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LECTURE

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Geminiano T. De Ocampo Medical Research Foundation Centennial Lecture

Eye-cornea bank for sight restoration in the Philippines

THE CORNEA is the clear, transparent circular structure that constitutes the anterior one-fifth of the outermost coat of the eye. It serves as the first window of the eye for light to reach the photosensitive layers of the retina. More than simply permitting light transmission, the cornea is also a powerful refracting medium. Its refractive property is due to 5 attributes: surface, curvature, refractive index, interference pattern, and transparency. When any of these attributes is lost because of disease, as in scarring, the cornea fails to perform its most important function—to help provide clear vision. Surgical replacement of the diseased cornea becomes necessary for the eye to regain functional vision, hence the need for an eye or cornea bank.

Diseases of the cornea are not uncommon in the Philippines. Valenton et al., in a 20-year study (1971 to 1991) of patients seen at the External Disease Clinic of the Philippine General Hospital (PGH), showed that 6,176 or 43.2% of the 14,553 cases were diseases of the cornea.[1] Relevant published reports from 1936 to 1995[2-9] indicated that 6.8% to 14.7% of blindness cases in one or both eyes were due to corneal diseases. That the majority of them could benefit from corneal transplantation was shown in another study. At the PGH Cornea Clinic, of the 448 new cases seen in a 12-month period (1971 to 1972), 244 or 54% needed corneal grafting[10] to restore useful vision. Thus, the need for human eyes or corneas.

It can be rightly said that the progress of ophthalmology in the Philippines cannot proceed without a functioning eye bank.

The Beginning

The seminal work on human-eye banking in the Philippines started in 1948. It was three years after the American eye surgeon, Dr. R. Townley Paton, established the Eye Bank for Sight Restoration in 1945 in New York City.[11]

Dr. Edmundo Reyes, a Filipino Eye-Ear-Nose-Throat (EENT) specialist and his brother, Justice J.B.L. Reyes, were requested by Dr. Geminiano de Ocampo

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to craft a bill on human-organ donation for medical and scientific purposes.[12] The bill was introduced in the Philippine Congress by Senator Lorenzo Tanada in April 1948. It became the Republic Act (RA) 349, signed by President Elpidio Quirino on May 17, 1949 as the first law on donation of human organs including the eyes.

Dr. Geminiano de Ocampo returned to Manila in 1947. He completed a year of Kellogg fellowship, which introduced him to corneal transplantation, among other fields, at the Johns Hopkins University in Baltimore, Maryland and at the Columbia Presbyterian University in New York City. He was a member of the consultant staff of the EENT Department at PGH, the national medical referral center in the country at the time. He was aware of the high prevalence of blindness due to corneal pathologies among Filipinos. Sourcing eyeballs for those suffering from corneal blindness became his obsession. Thus, an eye bank was organized at the PGH in May 1948 even before the passage of the law on human-organ donation.[12] It was with the approval of the hospital director, Dr. Antonio G. Sison, and the chief of clinics, Dr. Carmelo Reyes. The bank paved the way for the first full-thickness corneal grafting to be performed by Dr. Geminiano de Ocampo in June 1949 at St. Luke's Hospital.[13]

With RA 349 permitting the removal of eyeballs for medical and scientific purposes as long as the donor had executed a deed of donation before death, it was just a matter of time before the first national eye bank was established. This happened on November 27, 1950 through the efforts of American Ray Higgins of the Philippine Blood Bank, Dr. Geminiano de Ocampo, and Dr. Jesus Tamesis Sr. When incorporated in 1951, the bank became known as the Philippine Eye Bank for Sight Restoration (PEBSR). It became the first eye bank in Southeast Asia, ahead of those in Japan, India, Ceylon, and Hong Kong.

The existence of the law and the eye bank notwithstanding, donations of human eyeballs for medical purposes were scarce and far between. During the first 2 years of the bank's operations, it became clear that RA 349 needed some amendments, specifically on the matter of the donor's consent.

