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PCIOL implantation by small incision cataract surgery in children with traumatic cataract

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ABSTRACT

Interventional Study, among children with traumatic cataracts attending Ophthalmology OPD. Patients of both sexes and at different ages under 15 years were included. The etiology included was blunt trauma causing traumatic cataract. A detailed study of the age, etiology, pre-operative status of the eye, time of surgery following trauma, the final visual outcome was done and informed consent was taken. Postoperative follow up was done up to 2 months following surgery. There were no serious operative complications. Clinically significant posterior capsule opacification was seen in 20 % cases and YAG capsulotomy was performed in 4 patients. Visual acuity was 6/12 or better in 80% of eyes at the last follow up examination. The visual acuity after implantation of posterior chamber IOLs by SICS in children with traumatic cataracts was encouraging.

Keywords— *Traumatic cataract, Blunt trauma, PCIOL implantation*

1. INTRODUCTION

- Ocular trauma is regarded as one of the most important public health problem worldwide. It is the single most important cause of acquired monocular blindness in the world. Around 40% of monocular blindness may be related to ocular trauma. [1,2]
- Ocular trauma can induce cataract formation. [3-8] A traumatic cataract may develop after various type of ocular insult including blunt and penetrating trauma. Other rare causes of traumatic cataract include infrared energy, ionizing radiation and ultraviolet radiation. [9]
- Mode of injury in children is mostly domestic injury most commonly during playing at home or school. [10]
- The visual prognosis of traumatic cataract depends upon the type of ocular trauma, extent of lenticular involvement and associated damage to the ocular structure. However regarding the time of intervention of cataract surgery it has been emphasized that for a better prognosis the treatment should be completed within six months in children. [11]
- The use of intraocular lenses (IOLs) in infants and young children remains a controversial subject but there have now been many reports from the developed world which show good visual results following posterior chamber lens implantation in children older than 1 year.

Fig. 1 and 2: A case of traumatic cataract, Rosette type of traumatic cataract

2. AIMS AND OBJECTIVES

2.1 Aim

To assess the efficacy of PCIOL Implantation by Small Incision Cataract Surgery in Children with Traumatic Cataract.

2.2 Objectives

- To assess the visual outcome following management in children with traumatic cataract.
- Evaluation of complications after surgery.

3. METHODOLOGY

3.1 Study design and location

Prospective, Interventional Study, among children presenting with traumatic cataract attending the Ophthalmology OPD of AVBRH, Sawangi, Wardha.

3.2 Study duration

1 year (July 2017- July 2018)

3.3 Sample size

A total of 20 patients attending our tertiary care hospital, Acharya Vinoba Bhave Rural Hospital, Sawangi (Meghe), Wardha were selected.

3.4 Inclusion criteria

- Children below 15 years who present with Traumatic Cataract as a result of blunt trauma.
- Both sexes.

3.5 Exclusion criteria

1. All other types of cataract other than traumatic cataract such as:
   - Complicated cataract.
   - Congenital or developmental cataract.
2. Cataract with Posterior Segment Pathologies
3. Penetrating injury/globe rupture.
   - 20 Patients of both sexes and at different ages under 15 years were included.
   - The etiology included was blunt trauma causing traumatic cataract.
   - A detailed study of the age, etiology, preoperative status of the eye, time of surgery following trauma, the final visual outcome was done and informed consent was taken.
   - Postoperative follows up was done up to 2 months following surgery.

4. SURGICAL TECHNIQUE

The procedure is done either with intra venous sedation or general anesthesia.

1. Superior rectus (bridle) suture is passed to fix the eye in downward gaze.
2. Conjunctival flap and exposure of sclera - A small fornix-based conjunctival flap is made with the help of sharp-tipped scissors along the limbus from 10 to 2 O'clock positions. Conjunctiva and the Tenon's capsule are dissected, separated from the underlying sclera and retracted to expose about 4 mm strip of sclera along the entire incision length.
3. Haemostasis is achieved by applying gentle and just adequate wet field cautery.
4. Sclero-corneal tunnel incision. A self-sealing sclero-corneal tunnel incision is made in manual SICS.
   It consists of the following components:
   (i) External scleral incision. A one-third to half-thickness external scleral groove is made about 1.5 to 2mm behind the limbus. It varies from 5.5 mm to 7.5 mm in length depending upon the hardness of the nucleus. It may be straight, frown shaped or chevron in configuration.
   (ii) Sclero-corneal tunnel. It is made with the help of a crescent knife. It usually extends 1-1.5 mm into the clear cornea.
   (iii) Internal corneal incision. It is made with the help of a sharp 3.2 mm angled keratome.
5. Side-port entry of about 1.5-mm valvular corneal incision is made at 9 o'clock.
6. Anterior capsulotomy
   (i) Can-opener's technique. In it, an irrigating cystitome (or simply a 26 gauge needle, bent at its tip) is introduced into the anterior chamber and multiple small radial cuts are made in the anterior capsule for 360o
   (ii) Continuous circular capsulorrhexis (CCC). In this the anterior capsule is torn in a circular fashion either with the help of an irrigating bent-needle cystitome or with a capsulorrhexis forceps.
7. Hydrodissection. After the anterior capsulotomy, the balanced salt solution (BSS) is injected under the peripheral part of the anterior capsule. This manoeuvre separates the corticonuclear mass from the capsule.
8. Nuclear management. It consists of following manoeuvres:
   (i) Prolapse of nucleus out of the capsular bag into the anterior chamber is usually initiated during hydrodissection and completed by rotating the nucleus with Sinskey's hook.
   (ii) Delivery of the nucleus outside through the corneo-scleral tunnel can be done by any of the following methods:
      - Irrigating wire vectis method
      - Blumenthal's technique,
      - Phacosandwitch technique,
      - Phacofracture technique, and
      - Fishhook technique.

