

Evaluation of the Frequency of Posterior Segment Pathologies Determined by B-Scan Ultrasonography in Patients with Congenital Cataract

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Purpose: To evaluate the frequency of posterior segment pathologies determined by B-Scan Ultrasonography in patients with congenital cataract.

Material and Methods: 204 Patients with congenital cataract admitted in ophthalmology department in Bahawal Victoria hospital Bahawalpur were included in the study. Study period was six months with non probability consecutive sampling. Age range was from new born to five years. Patients having cataract underwent B-Mode Ultrasonography. B-Mode Ultrasonography was done with HISCAN (OPTIKON), by 4th year resident under supervision of consultant ophthalmologist. Outcome variables like vitreous disorders, retinal detachment and intraocular tumours were measured.

Results: Ninety female and 114 male patients (total 237 eyes) were analysed. On B-Scan Ultrasonography seventeen eyes (7.17%) showed finding suggestive of posterior segment pathology while two hundred and twenty (92.83%) eyes showed no pathology in posterior segment in patient with congenital cataract. The most common finding was in the vitreous. Five (2.5%) eyes showed persistent fetal vasculature (PHPV) and three (1.5%) showed haemorrhage. Intraocular tumour was present as elevated fundus lesion in 3 (1.5%) eyes. Retinal detachment was present in one (0.5%) eye. Detectable optic nerve lesions were present in four eyes; in 1 eye (0.5%) there was optic disc drusen, elevated optic disc was present in 2 (1%) and one eye (0.5%) showed cupping. Other demonstrable findings were posterior staphyloma in one (0.5%) eye.

Conclusion: B-Scan Ultrasonography proves accurate and beneficial in opaque ocular media to detect posterior segment pathologies. There is possibility that some kind of other pathology might be present behind the cataract. B-Mode Ultrasonography should be included as essential investigating tool in evaluation of eyes undergoing cataract surgery in paediatrics population.

B-mode Ultrasonography is used to investigate and diagnose variety of ocular conditions. B-Mode (brightness mode) Ultrasonography is of great help when optical methods fail to give clear view of posterior segment of the globe¹. B-Scan Ultrasonography uses high frequency (10MHz) sound waves to produce echoes as they strike interfaces between acoustically distinct structures². B-Scan two dimen-

sional USG (Ultrasonography) provides topographic information concerning the size, shape and quality of a lesion as well as its relationship to other structures². The ability to examine the posterior segment of the eye accurately in patient with opaque media is essential for good surgical care of the cataract patient. Sometime congenital cataract is associated with posterior segment pathologies like vitreous disorder,

retinal detachment, intraocular tumour, and intraocular foreign body. The imaging modality that is simple, cheap and employed globally in this regard is B-Scan Ultrasonography. It is routinely used and recommended for use in patient with dense cataract³. Now, even a variety of studies have been undertaken that review the presence of posterior segments pathologies in adults³, no trial has so far demonstrated such findings in children suffering from congenital cataract, especially in our country. It therefore remains to be established that what kind of common pathologies are present in posterior segments that we routinely miss in children with congenital cataract. These common posterior segment pathologies have a significant impact in the clinical course and visual development of patients with congenital cataract. This study will demonstrate the frequency of these pathologies in cataract patients of this age group in our part of the world, so that appropriate planning in such patients could be done.

MATERIAL AND METHODS

This cross sectional study was carried out in Department of Ophthalmology, Bahawal Victoria hospital Bahawalpur. Study was conducted for a period of six months from 27th May 2012 to 28th November 2012. 237 eyes were included in this study.

Hypothesized % frequency of outcome factor in the population (p): 4%+/-2.5

Confidence limits as % of 100(absolute +/- %) (d): 2.5%. Design effect (for cluster surveys-DEFF): 1.

Non probability consecutive sampling technique was adopted. All children with positive congenital cataract up to the age of 5 years were included in this study because of late pursuance of congenital cataract cases in our settings. Following children were excluded from our study; individual with history of trauma to the globe any time after birth, individuals with uveitis, cases with known glaucoma and previous ocular surgery.

Data Analysis

All the data was computerized and SPSS version 10 was used for analysis of data. Descriptive statistics was used to analyse the data. Quantitative variables like age was measured by mean and standard deviation. Qualitative variables like gender and posterior segment pathologies including vitreous disorders (haemorrhage), retinal detachment, and intraocular tumours were measured by frequency and

percentage. Confounding variables like age, was controlled by making cross matched stratified tables. The chi-square test was used for analysis and the value of $p < 0.05\%$ was considered significant.

