Precision + Innovation

Defining the Future of Ophthalmology

Celebrating 200 YEARS 1820 – 2020

New York Eye and Ear Infirmary of Mount Sinai

Message from James C. Tsai, MD

President, New York Eye and Ear Infirmary of Mount Sinai
Delafield-Rodgers Professor and Chair,
Department of Ophthalmology
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Mount Sinai Health System

As America's first eye specialty hospital, founded in 1820, New York Eye and Ear Infirmary of Mount Sinai (NYEE) has made it its mission to enhance patient care through groundbreaking research and innovation that can be rapidly translated from bench to bedside. In this issue, we take a closer look at one of NYEE's esteemed physicians, Paul Finger, MD, FACS, and his pioneering work in the field of ocular cancer, which has had a profound impact on current treatment modalities and their outcomes. In addition, NYEE continues to move forward in bringing robotic microsurgical interventions to the United States as the hospital comes closer to its first clinical trials in epiretinal membrane peeling.

Last year NYEE proudly celebrated its 200-year legacy of leadership, excellence in patient care, and training the ophthalmic leaders of tomorrow. While the ongoing impact of the COVID-19 pandemic prevented us from holding in-person celebratory events, we look forward to welcoming alumni, friends, colleagues, and supporters of NYEE at the Bicentennial Gala and CME Symposia in 2022.

Save the Date

NYEE Celebrates Its 200th Anniversary

Bicentennial Gala
The Plaza Hotel
768 Fifth Avenue,
New York, NY

Thursday, March 24, 2022

Transformational Ophthalmology 2022: Envisioning Our Third Century
New York Academy of Medicine
1216 Fifth Avenue, New York, NY

Friday, March 25, 2022

For more information and tickets go to **www.nyee.edu/200years**

Readying the Robot for Its U.S. Clinical Debut

Dr. Ianchulev using the microsurgical robot with an eye model in an intraoperative training scenario.

The first robotic assistant for ophthalmic surgery in the United States is being groomed by New York Eye and Ear Infirmary of Mount Sinai (NYEE) in 2021 for a host of clinical firsts, including pivotal regulatory trials, development of a high-precision glaucoma module, and advanced surgical training. The system arrived in June 2020 from its creator in the Netherlands, Preceyes B.V., which is now partnering with NYEE to make the device the centerpiece for a new chapter in micro-interventional ophthalmic surgery in this country and around the world.

To provide a platform for this intensifying effort, the Mount Sinai Health System launched a long-term collaboration with Preceyes in January. That arrangement gives Mount Sinai an equity investment in the Dutch medical robotics company, as well as a seat on its board of directors.

"This partnership provides a joint leadership role for NYEE, Mount Sinai, and Preceyes to bring robotics into the mainstream of ophthalmic surgery," says Tsontcho (Sean) Ianchulev, MD, MPH, Professor of Ophthalmology at the Icahn School of Medicine at Mount Sinai, whose work with Preceyes over the past seven years led to the device's debut in the United States. "It's not just the installation of a robot; it's a very extensive collaboration for development of new technology and intellectual property."

