Research achievements on which any fellowship received

Dr. Mandal received the fellowship of the National Academy of Medical Sciences (FAMS) in 2019 for his contributions to medical science and Ophthalmology. The citation is as follows:

“Dr. Mandal has made significant contributions in Ophthalmology both in clinical practice and in basic research. His expertise in the management of congenital glaucoma and his research work on the molecular genetics of glaucoma are noteworthy. He is the first Ophthalmologist to receive the ‘Shanti Swarup Bhatnagar” award. He is the senior instructor for instruction courses in the American Academy of Ophthalmology for the last 10 years”.

Some of the clinical research achievements on which the fellowship was awarded are cited below:

In 1998 we published the surgical results of CTT for PCG who underwent surgery between August 1990 and September 1995. The series included 182 eyes of 120 patients of which 122 (67%) eyes had newborn glaucoma; 22 (12.1%) eyes had infantile onset and 38 (20.9%) had late-onset PCG. The success probability of patients with late-onset glaucoma was significantly lower than it was for those with new-born variety (P=0.039). Of the 182 eyes, 105 (57.7%) eyes had corneal oedema at presentation. Eighty-one (79%) of 105 eyes had complete clearance of corneal oedema postoperatively. We concluded that CTT is safe and effective and sufficiently predictable to be considered the first choice of surgical treatment in new-born glaucoma with corneal oedema. Juvenile glaucoma had the worst prognosis and infantile glaucoma had a better prognosis than did late-onset PCG.

In 2003, we reported the outcome of CTT on infants younger than 1 month with PCG. The medical records of 25 consecutive patients (47 eyes) who underwent CTT by a single surgeon were retrospectively reviewed. Twelve-, 24-, and 36-month survival rates of complete success for IOP control were 89.4%, 83.6%, and 71.7% respectively, which were maintained for 7 years of follow-up. Final best-spectacle corrected visual acuity was 6/12 or better in 5 patients (26.3%), 7 patients (36.8%) obtained 6/18 or better, 8 patients (42.1%) achieved a final visual acuity of <6/18 to 6/60 and 4 patients obtained <3/60. There were no significant intra-or postoperative complications in any patient. Anesthesia-related complications developed in 2 patients; however, they were resuscitated successfully. We concluded that CTT offers a viable surgical option in infants that have cloudy corneas at birth due to early-onset PCG. It is associated with a favorable visual outcome and a low rate of anesthetic complications in our Indian population.

In 2004, we reported the long-term surgical and visual outcomes in children with PCG operated on within 6 months of birth. The study included 299 eyes of 157 consecutive patients who underwent CTT from January 1900 through December 2001 by a single surgeon. The probability of success (IOP <21mmHg) was 94.5%, 92.1%, 86.7%, 79.4%, 72.9% and 63.1% at 1^{st}, 2^{nd}, 3^{rd}, 4^{th}, 5^{th} and 6^{th} year respectively. Postoperatively normal corneal clarity was achieved in 83 of 133 eyes (62.4%) with corneal oedema. There were no major intraoperative complications. We concluded that CTT is safe and effective in PCG and it leads to an excellent IOP control with

moderate visual outcome. The visual outcome of this series is better than or comparable to that in most reported studies.

Corneal enlargement is a poor prognostic factor in the management of PCG. It is generally accepted that the success of goniotomy is not as good in eyes with significant buphthalmos. In patients with significant increase in corneal diameter, goniotomy is technically difficult to perform. Barkan believed that eyes with corneal diameter >15mm are not suitable for goniotomy. We performed CTT on 74 consecutive patients (121 eyes) in advanced PCG with corneal diameter of 14mm or more over a 13-year period from January 1990 to December 2002. We concluded that CTT is safe and effective in patients with advanced PCG with corneal diameter of 14mm or more. It offered good IOP control with a low complication rate, with one-third of patients achieving visual acuity of 6/18 or better. The additional advantage of CTT is that it allows greater surgical flexibility in advanced buphthalmos. For example, conversion to trabeculectomy is feasible in cases where identification of Schlemm's canal is not possible. In this study, such a situation was encountered in 5 (4.1%) eyes.

Safety and efficacy of simultaneous bilateral primary CTT for PCG was evaluated by us. We studied 109 consecutive patients (218 eyes) who underwent simultaneous bilateral CTT from January 1990 through December 1999. The success probability for IOP control and visual outcome was optimal. There was no incidence of endophthalmitis or any other sight-threatening complication. Of the anesthetic complications, apnea occurred in 17 (15.6%) patients and all were successfully resuscitated. The most serious post-anesthetic complication was cardio-pulmonary arrest that occurred 5 hours postoperatively following aspiration during feeding in one child. This child could not be resuscitated. Two children had delayed recovery from anesthesia (2 and 4 hours respectively). The child who had delayed recovery by 2 hours survived and has completed 18 years of follow-up while the other child expired 48 hours later. We concluded that simultaneous bilateral primary CTT is safe and effective for PCG. It obviates the need for long second anesthesia with its attendant risks. It offers several other benefits to the patients and families. The decision making process for simultaneous bilateral surgery must involve the treating surgeon, the parents and the anesthesiologists