RA 349 as amended became RA 1056, signed by President Elpidio Quirino on June 12, 1954. The new provision explicitly stated that permission to remove the eyeballs "may be granted by his nearest relative or guardian at the time of his death or in the absence thereof by his nearest relative or guardian at the time of his death or in the absence thereof by the person or head of the hospital or institution having custody of the body of the deceased provided, however, that the said person or head of the hospital or institution has exerted reasonable effort to locate the aforesaid guardian or relative." The new provision had the prior endorsement of Secretary Teodoro Evangelista, Health Secretary Juan Salcedo, and Justice Secretary Jose Bengson. Senator Lorenzo Tanada, the original author of RA 349, with the help of Senator Joe Locsin, Congressman Arturo Tolentino, and Congressman Venancio Ziga successfully worked for the inclusion of the new provision.

In 1956, Pope Pious XII issued an encyclical stating that the Catholic Church was not against the donation of human organs and eyeballs for medical purposes. It was hoped that the papal blessings would help the work on human-eye banking.

Early State of Eye Banking

In the 1950s, the scientific and technologic knowledge and practices on eye banking were simple if not primitive by present standards. The collection and storage procedures were less demanding than present eye banking. At the time, the eyeballs were enucleated within 6 hours after death, cleansed in solutions with penicillin, and stored in the moist chamber of sterile stoppered bottles at –4 degrees Celsius inside an average refrigerator. When used as full-thickness grafts for visual purposes, the corneas had to be transplanted within 48 hours after enucleation.

It was not unusual that corneas were immediately transplanted after enucleation. Patients for keratoplasty were already in the hospital. Eyeballs not used within 2 days after enucleation or considered inappropriate for full-thickness visual keratoplasties were transferred and stored in absolute glycerin. Their corneas were used either for anterior lamellar, tectonic, or therapeutic keratoplasties. Unused eyeballs became materials for research.

There were, however, important problems that stood in the way of the future and progress of the country's first eye bank. The Filipino's cultural bias against organ donation, raging professional rivalries, lack of committed leadership with the willingness to "manage interdependence" among varied but complementary expertise and resources contributed to the "touch and go" affair that was the fate of the first eye bank. Succeeding leaderships of the eye bank did everything possible not to let the bank wither on the vine. To support its work, 2 major programs were organized and institutionalized: Sight Saving Week and the Society for the Prevention of Blindness.

Sight Saving Week

The problem of eye donations was addressed formally when President Ramon Magsaysay issued a proclamation in 1953 for the annual observance of the Sight Saving Week.[12] With the help of Dr. Romero Atienza, president of the Philippine Medical Assocation, the Philippine Eye Bank (PEB) worked for the presidential proclamation.

The Sight Saving Week had 2 main objectives: to make Filipinos aware of the importance of sight and encourage them to organize special groups assigned for the week's celebration. Prominent civic-minded businessmen were requested to head the groups. Romeo Villongco, Ernesto Rufino, Leopoldo Rovira, Manuel del Rosario, and Henry Ang were some of them.

Philippine Society for the Prevention of Blindness

The positive response of the public to the Sight Saving Week led to a decision to expand the activities on sight promotion and blindness prevention. In 1959, the Philippine Society for the Prevention of Blindness was organized through the efforts of Dr. Geminiano de Ocampo, representing the PEB, and Dr. Carlos Sevilla as president of the Philippine Society of Ophthalmology and Otolaryngology. Dr. Severino Lopez became the society's first president. The society took over the work on the observance of the Sight Saving Week. It conducted regular nationwide public-information campaigns on the importance of sight and eye care while appealing for eyeball donations. The society was active until Martial Law was declared in 1972. It was rehabilitated in 1979 with Dr. Edgardo Caparas as secretary general.[14]

Human-Cornea Bank

By the 1960s, the PGH Cornea Clinic, established in 1950, had become the largest referral unit for patients with corneal diseases from all over the Philippines. Many of the patients needed corneal transplantation for visual reasons. Studies on the use of corneal heterografts, e.g., chicken and monkey eyes, proved unavailing because of immunologic rejection.[15] The need to unravel the Mindoro corneal blindness was high on the research agenda at the clinic.[16] Keratoprosthesis was yet in the seminal stages.