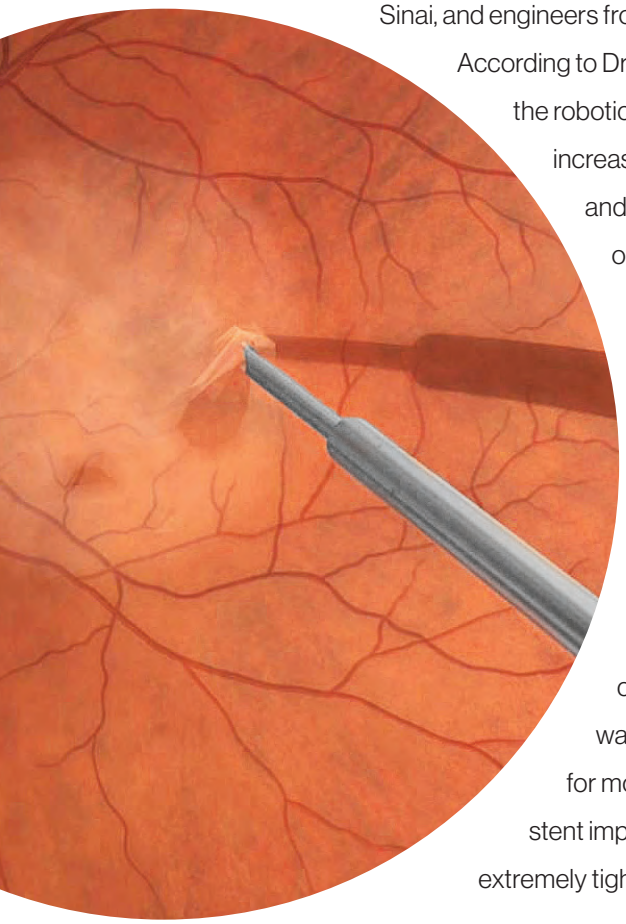
A critical step is clinical trials required by the U.S. Food and Drug Administration before the robot's rollout in the operating room. The initial study will involve retinal surgery and, more specifically, a module originally developed by Preceyes (and already approved in Europe) for epiretinal membrane peeling to remove micron-thin sheets of cells that grow over the macula, distorting its surface and greatly reducing central vision. "This is where the high precision of the robotic assistant can play a crucial role by minimizing traumatic impact of surgery on the retinal tissue," explains Dr. Ianchulev, who is Director of the Ophthalmic

Innovation and Technology Program at NYEE.

The device's unprecedented level of accuracy is also setting the stage for development of the first-ever robotics for micro-interventional glaucoma surgery. Backed by a New York Eye and Ear Infirmary Foundation grant, the task of creating sophisticated software and hardware for this application is being shared by ophthalmic surgeons and a newly hired bioengineer from NYEE, the biomedical design team at Mount Sinai, and engineers from Preceyes.

Close-up view of the robot. The balanced manipulator design offers a quick ejection response time <0.5 s, manually removable instrument and manipulator, trocar connection for eye stabilization.

According to Dr. Ianchulev, the robotic assistant will increase the precision and resolution of surgical interventions within the anterior chamber of the eye by 20 to 30 times. This capability could pave the way, for example, for more accurate stent implantation in the extremely tight trabecular space (100 to 200 microns wide) of Schlemm's canal. Indeed, by reducing the approximately 100-micron natural tremor of the human hand to between one and two microns, robotic-assisted surgery could pave the way for a new era of glaucoma microsurgical intervention.



