drugs of greater potency and duration.'**
>
> —Carl C. Awh, MD

Retina specialists won't really mind, because retinal laser treatments will be reimbursed by iCare (which will replace Medicare in late 2019) at an inflation-adjusted $79.99, with most treatments performed via the iPhone19 in the comfort of patients' homes.

Timothy Stout: Lasers are used today to either generate a well-defined scar (retinopexy) or to modulate a biologic response (modify cells that are producing VEGF or other cytokines). I don't think that the "well-defined scar" aspect of laser treatment will go away over the next 30 years—we will still have retinal breaks in 2042. Hopefully we will have more biologically directed methods of cytokine modulation, prevention of cell death, and maintenance of vascular function.

> **'Hospital-based retina surgery will cease to exist in the next 10 years—or sooner, depending on economics.'**
>
> —Gaurav K. Shah, MD

Gaurav Shah: I still think there will be a use for these types of therapies in comparison to pharmacologic treatments. They may play a role either in combination with or used sequentially after pharmacologic therapy in precise imaging of the retina and choroid. This may help us direct these therapies where they will have the greatest benefits with the fewest side effects.

How will drugs be delivered for retinal disease in the coming decades?

Carl Awh: Intravitreal injections will remain necessary for decades, but will employ drugs of greater potency and duration. Improved topical antiseptics and anesthetics will remove much of the risk and discomfort from the injection process.

Long-term drug release devices will become a mainstay of therapy for AMD (both neovascular and atrophic) and diabetic retinopathy. The need for sustained-release therapy will gradually diminish due to preventive strategies and gene therapy.

Nanotechnology and targeted vector therapies will allow oral or intravenous administration of agents that patrol the body, destroying degenerating cells and repairing aging DNA in selected cell types.

Or, we'll just inject Avastin …

Final prediction: Retina specialists will don their jetpacks for a quick hop to the office.

If it's raining—which they will know 10 days in advance, due to improvements in meteorology—they'll take the flying car.

Timothy Stout: Over the next few years, we will become much better at achieving a "sustained effect" for biologics—depot delivery of drugs and long-term expression of biologics via gene or stem cell delivery are already in the works. As better gene therapy vectors are produced, transduction of photoreceptor or RPE cells via intravitreal injection is likely.

Transduction of these cells has already been demonstrated with vector delivery into the suprachoroidal space. Hopefully, a better understanding of the interplay among our immune system, microbiome, and genotype will allow us to develop systemic therapies that will delay or prevent many of the degenerative diseases we now struggle to treat.

Gaurav Shah: We may look back on intravitreal injections as a barbaric way of introducing drugs into the eye—or we may still be delivering drugs via this route as long as we are able to both improve and preserve vision. If a delivery platform is not found to be as suitable, safe, reliable, and cost-effective as intravitreal injections, the delivery of drugs may not look that different in 5 to 10 years.

Only time and end results will tell whether our hopes for a sustained drug delivery device become reality for AMD, diabetic retinopathy, and retinal vascular diseases. Drugs may also be delivered not only by the ocular route, but maybe subcutaneously, implanted in a way that they deliver doses significantly into the eye that make a difference with the disease being treated.

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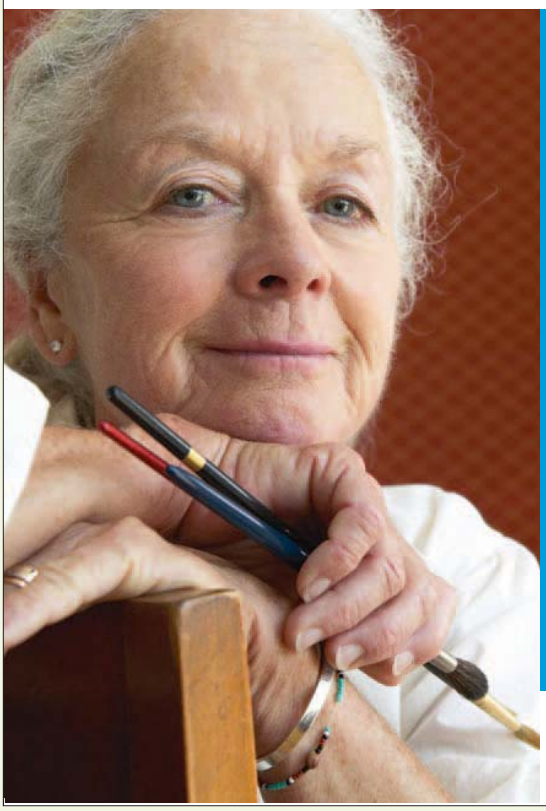
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The Role of Nutritionals in the Aging Eye:
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When Should a Vitreoretinal Surgeon Stop Operating?

One of the most difficult lifetime decisions for vitreoretinal surgeons is when to stop operating. For younger surgeons, it is easy to peer down a nearly endless time line and pick age 60 or 65. However, when they reach that age, many surgeons decide to continue operating indefinitely.

Financial considerations may play a role if underperforming portfolios have left a physician short on retirement income. Ego and the fear of losing esteem among colleagues who still operate can also be a strong motivator to continue performing surgery.

I decided to stop operating 18 months ago at age 70. This decision was slow in coming and involved considerable personal angst. For more than 30 years, I had arisen each morning and looked into the mirror at a person who could save vision with his hands and his brain.

My personal assessment was that I was still completely competent in the operating room. If my skills had eroded, I was not aware of it, nor did I believe my partners were whispering about me in the back halls.

But the thrill was definitely gone. I began to dread long days in the operating room, not because of physical fatigue, but because of a desire to lower my stress level. The aggressive personal injury attorney with a 20/30 +1 epiretinal membrane no longer inspired me to surgical excellence. Being referred a thrice-operated dreadful proliferative vitreoretinopathy case to administer surgical last rites became more of an annoyance than a chance to prove my surgical manhood.

I found myself awakening in the dead of the night to consider what my life would be like as a *former* vitreoretinal surgeon. Would I immediately become a second-class citizen in the office and at national meetings? What about my income—would it plummet? If I did continue to do surgery, at what point would I begin to deliver second-class surgical care and perhaps harm people?

Oliver Wendell Holmes, MD, once stated, "Many people like their doctors moldy like their cheese." But is this true for surgeons? Perhaps not. It is generally thought that human physical skills begin to deteriorate in the late 20s. Certainly among high-level athletes, this is abundantly plain. But what about surgical ability, which involves not only physical skills but a strong input of cognitive function?

A multitude of studies have attempted to determine if aging surgeons put their patients at increased risk. In 2006, a widely quoted study from the *Annals of Surgery* compared surgeons aged 41 to 50 with those over 60 years and found higher mortality rates for older surgeons performing complex operations such as pancreatectomy, carotid endarterectomy, and coronary artery bypass.[1]

> 'I began to dread long days in the operating room, not because of physical fatigue, but because of a desire to lower my stress level.'

