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An Assessment of Reliable Tools for Monitoring Primary Congenital Glaucoma Following Surgery

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ABSTRACT

Background: Primary congenital glaucoma afflicts children, Glaucoma surgery is the mainstay of the treatment to preserve useful vision, intraocular pressure(IOP), corneal diameter changes and fundus changes are the common tools used to monitor progress post operatively, subtle fundus changes suffer from observer bias, this study compares IOP and Corneal diameter as reliable tool for monitoring progress in such patients. **Methods:** 40 patients were included in the study; they were randomly distributed in two groups for two different surgeries for glaucoma, IOP and corneal diameter changes were recorded for a year at intervals. **Results:** The IOP showed a sharp decline in both the groups, so much so that the changes were comparable in two groups. The corneal diameter changes were not significant when compared. **Conclusion:** IOP is a better criterion to monitor progress in post operative duration of primary congenital glaucoma patients.

Keywords: Primary congenital glaucoma, Reliable tool, Corneal diameter changes.

INTRODUCTION

Primary congenital glaucoma (PCG) is one of the prominent preventable causes of childhood blindness. Surgery is the treatment of choice Trabeculectomy alone or Trabeculectomy with Trabeculotomy are considered ideal choices for the condition.[1,2] The purpose of these procedures is to reduce the Intra ocular pressure [IOP], and thus prevent impending blindness and physical changes like buphthalmos. It is known that the infantile human eye grows maximally in the first five years of life, the first two years are the most crucial as the growth is fastest. This when superimposed with a high IOP causes an increase in axial length and in the corneal diameter, as the infantile ocular tissues are soft and elastic.[3] Increase in the size of the eyeball can cause axial myopia and increase in corneal diameter, thus IOP measurements are masked to normal or near normal at follow ups, but changes of corneal diameter, and fundus changes may be present. The increase in the two parameters together or independently may be signs indicating a worsening of the condition.[4] The commonest sign relied upon are changes in IOP and that of corneal diameter (fundus changes suffer from observer bias). This study is aimed at finding, which may be more reliable criteria between the two.

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MATERIALS AND METHODS

The study was approved by the ethical committee of the Institution, and the research was in accordance with the tenets of Helsinki. Patients were recruited randomly in the Glaucoma clinic of a tertiary care hospital of India,

40 patients were included in the study between 2012 and 2014. The patients were randomized into two groups for surgical procedures for treatment of Primary congenital glaucoma. Group 1 had 18 patients and was operated by one surgical procedure and group 2 had 22 patients were operated by different surgical procedure. Only patients with PCG in the age between 0-14 years were included, whereas patients above 14 years of age were excluded from the study.

All patients underwent IOP measurement and corneal diameter measurements pre operatively, one week postoperatively, subsequently at 3, 6, 9 and 12 monthly follow ups. Student's t- test was used to compare values. I-care tonometer was used in patients who could not cooperate for applanation tonometery. Horizontal corneal diameter was measured under general anesthesia by Castroviejo callipers. Values greater than 10.5 mm at birth or greater than 11.5mm at one year were taken as cut-off.

RESULTS

Table 1: Age distribution of patients included in the study, in the two groups

Age wise distribution Age group	Group 1(n=18) Operated by one method for glaucoma	Group 2(n=22) Operated by another method for glaucoma
0-<5 years	11	13
5-<10 Years	5	7
10-<16 Years	2	2

Table 2: Changes in Intraocular pressure (IOP) preoperatively and postoperatively in the two study groups

Comparison of IOP 0n follow up	Group 1 (mean±SD)	Group 2 (mean±SD)	p-value
IOP pre-operative	30.93 ± 2.84	30.13 ± 3.50	0.498
IOP 7day post-operative	12.40 ± 2.13	14.73 ± 2.60	0.012
IOP 1 month post-operative	14.07 ± 1.90	16.53 ± 2-06	0.002
IOP 3 month post-operative	15.20 ± 1.78	17.93 ± 2.25	0.001
IOP 6 month post-operative	16.67 ± 1.83	20.73 ± 3.63	0.001
IOP 9 month post-operative	16.87 ± 1.88	20.73 ± 3.63	0.001
IOP 12 month post-operative	16.72 ± 1.33	20.11 ± 2.21	0.001

Table 3: Changes in Corneal diameter preoperatively and post operatively in the two study groups

Comparison of corneal diameter on follow up	Group 1 (Mean ± SD)	Group 2 (Mean ± SD)	p-value
Corneal diameter pre-operative	13.527 ± 0.7005	13.233 ± 0.7188	0.267
Corneal diameter 7 day post-operative	13.580 ± 0.7370	13.280 ± 0.7253	0.271
Corneal diameter 1 month post-operative	13.580 ± 0.7193	13.253 ± 0.7337	0.228
Corneal diameter 3 month post-operative	13.500 ± 0.6793	13.200 ± 0.7280	0.253
Corneal diameter 6 month post-operative	13.453 ± 0.6696	13.147 ± 0.7220	0.238
Corneal diameter 12 post-operative month	13.252 ± 0.5462	13.122 ± 0.632	0.236

DISCUSSION

Patients above 10 years of age were only,[4] [Table 1] hence I-Care tonometer was largely used as the device for IOP measurement. IOP is the only risk factor in glaucoma which can be modified by drugs or surgery,[5] hence reduction of IOP was studied, both groups show a consistent reduction of IOP over the year [Table 2], their p-values showing a difference when values from both groups are compared, the values reduce to stable values at six months and thence form a plateau, this is in consonance with Jiang et al,[6] who have shown a stable IOP following glaucoma surgery, followed by a regression. Panarelli et al,[7] have suggested manipulations following surgery to achieve stabilization of IOP for prolonged benefit of the patient, thus claiming control over this parameter. The changes in IOP in our study over time are significant values and hence easily comparable to value of previous visit.

Corneal diameter changes show a regression back to normal [Table 3], the values when compared in both the groups are comparable, but the changes are subtle, and not easily comparable with values on previous visit. Dietlein et al,[8] have also reported no significant change in corneal diameter of congenital glaucoma patients following glaucoma surgery. The authors of this study have compared two surgical procedures in the same set of patients and found that the difference in the two surgical groups were not significant.[9] The results of the above study also tell us that there is no relationship between decrease in IOP and corneal diameter changes. Studies have also not shown evidence to any relationship.[10,11]

CONCLUSION

In patients of primary congenital glaucoma, IOP is a better criterion to assess the success of a surgical procedure as compare to changes in the corneal diameter.

Ethical Clearance

The study was undertaken as Post graduate thesis for Masters in Ophthalmology, the ethical clearance was given by the Institute Ethical Committee of the Institute of medical Sciences, Banaras Hindu University UP, India.

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