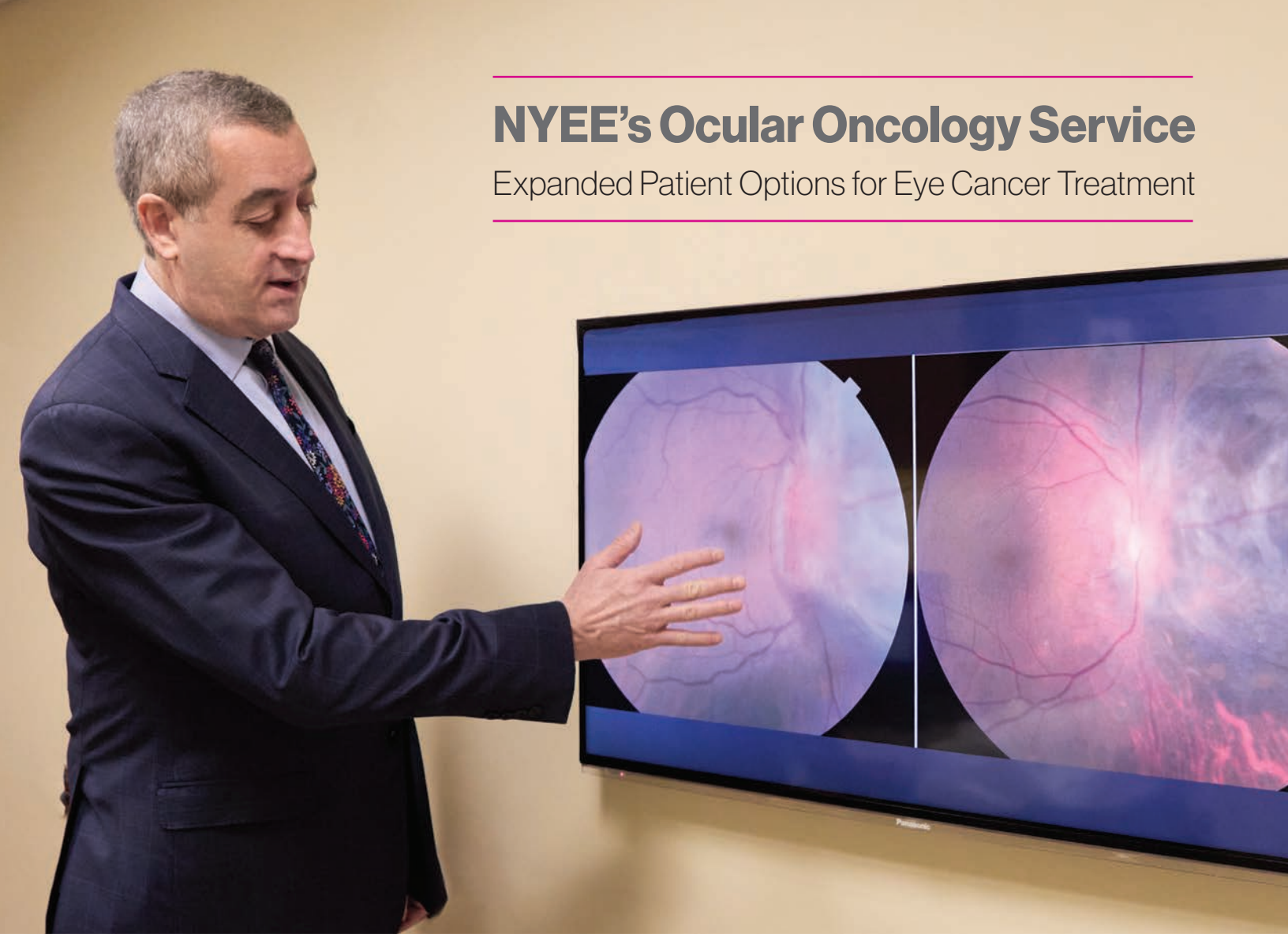
Microsurgical robot connected to the EyeSi virtual surgical simulator in the Buxton Microsurgical Center where ophthalmic surgeons and trainees can practice epiretinal membrane peeling.

The surgical robot is also opening exciting new training opportunities, which will include residents and fellows at NYEE beginning this year. As part of that initiative, NYEE has connected the robot to the EyeSi surgical simulator in the Jorge N. Buxton, MD, Microsurgical Education Center. "By training residents and fellows in the use of the surgical robot, we'll continue NYEE's tradition of special surgical wet labs at our world-class Buxton microsurgical laboratory," says Harsha S. Reddy, MD, Director of Residency Training at NYEE. "Trainees are taught here in small-group settings by surgeons who are experts in their fields."

Even in advance of the surgical robot's clinical validation, it is drawing intense interest from surgeons around the country. "The robot is already being widely seen as a game changer, and we expect the excitement to grow as we get closer to implementation," notes Dr. Ianchulev. "We're certainly anxious to extend the technology by collaborating with others who have serious ideas for surgical innovation in areas like subretinal injections and gene therapy."