However, older surgeons who had maintained a high surgical volume were much less likely to have increased complications. For many operations, there was no statistical difference between the older and younger surgeons. The world-famous heart surgeon Michael DeBakey at age 91 made the provocative statement, "I would not mind being operated on by a surgeon 91 years old."[2]

A 1998 study of 330 knee replacement operations found that a younger surgeon age correlated with fewer complications.[3] An evaluation of laparoscopic hernia repairs in 1998 noted a higher rate of recurrence among surgeons age 45 and older.[4] A recent prospective multicenter study of thyroid surgeons in the *British Medical Journal* showed that surgeons between ages 35 and 50 had better outcomes than both their older and younger colleagues.[5] Unlike the *Annals of Surgery* study results, maintaining a high volume of surgery did not protect older thyroid surgeons from a higher complication rate.

However, there is no compelling evidence that some older surgeons who do not reduce their case load, who stay in good health, and are faithful in continued education cannot stay competent into their 70s. In the United Kingdom, surgeons by law must stop operating in the Public Health Service at age 65. However, they are permitted to continue surgery in private practice until age 70.

To sample the opinions of vitreoretinal surgeons of various ages across the country in regard to the appropriate time to stop operating, the questionnaire on page 47 was sent to almost 50 surgeons. Their responses were illuminating.

Most respondents stated that vitreoretinal surgeons reach peak manual dexterity and hand/eye coordination between ages 35 and 50. There was a consensus that experience can compensate for some attrition of mechanical skills for a number of years, but few believed that the penumbra of protection could extend to age 70 and beyond.

Regarding referring a neurosurgeon friend with a tricky macular pucker to a younger or older vitreoretinal surgeon, a very strong majority chose the 45-year-old surgeon over the 72-year-old one.

There was a split opinion about whether the surgeon or the scrub assistant would first notice a diminution of surgical skills. One person commented that the surgeon would be the first to notice the decline, but the last to admit it.

Surgeons responding to this questionnaire ranged in age from 36 to 80 years. Nine respondents no longer operate and had

When should a retina surgeon stop operating?

1. At approximately what age do you think a vitreoretinal surgeon is at his or her best in terms of manual dexterity and hand/eye coordination?
2. Can increased surgical wisdom with aging compensate for attrition of surgical hand ability to age 70 and beyond?
3. If a close friend neurosurgeon had a 20/30 ERM with underlying lamellar thinning, would you be more likely to refer the doctor to a 45-year-old well-known vitreoretinal surgeon or a 72-year-old well-known vitreoretinal surgeon?
4. If your surgical skills start to diminish, will you or your longtime surgical assistant know this first?
5. Do you still operate?
   Full schedule?
   Reduced schedule?
   Stopped operating at age _____
6. Are you:
   Younger than age 50 _____
   Age 50 or older _____
   Actual Age (Optional) _____
7. If you still operate, at what age do you envision yourself giving up surgery completely?
8. Will financial incentives play a role in your decision when to stop operating?
9. Comments?
   _____

stopped surgery at ages ranging from 56 to 77. Of those people still operating, the favorite proposed age to hang up the vitrector was between 60 and 65. Most surgeons believed that money would not be a major factor in determining when to stop operating.

Several surgeons opined that they lose money when they leave the office to go to the operating room. Surely this must apply only to relatively low-volume surgeons. In our retina group of 17 doctors with salary based largely on productivity, the young, very surgically busy members essentially earn double the average take-home pay of other members of the practice.

I myself had personal concerns about taking a major income hit when I no longer operated. My average number of OR surgery cases for my last 2 years of operating was 370 per year. As it turns out, my income thus far has dropped only 20%, thanks in large part to a very busy injection practice in the office. In our practice, if a surgeon does not do at least 4 OR cases on a full surgery day, he or she would have been more productive staying in the office and being busy with medical retina.

The decision to stop operating is obviously a very personal one, which can be influenced by many factors including general health, ego, finances, and surgery-induced stress level. It also depends on whether the person still enjoys the rigors of the operating room and the postoperative care of cases that do not always go perfectly.

'Complex tasks that involve more than one stimulus and more than one response show a much earlier decline than simple reaction times.'

There is no doubt, however, that simple reaction time shortens from infancy into the late 20s, then increases slowly into the 50s and 60s, with rapid lengthening as the person enters the 70s.[6] Complex tasks that involve more than one stimulus and more than one response show a much earlier decline than simple reaction times.

Thus, if a Code Brown occurred during a vitrectomy (for example, a "simple" vitrectomy that suddenly becomes a giant tear with loss of the infusion line and a burgeoning choroidal hemorrhage), a younger surgeon might be better equipped to deal rapidly with the emergency. Of course, the opposing view would be that an older surgeon with vast experience would make all the right moves, albeit slightly slower than a younger surgeon.

Stopping surgery was precisely the right decision for me, and I have zero regrets. My stress level has dropped precipitously and my days in the office are actually fun, knowing that I can triage all surgical train wrecks to my younger partners. Of course, I am no longer a card-carrying member of the OR Club and am no longer entitled to participate knowingly in surgical discussions, except as an ex officio member.

My gravitas level has dropped a bit, and I find myself lower in the office pecking order. But my patients still love me, and I can do almost as much good with a syringe and needle as I did in my former life as a vitreoretinal surgeon. Our retina group has recently solved the potential problem of surgeons operating into their dotage by including in our employment contract the obligation to stop surgery at age 70.

No discussion of this topic would be complete without interviewing Steve Charles, MD, who has maintained a very high-volume surgical practice for more than 3 decades. Steve believes he is surgically at his best. He attributes his continued surgical skill to a rigorous exercise program with weights, abstinence from alcohol, and a healthy diet. However, Steve believes that retention of the ability to operate at a high level as one ages is highly variable among surgeons.

After careful consideration regarding age and surgical proficiency, my belief is that it likely is possible for a subset of vitreoretinal surgeons to remain reasonably close to peak performance into the late 60s, perhaps early 70s, *if* they:

- Had been top-tier surgeons earlier in their career
- Maintain a high surgery volume and do not cherry-pick the easy cases and punt the hard ones
- Stay in excellent mental and physical health
- Embrace new technology and surgical advances
- Keep firmly in mind the famous admonition of Hall of Fame baseball pitcher, Satchel Paige: "Don't look back—something might be gaining on you."

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I would like to express my appreciation to the many vitreoretinal surgeons across the country who responded to my questionnaire.

Financial Disclosures

Dr. Fuller - None.

Jerald A. Bovino, MD
Section Editor



Take Some Chips Off the Table

You would love my old college buddy, Jesse. He is one of those lovably sarcastic guys with a heart the size of Texas and a broad smile that reaches from Maine to Oregon. It's all complemented by a dry sense of humor that can make you laugh uncontrollably at the most unexpected times. Jesse sat next to me for a semester in freshman chemistry. I didn't see him again for more than 30 years.

