The Natural choice for paediatric patients

Demot McGrath in Paris

The AcrySof Natural Lens (Alcon Laboratories Inc.) is a safe, efficacious and easy to implant IOL in paediatric patients, according to a number of leading experts in the field.

“The AcrySof Natural is my implant of choice for these more challenging paediatric patients because it is easy to implant in the capsular bag and has a very low complication rate over the long term, which is critical for these very young patients,” said Abhay R. Vasavada, MD, Baladevi Cataract & IOL Rate over the long term, which is critical for choice for these more challenging paediatric patients.

Laboratories Inc.) is a safe, efficacious and easy to implant IOL in paediatric patients, according to a number of leading experts in the field. The inflammatory response is practically nil because with the latest viscoelastics and the way we perform cataract removal now with less phaco energy and smaller incisions, the surgery is much less traumatic than it was several years ago,” he said.

In addition to an ultraviolet (UV) light-absorbing chromophore, the AcrySof Natural lens features a patented yellow chromophore that is integrated into the lens material to filter high-energy wavelengths of the blue-light spectrum.

In Dr Vasavada’s opinion, this type of lens will become the industry standard as evidence grows of the validity of blue-light filtering to protect the retina in pseudophakic eyes.

“I believe that the standard of care is going more and more to a platform that is designed to protect the retina from harmful blue-light toxicity. That is why I choose the AcrySof lens because it behaves exactly the same as the traditional AcrySof lens in terms of its technical response and outcome but hopefully at the same time prevents UV-light induced damage over a long period of time because these patients have to be exposed to these light conditions all their life and in my part of the world UV-light toxicity is a genuine issue of concern,” he said.

M. Edward Wilson, MD, another surgeon with extensive experience of implanting the AcrySof lens in children, echoed Dr Vasavada’s endorsement of the manifold advantages offered by the Natural IOL.

“The single-piece AcrySof IOIs, either the clear SA or the yellow SN model, have the advantage that they can be inserted as a compact unit into even the smallest of capsular bags. It unfolds very slowly, allowing the surgeon to verify that it is completely within the capsular bag. It also does not stress the edge of the capsulorhexis even when the capsular opening is small. This again is because of the single-piece design and the delivery mechanism through the inserter,’’ he said.

Dr Wilson also advised inserting the IOL into the capsular bag before the posterior capsule is opened.

“Even when a posterior capsulorhexis is planned, as is common when operating on young children, I recommend inserting the IOL into the capsular bag before the posterior capsule is opened. After it has unfolded completely and after the optical axis is set, I have been performing the surgery as non-traumatic as possible in these situations. The optical axis is set then I use the 3-piece AcrySof MA-60 which has a posterior angulation and is suitable for sulcus placement,” he said.

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Their expert is familiar with the technology recommend using micro-incisions to reduce the likelihood of induced astigmatism and minimise trauma to the eye.

By using a single-piece acrylic IOL and the Monarch injector, the incision size can be minimised to 2.7mm also in the paediatric eye. This is a very soft IOL and therefore probably suitable for the small eyes of the newborn baby when implanted in the capsular bag,” said Charlotta Zetterstrom, MD, who has implanted between 200 and 300 Natural IOls in children since 2003.

“A small incision is vital to get the best out of this technology,” agrees Dr Vasavada. “I used to use 3.0mm incisions in children but with the C-cartridge and the microincision technique which has been developed in adult cataract surgery, I am able to transfer that experience into children now. With the Natural I don’t use more than a 2.4mm incision. That is important in children because the larger the incision the greater the induced astigmatism, which can lead to amblyopia formation,” he said.

Another critical factor in paediatric surgery is the question of the timing of the surgery. For Prof Zetterstrom, Ullevål University Hospital, University of Oslo, Norway, rapid intervention is essential in the event of dense cataract.

“It is important to act quickly with dense congenital cataract while the reversibility of amblyopia depends on the stage of maturity of the visual system and the most critical period is when the patient is younger than two months. Visual deprivation during this period usually causes severe and permanent visual loss and permanent nystagmus if not managed properly. If visual deprivation occurs after the age of two to three months, amblyopia is usually reversible to some extent and nystagmus is not present. The sensitivity to amblyopia then gradually decreases until the age of six or seven years when visual maturation is complete,” she said.

Dr Zetterstrom noted that visual loss and the development of amblyopia also depend on the size and location of the cataract and particularly on its density. If the opacities are large enough to obscure the fundus view through an undilated pupil, amblyopia development can be expected, she said.

Age and timing critical

For Dr Vasavada the age of the children is a key factor in deciding whether to proceed with the surgery.