In 1964, I was a research associate at the Cornea Clinic for projects funded by the National Science Development Board (NSDB). Arrangements were made between the Departments of Pathology and Ophthalmology to permit the latter to collect corneas from human cadavers brought to the morgue for autopsy. I started collecting corneal buttons for patients already admitted to the beds of the Eye Department of the PGH and for the studies on corneal viability.[17-20]

In a period of 2 years, 322 corneal buttons were collected: 118 full thickness, 188 anterior lamellae, and 16 posterior lamellae. Of these specimens, 86 were used for homografting for various types of corneal disorders: 28 full thickness, 56 anterior lamellar, and 2 posterior lamellar keratoplasties. The rest of the specimens were used in various experiments on corneal viability.[21]

I returned to Manila in 1967, after a two-year US Public-Health, Education, and Welfare postdoctoral research fellowship at the Institute of Neurological Diseases of the National Institutes of Health in Bethesda, Maryland, to find a full-functioning cornea bank. Many innovations had been introduced,[22] foremost of which was the system of postmortem cooling of cadaver eyes prior to harvesting the corneas and the subsequent cooling of the harvested corneas.[23] Dr. Mario Valenton invented an instrument that fashioned black plastic conformers from used X-ray plates for repairing the anterior segment of the eyes after the corneas had been removed.

Renewed Efforts for Human-Eye Donations

While the PGH eye patients could hope to have corneal grafting, it was not so in other hospitals. Dr. Jesus Tamesis Sr., who performed the second corneal transplantation in the country in 1950, was largely dependent on what the PEB could occasionally provide him. So did Dr. Carlos Sevilla who also began performing corneal transplantation. Dr. Sevilla had the distinction of helping mobilize the society's elite to support the work of the eye bank.

Dr. Manuel Hechanova returned to the Philippines in 1965 after training in the USA. He informed me that Benjie Kosloff was a very active chairperson of the PEB. Together, they helped establish a linkage between the Bureau of Prisons and the PEB to enable the latter to secure donations from inmates.

Other Filipino eye surgeons had to rely on eyeballs that began to trickle to Manila from Sri Lanka. Some of these surgeons included Dr. Cayetano Mangahas, Dr. Cosme Naval, and Dr. Rodolfo Chuanico. Dr. Naval's first corneal transplant, done in 1970, was in fact an autotransplant for want of a donor homograft.

The media was once again requested to help in the solicitation of donors for human eyeballs. Letty Jimenez Magsanoc was one of those who wrote articles about the eye problems in the country. In one of her articles published in the *Philippine Panorama* on July 5, 1970, she quoted the assistant director of the Philippine Eye Research Institute: "The need for sufficient numbers of human corneas, both for clinical uses and research purposes, has not been adequately met by us. While in the USA and in most countries of Europe, such specimens are in abundance, in the Asia-Pacific area, including the Philippines, there is a dire need for them."[24]

The help of the media continued for several years. An article by Jennie Ilustre of the *Times Journal* published on March 29, 1975 carried the subtitle "The Philippine Eye Bank for Sight Restoration Inc. is a unique bank. It is always empty."[25] This essentially captured the state of the PEB in those years.

But the public was not totally indifferent. Earlier, Rosalinda Orosa in her column, Week of Gallant Gestures, in the March 22, 1976 issue of the *Philippine Daily Express*[26]

wrote about how the famous Betsy Westerndorp de Brias generously donated the eyes of her deceased husband Antonio Brias, an executive of San Miguel Corporation. The corneas were used on 2 indigent patients at the Philippine General Hospital.

Miss Orosa wrote further: "Ever since Dr. Salceda performed the said corneal transplant (using her husband's eyes), Mrs. Brias has made the cause of the blind people her own, encouraged as she is by the lasting benefits that have been derived from her husband's donation. She has now pledged her own eyes to the eye bank. Her three daughters—Sylvia, Isabel, and Carmen—have followed suit."