Over spring break one year in the 1990s, my wife and I took our children to a Club Med in Ixtapa, Mexico. It's the kind of place where you dance around on the beach and sing silly songs and wave your hands in the air while you trade plastic beads for margaritas. Meanwhile, your kids are swinging wildly from a circus trapeze set up in a grove of palm trees next to the sea.

At the communal dinner on the first night, we walked into the restaurant and sat with another couple who had 5 children in tow. As we started chatting and comparing notes, I was surprised and delighted to learn it was Jesse from freshman chemistry. By this time, he had married a beautiful blue-eyed brunette and built a wonderful family. There they were—all 7 of them—sitting around the table stuffing spicy shrimp and pasta in their mouths. "Pass the guacamole, *por favor*."

> '[I]nstead of metaphorically always pressing your life to the next roll, try to slip some chips of enjoyment in your pocket as you go.'

"Wow. Jesse! What happened to you after freshman year?" I asked. "You disappeared!"

Jesse replied that he "flunked out of pre-med." "I found out I was no Einstein!" he said. "I came back to college a year later and got a degree in accounting." He added that he "wasn't much good at that either," so when he left college, he jumped into the stock market.

The short story is that by the time he was 32, he had made so much money that he retired. I am confident that all the "Einstein" retina surgeons reading this will see the irony in the fact that you are still working for intermediate office visits, while "no-Einstein" Jesse has been playing golf and sipping mint juleps for the past 30 years. Like our children always tell us, "Life isn't fair."

Since that chance encounter in Mexico, Jesse and I have reestablished our friendship and made a bunch of guys' trips to Las Vegas. The most fun thing about Jesse is watching him shoot craps. He has a unique style that revolves around taking huge risks. When I play, I win a bit and lose a bit and take chips off the table as I go. In contrast, Jesse is what crap shooters call a *pressa*. Every time he wins, he just keeps telling the dealer to leave the money on the table so the bet doubles and quadruples and so forth.

The object of craps is to keep rolling the same numbers over and over, and each time you do, you get paid. The only number that can wipe out all the bets is the 7. The problem is that there are more ways to make a 7 than any other number. Accordingly, sooner or later, it will rear its ugly head and everything on the table will be lost. Craps shooters like Jesse are always waiting for what they call "the dream roll." Most of the time, however, they are rudely awakened from that dream by the 7. The dealer calls "7 out." All the money is gone.

As our 30th ASRS anniversary meeting is in Las Vegas, you can stop at the casino and experience firsthand the exciting banter around a hot craps table. Long-legged blondes in short skirts, plunging necklines, and 6-inch Manolo Blahniks belly up to the table with their $2 bets—all the time searching for the guy with the yellow $1000 "banana chips." Perfect strangers become instant friends, jumping and hugging and high-fiving each other as each number thrown delivers bundles of money to the winners.

Invariably, as the action heats up, the stick-man starts talking about Jesse in nonsensical rhyming couplets and doublets and iambic pentameter. "He's a *pressa* from Odessa."

Jesse screams back to the dealer "Press 'em up! Play 'em like they're your own!"

In craps, each number has its own colorful nickname. Four is *Little Joe*. Five is *Feever*. Eight is *Eighter from Decatur*. Nine is *Nina Ross*. My favorite, the hard 6, is a "*doggie's dilemma*" (2 trees). You get the idea. After you establish the first "point," every number is good—except the 7!

> 'Your professional life is a marathon—not a sprint. The more you stay in emotional and physical balance, the more you will enjoy your patients and your work.'

The takeaway from this story is to have some fun along the way and not to lead your life like Jesse shoots craps. I have seen countless retina surgeons who, at the expense of friends and family, work themselves to death. Like my buddy Jesse in the casino, they never figure out how to "take some chips off the table." Sooner or later, life will throw you a 7—in the form of a divorce, an unexpected illness, or the grim reaper. With this in mind, instead of metaphorically always pressing your life to the next roll, try to slip some chips of enjoyment in your pocket as you go.

When I was in practice, I insisted that young retina surgeons take a half-day off during the week and a minimum of 6 weeks' vacation. Your professional life is a marathon—not a sprint. The more you stay in emotional and physical balance, the more you will enjoy your patients and your work.

And the best tax shelter is simply to go on vacation. You get 100% of the enjoyment. The government gets nothing. It's great to attend

some professional meetings, but try to use some of the time away from the practice for nonmedical activities. Go for a walk with your spouse, get to the gym, learn a new hobby, or play a musical instrument.

Alternatively, attend your kids' tennis and soccer matches or simply put your feet up and relax. On vacation, take your family to a new country and spend even more time with your children. Saint Augustine said, "The world is a book and those who do not travel read only one page." Don't lead your life waiting for the "dream roll" and pretending the 7 will never show up. It will! Just ask Jesse.

Fortunately, Jesse is a lot better at living his life than he is at shooting craps. You will usually find him with a smile on his face and a 5 iron in his hand, someplace in America. Sadly, the real Einsteins like us may still have to spend most of our days schlepping along giving Lucentis injections. But when you can relax with your spouse on a pristine Belize beach, teach your daughter to ride a bike, or find some time to devote to philanthropy, you will have achieved the craps shooter's equivalent of "winner, winner—chicken dinner!"

Financial Disclosures

Dr. Bovino—EYE SCIENCE OCULAR VITAMIN COMPANY: Board of Directors, No Compensation Received.

ASRS 30TH *Anniversary* Thirty Years of Retinal Surgery... *Continued*

Two years later, I developed scissor delamination of ERM, initially performed with so-called horizontal scissors (actually 135°). Delamination is performed with both blades in the potential space between ERM and retina; it is best done in an inside-out direction preceded by access segmentation. *En bloc* is a nonsense term some surgeons apply to this technique; removal in one piece is reasonable only in cancer surgery. It is better to divide the ERM into sections to be removed with the cutter after delamination to avoid traction on posterior vitreous cortex attached to the outer margin of the ERM.

Curved scissors are better for both segmentation and delamination because the retina surface is concave, so curved blades are less likely to impale the retina. Likewise, curved scissors are better than vertical scissors for segmentation because blade thickness is much less than blade width; less space is required to place one blade in the potential space between ERM and retina. Transitioning from access segmentation to inside-out delamination does not require tool exchange; the curved scissors are ideal for both tasks.

'Revolutionary steps are risky and controversial, but are essential to improving outcomes and treating disorders as yet untreatable. These breakthroughs inevitably lead to evolutionary change ...'

Advances in cutter technology and fluidics have enabled use of the cutter for delamination. Scissors are still required for tabletop tractional retinal detachments with broad areas of highly adherent ERM. I have developed 2 distinct types of cutter delamination: with horizontal scissors in 1978, and conformal delamination with curved scissors in 2000. Conformal cutter delamination is required for rigid, typically thick ERM; it is performed by placing the port in contact with the edge of the ERM, with the port rotated somewhat away from the retina. It is called conformal because the cutter is rotated around the long axis to maintain optimal angle of attack while traversing retinal concavities and convexities.