NYEE's Ocular Oncology Service

Expanded Patient Options for Eye Cancer Treatment



Dr. Finger showing before and after treatment of a choroidal melanoma. ***Left:*** *Before treatment, tumor completely encircles and covers the optic disc.* ***Right:*** *Two years after Finger's slotted plaque radiation therapy, the melanoma is darker, smaller, and the optic disc is uncovered.*

Since its inception in 1989, the Ocular Oncology Service at New York Eye and Ear Infirmary of Mount Sinai (NYEE) has been a home to the most advanced forms of eye cancer treatment in the world. For the past 30 years, it has offered patients a range of treatment options aimed at preserving life, preserving the eye, and saving sight.

The founding Director of the service, Paul T. Finger, MD, FACS, pioneered many of the surgical and therapeutic breakthroughs that have become a staple not only at NYEE's Ocular Oncology Service but around the world. They include the use of topical chemotherapy for conjunctival melanoma, anti-VEGF therapy following radiation, and innovations in radioactive plaque treatment. On the diagnostic side, NYEE has developed and introduced new applications of ultrasound biomicroscopy, optical coherence tomography, and digital imaging, all designed to identify and target eye cancers with submillimeter precision.

Because ocular cancers are often complex and systemic in nature, our experts work closely with multiple specialists at Mount Sinai, including radiation oncologists, oncologists, and hematologists to provide the most comprehensive and appropriate treatment. The Ocular Oncology Service also relies on the deep expertise of the Ophthalmic Pathology Service. The only remaining eye pathology department in the New York metropolitan area, our pathology service offers accurate diagnoses and the most sophisticated analyses of eye tumor biopsies. Within NYEE's own network, specialists in oculoplastic and reconstructive surgery help optimize our patients' appearance and function in cases that require eyelid tumor repair.

Topical Chemotherapy

In 1993, Dr. Finger became the first physician to use mitomycin chemotherapy eye drops to treat conjunctival melanoma and primary acquired melanosis. Since then, the therapy has become widely used around the world to reduce tumors prior to surgical removal, and with surgery in cases where excess normal tissue is involved. More recent work showed that topical interferon chemotherapy (Intron A) eye drops could be used to treat superficial conjunctival melanoma and most giant conjunctival squamous carcinomas without surgery. On the Ocular Oncology Service, almost all squamous carcinomas are cured with eye drops alone.

Finger-Slotted Eye Plaques

Not satisfied with existing treatments, Dr. Finger invented this technique, which allows ophthalmologists to both effectively treat and often save the sight (and potentially the lives) of patients whose choroidal melanoma is near, touching, or wrapped around the optic nerve. This unique approach provides 8-mm slots or cut-outs to accommodate the orbital optic nerve into the radioactive disk (thus bringing the disk's radiation seeds into position as to completely treat the entire intraocular tumor).

Unlike old fashioned notched plaques, "Finger's-slotted Eye Plaques" allow the entire tumor to be covered by the radiation. Improved local control has saved lives and eliminated most of the enucleations previously performed on choroidal melanoma patients at NYEE.

Anti-VEGF Therapy Following Plaques Radiation

While radiation has become the treatment of choice for patients with intraocular melanoma, concern has persisted over the damage it can cause to surrounding structures, including irreversible vision loss from radiation maculopathy (RM). Physicians at NYEE worked to change the paradigm through research that showed early administration of monthly intravitreal anti-VEGF medication (bevacizumab) was well tolerated and prevented or delayed vision-threatening RM in high-risk choroidal melanoma patients after plaque therapy (Ophthalmology Retina, May 2020). Without anti-VEGF treatment, the average patient with posterior choroidal melanoma became 20/160 due to radiation optic neuropathy or maculopathy. "In contrast, utilizing early intervention and tight suppression with periodic intravitreal anti-VEGF therapy, the average patient retained 20/32," says Dr. Finger, who conducted a recent study with Brittany Powell, MD, a retina fellow in the Department of Ophthalmology at NYEE, and holds the U.S. patent for anti-VEGF therapy for radiation vasculopathy. "It's been a game-changer for eye cancer patients," asserts Dr. Finger.

