

Prof. Shlomo Melamed: the importance of early diagnosis and understanding for glaucoma

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Expert introduction

Prof. Shlomo Melamed is a Professor of Ophthalmology at the Tel Aviv University Medical School, the Director of the Sam Rothberg Glaucoma Center, Sheba Medical Center and the incumbent of the Zuker-Sussman Chair for Glaucoma Research at the Tel Aviv University, Israel.

During 1983–1985, he finished his fellowship at Massachusetts Eye and Ear Infirmary, a teaching hospital of Harvard Medical School and continued his focus on glaucoma service until 1988. Prof. Melamed is the founder and organizer of several international organizations, which are dedicated to glaucoma advancement. For example, he was the founder of International Glaucoma Symposia (IGS), which he had been the president for many times from 1991 to 2008; He was also the Founder and Chair of the World Glaucoma Projects Committee (WGPC)—an international surgical education and outreach program in the developing world in 2009. Meanwhile, Prof. Melamed was also the Chair of the Third World Glaucoma Promotion from 2009 to 2016. He has organized and participated in expeditions in places like Papua New Guinea, Micronesia, Bolivia, Togo and Benin in West Africa, Burkina Faso, India and Nigeria.

Editor's note

The Guangzhou Glaucoma Forum (GZGF) was successfully held in Zhongshan Ophthalmology Center on April 21–22, 2018. The forum gathered domestic and international experts from all over the world, including Prof. Shlomo Melamed from Israel, Prof. Larry Benowitz from Harvard Medical School, Prof. Leopold Schmetterer from Singapore Eye Research Institute, Prof. Anuj Chauhan from University of Florida and Prof. Keith Barton from Moorfields Eye Hospital. The AME editorial team had the honor to interview Prof. Melamed (*Figure 1*).

Prof. Melamed shared with us his topic ‘Glaucoma



Figure 1 Photo with Prof. Melamed after the interview.

and Intracranial Pressure’ for the speech at the forum and his dedication in promoting awareness of the severity of glaucoma in the developing countries. “It’s good for the heart,” Prof. Melamed said.

Interview

AES: Please briefly introduce yourself to our readers

Prof. Melamed: I am Shlomo Melamed, a full Professor at the Tel Aviv University Medical School, the Director of the Sam Rothberg Glaucoma Center and the incumbent of the Zuker-Sussman Chair for Glaucoma Research at the Tel Aviv University.

AES: Could you share with us your speech about glaucoma and intracranial pressure today?

Prof. Melamed: This is an important issue and a very

hot topic of glaucoma science in the last few years. I was also glad to listen to Prof. Ningli Wang, the Director of Beijing Tongren Eye Center and the President of Chinese Ophthalmology Society, to talk about the same topic today. In fact, I think we sort of combined information together without talking about this with each other in advance. The idea that the most important thing for understanding the mechanism of all pathogenesis of glaucoma is to understand the translaminal pressure (TLP). The TLP per definition is the difference between the intraocular pressure (IOP) on one hand and the cerebrospinal fluid (CSF) pressure in the subarachnoid space, covering the optic nerve on the other hand. The relationship of these two compartments is important for the understanding of two issues.

First of all, if IOP is raised and elevated higher than CSF pressure, there will be posterior bowing of the lamina cribrosa (LC) and a mechanical strangulation of the axons from the retinal ganglion cells (RGCs). This is the basis disease process of glaucoma. Secondly, if CSF pressure is increased, like IOP elevation, or hypotony after surgery, like trabeculectomy, we will see papilledema or the optic nerve being pushed forward. This may be associated with pathologies and disturbances in the visual field and visual acuity. For both sides, the TLP is the basic concept and explanation of what is going on.

AES: *What is the surgical procedure for glaucoma and what is your preference?*

Prof. Melamed: To treat glaucoma, we need to lower IOP in most of the cases. There are different kinds of approaches. Sometimes, it starts with using eyedrops to reduce the pressure or laser treatment. But the more we learn from new methodologies and surgical approaches to glaucoma, it becomes clear that we need surgical procedures that are less invasive and less problematic to eyes, which could also lower the pressure for many patients.

One of these approaches is something that I came to talk about which is called the CO₂ laser-assisted deep sclerectomy surgery (CLASS). The golden rule right now for glaucoma surgery is a surgical procedure called trabeculectomy, in which we would pierce a hole into the eye so that the pressure would go down for the eye. It can be very effective, but it is associated with too many complications, like shallow chambers, hypotony, bleeding, loss of vision, endophthalmitis after blebitis,

etc. This procedure works by the creation of what we call a filtering bleb, an elevation of the conjunctiva, which accumulates the aqueous humor and this also leads to many complications and discomfort for the patients. The idea of CLASS is that you don't have to penetrate into the eyes and the anterior chamber. You use a laser to scrape layers of sclera and expose the roof of Schlemm's canal. In this way, the aqueous humor will be released from the eyes and the pressure will go down successfully without penetration into the anterior chamber. There will be no complications coming from piercing eyes and creating a hole through the eyes. So far, we are very happy with the result. I know there are several centers started looking into it in China and the results are very encouraging as well.