Foldback delamination is performed with the cutter on top of the ERM with the port just behind the ERM's leading edge. Foldback delamination is used for more flexible, typically thinner ERMs; it is safer than conformal because the ERM is between the cutter and the retina.

Subretinal surgery

Machemer and I simultaneously and independently developed subretinal surgery in around 1980. My technique is called punch-through retinotomy and does not require diathermy, the vitreous cutter, or a large retinal incision. The closed, currently 25-gauge forceps are pushed through the retina at the highest point of retinal elevation due to the subretinal band just adjacent to the band.

The forceps are withdrawn and opened to grasp and lift the band; the endoilluminator can be used as a fulcrum to double the tangential pull length. Pre-existing retinal defects can also be used to access the subretinal space. Dense, fibrous, often vascularized bands can be divided with scissors to relieve the traction.

Relaxing retinotomy vs retinectomy

Machemer developed relaxing retinotomy at the same time I developed retinectomy in 1978. With his technique, the retina, ERM, and vitreous anterior to the retinotomy are left in place. This technique is more likely to result in chronic hypotony. Retinotomy was usually performed in a fluid environment. In contrast, retinectomy is done incrementally, under air or silicone oil, and all tissue anterior to the retinal cut is removed with the cutter. Scissors are not required and diathermy is needed only for very large vessels.

Summary

Revolutionary steps are risky and controversial, but are essential to improving outcomes and treating disorders as yet untreatable. These breakthroughs inevitably lead to evolutionary change, often by people other than the initial innovator. Continuous improvement in patient outcomes, not getting credit or financial compensation, must remain our primary goal.

Financial Disclosures

Dr. Charles – ALCON LABORATORIES, INC: Consultant, Royalty.

Trexler M. Topping, MD
Section Editor



You've Come a Long Way, Baby!

Our Society is 30! While this column usually tries to look at the future impact of changes in the US medical care delivery system, it may be useful to take a look back this time. If any of us had attempted in 1982 to predict where we would be now, how we would be managing our patients, and what our practices would look like, we would have been so far off the mark. Had someone made predictions reflecting the kinds of practice we have now, the columnist would have been laughed off as touched in the head—or maybe under the influence of some psychedelic concoction.

Now, 30 years have passed and it is time to both celebrate how retinal practice has evolved, and to see the role that the ASRS—then the Vitreous Society—has played in this evolution. The original Vitreous Society began with a number of young vitreoretinal specialists who got together, exchanged ideas, learned from one another—and had a lot of fun at the meetings.

In the early 1980s, most of us transitioned from using a vitreous infusion suction cutter (VISC) or other large-bore vitrectomy device of 3.2 mm diameter to a 20-gauge instrument. Surgery with or under air was in its infancy, with some of us using aquarium pumps to supply intraoperative air for air-fluid exchanges. Our macula-on retinal detachment patients went to the hospital and we operated immediately, often late at night.

Then in 1986, George Hilton and Sandy Grizzard presented the concept of pneumatic retinopexy at the Vitreous Society, where new and unconventional ideas were always welcome. Several years later in 1991, Neil Kelly and Rob Wendel described repairing macular holes by using vitrectomy and intraocular gas tamponade. Where did ideas like that get shared and adopted? The Vitreous Society!

Turn the clock forward nearly 2 decades. At the 2005 ASRS Annual Meeting in Montreal, Phil Rosenfeld described the use of Avastin in treating exudative AMD—and a cataclysmic change in retina practice ensued.

What I said about the spirit of the group of young surgeons who got together for friendship, sharing of ideas, and learning from one another has certainly shown itself to be true. ASRS has blossomed into the forum for presenting new ideas and speeding improved quality care to our patients; this is made possible by our members' adopting the exciting, beneficial concepts and techniques they learn more about at ASRS.

Through the years, I have had a role in the federal affairs side of medicine—a strange field to me after working in laboratory and clinical research. I fondly remember Sandy Grizzard representing the Vitreous Society at the American Academy of Ophthalmology (AAO) Council, vehemently orating about the value of and need for subspecialty accreditation. The push for accreditation still goes on, but its roots were in this group.

As we move farther into the realm of federal coverage and payment policy, we see more and more contribution by ASRS members in presenting to the Health Care Financing Administration (HCFA)—now the Centers for Medicare & Medicaid Services (CMS), and testifying at the AMA/Specialty Society Relative Value Scale Update Committee (RUC).

Eloquent presentations by Kirk Packo, contributions by Pravin Dugel, and tireless work by George Williams have guided decision making to make the lives of retinal specialists better—thereby improving patients' lives even more. Retina specialists wear many hats as members of ASRS, the AAO, other societies, state groups, and more. But CMS knows ASRS representatives are presenting reliable information, and the agency listens as much as it can—although with all the craziness of health care financing, presbycusis may be setting in. We all should be proud of the ASRS members who step up to enable us all to practice more efficiently.

Through the years, we've scribbled notes in our paper charts and learned to draw pretty multicolored pictures of tears and detachments. The Dictaphone used to be almost another appendage. Times are passing, and how I wish I had learned to type in high school! Our notes today are actually legible, and information can be so much more expeditiously transferred. It is now easy to send notes on our snow bird patients to physicians in the South—with fax or email, or print the notes and put them in the patient's hand.

'The ability to show images to patients and families in our exam rooms has led us into a real epoch of patient-centered medicine.'

Electronic gizmos intrigue retina specialists. How many of us have iPhones, iPads, and digital cameras? This is a help to us, as with all of our digital imaging—OCTs, photos, and angiography. The ability to show images to patients and families in our exam rooms has led us into a real epoch of patient-centered medicine. A wet-AMD patient has an OCT and comes into the exam room with her family. As I project the OCT onto the big screen, her daughter says, "Mom, do you see the fluid? You do need an injection today." Now patients really *are* involved in their care.

I feel an obligation to look at the tea leaves again—but I will not be so foolhardy as to predict the next 30 years. I will say I am confident the Society will exert extreme efforts to keep ASRS the place to come and share information about the best new and improved

Continued on page 54

Matthew T. Witmer, MD



Stephen Tsang, MD, PhD



Szilárd Kiss, MD



K. Bailey Freund, MD
Section Editor



Case History: A 53-year-old male with beta thalassemia major was referred for an evaluation after experiencing 2 weeks of blurry vision which seemed worse during the night and decreased color vision. He denied any family history of ocular disease. On presentation, visual acuity was 20/80 in both eyes. The patient demonstrated a central scotoma in both eyes.