Palladium-103 Plaques Radiation Therapy

At a time when most ocular oncologists were treating intraocular choroidal and iris melanoma with iodine-125 or ruthenium-106 plaque therapy, NYEE's Ocular Oncology Service once again offered its patients a better solution. In 1991, Dr. Finger discovered that the use of palladium-103 plaque brachytherapy typically offered improved intraocular radiation distributions compared to the more widely used iodine-125 plaques. The use of palladium-103 enhanced vision retention and local cancer control.

Micro-Incision Biopsy for Ciliary Body Tumors

Because their obscure location typically prevents visualization, ciliary body tumors have presented a diagnostic challenge for ocular oncology. Dr. Finger's response was to develop a small incision technique that uses a 27-gauge aspiration cutter and intracameral viscoelastic to make an iridotomy at the iris root, then extend it through the iris into the tumor. This provides a minimally invasive and safe method for obtaining ciliary body tissue for cytology, histopathology, and immunohistochemical analysis. In addition to minimizing the risk of damage to normal intraocular structures, this innovative biopsy approach can be performed through a small, self-sealing, clear corneal incision that doesn't require a suture for closure.

For Referrals to Ocular Oncology Service:

The Bendheim Family Retina Center
at New York Eye and Ear Infirmary of Mount Sinai

310 E. 14th Street, North Building, 8th Floor

New York, NY 10003 | Phone: **212-614-8301**

Topical Chemotherapy

Two patients treated with chemotherapy eye drops as the sole curative therapy. ***Top:*** Slit lamp photograph of a giant ocular surface squamous neoplasm with extensive bulbar conjunctival, limbal, and corneal involvement. Pretreatment (A) and (B) showing complete resolution of tumor utilizing topical IFNα2b (3 months) at 12 months of follow up. ***Bottom:*** A second patient prior to treatment (C) multifocal lesion and (D) showing complete resolution utilizing topical IFNα2b (3 months) plus 5 FU (2 weeks) at 15 months. Note the absence of symblepharon, corneal, or scleral thinning.

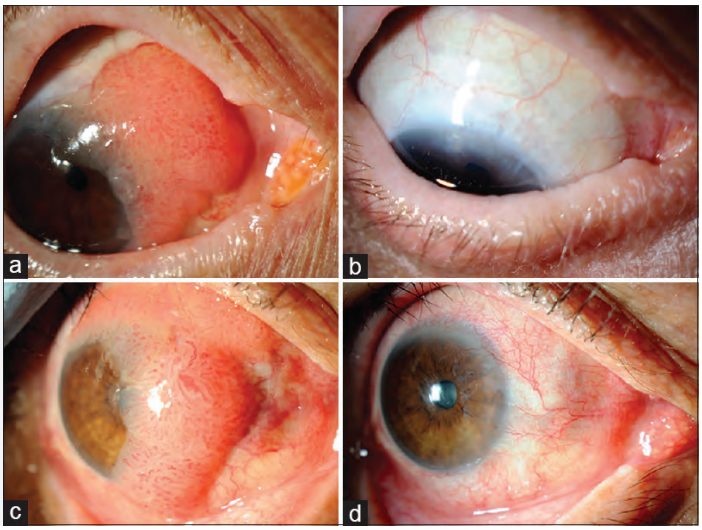


Image reproduced by permission of the *Indian Journal of Ophthalmology,* Topical chemotherapy for giant ocular surface squamous neoplasia of the conjunctiva and cornea: Is surgery necessary? 2018;66(1):55-60.

Finger's Slotted Eye Plaques

Top: Note a cut out in a standard COMS-type plaque is fashioned to be large enough to accommodate the typically 5-6 mm wide orbital optic nerve sheath, and thus allow the plaque to be placed so as to cover and thus treat tumors involving the optic disc.

Bottom: Intraoperative ultrasound imaging demonstrates the plaque positioned around the retrobulbar optic nerve.