AES: *Could you share with us the vision for the glaucoma therapy?*

Prof. Melamed: Glaucoma is an enigmatic disease and a disease that is very hard to control. There are 64 types of glaucoma and all kinds of mechanisms are involved with this disease. As I said in the beginning, the basic mechanism has to do with the effect of elevated IOP on the strangulations of the axons coming out to the optic nerve.

Right now, 'lowering the pressure' is one thing that we know we are doing well. And we learned from a large number of clinical studies across different sections that if you lower IOP sufficiently for each specific type of glaucoma, it will halt the disease. Though the damage that has been done up to that point is irreversible, we will prevent the continuation of the damage caused by glaucoma, the encroachment of the visual field and eventually the loss of vision.

In the last 15 years, we were able to cut down the cases of blindness from glaucoma by 50% because of early diagnosis, early treatment and very efficient treatment with drugs, laser or surgery. The safer the procedures are, the more liberal we are in using them. For instance, we choose to use the procedure—CLASS, which I discussed with you previously, more often because of its excellent safety profile. There are other procedures as well. Any procedures that are safer will be adopted by more surgeons and will be used earlier in the disease with much less damage. This is how we see the development of treatment down the line.

AES: We know that the number of glaucoma patients is increasing these years. How do we prevent from suffering this disease in our daily life?

Prof. Melamed: This is an excellent question. I don't know whether it is right to say that the number of glaucoma patients is increasing. I think it is more accurate to say that we have diagnosed more and more cases of glaucoma. Glaucoma is there, but we had some hard time diagnosing it, especially in the third world countries. I held meetings through the collaboration between the World Glaucoma Association (WGA) and the African Glaucoma Society, trying to understand the burden of this disease in Africa.

In Africa, glaucoma is a major problem. What kind of damages that this disease is causing in Africa is unbelievable and yet the understanding of it is not ideal. Also, people don't have money to buy drugs or do checkups. Regular checkups are crucial as usually there is no pain associated with glaucoma, only gradual vision loss. There are no red signs as an alarm. This is why it is called 'the silent thief of sight'.

I would say that in about half of the population of the world, the term glaucoma is not very well-known and the risk of this disease is not very well recognized, especially in countries like Africa, India and South Asia. Information does not transfer well from their governments, nor through the population, so we miss lots of cases. Another thing is that because of the nature of this disease, there is no pain and no visual acuity loss, people usually come late for the diagnosis.

So, the main challenge of the education for glaucoma would be to teach ophthalmologists and the public to go for regular checkups from an early age and diagnose this disease as early as possible. If you diagnose this disease earlier, you start treatment earlier and you will be more likely to keep your vision.

AES: As we know you finished your fellowship in the United States, could you share with us your experience in the States, comparing your medical experience in Israel?

Prof. Melamed: I did my fellowship at Harvard Medical School and also stayed there as a faculty member for several years. I think I was very lucky in many aspects, you are exposed and surrounded by the best of the best. Anything you really want to do at the highest level is open for you there. I enjoyed my time very much and it was my

most prolific years as a fellow. We investigated all kinds of interesting questions and most of my good studies were carried out when I was at Harvard. The exposure, the atmosphere and the intimacy with excellent people of all discipline is the main advantage of doing fellowship in USA.

I have no complaints. Israel is well-known for numbers of smart people and a lot of high-tech companies, which if you do a statistical calculation between capitals, it is No. 1 in the world. There are high-tech companies in agriculture, computer science, cyber, bioscience, biomedicine, and other good ideas. Even ideas in the glaucoma field that came from Israel became internationally known later. I have a very good group in the Tel Aviv University and the research is ongoing. We have very good collaboration with investigators all over the world, including the United States, France, Singapore and China, etc. I'm very happy in both places.

AES: Could you share with us your experience as the Chairman of the Third World Glaucoma Promotion?

Prof. Melamed: I was the Chairman of the Third World Glaucoma Promotion from 2009 to 2016. I can't recall when exactly we had the first African glaucoma meeting in Ghana, but it was a very successful meeting. We tried to address the issues of glaucoma in Africa with participants from Africa and other parts of the world. It was a good meeting and we spent three days discussing the key issues and preparing for new advances, which is still challenging, although the progress for glaucoma in Africa has been made.

I've done a lot of projects in Africa. I'm interested in what is called 'Geographical Ophthalmology', and I have done many cases in different places. I organize surgical expeditions, not only to treat patients, but also to educate the ophthalmologists, especially on surgery. I was in places like Papua New Guinea, Micronesia, Bolivia, Amazon, India and other places in Africa. Every time we went with the main purpose of teaching ophthalmologists there on how to treat patients and also donating instruments. I usually took residents and colleagues with me. We have been to countries like Ghana, Togo, Nigeria, Madagascar, and Burkina Faso. Each time we went specifically to a certain place, and right now we are going to Ethiopia. The relationship between Israel and African countries is good. We try to promote ophthalmic education there. We also bring African people to Israel for the purpose of teaching, doing surgery and

learning about the disease process. I'm very proud of these kinds of activities. It's good for the heart.

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