“It has to be remembered that this is still quite controversial and not everyone believes that it is safe to implant lenses in infants. In very young children, the critical point is to have the IOL implantation in the capsular bag. I will implant an IOL in an infant only if I can be sure to fixate the IOL inside the capsular bag. If I cannot achieve this, I don’t place an IOL in the infant eye under one-year and will place a Natural IOL secondarily when the child is three years old,” he said.

Dr Wilson said that he uses the AcrySof IOL for all routine paediatric cases, although he stressed that the single-piece AcrySof should not be placed in the ciliary sulcus.

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Complications include inflammation, glaucoma

In terms of complications associated with IOL implantation in paediatric patients, Dr Wilson cites excessive postoperative inflammation, posterior synechiae, pupillary capture, and visual axis opacification (after-cataract) as potential problems.

Secondary glaucoma is also a real threat in paediatric patients, noted Dr Zetterstrom.

“Secondary glaucoma is unfortunately a common complication and definitely the most sight-threatening. The highest incidence is found when the surgery has been done early, that is below the age of two months, and a much lower incidence is found when surgery has been performed over the age of one. Eyes with small corneal size, nuclear cataract or persistent foetal vasculature are at greatest risk. Implantation of an IOL into the capsular bag seems to inhibit the development of secondary glaucoma,” she said.

Dr Wilson said that he tries to avoid excess iris manipulation and makes the surgery as non-traumatic as possible in order to reduce the risk of postoperative

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inflammation. In this respect, he notes that the Natural IOL is a perfect choice of implant.

“The AcrySof Natural produces less inflammation in my hands because it can be delivered into the capsular bag without any iris manipulation. A carefully done vitrectorhexis or manual capsulorhexis can prevent pupil capture of the IOL by keeping the capsulorhexis edge over the optic for 360 degrees,” he said.

Getting to grips with after-cataract

However, it is opacification of the visual axis that is considered the most common complication after cataract surgery, particularly in children who have surgery under the age of one year. Lens epithelial cells will grow on the anterior vitreous surface if not removed. But even if the anterior part of the vitreous has been removed, cells can grow both on the anterior and posterior surface of the IOL, although there are some strategies that can be adopted to minimise the risk.

“In order to help prevent after-cataract I would recommend anterior vitrectomy as well as posterior capsulorhexis for children under two years. For children between two and six years, I perform only posterior capsulorhexis with no vitrectomy and in children older than six years, I perform neither posterior capsulorhexis nor vitrectomy,” said Dr Vasavada.

As a preventive step to avoid visual axis opacification, Dr Wilson advocates cleaning the capsular bag of all cortical material and performing a 4.5mm posterior capsulorhexis with anterior vitrectomy in children less than six or seven years of age.

“Most visual axis opacification is caused from new cortex formation made by the few epithelial cells that were not washed out at the time of surgery. VAO occurs more often when surgery must be done in the first six months of life, despite an adequate posterior capsulorhexis and vitrectomy, and when an IOL is used. The IOL is not so much of a scaffold for the cells. Rather, it keeps the capsule remnants from sealing into a Sommering’s ring. The new cortex material reaches the centre of the pupil more often in infants who are implanted with an IOL because the capsule edges do not seal to the IOL as well as it seals to itself. In effect it is the difference between a closed Sommering’s ring or an open Sommering’s ring,” he said.

Dr Zetterstrom said that she performs anterior and posterior capsulorhexis in all children. She noted, however, that even when a posterior capsulorhexis has been performed, growth of lens epithelial cells on the vitreous surface or on the back of the optic can be found some months after surgery.

“In children below the age of six years I also perform a dry anterior vitrectomy to reduce the incidence of opacification of the visual axis. A very promising device to fight VAO in children is the Perfect Capsule device invented by Anthony J Maloof, which allows selective irrigation of the capsular bag following phacoemulsification. We have recently tested the device in young rabbits to prevent PCO and proved its efficacy when irrigated with 5-fluorouracil. We have also found it safe to use in young rabbit eyes,” she said.

Teamwork holds the key

Another key difference between adult and paediatric cataract surgery lies in the postoperative care, emphasises Dr Vasavada.

“The surgeon plays an important role in the management of paediatric patients but it is not a task for him or her alone. With children the management is really only beginning after the surgery.”

Charlotta Zetterstrom MD

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Dr Zetterstrom agreed. “In the newborn eye I still have some concerns while there is no available IOL that really fits the small newborn eye. Also the Natural IOL is available in an optic size of 6mm and I wish that the single-piece AcrySof IOL with an optic size of 5.5 also could be produced with the yellow chromophore,” she said.

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