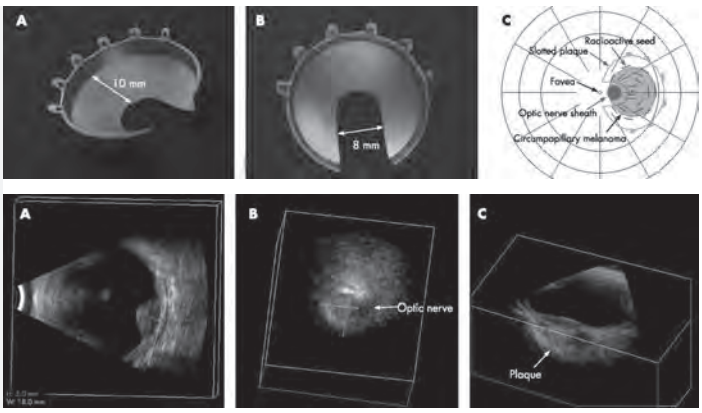
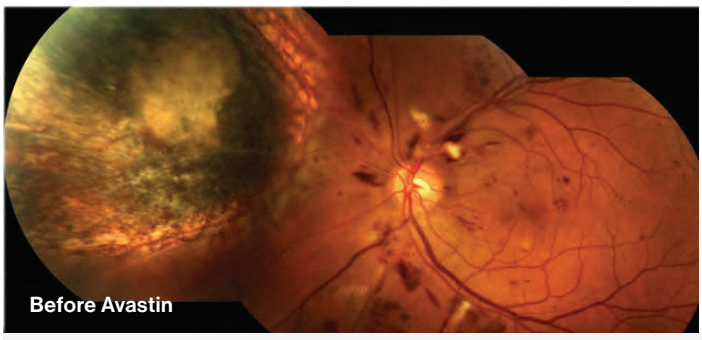
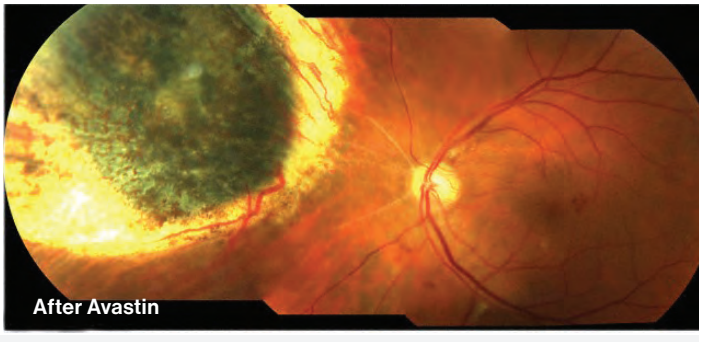


Image reproduced by permission of the *British Journal of Ophthalmology*, Finger's "slotted" eye plaque radiation therapy: treatment of juxtapapillary and circumpapillary intraocular tumours. 2007;91:891-894 Figures 1 and 3.

Intravitreal Anti-VEGF Therapy for Radiation Retinopathy



Photograph shows a nasal, plaque-treated choroidal melanoma with Stage II radiation retinopathy (cotton wool spots, retinal hemorrhages and macular edema).



Eight monthly anti-VEGF injections were associated with resolution of both the retinal hemorrhages and cotton-wool spots associated with radiation retinopathy.

Palladium-103 Plaque Radiation Therapy

Left: A photograph of free palladium-103 seeds on a white background. ***Middle:*** Palladium-103 seeds densely packed within a COMS-type gold eye plaque seed through acrylic fixative. ***Right:*** A diagram showing how an eye plaque is placed on the surface of the eye to treat an intraocular tumor. Note, though palladium-103 seeds are the same size and shape as iodine-125 seeds, Dr. Finger has shown that treatment of choroidal melanoma with palladium-103 seeds typically offers a more favorable intraocular radiation distribution.