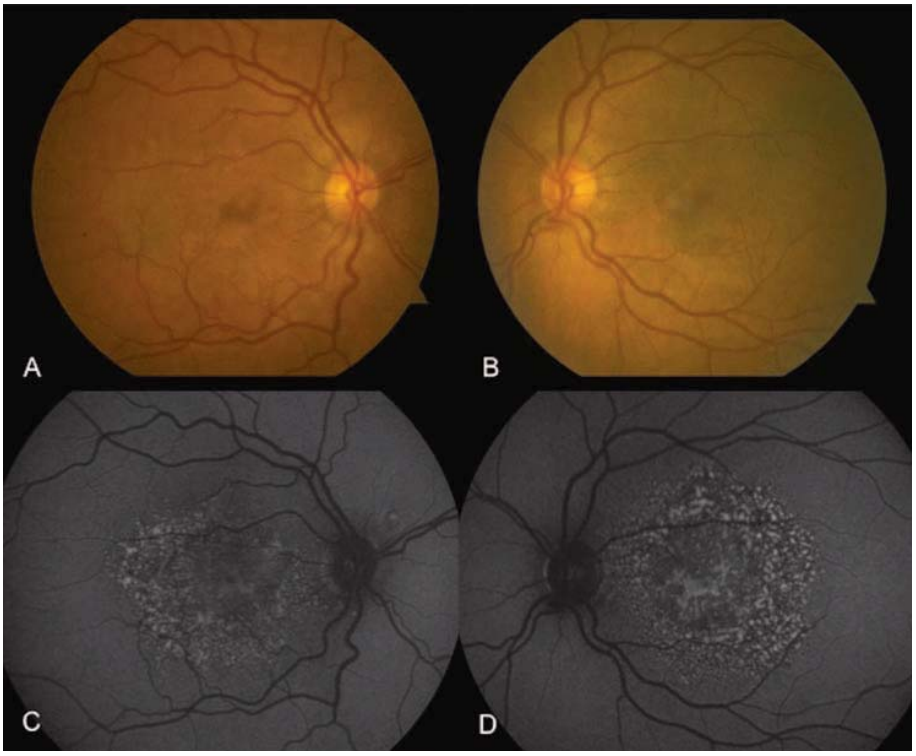


Figure 1. Color photographs of the right (A) and left (B) eye on presentation demonstrate RPE changes within the macula. FAF images of the right (C) and left (D) eyes highlight the RPE abnormalities more clearly and reveal a speckled pattern of hyper- and hypoautofluorescent abnormalities.

Dilated funduscopic examination findings and fundus autofluorescence findings are shown in Figure 1. Spectral-domain OCT (SD-OCT) images are shown in Figure 2. Fluorescein angiogram images are shown in Figure 3.

The electroretinogram (ERG) showed a delay in the transient photopic and 30 Hz flicker cone response in both eyes. The scotopic and rod-specific ERG appeared normal. The electrooculogram was normal.

What is your diagnosis?

See discussion on page 56.

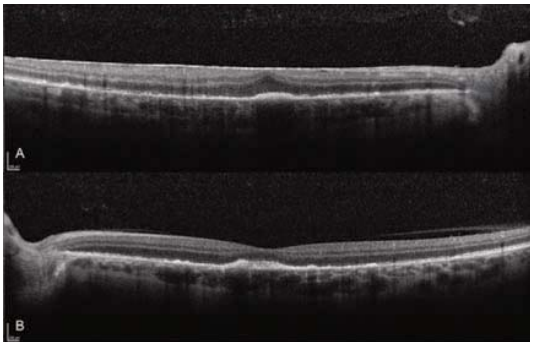


Figure 2. SD-OCT of the right (A) and left (B) eyes on presentation shows bilateral diffuse disruption of the IS/OS junction and a collection of subretinal hyperreflective material beneath the fovea.

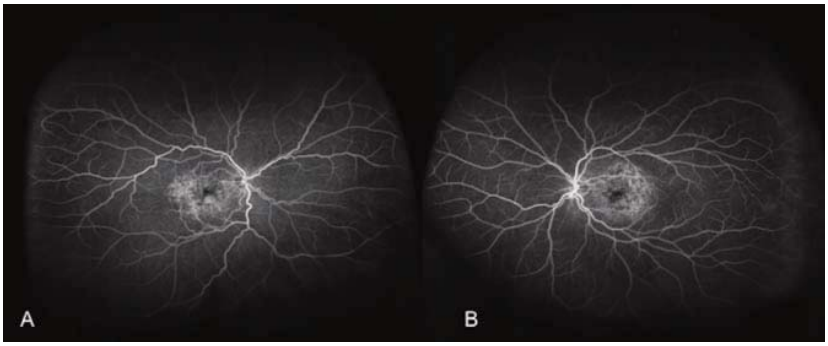
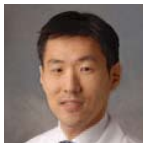


Figure 3. Ultra-wide-field fluorescein angiogram of the right (A) and left (B) eyes at 1 minute. There is hyperfluorescence in the central macula that stained in the later frames.

Johnstone M. Kim, MD



Michael M. Altaweel, MD
Section Co-Editor



Asheesh Tewari, MD
Section Co-Editor



Vitrectomy without Laser Treatment or Gas Tamponade for Macular Detachment Associated with an Optic Disc Pit

[published online ahead of print January 4, 2012]. Hirakata A, Inoue M, Hiraoka T, McCuen BW. *Ophthalmol.* 2012;119(4):810-818.

Though often asymptomatic and incidental, optic disc pits can be complicated by serous macular detachments and a schisis-like separation of the inner and outer retina. There is controversy in the treatment of optic disc pit maculopathy. Currently treatments can include the use of peripapillary laser to create a barrier between the optic disc and the potential fluid space in the macula.

Other treatments include varying combinations of vitrectomy, induction of a posterior vitreous detachment (PVD), laser photocoagulation, and internal gas tamponade. Less commonly advocated treatments include internal gas tamponade alone and macular scleral buckling.

This author group previously reported on the efficacy of vitrectomy with PVD induction and gas tamponade without laser treatment in managing macular detachments associated with optic disc pits. Although the success rate of reattachment was high, complete successful reattachment took almost 1 year after surgery.

Thus, the authors postulated that gas tamponade might not be necessary, as gas was resorbed long before successful reattachment. The elimination of intraocular gas tamponade removes potential complications of fluid-air exchange as well as the need for postoperative facedown positioning.

This noncomparative, retrospective, interventional case series aimed to evaluate the clinical outcomes of vitrectomy without gas tamponade or laser photocoagulation at the margin of the optic nerve when treating optic disc pit-associated macular detachments. All eyes were evaluated with OCT.

Eight eyes from 8 patients (ages 8 to 56 years) with optic disc pit-associated macular detachments were followed for 10 to 46 months after surgery (mean 26 months). Twenty-gauge vitrectomy was performed on 3 eyes and 25-gauge vitrectomy was performed on 5 eyes. PVD was induced with the intention of releasing vitreous traction at the optic disc pit.

Preoperative vision ranged from 20/20 to 20/300 (mean 20/67), with a duration of symptoms from 2 to 35 months. Complete retinal attachment was achieved in 7 of 8 eyes after initial treatment, where the postoperative OCT showed an acute reduction of inner schisis-like separation adjacent to the disc and a gradual decrease in outer retinoschisis-like separation.

Macular detachment decreased gradually, with complete macular attachment ranging from 6 to 16 months (mean 12 months). The corresponding visual acuity also improved postoperatively, and all 7 patients had final best-corrected visual acuity (BCVA) of 20/30 or better.