"Moved beyond words by these facts, Mrs. Brias has since then made the campaign for the blind her magnificent obsession. One Saturday, when the "Saturday Group"—established painters and neophytes who meet to paint every weekend—gathered in her house for one of their regular sessions, she lost no time in soliciting donations."

"The first person she talked to was Galo Ocampo who spread the word during his conference. They quickly responded and before the afternoon was over, HR Ocampo, Cesar Legaspi, Cenon Rivera, Tony Nuyda, Onib Olmedo, along with recent art recruits like Hernando Abaya, have verbally pledged their eyes to the eye bank."

"Most famous donor on that same occasion was siren-turned-photographer Gina Lollobrigida. With three more than willing assistants in tow, the famous Lollo ha[d] come to take pictures of the artists' model."

The sustained support by the media to the PEB drew public attention to ophthalmology in the Philippines. The extensive media coverage of the 1974 epidemic of hemorrhagic conjunctivitis in the country served to rally public support to the work on eye banking.

In 1974, no less than Doña Josefa Edralin-Marcos, mother of then president Ferdinand Marcos, generously served as the honorary chairperson of the Philippine Eye Bank. She helped solicit eye donations. During the observance of the Sight Saving Week in August 1974, she transferred the many pledges to Mrs. Gloria Mascardo, chairperson of the PEB. Present during the ceremonies were Mrs. Trinidad Mangubat representing the Lions Club, and the Director of the Philippine Eye Research Institute who was concurrently the president of the National Council on Blindness. [27]

Mrs. Mascardo became the chairperson of the PEB in 1971 when Mrs. Benjie Kosloff left for the USA. Mrs. Mascardo was the wife of customs collector Mr. Salvador Mascardo. She strengthened the arrangement with the Bureau of Prisons, such that eyeballs can be collected from deceased inmates. She also facilitated donations of eyeballs from Ceylon.

On November 19, 1971, Mr. A.T. Artyaratne personally handcarried 4 human eyeballs to Manila.[28] Mr. Artyaratne was the 1969 Ramon Magsaysay Awardee for Community Service. Ceylon (Sri Lanka) Charge d'Affaires Mr. N.M.M.T. Hussain and his lovely wife tendered a reception for the awardee on November 21, 1971. Officers of the PEB and the 4 Filipino ophthalmologists who were to use the corneas for transplantation were invited. The event marked the beginning of the regular shipment of eyeballs from Ceylon to Manila via Philippine Airlines.

The supply of eyeballs from Ceylon continued for almost a decade. Dr. Hudson Silva, who became the president of the Eye Bank of Sri Lanka, visited the Philippines on March 20 and September 20, 1980. Mrs. Mascardo hosted Dr. Silva's meeting with local ophthalmologists at her office at the Central Bank. Dr. Silva also gave lectures on eye banking at the then Philippine Eye Research Institute, UP Health Science Center.

Rather than being fully dependent on foreign donations of eyeballs, several Filipino ophthalmologists dedicated time to help the Philippine Eye Bank. Notable was Dr. Liborio Mangubat whom I accompanied on two occasions to meet with Mrs. Mascardo. The agenda was to explore how the Philippine Society of Ophthalmology could help the eye bank. Dr. Mangubat was president and a very active member of the San Juan Lions Club.

Dr. Edgardo Caparas also explored how the Rotary Club of Manila could help the eye bank. In 1993, he thought of situating an eye bank at the Eye Referral Center. His interest was the natural consequence of his first-hand experience with people suffering from corneal blindness. Dr. Caparas was very much involved in the outreach eye clinics of the Rotary Club in various parts of the country.