9. Aspiration of cortex. The remaining cortex is aspirated out using a two-way irrigation and aspiration cannula from the main incision and/or side port entry.
10. IOL implantation. A posterior chamber IOL is implanted in the capsular bag after filling the bag with viscoelastic substance.
11. Removal of viscoelastic material is done thoroughly from the anterior chamber and capsular bag with the help of two-way irrigation aspiration cannula.
12. Wound closure.The anterior chamber is deepened with balanced salt solution / Ringer's lactate solution injected through side port entry. This leads to self-sealing of the sclero-corneal tunnel incision due to valve effect. The conjunctival flap is reposited back and is anchored with the help of wet field cautery.
    - Eye dressing is used for 24 hours and the patient is discharged on the 1st-day post operatively.
    - Oral antibiotics are given for 5 days together with antibiotic eye drops which are used for 2 months days.
    - YAG capsulotomy was performed in post operatively in patients having posterior capsular opacification.

5. RESULTS

- The present study included 11 males (55%) and 9 females (45%).
- The age of the patients ranged between 8 and 15 years.
- Pre-operative visual acuity was PL+,PR Accurate & in 12 patients (60%) & between CF 1m – 6/24 in 8 patients (40%).
- Traumatic Cataract was due to blunt trauma in all the cases.
- 16 patients (80%) were operated within 2 months following trauma while 4 patients (20%) were operated within 6 months.
- SICS was performed & Posterior Chamber IOL was implanted in all the patients.
- Post operative antibiotic eye drops were given for 2 months.
- Patients are followed up for a minimum of 6 months.
- Post-operative iritis was seen in 5 patients (25%).
- Posterior Capsular Opacification was seen in 4 Patients (20%), thus YAG capsulotomy was performed.
- BCVA after at 6 months was 6/6 in 8 patients (40%), 6/9 in 6 patients 30%) and between 6/36 – 6/12 in 4 patients (20 %)
- Corneal scarring following trauma was the main reason for reduced visual acuity in the 4 patients.

6. DISCUSSION

- This prospective study was undertaken to evaluate the complications and visual outcome of IOL implantation in children with unilateral traumatic cataract in a developing country where follow up, and access to health care is limited.
- Inexpensive, yet high quality, IOLs are now widely available in India and many ophthalmic units are able to perform microsurgical techniques. In general, the rate of serious complications following cataract surgery and IOLs is low but almost all of the studies are retrospective and the age of children and type of cataract are very variable both within and between series. [12]
- Newer techniques such as capsulorhexis will improve lens centration and this, as well as surface modified lenses, forward angulation of the lens haptics, and larger optics, are likely to reduce the incidence of pupil capture in the future.
- Posterior capsular opacification in young children after an extracapsular cataract extraction is rapid and almost universal. In our series, 20% of children had required further intervention.

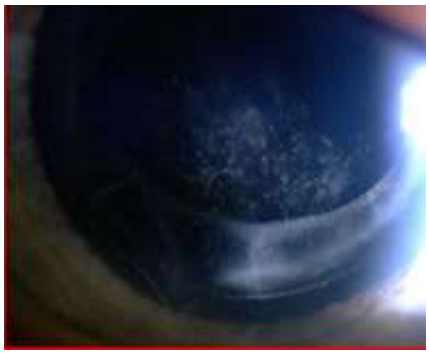

Fig. 3: Posterior capsular opacification

- Early YAG laser capsulotomy following surgery has been successful and we now perform a YAG laser capsulotomy on compliant children within 2 days of surgery before discharge.
- Visual acuity results following posterior chamber IOLs for traumatic cataract are encouraging.
- BCVA after at 6 months was 6/6 in 8 patients (40%), 6/9 in 6 patients 30%) and between 6/36 – 6/12 in 4 patients (20 %)
- Corneal scarring following trauma was the main reason for reduced visual acuity in the 4 patients.

7. CONCLUSION

Early screening, frequent follow ups, appropriate timely surgery has good post-operative visual recovery and prevents the potential vision threatening complications.

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