One patient did not reattach with vitrectomy without laser or gas tamponade and required a repeat surgery with internal limiting membrane (ILM) peel, subretinal fluid drainage, gas tamponade, and peripapillary laser. Reattachment was achieved 24 months after the initial surgery.

The authors postulate that peripapillary vitreous traction in patients without a PVD is the trigger for schisis-like separation, and perivascular spaces around the pit allow for the passage of fluid into the retina, causing maculopathy. Therefore, the release of anterior-posterior vitreous traction would structurally address the principal trigger for the maculopathy.

Application to Practice: There are many recommended ways to address optic disc pit-related maculopathy. Vitrectomy with induction of a PVD, without gas tamponade or laser photocoagulation, can be an effective method to treat a majority of cases without the added risks of peripapillary laser or fluid-gas exchange.

One-Year Outcomes of the DA VINCI Study of VEGF Trap-Eye in Eyes with Diabetic Macular Edema

[published online ahead of print April 25, 2012]. Do DV, Nguyen QD, Boyer D, et al; DA VINCI Study Group. *Ophthalmol*. In press.

Diabetic macular edema is the leading cause of vision loss due to diabetic retinopathy. A number of recent clinical trials have demonstrated the potential of intravitreal anti-VEGF agents to effectively reduce diabetic macular edema and improve visual acuity. The DA VINCI study is a randomized, double-masked, phase 2 clinical trial that compared various doses and dosing regimens of VEGF Trap-Eye with laser photocoagulation for the treatment of eyes with diabetic macular edema.

There were 5 possible VEGF Trap-Eye treatment regimens in the study: 0.5 mg every 4 weeks (0.5q4); 2 mg every 4 weeks (2q4); 2 mg every 8 weeks after 3 initial monthly doses (2q8); 2 mg dosing as needed after 3 initial monthly doses (2PRN); or macular laser photocoagulation.

VEGF Trap-Eye groups responded favorably over 52 weeks compared with the laser group in visual acuity, reduction in retinal thickness, and in severity of diabetic retinopathy. The findings were consistent with those reported previously at 24 weeks. Mean BCVA improved by 11.0 letters in the 0.5q4 group, 13.1 letters in the 2q4 group, 9.7 letters in the 2q8 group, 12.0 letters in the 2PRN group, and decreased by 1.3 letters in the laser group ($P \leq .001$ vs laser).

A gain of 15 or more ETDRS letters was achieved in 40.9% ($P = .0031$), 45.5% ($P = .0007$), 23.8% ($P = .1608$), and 42.2% ($P = .0016$) for the VEGF Trap-Eye groups vs 11.4% for laser. Mean central retinal thickness as determined by OCT was reduced in the VEGF Trap-Eye groups by 165.4 µm, 227.4 µm, 187.8 µm, and 180.3 µm vs an increase in retinal thickness of 58.4 µm in the laser group ($P < .001$ vs laser).

At week 52, 40%, 31%, 64%, and 32% of the 0.5q4, 2q4, 2q8, and 2PRN VEGF Trap-Eye groups, respectively, had an improvement in their diabetic retinopathy severity score, compared with 12% in the laser group.

Adverse events in the trial were similar to those described in therapeutic trials of other anti-VEGF agents. Two eyes developed injection-related endophthalmitis. Systemic adverse events such as hypertension and congestive heart failure were generally attributed to the patient's underlying medical condition.

Application to Practice: The current study has provided strong evidence of efficacy of VEGF Trap-Eye for treating diabetic macular edema from the standpoint of retinal morphology and visual acuity outcomes. In addition to improving macular edema, the progression of diabetic retinopathy was frequently stopped or reversed—offering another advantage in comparison with macular laser.

Treatment with VEGF Trap Eye on a PRN basis (following 3 serial intravitreal injections) was similarly effective as other treatment regimens, offering the potential to reduce treatment burden. VEGF Trap-Eye for diabetic macular edema will be evaluated further in Phase 3 clinical trials.

Photoreceptor Damage and Foveal Sensitivity in Surgically Closed Macular Holes: An Adaptive Optics Scanning Laser Ophthalmoscopy Study

[published online ahead of print April 23, 2012]. Ooto S, Hangai M, Takayama K, Ueda-Arakawa N, Hanebuchi M, Yoshimura N. *Am J Ophthalmol*. In press.

The success rate of anatomic closure of macular holes (MHs) after vitrectomy, internal limiting membrane (ILM) peel, and intraocular gas is high. However, successful closed macular holes without concurrent satisfactory visual recovery remains problematic for some patients. There is interest in finding pre- and postoperative indicators for successful visual recovery after MH repair.

Recent studies with OCT have shown associations of disrupted photoreceptor IS/OS junction and postoperative visual dysfunction. This prospective interventional case series takes this research a step further. The series looks at photoreceptor structure using adaptive optics scanning laser ophthalmoscopy (AO SLO) to evaluate decreased cone density and areas of cone loss; it then correlates findings with visual function measured by microperimetry (MP-1; NIDEK, Padova, Italy) and visual acuity. They also correlated findings from AO SLO and spectral-domain OCT (SD-OCT).

Twenty-one eyes of 19 patients with idiopathic full-thickness macular holes (stages 2 to 4) underwent 23-gauge vitrectomy. Either triamcinolone acetonide (8) or 0.05% indocyanine green (ICG) dye (13) ILM peel was performed, followed by a fluid-gas exchange with 25% sulfur hexafluoride (SF6) and facedown positioning for 7 days. All patients had anatomically closed macular holes postoperatively. Fifteen nonoperative normal patients were used as controls.

AO SLO was used to obtain both mean cone density and mean extent of dark area (absence of cones) in square millimeters. When compared with controls, postoperative cone density was significantly less: 19,650 cones/mm2 vs 31,775 cones/mm2 respectively ($P = .003$). The dark areas measured 0.203 +/- 0.222 mm2 compared with 0 in normal eyes.

Both preoperative ($P = .024$) and postoperative ($P < .001$) visual acuity correlated with postoperative cone density. Lower cone density and higher cone loss area correlated with poorer visual acuity. Foveal sensitivity, measured by fundus monitoring microperimetry, also correlated with cone density and cone loss area.

SD OCTs were obtained pre- and postoperatively. IS/OS junction reflectivity, as measured by intensity on gray-scale relative to unaffected peripheral macula, was used to determine the mean diameter of decreased reflectivity; this measured the structural disruption of the IS/OS junction on SD OCT.

The OCT also demonstrated that lower cone density correlated with thinner inner and outer segments ($P = .014$), but did not correlate with thickness of the outer nuclear layer. There was a correlation between cone loss area ($P = .13$) and decreased IS/OS reflectivity size and a trend toward correlation between decreased IS/OS reflectivity size ($P = .156$) and cone density.

Application to Practice: Anatomically closed macular holes can occasionally fail to achieve satisfactory visual recovery. This can sometimes be explained by structural defects in the retina, particularly the photoreceptor cell layer, as demonstrated by abnormalities in the IS/OS junction on OCT.