Breakthrough for Cornea Banking

Meanwhile, the technology of eye and cornea preservation was unraveling. The specular microscope had arrived for *in vivo* observation of the human corneal endothelium. Early basic studies and experiments on animal and human corneal endothelium were beginning to show their clinical usefulness. The structural and functional integrity of the corneal endothelium could already be preserved for extended periods of time. In media containing nutrients in appropriate pH and osmolarity, and stored at +4 degrees Celsius, endothelial cells could remain viable for as long as 14 days.[29-32] When used in homograft full-thickness keratoplasties, corneas so preserved resulted in clear graft.[33-35]

The preservation media prolonging the viability of the endothelium facilitated the storage and transfer of donor corneas. Corneal buttons and not eyeballs were being collected. The new and improved collection and preservation of corneal buttons contributed to the increase in the number of donor materials.

The Philippines became one of the recipients of preserved human corneal buttons. Donations from American eye banks to Manila were facilitated by the Lions International. I was one of the lucky recipients of regular corneal buttons from USA through this system.[35] It may be said that this new system of collecting and preserving corneal buttons facilitated the establishment of cornea banks.

The New Eye-Cornea Bank in the Philippines

The ebb and tide that characterized earlier work on eye banking in the Philippines are, at long last, over. For the first time, the country has a truly operational eye-cornea bank. The bank is predictably able to provide high-quality corneal and scleral tissues in sufficient quantity for visual, therapeutic, and tectonic transplantation procedures among truly deserving recipients irrespective of social and economic status. It has facilitated work on teaching and training Filipino ophthalmologists in corneal transplantation surgery, and on the all-important need to undertake scientific research to help push the frontiers of ophthalmic science specially as it pertains to Filipinos. [36-37]

The Sta. Lucia International Eye Bank of Manila (SLIEBM) started operating on October 16, 1995, some 19 months after the Eye Bank Foundation of the Philippines (EBFP) was organized on March 17, 1994. Having met the required international quality standards and guidelines, the SLIEBM has developed into a world-class eye bank (Felton PA, De' Lap DJ. Gold standard in international eye banking. Pesonal communication, 2007). It is a recognized member in the world's network of eye banks that constitute the International Federation of Eye and Tissue Banks International (IFETB/TBI).

The SLIEBM as the Philippine Eye Bank and the Foundation that operates it are the singular work and accomplishment of Dr. Ma. Dominga B. Padilla. From the time she was completing her residency training in ophthalmology at the Philippine General Hospital in 1987 to 1989 and through her fellowship at the Institute of Ophthalmology in 1990, UP Manila, establishing a new eye bank had become her apostolate. This I know. In her own words, she talked about her rendezvous with destiny: "As you very well know, I always remember the brainstorming sessions we had in the Institute of Ophthalmology. You would usually pull both Vic Caparas and myself and talk to us about not to be content being ordinary ophthalmic practitioners. You made us deeply aware, being who we are, of our special responsibilities, and to seriously do something about the lack of an efficient eye-banking system in the country. Well sir, I believe you prophesied when you uttered these words then."

It must have been her growing interest in the cornea and eye bank that in 1991, she helped me set up the Specular Microscopy Laboratory at the Institute of Ophthalmology. She worked for the donation of a Konan ST 500 Contact Specular Microscope from the philanthropist Don Emilio Yap. At the time, the other specular microscope acquired in 1982 was in the Eye Referral Center.

The work strategic to the birth, growth, and development of the new eye-cornea bank done by Dr. Padilla is difficult to chronicle. A few may be mentioned: She singlehandedly organized the EBFP that operates the eye-cornea bank. She helped in the amendment of the old RA 1056 to become RA 7170, the Organ Donation Act of 1991. But more important was the crafting of the operative law of the current eye-cornea banking. RA 7885 of 1995 entitled An Act to Advance Corneal Transplantation in the Philippines amended RA 7170 to permit the removal of the cornea with a rim of sclera for medical and scientific purposes. No longer is it necessary to remove the entire eyeball. The amendment was approved in the House of Representatives on February 13, 1995 and in the Senate on February 15, 1995.

