

International Glaucoma

A personal account of how collaborating with physicians overseas expands research possibilities.

BY PRADEEP Y. RAMULU, MD, MHS, PhD



In the article that follows, Dr. Ramulu beautifully describes the essence of international collaboration. As a fellow, I felt that research conducted outside the United States was inferior and not worth pursuing. Boy, was I wrong!

At many international centers in developing nations, the physicians are bright and talented but often lack either the time (they typically have clinical responsibilities 12 hours per day, 6 days per week) or the know-how to develop research protocols. They also do not have protected time, something common in University centers, and the education they receive is often based on rote memorization rather than critical thinking.

The synergies of international collaboration are many. If, as espoused by the late David Epstein, MD, a patient population is considered a "clinical laboratory," performing clinical research in less-developed nations can provide investigators with an exponentially larger laboratory. In addition to the vast size of the population, this laboratory may have many advantages, including the opportunity for extensive follow-up and less diversity. In developing nations, there may be more untreated eyes at presentation, and the stage of the ocular disease may be more severe than what is usually seen in US populations. Because of consanguinity, diseases such as aniridia and congenital glaucoma may appear more frequently.

In terms of the disadvantages associated with international research, access to follow-up may be more difficult (or not, if the population is generally immobile) because of poor infrastructure (road and bus system). Institutional review board regulations may prevent studies that might otherwise be ethical and relatively easy. There may be other obstacles such as the international transportation of biologic materials and DNA.

International collaboration is a win-win-win situation. Each party learns many lessons from the other. I have learned so much from my partners. Patients win, and the friendships are the most rewarding. Finally, as stated by Dr. Ramulu, it is humbling to witness the high quality of both the medicine and research being practiced in areas that are often strapped for resources. These advantages definitely outweigh the costs and inconveniences of travel.

— Alan L. Robin, MD, section editor

I have been asked to write about the advantages and disadvantages of conducting glaucoma research abroad. I find it ironic that I, of all people, would be asked to do so. Year after year, many medical students and residency and fellowship applicants describe an interest in international ophthalmology, whereas I would have expressed no such interest at that stage of my career. In fact, of the eight members of my residency class, I was the only one not to use my elective time for an international experience. A series of events ultimately led me toward what I now understand to be a true privilege: collaborating with ophthalmologists and scientists outside the United States to answer fundamental questions about glaucoma and to reduce preventable blindness from the disease.

CONSIDERATIONS

As a medical student, resident, and faculty member, the reasons not to get involved in international ophthalmology are numerous. First, it requires additional travel and time away from home beyond what is normally required for conferences, teaching, and continuing medical education. My daughter was born during my third year of residency (when my elective took place), and I do not regret having forsaken an international experience for the opportunity to get to know her. Second, there are financial costs associated with doing such work, including the need to fund projects; time away from work, which leads to lost clinical revenue; incidental costs such as travel and lodging; and costs associated with hosting visiting international scholars. Most importantly, a project or a cause is required—a specific idea that makes all of the time and financial costs worth the effort. It is rare to have such an ambitious idea early in one's career.

MY EXPERIENCE

My first step toward "international glaucoma" occurred while I was a fellow at Bascom Palmer. Several faculty members from the Aravind Eye Institute in India visited. In Figure 1, Dr. Rengaraj Venkatesh (my future primary collaborator) is shown standing next to me, although we were no more than acquaintances at the time. My next contact with Dr. Venkatesh came years later, at the suggestion of Drs. Arvind Neel and Alan Robin, MD. I had



Figure 1. From left to right: Dr. R. Ramakrishnan (Aravind), Dr. Donald Budenz (Bascom Palmer), Dr. Richard Parrish (Bascom Palmer), Dr. Rengaraj Venkatesh (Aravind), Dr. Pradeep Ramulu (Bascom Palmer fellow), and Dr. Arvind Neelakantan (Bascom Palmer fellow).

recently joined the Wilmer faculty, and Dr. Venkatesh had been named chief medical officer of the Aravind Eye Hospital in Pondicherry (a city in Southern India). He was looking for a collaborator to augment research at his hospital. Dr. Robin arranged for me to meet Dr. Venkatesh during his visit to Baltimore. At this time, he mentioned that his team had recently started a project to screen family members of both open- and angle-closure glaucoma (ACG) patients. This topic caught my attention, as I had recently written a chapter on the epidemiology of glaucoma and had noted that, at the time, there was very little literature investigating the importance of family history in ACG.¹⁻³ If family history really was a significant risk factor, screening programs based on family history would be an excellent way to prevent needless blindness related to primary ACG.

