Guest editorial

Cataract surgery in Nepal: then and now

Hennig A
Medical Director
Sagarmatha Chaudhary Eye Hospital, Lahan, Nepal

During the last decades there has been a tremendous change in cataract surgery in industrialized countries. With a delay of about ten years, this trend has also happened in developing countries like Nepal.

The author has been working in Nepal since 1982. At that time, only 7 ophthalmologists working in one eye hospital and four eye departments in the whole country performed around 700 cataract operations per year. Through the initiative of a group of dedicated colleagues, like Dr Ram Prasad Pokhrel, the ophthalmic services in Nepal have grown to an outstanding model among the developing countries, and the services have been reached to the unreached (Pokhrel RP, 2003).

Today, Nepal has 150 ophthalmologists and 391 ophthalmic assistants, working in 20 eye hospitals, 14 eye departments and 62 primary eye care centres. In 2009, nearly 210,000 cataract surgeries were performed. The cataract surgical rate is now considered to be 2,600 per million population per year.

One of the eye hospitals is the Sagarmatha Choudhary Eye Hospital, which was established with the support of CBM Germany in cooperation with the Nepal Netra Jyoti Sangh (a local NGO). It is located in the south-eastern plains of Nepal in the small town of Lahan. From its beginning in 1983, it has constantly grown. Meanwhile, with the start of an additional eye hospital in Biratnagar and six satellite clinics it has become the Eastern Regional Eye Care Programme (EREC-P). From 1983 till date, over 3 million patients have been examined and treated and more than 670,000 eye surgeries have been performed, over 90 % of them being cataract operations.

The change in cataract surgical techniques over the years is described on the basis of experience gained at Sagarmatha Choudhary Eye Hospital.

Intracapsular Cataract Extraction (ICCE) and aphakic correction with cataract glasses
While in early 1980 ophthalmologists in industrialised nations had already started with the implantation of posterior chamber intraocular lenses (IOLs), ICCE, often without applying sutures, or even "Couching" was the cataract surgical procedure in Nepal.

During the first ten years in Lahan, mainly ICCE was performed. The opening of the eye was done with a von-Graefe knife (photo 1). After peripheral iridectomy the complete lens was extracted with cryo (photo 2), and the wound closed with 3 sutures.

Photo-1: von-Graefe knife

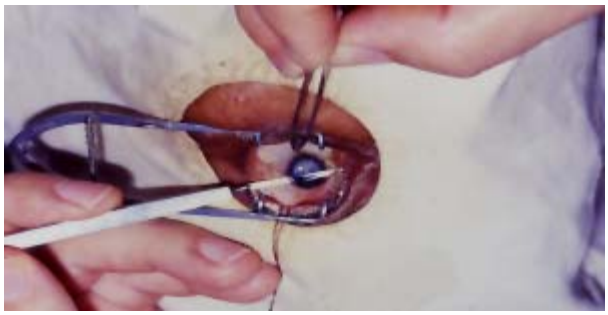
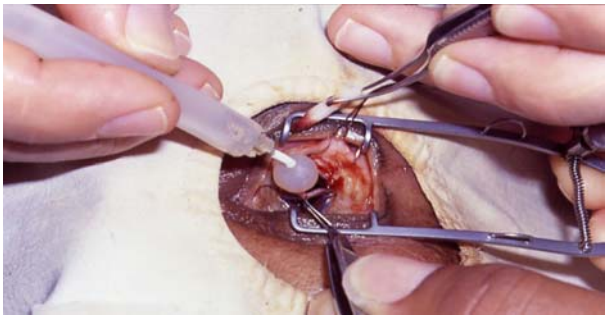


Photo-2: Extracting the lens with a cryo



Initially, the author used a high quality Zeiss magnifying loupe with two times magnification. As no electricity was available, the surgical instruments were sterilized in pressure cookers. To allow high efficiency with the rapidly increasing number of patients, surgery was performed in the standing position with the surgeon moving between several OT tables. With lots of cataract operations, resulting in vast surgical experience, the rate of intra-operative complications such as vitreous loss was low and good visual acuity with cataract glasses was achieved (Hennig A et al 1992). At discharge the patients were given standard +11 dioptre spectacles for optical correction. The main problem, however, were the cataract glasses. They did not provide a good visual quality, often didn't last long, got scratched, broken (photo 3) or were lost. Without replacement, the operated eye then became blind again.