AO SLO measured photoreceptor density and identified areas of photoreceptor cell loss that corresponded with poor visual outcome. This may provide another way to evaluate visual recovery and retinal function in patients with macular hole undergoing surgical repair.

Prediction of Proliferative Vitreoretinopathy after Retinal Detachment Surgery: Potential of Biomarker Profiling.

[published online ahead of print April 30, 2012]. Ricker LJAG, Kessels AGH, De Jager W, Hendrikse F, Kijlstra A, la Heij EC. *Am J Ophthalmol*. In press.

Proliferative vitreoretinopathy (PVR) remains the most common reason for redetachment after retinal detachment repair. As new prophylactic therapies emerge to prevent PVR formation, high-risk subgroups need to be identified to improve the risk-to-benefit ratio of adjunctive treatments. Various cytokines have been implicated in contributing to the development of PVR. This study attempts to evaluate the potential for biomarker profiling in identifying this specific subgroup.

This retrospective case-controlled study evaluated undiluted subretinal fluid samples collected from scleral buckle surgeries for primary rhegmatogenous retinal detachment repairs. These detachments had a maximum PVR grade of C1 and greater than 1 quadrant involvement. Of the 306 samples collected, 45 patients redetached secondary to PVR.

Twenty-four samples were excluded because of low sample volume or contamination (9), late-developing PVR (6), preoperative vitreous hemorrhage (4), preoperative trauma (4), or preoperative cryotherapy (1).

Twenty-one samples were compared with control samples from patients who did not redetach. On average, 86% had macula-off detachments, 81% had intraocular gas injections, 71% had intraoperative cryotherapy, and 33% were pseudophakic.

Multiplex immunoassays (Luminex; Austin, Texas) were used. These contained antibody-coated microspheres incubated with subretinal fluid along with the 50 potential biomarkers of interest.

Mark E. Hammer, MD
President, Foundation of the
American Society of Retina Specialists



Meet Our New Interim Foundation Director


Robyn Lira

Robyn Lira, ASRS director of member relations, has just been named the interim director of the Foundation. She will oversee fundraising to support ASRS programs designed to improve the quality of life for people with retinal disease.

Robyn joined ASRS in 2010, soon after the Society moved from Chico, California to Chicago. She previously worked for the American Academy of Physical Medicine and Rehabilitation, as well as for the National Association of Social Workers. Robyn holds a bachelor's degree in English from Valparaiso University in Indiana.

Foundation to raise funds for ASRS projects

The Foundation is beginning to fund some exciting new ASRS initiatives. Robyn's goal is to make sure our members, as well as the public, become familiar with our efforts to educate physicians and patients on the latest advances in retina.

In 2012, the Foundation is raising funds for the Society to update our Saving Vision website, which will be accessed either through the ASRS website or directly from www.savingvision.org. This patient portal is designed to provide the most up-to-date information on retinal diseases and treatments.

RETINA 20/20 will help educate patients

Robyn also will be involved in fundraising for the new RETINA 20/20 program, co-chaired by Neil Bressler, MD, and Sophie Bakri, MD. This patient education campaign is designed to support the goals of Healthy People 2020—a program of the US Department of Health and Human Services aimed at improving the overall health of Americans. The focus of RETINA 20/20 is to provide information to help patients reduce visual impairment due to AMD and diabetic retinopathy.

Financial Disclosures
Dr. Hammer – None.

TEA LEAVES >> *Continued from page 50*

ways to help our patients. I am sure ASRS physicians will continue to do groundbreaking research, as I mentioned in my summer 2012 column, to improve our patients' quality of life. I am also confident that ASRS members will continue to selflessly give of their time in our struggles with CMS, the government, and payors. While I cannot imagine the practice of the future, it will only be so much better.

While musing about this Society's first 30 years, I am reminded of a commercial slogan, "You've come a long way, Baby!" I daresay the excitement of ASRS and its membership is much more addictive than the Virginia Slims cigarettes they were selling with that ad campaign.

Financial Disclosures:

Dr. Topping – OPHTHALMIC MUTUAL INSURANCE COMPANY: Board of Directors, Honoraria; NATIONAL EYE INSTITUTE: Contract Research, Grants.

LITERATURE ROUNDUP >> *Continued from page 53*

The biomarkers of interest included various interleukins (ILs), growth factors, chemokines, adhesion molecules, adipokines, proteases, and inhibitors. Researchers analyzed the correlation between concentrations of biomarkers and clinical preoperative and intraoperative risk factors for PVR.

Eighteen biomarkers were shown to be significantly different between the PVR group and case controls. The markers included IL-1a, IL-2, IL-3, IL-6, IL-11, macrophage migration inhibitory factor (MIF), chemokine (C-C motif) ligand 2, CCL3, CCL11, CCL17, CCL18, CCL19, CCL22, chemokine (C-X-C motif) ligand 10, cathepsin S, adiponectin, and intercellular adhesion molecule-1.

The only clinical variable that was an independent predictor of postoperative PVR development was preoperative PVR. The combination of 3 biomarkers: CCL22, IL-3, and MIF in conjunction with preoperative PVR was the best predictor for postoperative PVR redetachment.

The model was able to predict the outcome for PVR redetachment in 94% of cases, with a sensitivity of 94.1% and specificity of 94.2%.

Application to Practice: The combination of IL-3, CCL22, and MIF biomarkers, along with the preoperative PVR grade, improved the predictability of identifying high-risk patients for PVR-related redetachment. Though currently not commercially available, biomarker profiling may enable identification of high-risk subgroups, allowing targeted treatment for PVR prophylaxis in this specific demographic.

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Dr. Tewari – SYNERGETICS USA: Consultant, Honoraria.

Dr. Kim – None.

Discussion

Upon further questioning, the patient revealed that he had been taking subcutaneous deferoxamine to treat iron overload due to chronic blood transfusions. Five months after the cessation of the deferoxamine, the patient's visual acuity returned to 20/30 OU and the OCT showed an improvement in the outer retinal anatomy (Figures 4 and 5).

Deferoxamine mesylate is an iron chelator used to treat chronic iron overload in patients with transfusion-dependent anemias or high serum aluminum in patients on dialysis. This medication may be administered subcutaneously, intramuscularly, or intravenously. The ocular side effects of deferoxamine include cataracts, optic neuropathy, and retinal toxicity.[1]

The typical visual symptoms of retinal toxicity from deferoxamine include blurry vision, decreased color vision, nyctalopia, metamorphopsia, or a central scotoma. Upon funduscopic examination, patients may demonstrate macular and/or peripheral RPE changes. These changes may be located in the peripapillary, papillomacular, and paramacular regions.[2] The earliest funduscopic change is typically a subtle opacification or loss of retinal transparency of the outer retina and RPE.[2] OCT may show disruption of the architecture of the outer retina.