So thorough is Dr. Padilla's understanding of the dynamics of eye-tissue banking that hers has been a systems approach to the problems involved. She resolved the legal basis and dealt with the organizational and operational issues of the bank. Once the bank was granted the needed space at the Makati Medical Center, where it was originally located, she proceeded to establish the relevant support mechanisms. These mechanisms include the hiring and training of the necessary personnel; the signing of agreements with the Philippine Airlines, Aboitiz Air, and LBC couriers for transporting the eye tissues to different parts of the country; the setting up of a Surgical Fund for Indigent Patients supported by ABS-CBN, Aboitiz Foundation, and the Tissue Bank International, among others; the establishment of the Hospital Retrieval Program to help diversify sourcing of eye-tissue collections; and insuring the close collaboration and support of the Philippine National Police and the National Bureau of Investigation. In May 2004, she signed a memorandum of agreement with then Health Secretary Dr. Manuel Dayrit for the bank to include government hospitals as part of the network of institutions for cornea retrieval.

Truly, the new eye-cornea banking under its dedicated leadership provides new windows of opportunity for restoring sight to those suffering from corneal blindness.[38] The bank reported on March 31, 2004 that it had collected 5,919 corneal and scleral tissues since the start of its operations in 1999. At present, the bank processes an average of 140 corneas a month. This size of the harvest enables the bank "to supply not just optical tissues around the world, with priority to the Philippines, Asia, and the Middle East, but tissue for training" (Padilla MDB.

Personal communication, June 21, 2007).

The bank plans to start a training program on eye-cornea banking for people from other countries who wish to come to the eye bank for training. Indeed, the bank in its new home at the Sentro Oftalmologico Jose Rizal inside the PGH Compound is awash with plans that include processing other human tissues for glaucoma and ophthalmic plastic surgeries.

It is a tribute to Dr. Ma. Dominga B. Padilla, her fellow officers and coworkers, and the members of the board of trustees that the SLIEBM, known as the Philippine Eye Bank, is rated a "world-class eye bank." Accordingly, the bank has been the recipient of the Tissue Bank International Award for "exemplary work in sight restoration for the corneally blind" in 1998, and the First Philippine Academy of Ophthalmology-Jesus Tamesis Sr. Award for community service in 2000.