Photo-3: Broken spectacles

ICCE and insertion of Iris Claw Lens (Lobster-claw lens)

To avoid the problem with the cataract glasses, in 1989, a few hundred Iris Claw lenses, developed by Jan Worst, were inserted after ICCE. However, skilled and experienced surgeons found the insertion of this lens rather difficult, especially fixing the right amount of iris tissue into the lens claws. Also, sometimes cornea decompensation was observed at long-term follow-up, especially when the claw lost its iris fixation, resulting in IOL cornea touch.

ICCE and insertion of Anterior Chamber Intraocular Lenses (AC IOL)

More promising was the idea to overcome the problem with aphakic cataract glasses by inserting modern Kelman AC IOLs, which started in 1990. The surgical technique was still ICCE.

After removal of the lens, repositioning of the iris and filling the anterior chamber with air, a modern AC IOL was inserted - first the four-point Kelman IOL (photo 4), and later the 3-point AC IOL.

In Lahan, a randomised clinical trial, as recommended by the WHO, was conducted, which showed that the modern four-point AC IOL achieved excellent results in also the long-term studies (Hennig A et al 2001). Therefore, there was high expectation that ICCE surgeons in developing countries would change to this method. However, this did not happen for various reasons. Instead, eye surgeons preferred to learn and use the extracapsular method.

In the early nineties, eye care providers like Aravind Eye Hospital in South-India started the production of good quality IOLs, affordable to most patients. In Nepal, the pioneer for extracapsular cataract extraction is Dr. Sanduk Ruit (Ruit S et al 1991) who also established an IOL manufacturing unit at Tilganga Eye Centre in Kathmandu.

Photo-4: AC IOL to be inserted after ICCE

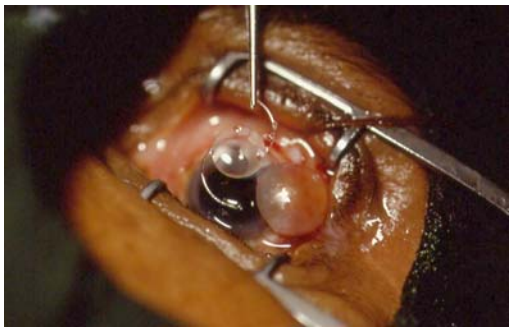
Extracapsular cataract extraction (ECCE) and insertion of Posterior Chamber Intraocular Lenses (PC IOL)

From 1990 onwards, in Lahan, AC IOLs as well as PC IOLs were inserted, but increasingly more PC IOLs, because an intact posterior capsule reduces the risk of vitreous problems and the capsular bag is considered the best location for an IOL.

Also with ECCE, the von-Graefe cataract knife proved to be suitable for the opening of the eye as well as for the linear capsulotomy. After thorough hydrodissection, the nucleus was extracted and the remaining cortex removed with a Simcoe cannula. Then the anterior capsule was cut twice and the PC IOL inserted into the capsular bag under protection of injected air (photo 5). Finally, the anterior capsule was removed and the wound closed with three sutures.

From 1997 onwards, all cataract patients at Lahan received an IOL according to biometry findings.

Photo-5: PC IOL to be inserted after ECCE



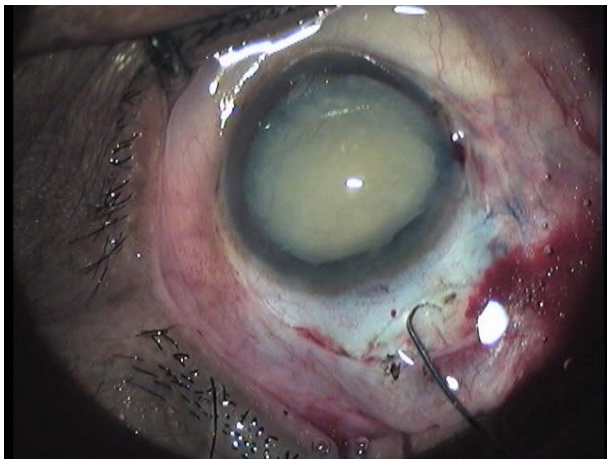
"Small Incision Cataract Surgery (SICS)"-Fishhook Technique

Inspired by Dr. M. Blumenthal and his self-sealing sutureless technique, the author started with "Small Incision Cataract Surgery (SICS)". In 1997, the "Fishhook Technique" was developed in Lahan, Nepal, as a special form of SICS. Due to good surgical results, including fast visual recovery, the Fishhook Technique replaced ab-externo ECCE/PC IOL with sutures and became the standard cataract surgical technique in Lahan from 1998 onwards (Hennig A et al 2003).