RESULTS

Two hundred and thirty seven eyes of two hundred and four patients were included in the study. Ninety (44.1%) were female and one hundred and fourteen (55.9%) were male patients. Age range was from seven days to five years. Mean age was four years with

Table 1: Vitreous Disorders

	Frequency	Percent
Hemorrhage / opacities	3	1.5
Bands / membranes	5	2.5
Pathology absent	196	96.1
Total	204	100.0

Table 2: Intraocular Tumours

	Frequency	Percent
Present	3	1.5
Absent	201	98.5
Total	204	100.0

Table 3: Retinal Detachment

	Frequency	Percent
Present	1	.5
Absent	203	99.5
Total	204	100.0

Table 4: Optic Disc Lesions

	Frequency	Percent
Optic disc drusen	1	0.5
Optic disc swelling	2	1.0
Optic disc cupping	1	.5
Absent	200	98.0
Total	204	100.0

standard deviation 3.23. Below one year were 72 (35.3%), from one year to three years were 83 (40.7%), and from three years to five years were 49 (24%). On B-Scan Ultrasonography seventeen eyes (7.17%) showed finding suggestive of posterior segment pathology while two hundred and twenty (92.83%) eyes showed no pathology in posterior segment in patient with congenital cataract.

The most common finding was in the vitreous. Five (2.5%) eyes showed persistent fetal vasculature and three (1.5%) showed haemorrhage. Intraocular tumours were present as elevated fundus lesion in 3 (1.5%) eyes. Retinal detachment was present in one (0.5%) eye. Detectable optic nerve lesions were present in four eyes; in 1 eye (0.5%) was optic disc drusen, elevated optic disc was present in 2 (1%) and one eye (0.5%) showed cupping. Other demonstrable findings were posterior staphyloma in one (0.5%) eye. Statistically the value of the test of significance (p value) is of the order of >0.05 for all variables, which shows that the relationships of various outcome variables with different age groups and gender of the patients are insignificant.

DISCUSSION

Over the last 30 years, ultrasonography has greatly advanced which has enabled us to study posterior segment of the eye even in the presence of opaque media like dense cataract. Cataract is a one of the leading cause of treatable blindness in developing countries. Many of these cases have advanced cataracts that preclude visualization of fundus prior to cataract surgery. Such visualization is considered important to provide accurate prognosis for vision after cataract surgery. Under such circumstances ultrasonographic examination can provide information regarding such abnormalities⁴.

In this study high percentage (3.37%) of findings were present in the vitreous cavity; including two patients with vitreous haemorrhage and one with nonspecific homogenous hyper-echoic vitreous (1.5%), other five patients showed bands and membrane consistent with persistent hyperplastic vitreous (2.5%). Persistent hyperplastic primary vitreous is often associated with cataract in children.

Only one eye in this study showed characteristics of retinal detachment (0.5%) on B-scan USG. Frequency of retinal detachment differ in traumatic and non traumatic eyes of patients as well as with the age of patients. Qureshi MA et al found Retinal

detachment in non-traumatic cataract patients was (1.47%) and (21.12%) in traumatic cataract patients⁷.

Along with three primary variables (retinal detachment, intraocular tumours and vitreous disorders) there were other findings detectable by B-Mode USG, these broadly classified into optic disc lesions and miscellaneous lesions. Optic disc swelling was present in 1%, cupping in 0.5% and drusens in 0.5%. Shaikh et al⁸ in their study of 227 eyes found similar optic disc findings. Optic disc edema was 0.45%, retinal detachment in 0.9%, vitreous hemorrhage in 1.32% and posterior staphyloma in 3.52%.

CONCLUSION

B-Scan ultrasonography proves accurate and beneficial in opaque ocular media to detect posterior segment pathologies. There is possibility that some kind of other pathology might be present behind the cataract. B-Mode ultrasonography should be included as essential investigating tool in evaluation of eyes undergoing cataract surgery in paediatrics population.

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REFERENCES

1. Ehlers JP, Shah CP, Fenton GL, Hoskins EN, Shelsta HN. Pediatrics. In: The Wills eye manual, office and emergency room diagnosis and treatment of eye disease. New Delhi: Wolters Kluwer health. 2008: 179-81.
2. Kanski JJ. Imaging techniques. In: Clinical ophthalmology, a systemic approach. London: Butterworth - Heinemann. 2007: 44-5.
3. Aironi VD, Gandage SG. Pictorial essay: B-scan Ultrasonography in Ocular abnormalities. Indian J Radiol Imaging. 2009; 19: 109-15.
4. Salman A, Palmer P, Vanila CG, Thomas PA, Nelson Jesudasan CA. Is ultrasonography essential before surgery in eyes with advanced cataracts, JPGM. 2006; 52: 19-22.

5. **Dawood Z, Mirza SA, Qadeer A.** Role of B-scan ultrasonography for posterior segment lesions. Pak J LUMHS. 2008; 07: 07-12.
6. **Ahmed J, Shaikh FF, Rizwan A, Memon MF.** Evaluation of vitro-retinal pathologies using B-scan ultrasound. Pak J Ophthalmol. 2009; 25: 4.
7. **Qurshi MA, Laghari K.** Role of B-Scan Ultrasonography in pre-operative cataract patients. Int J Health Sci (Qassim). 2010 January; 4 (1): 31-7.
8. **Shaikh FU, Narsani AK, Jatoi SM, Shaikh ZA.** Preoperative Posterior Segment Evaluation by Ultrasonography in Dense Cataract. Pak J Ophthalmol. 2009; 25: 135-8.