Micro-Incision Biopsy for Anterior Uveal Tumors

Left: A 27-gauge aspiration cutter is inserted through clear cornea, while visco-elastic maintains the depth of the anterior chamber. ***Right:*** The cutter is used to perform an iridectomy at the iris root, through which the surgeon accesses the ciliary body tumor for biopsy.

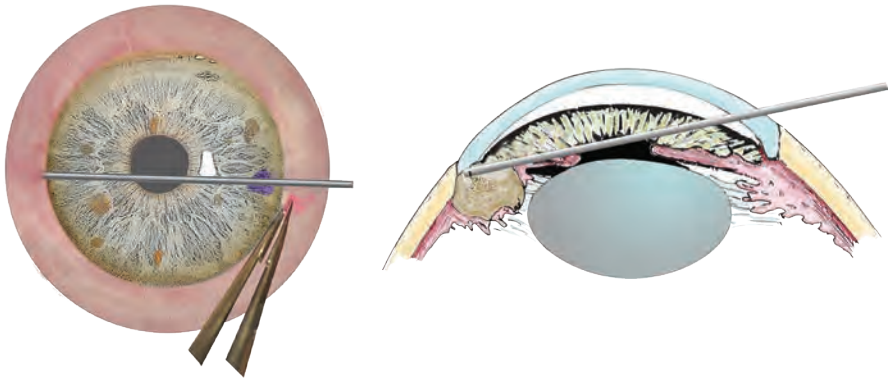


Image reproduced by permission of the *Canadian Journal of Ophthalmology,* 2020 Finger PT, Chua MR, Iacob CE. Micro-incision, trans-iridal aspiration cutter biopsy for ciliary body tumours. *Can J Ophthalmol.* 2020 Sep 10:S0008-4182(20)30710-9. doi: 10.1016/j.jcjo.2020.08.002. Epub ahead of print.

Doctor Reported Outcomes (DRO)*

Collected as each patient returned for follow-up, near-real-time outcome data was averaged pertaining to the treatment, vision, life, and follow-up. The DRO included patients presenting with choroidal melanoma, iris-ciliary body melanoma, and ocular surface squamous carcinoma. A unique software program, developed by a NYEE Ocular Tumor fellow, was used to collect this data on a HIPPA compliant internet portal. At NYEE, we have found this information helpful for both patient education and results-based monitoring.

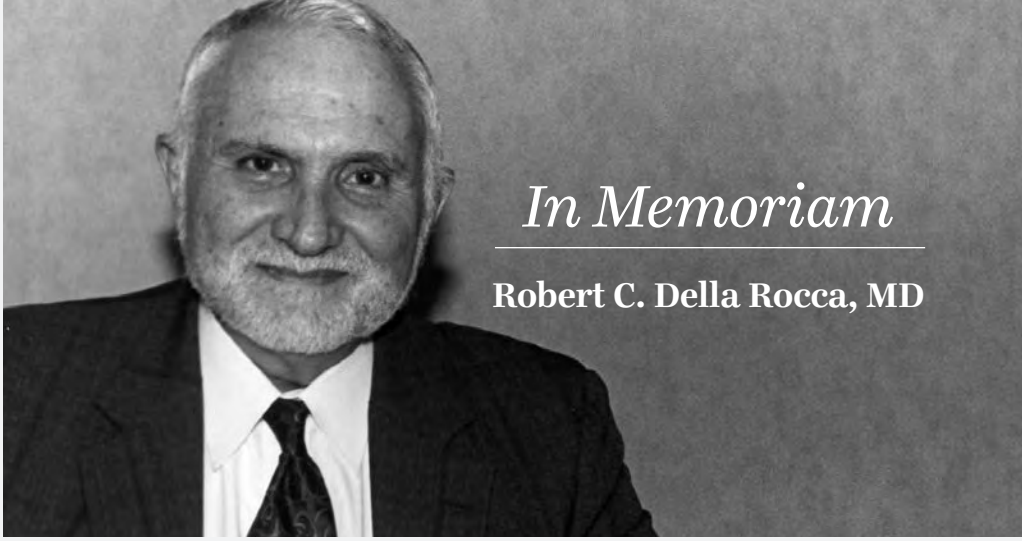
**Last updated on 02/18/2021.*

Choroidal Melanoma	
Patients entered	316
Average vision	20/63
Most common vision	20/25
Local tumor destruction	99.7%
Preserved eye (no enucleation)	95.6%
Initial eye removal	4.4%
Average follow-up (in years)	7.7