Transforming this idea into reality was no small matter. First, I needed to understand why my participation would even be necessary in such a project. Dr. Venkatesh was a bright and vibrant physician, equal or greater to me in all ways. Dr. Robin convinced me that his brilliance was balanced by a lack of time needed to start and carry out such a detailed project. After all, Dr. Venkatesh was trying to build a research program while managing a huge clinical enterprise, and he simply did not have the time necessary to build a protocol and oversee its inception.

Second, we needed time to discuss further our ideas and transform them into a proposal worthy of funding. Luckily, my wife's cousin happened to be organizing the Glaucoma Society of India meeting a few months after

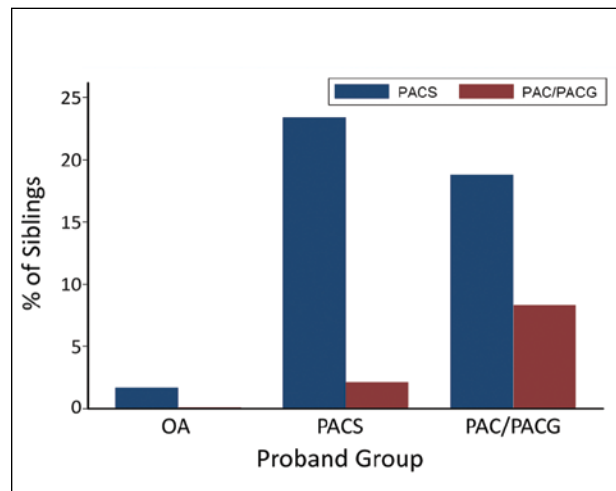


Figure 2. Siblings of patients with open angles (OA), primary angle-closure suspicion (PACS), and primary angle closure (PAC) or primary angle-closure glaucoma (PACG) were assessed by gonioscopy.

Dr. Venkatesh and I met. She invited me to attend the conference, and I took the opportunity not only to attend, but also to spend several days visiting Dr. Venkatesh. During this time, I came to better appreciate the Aravind Eye Care System and how our proposed project would work. A few months later, Dr. Venkatesh forwarded to me a call for proposals sent out by the Glaucoma Research Foundation. Our proposal was not accepted, but a revised version of the proposal was later funded through the Wilmer Director's fund (supported by Research to Prevent Blindness and grateful patients).

REFLECTION ON COLLABORATION

Roughly 4 years later, my international work from this project and others has benefited me tremendously in expected and unexpected ways. Forging international collaborative relationships has resulted in new knowledge. Dr. Venkatesh and I have shown that siblings of patients with angle closure are more than 13 times as likely to have prevalent angle closure themselves (Figure 2) and that a 70-year-old female sibling of a patient with angle closure has a 60% likelihood of having angle closure, assuming she had not been previously treated. Our publications have also suggested possible genetic associations for the observed phenotype within our South Indian population.⁴ Even more importantly, this knowledge has been generated while running a charitable program in which angle-closure suspects are screened. More than 80 undiagnosed cases of angle closure were identified as a part of our study, and all of the patients underwent iridotomies at no charge. It is likely that

vision was preserved in at least some of these patients.

What I did not expect was how humbling and inspiring my work has been. Dr. Venkatesh and my international collaborators are tremendous doctors, surgeons, and humanitarians. They see patients 6 to 7 days a week, perform 100 or more surgeries weekly, and see 100 or more patients a day in the clinic. They work in the Aravind Eye Care System, which, with its innovations in service design and low-cost high-quality IOL manufacturing, has likely done more to eliminate preventable blindness than any other institute worldwide.⁵ To call myself a friend and colleague of these individuals has been a true honor. Working with them has helped me understand my role as an ophthalmologist, which is to share and develop in others the ability to conduct meaningful clinical research. Who better to train with than motivated ophthalmologists with huge clinical volumes who can answer challenging questions in ways that cannot be explained in the United States?

CONCLUSION

It has been a privilege to host and interact with a large number of international visitors at the Wilmer Eye Institute, and it is inspiring to see these physicians return home to pursue their own research such as conducting a randomized controlled trial to test a method to decrease phacemulsification complications in nanophthalmic eyes or to take a systematic approach to understanding and characterizing retinal dystrophies. Playing even a small part in their career trajectory and success is the real gift of working internationally and enough to counterbalance all the challenges of working on projects far from home. ■

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