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Management of cataract: have we found the solution?

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There is no doubt that cataract is a major problem facing ophthalmologists throughout the world.^{1,2} In developed countries, once cataract causes functional impairment, it is treated by surgery with the least amount of discomfort, disruption of daily life or employment. In developing countries, however, millions of patients with cataract live in darkness for years without the possibility of receiving surgery in their lifetime.

Good outcome from cataract surgery is the result of years of hard work by scientists, researchers, and innovators. Following the introduction of an intraocular lens implant by Dr Harold Ridley of St Thomas's Hospital in London in 1949,³ cataract extraction with posterior chamber lens implant has become the gold standard of cataract surgery, even in less privileged countries. The subsequent developments of phacoemulsification,⁴ capsulorhexis,⁵ hydrodissection, nucleus fracturing,⁶ foldable lens and small clear corneal incision have made cataract surgery the 'state-of-the-art' of ophthalmology. Correction of spherical refractive error by the power of the lens, and astigmatism by wound manipulation or keratotomy have sometimes allowed patients to enjoy better uncorrected visual acuity than before the onset of the disease.⁷

In Hong Kong, with a dual medical system of a public and a private sector exclusive of each other, intraocular lens implantation was first performed by private ophthalmologists in the early 1980s. In the public sector, intraocular lens implantation became the standard procedure only in the early 1990s. Cost was the major concern with regard to the

intraocular lens, viscoelastic substance, balance salt solution, microsurgical materials, and instruments. The complexity of surgical techniques, longer surgical time and possible high complication rates also cast doubt on whether intraocular lens implantation should be the choice of treatment for the vast number of patients with cataract in the public sector. With improvements in surgical skill and training in recent years, supported by the commitment of the government, more than 10,000 cataract extractions with lens implantation are now performed in the public hospitals every year.

Phacoemulsification was first performed in Hong Kong in the mid 1980s by private ophthalmologists trained at overseas centers. It was introduced into the public sector 5 years ago and the proportion of patients undergoing phacoemulsification has increased steadily in the past few years. At the Tung Wah Eastern Hospital, Hong Kong, 45% of cataract surgeries performed in 1998 were by phacoemulsification. The advantages of a small incision with less suturing, early recovery, shorter hospital stay, and less frequent follow-up, together with reduced discomfort for the patient both during and after surgery, make it a justifiable and cost-effective procedure.

The situation, however, is less encouraging in many developing countries. It has been estimated that 20 million people worldwide are blind because of cataract and the number is increasing by approximately 1 million per year.⁸ In China, cataract is the cause of blindness for about 4.4 million people, most of whom live in rural areas without surgical facilities.⁹ Moreover, the results of cataract surgery

in places where it is performed are often unsatisfactory.¹⁰⁻¹² The scale of the cataract problem in these countries cannot be over-emphasized and the burden on the governments to tackle the problem is immense.¹³ In Hong Kong, several projects have been conducted by enthusiastic organizations to help to deliver high quality eye care to patients in China. The Mobile Eye Treatment Center, launched in 1994, was the first project to perform cataract surgeries in rural areas of China, by converting a tourist bus into an operating room.⁹ This was followed by the train 'Lifeline Express' in 1997 and Sight First China Action in 1998. Ophthalmologists in Hong Kong, no matter whether they are from the private or public sector, have taken turns to perform cataract operations in these projects and to help train Chinese eye doctors. In these projects, implantation of an intraocular lens is emphasized because of its optical advantages in correcting aphakia. In many developing countries, a large proportion of cataract patients remain functionally blind after surgery because optical correction for aphakia is not provided.¹⁰ In December 1998, aided by the Sight First China Action project organized by the Lions Club, an intraocular lens factory was set up in Suzhou with the goal of providing high quality low cost implants for the patients.

Given the large scale of cataract problems in developing countries, it does not take long to realize that, with the present amount of manpower and resources in eye care, it is very difficult if not impossible to eliminate cataract blindness in these countries. The number of cataract operations that can be done by volunteers is comparatively small. It is now believed that the solution is to train the local surgeons to perform the operations. While a trainee surgeon can now operate on cataracts competently after performing 20 to 30 cases under supervision and training in a training center, difficult operations or decisions on complex situations such as cataract with diabetic retinopathy require much more experience and teaching.¹⁴⁻¹⁶ In Hong Kong and the United Kingdom, the training program leading to a Fellowship in Ophthalmology takes six years; in the United States, the resident program spans over three years, followed by a Fellowship program of one to two years. Without the commitment of the governments in developing countries, resources and manpower from the voluntary organizations alone appear insufficient to overcome the problem of cataract blindness in these countries. Dr. N.C. Chan, in his article on the 'NOOR' project in this issue, reports his experiences of

working with a missionary eye project in Afghanistan and the political problems involved.

In the long run, the medical profession has to continue to search for better ways of curing cataract and should not be content with the present achievements. The complication rate of modern cataract surgery is relatively low, but complications still occur, even in the best hands. Opacification of the posterior capsule has important implications for patients operated on in eye camps without access to full post-operative care.^{17,18} This is also the most frequent post-operative complication in modern cataract surgery. Recent advances in surgical techniques, materials and design of the intraocular lenses has significantly reduced the rate.¹⁹ A final solution to this major problem may lie in the studies of the effects of immunotoxin or other chemical agents, but these are still in the experimental stage.^{20,21} Endophthalmitis, retinal detachment, dislocated implant, glaucoma, endothelial damage or expulsive hemorrhage may cause irreversible loss of vision. Newer surgical methods for removal of the cataract, including the use of Erbium-YAG or Holmium-YAG laser have already been applied clinically^{22,23} but large-scale studies are required to prove their long-term efficacy and safety. At present, some medications such as aldose reductase inhibitor have been marketed as medical treatment for cataract without proven benefit.^{24,25} Other etiological factors associated with cataract, such as smoking, alcohol, and ultraviolet light exposure have been widely studied.²⁶⁻²⁹ The role of antioxidants in slowing cataract progression has been investigated with some beneficial effects shown in some studies, but there is no firm evidence to advise their use as nutritional supplements for cataract prevention.^{30,31}

Hong Kong, as Asia's premier financial center, and supported by the government's commitment to develop high-technology and traditional Chinese medicine, has a major role to play in training eye surgeons in this part of the world and organizing research to evaluate new forms of cataract treatment. To eradicate cataract blindness on a global basis, the treatment has to be simple and inexpensive.^{32,33} Until further breakthroughs are found, improved training and supervision of cataract surgeons, dissemination of medical knowledge, and developing means to lower the costs of surgery, are the main goals of any cataract program.

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