Iris-Ciliary Body Melanoma	
Patients entered	108
Average vision	20/20
Most common vision	20/20
Local tumor destruction	99.1%
Preserved eye (no enucleation)	98.2%
Initial eye removal	1.8%
Average follow-up (in years)	6.9

Squamous Conjunctival Malignancy	
Patients entered	30
Average vision	20/25
Most common vision	20/20
Local tumor destruction	96.7%
Preserved eye (no enucleation)	100%
Initial eye removal	0%
Average follow-up (in years)	2.8

For additional information on ocular cancer treatment outcomes: Maheshwari A, Finger PT, Malpani A, Jain P, Tomar AS, Garg G. Doctor reported outcomes: Real-world data from a tertiary eye cancer center. *Indian J Ophthalmol.* 2021;69:135-9.



In Memoriam

Robert C. Della Rocca, MD

On February 11, the field of ophthalmology lost one its brightest stars. ***Robert C. Della Rocca, MD,*** *a renowned physician, educator, and humanitarian passed away at the age of 79 surrounded by his family.*

An international leader in complex cosmetic and reconstructive eyelid, midfacial, and orbital surgery, Dr. Della Rocca served as Chief of Oculoplastic and Reconstructive Surgery at the Mount Sinai Health System since 2017. From 1982 to 2019, Dr. Della Rocca was the Chief of Oculoplastic, Reconstructive, and Orbital Surgery at New York Eye and Ear Infirmary of Mount Sinai (NYEE), while also serving as Chair of the Department of Ophthalmology at Mount Sinai St. Luke's (now Mount Sinai Morningside) from 2001 to 2019.

Dr. Della Rocca's passion for work as a clinician, teacher, and surgeon was evident from the start when he enlisted in the United States Army in 1968 and served in Vietnam with the 25th Division as a young doctor in the field and as an infantry battalion surgeon where he was awarded the Bronze Star Medal. A prolific lecturer, editor, and author, Dr. Della Rocca was a true force in his field, authoring more than 50 publications, including five oculoplastic textbooks and numerous peer-reviewed journal articles.

Generous with his time and knowledge, he trained more than 120 domestic and international fellows. He visited and worked in 15 countries as a teacher and volunteer surgeon, primarily in Latin America and the Middle East. His passion for international volunteerism resulted in the founding of the Volunteer Health Program, which sponsored annual eye care missions to the Dominican Republic to serve rural populations with limited access to medical care.

In recognition of decades of remarkable service, Dr. Della Rocca received NYEE's John Kearny Rodgers Physician of the Year Award in 2001, the American Academy of Ophthalmology's Humanitarian Award in 2003, and in the same year, the New York State Ophthalmologic Society's Hobie Award in recognition of a lifetime commitment and extraordinary contributions in the area of humanitarian/community service.

Dr. Della Rocca received his medical degree from Creighton Medical School. He completed an ophthalmology residency at NYEE followed by two fellowships in oculoplastic and orbital surgery at Manhattan Eye, Ear & Throat Hospital and Albany Medical Center.

Save the Date

Tenth Annual Steven M. Podos, MD, Symposium and Lecture: Innovations in Ophthalmology

Date and time:
Friday, June 4, 2021, 10am-5:30pm EST / 7am-2:30pm PST

This online live course is designed to update participants on emerging diagnostic and treatment techniques in glaucoma, retina, cataract, cornea, as well as advancements in global ophthalmology approaches to providing care to underserved populations in developing countries.

For additional information and to register, visit:
https://mssm.cloud-cme.com/10thPodos

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