References

1. Valenton MJ, Dy-Liacco JU, Espiritu CG. Corneal and external-disease problems in the Philippines. *Phillip J Ophthalmol* 1993; 1: 2.
2. Ubaldo A. Blindness among Filipinos. *J Phil Med Asso* 1936; 16: 223.
3. Salceda SR. *Towards a Program of Research in Ophthalmology.* Manila: Institute of Ophthalmology, University of the Philippines Manila, 1995.
4. Fojas M, De Ocampo G, Portes J. Survey of blindness in Bay, Laguna. *Phillip J Ophthalmol* 1969; 1: 14.
5. Alianza LC. A study on the incidence of blindness. *Phillip J Ophthalmol* 1976; 8: 67.
6. Fajardo R. Causes of blindness in the Philippines. Trans VI Congress of Asia Pacific Academy of Ophthalmology, Surabaya, 1976.
7. Gestuvo R. Frequency of blindness in Davao City. *Phillip J Ophthalmol* 1977; 9: 136.
8. Ramirez RA. *The Institute of Ophthalmology 1987 Blindness Survey.* Manila: Institute of Ophthalmology, University of the Philippines Manila, 1987.
9. Olivar-Santos E. The Second National Survey of Blindness in the Philippines. *Phillip J Ophthalmol* 1995; 25: 2.
10. Salceda SR. Corneal ulcer: a cause of preventable blindness in the Philippines. *Phillip J Ophthalmol* 1975; 7: 110.
11. Troutman RC. Microsurgery of the anterior segment of the eye. In: *The Cornea: Optics and Surgery.* St. Louis: CV Mosby Co, 1977; v. 11.
12. De Ocampo G. Ang kasaysayan ng Linggo ng Pagingat ng Paningin sa Pilipinas. *J Philipp Med Asso* 1963, 39: 8.
13. De Ocampo G. Corneal transplantation. First case report in the Philippines. *J Philipp Med Asso* 1949; 25: 601.
14. Caparas ET. Philippine Society for the Prevention of Blindness. *Phillip J Ophthalmol* 1979; 11:.
15. De Ocampo G, Sunga R, Cruz-Estrella C. The use of chicken and monkey cornea in human corneal grafting. In: G De Ocampo, *Choice of Keratoplasty. Transcript of the First Congress of Asia Pacific Academy of Ophthalmology*, Manila, 1960.
16. De Ocampo G, Salceda SR, Portes J. Mindoro blindness from corneal degeneration. *J Philipp Med Asso* 1963; 39: 12.
17. De Ocampo G, Salceda SR. The human cornea bank. *Oriental Arch Ophthalmol* 1965; 3: 14.
18. De Ocampo G, Salceda SR. The use of acellular cornea in keratoplasty. *Am J Ophthalmol* 1965; 59: 61.
19. De Ocampo G, Salceda SR. Basic viability observation and experiences on corneal endothelium. *J Philipp Med Asso* 1965; 41: 867.
20. De Ocampo G, Salceda SR. A biologic viability test for corneal endothelium. *Am J Ophthalmol* 1966; 61: 1514.
21. De Ocampo G, Salceda SR, De Leon A. A Human cornea bank. In: *De Ocampo Articles and Publications*, Manila, 1968. v. 4.
22. De Ocampo G , Salceda SR, De Leon A, et al. Some mechanical devices for cornea and eye bank. Presented during the National Science Technology week, First Post War National Science Convention, Manila, 8 July 1968.
23. De Ocampo G, Li JT, Gestuvo RG. Ocular postmortem cooling for preserving the human corneal endothelium. *J Philipp Med Asso* 1968; 44: 7.
24. Jimenez-Magsanoc L. Victims of crisis: government lack of vision snags eye researches. *Philippine Panorama*, July 5, 1970.
25. Ilustre JL. This bank is always empty. *Times Journal*, March 29, 1976.
26. Orosa R. A week of gallant gestures. Gina donates eyes. *Philippine Daily Express*, March 22, 1976.
27. Eye Donation Pledges. *Philippine Daily Express*, August 9, 1974.
28. Francisco RS. Eye transplant. *The Manila Times*, November 21, 1971.
29. McCarey BE, Kaufman HE. Improved corneal storage. *Invest Ophthalmol* 1974; 13: 165.
30. McCarey BE, Meyer RF, Kaufman HE. Improved corneal storage for penetrating keratoplasties in humans. *Ann Ophthalmol* 1976; 8: 1488.
31. Friedland BR, Forster RK. Comparison of corneal storage in McCarey-Kaufman medium, moist chamber of standard eye-bank condition. *Invest Ophthalmol* 1976; 15: 143.
32. Stein RM, Bourne WM, Campbell RJ. Chondroitin sulfate for corneal preservation at +4 C. Evaluation of electron microscopy. *Arch Ophthalmol* 1986; 104: 1356.
33. Stark WJ, Maumenee AE, Kenyon KR. Intermediate-term corneal storage for penetrating keratoplasty. *Am J Ophthalmol* 1975; 79: 115.
34. Van Horn DL, Schultz RO. Corneal preservation: recent advances. *Surv Ophthalmol* 1977; 21: 301.
35. Salceda SR, Alejo-Ramirez LR, Marin JD. Intemediate-term preserved corneas in penetrating keratoplasty. *UP Manila Jour* 1995; 1: 1.
36. Padilla MDB, Sibayan SAB, Gonzales CSA. Corneal endothelial cell density and morphology in normal Filipino eyes. *Cornea* 2004; 23: 129.
37. Padilla MDB, Eltanal-Pascual MAT. Indication for penetrating keratoplasty in the Philippines. *Philipp J Ophthalmol* 2005. 30: 4.
38. Salceda SR. Challenges for the Filipino ophthalmologists in the next millennium *PAO Focal Point* 2000; 5: 6.