After Frown incision, preparation of a corneo-scleral tunnel, opening of the anterior chamber and capsulotomy (linear or capsulorhexis), hydrodissection and mobilization of the nucleus are done, lifting the nucleus a bit out of the capsular bag at the side of the tunnel. This creates space for the injection of methylcellulose and the insertion of the "Fishhook" (photo-6), with which the entire nucleus gets extracted out of the capsular bag and through the self-sealing tunnel. This hook is made from a 30 G needle. The remaining cortex is removed by hydroexpression and with the help of an irrigation/ aspiration Simcoe cannula. Finally, a PC IOL is inserted into the capsular bag.

This surgical technique can be performed with a microscope as well as with high quality five times Zeiss loupe magnification. If the surgeon moves between several tables and the preparation for surgery as well as the final steps are done by specially trained OT staff, then an experienced surgeon can perform15-20 Fishhook surgeries per hour. The news about the good outcome after Fishhook surgery spread quickly and caused a further rapid increase in the number of patients and operation. So far, more than 400,000 Fishhook surgeries have been performed in Lahan and Biratnagar alone.

Photo-6: Fishhook before insertion



Phacoemulsification (Phaco)

In the meantime, surgeons and educated patients in developing countries were becoming interested in phacoemulsification. Most eye surgeons in developing countries now offer phaco with insertion of expensive foldable lenses to patients that can afford the procedure, whereas patients from low-income groups don't benefit from phaco.

In Lahan, we began using phaco in 2001, but only in recent years has it gained more importance. Phaco with foldable IOL is offered to patients who request it and can afford it. However, in Lahan, for about 90 % of phaco surgery, a rigid 5 mm optic PMMA IOL is implanted without any additional costs for the patient. These are mostly younger patients with not-too-hard nuclei, selected at the time of local anaesthesia.

Phaco surgery takes twice as long as SICS. However, if a phaco surgeon moves between two tables, about 8-10 phaco surgeries can be performed per hour. In order to keep surgical and phaco time low, the "phaco-chop" method is used, usually working in "burst mode". The nucleus is broken into several parts, emulsified and aspirated. For the removal of the epinucleus and the cortex, a Simcoe cannula and bi-manual irrigation-aspiration are used.

Nearly 8,000 such phaco surgeryies are currently performed in Lahan every year, which represents 20 % of all cataract surgeries done. It is expected that this will further rise in the coming years.

In the meantime, in Lahan as well as in Biratnagar, phacoemulsification surgery has become an integrated part of the routine surgical work.

The Lahan experience has shown that even with using a 5 mm optic PMMA IOL, a better uncorrected postoperative visual acuity is achieved than with the Fishhook technique, because the smaller incision causes less surgically-induced astigmatism.

The overall post-operative visual acuity at Lahan, including all cataract surgical techniques, has improved markedly with the introduction of the phaco technique. However, many patients still present for treatment at an advanced stage where the lens nucleus is too hard for phacoemulsification. For them, the Fishhook technique is more appropriate.

What is the future of cataract surgery in developing countries like Nepal?

New cataract surgical techniques reach developing countries with a delay of some years. Modern cataract surgical techniques like phaco may need to be adjusted and adapted to local conditions.

With IOL insertion, cataract patients don't need to wait any more until both eyes are blind. Nowadays, patients are coming for surgery much earlier and are younger. They will benefit from modern surgical techniques.

The goal for cataract surgeons is to provide the best post-operative visual outcome for the patients. Surgeons, in any setting, should be able to provide the best possible cataract surgical technique depending on the type of cataract. This means that cataract surgeons should master several techniques, such as SICS, for cataracts with very hard nuclei, and phacoemulsification for less advanced cataracts.

The eye care programmes in Nepal demonstrate nicely the shift from treatment to prevention of cataract blindness.

References

Hennig A, Johnson GJ, Evans JR, Lagnado R, Poulson A, Pradhan D, Foster A, Wormald RP (2001). Long term clinical outcome of a randomised controlled trial of anterior chamber lenses after high volume intra-capsular cataract surgery. Br J Ophthalmol; 85(1): 11-7.

Hennig A, Kumar J, Yorston D, Foster A (2003). Sutureless cataract surgery with nucleus extraction: Outcome of a prospective study in Nepal. Br J Ophthalmol; 87(3): 266-70.

Hennig A, Shrestha SP, Foster A (1992). Results and evaluation of high volume intra-capsular cataract surgery in Nepal. Acta Ophthalmol (Copenh); 70(3): 402-6.

Pokhrel RP (2003). Reaching the Unreached. Published by Sobhana Pokhrel.

Ruit S, Robin AL, Pokhrel RP, Sharma A, DeFaller J (1991). Extracapsular cataract extraction in Nepal: 2-year outcome. Arch Ophthalmol; 109(12):1761-3.

Source of support: nil. Conflict of interest: none