Fundus autofluorescence (FAF) imaging may show stippled hyperautofluorescence within an area of hypoautofluorescence. These FAF abnormalities may precede funduscopic lesions and visual symptoms. A recent report of patients with beta thalassemia who used deferoxamine for a minimum of 10 years indicated that 9% of patients demonstrated FAF abnormalities.[3] The authors classified the FAF changes into 4 categories: minimal change, focal, patchy, and speckled.[3]

Alterations found with FAF imaging did not necessarily correspond to funduscopic examination findings, suggesting that FAF imaging provides different diagnostic information to assess toxicity. Fluorescein angiography may show diffuse, late hyperfluorescence in early cases, which may precede the development of RPE changes.

Deferoxamine toxicity also causes ERG abnormalities such as reduced scotopic and photopic a and b wave amplitudes or prolonged rod and cone implicit times. The EOG may show reduced Arden ratios.

The pathophysiologic mechanism by which deferoxamine causes toxicity is unclear. However, current theories include direct toxic effects of the medication to the RPE cells, mediated by p38.[4] An additional hypothesis relates to a toxic effect of iron-, copper-, or zinc-deficient environments induced by deferoxamine.

Treatment of deferoxamine toxicity requires either drug cessation or dose reduction. These measures may allow for vision to improve as well as the electrophysiologic abnormalities to normalize. However, in some patients, the vision loss is irreversible. Continued use of the medication may result in further vision loss. It has been suggested that ophthalmic screening should be carried out for patients receiving high-dose subcutaneous or intravenous therapy.[5] Early detection of retinal toxicity may lead to the appropriate adjustment of the dose and prevention of long-term visual loss.

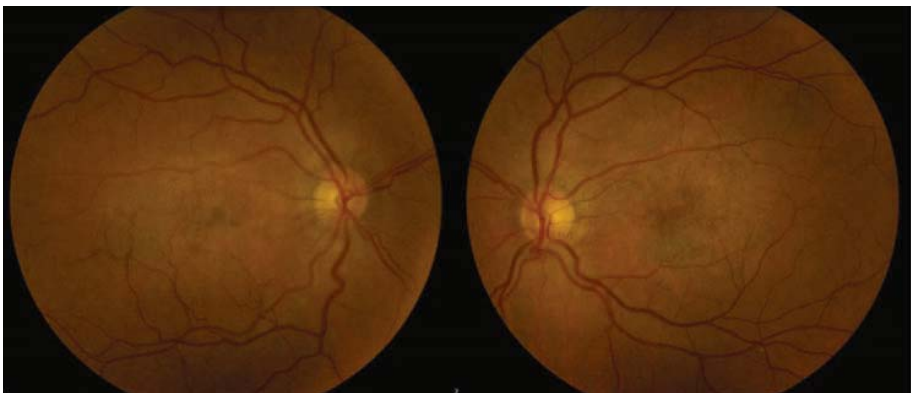


Figure 4. Color photographs of the right (A) and left (B) eyes 5 months after cessation of deferoxamine. There are persistent RPE alterations in the central macula of both eyes. Visual acuity was 20/30 OU.

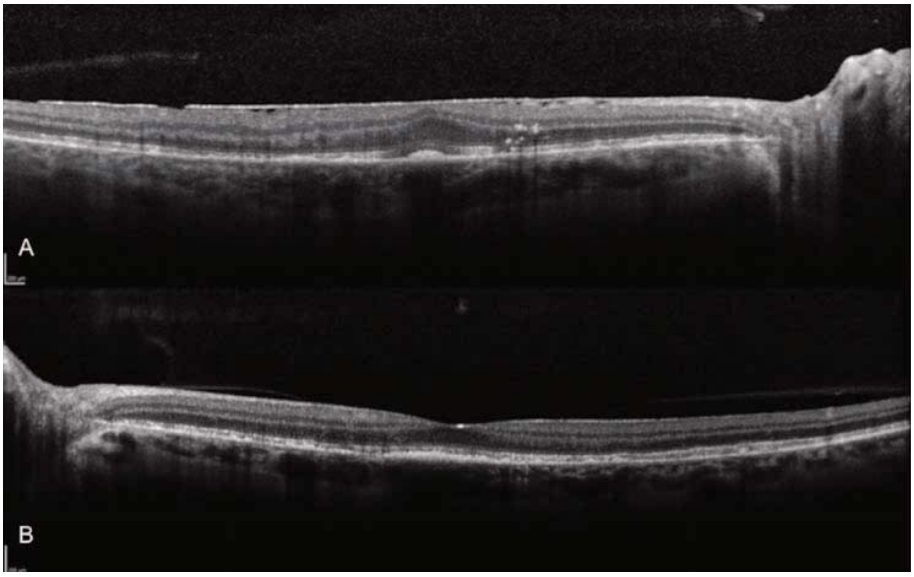


Figure 5. SD-OCT of the right (A) and left (B) eyes 5 months after cessation of deferoxamine shows partial recovery of the IS/OS junction in both eyes.

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Financial Disclosures

Dr. Freund – GENENTECH: Advisory Board, Investigator, Honoraria; REGENERON PHARMACEUTICALS, INC: Advisory Board, Consultant, Honoraria; QLT, INC: Consultant, Honoraria; ALIMERA SCIENCES: Advisory Board, Honoraria; DIGISIGHT: Advisory Board, Honoraria.

Dr. Witmer – None.

Dr. Kiss – ALLERGAN, INC: Advisory Board, Grants, Consultant, Honoraria, Investigator, Speaker; OPTOS PLC: Advisory Board, Grants, Consultant, Honoraria, Investigator, Speaker; GENENTECH: Advisory Board, Grants, Investigator, Speaker; REGENERON PHARMACEUTICALS, INC: Advisory Board, Grants, Investigator; ALIMERA SCIENCES: Advisory Board, Honoraria, Consultant, Speaker.

Dr. Tsang – None.

if the treating physicians had not contacted the ASRS TSC. We would like to thank all the treating physicians and would like to urge our colleagues to continue to report adverse events to the FDA MedWatch or to the ASRS TSC.

'[T]hese important cases would have gone unreported, perhaps endangering many more patients, if the treating physicians had not contacted the ASRS TSC.'

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ASRS helps members choose compounding pharmacies wisely

Last fall, when reports emerged of endophthalmitis cases resulting from tainted Avastin, ASRS surveyed members regarding their compounding pharmacies. The September 2011 survey asked ASRS members to identify the compounding pharmacies they were using. With this information, the Society sent a detailed questionnaire to those pharmacies, asking about their quality-control steps for ensuring that bevacizumab is safely compounded and distributed.

Compounding pharmacy information is available on the ASRS website

ASRS published the compounding pharmacies' completed questionnaires on its website in early October 2011 at http://www.asrs.org/education/clinical-updates/13. This detailed information on compounding pharmacies' standards for drug preparation and testing is intended to help you choose a compounding pharmacy that adheres to strict safety standards.

The ASRS website also offers tools for you to use when contacting compounding pharmacies, including a sample letter and the pharmacy safety questionnaire.

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