



# PRIMARY CONGENITAL GLAUCOMA; COMPARE THE SURGICAL OUTCOME BETWEEN MODIFIED TRABECULOTOMY V/S COMBINED MODIFIED TREBECULOTOMY & TREBECULECTOMY IN PRIMARY CONGENITAL GLAUCOMA.

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**ABSTRACT... Objectives:** The objective of this study is to compare the surgical outcome between modified trabeculotomy v/s combined modified trebeculotomy & trebeculectomy in primary congenital glaucoma. **Study Design:** Interventional case series. **Setting:** Paediatric Ophthalmology Department, Chandka Medical College. **Period:** June 2016 to June 2017. **Method:** This is a comparative study done to compare the outcomes of trabeculectomy and combined trabeculotomy and trabeculectomy. For comparison a prospective interventional study conducted in paediatric ophthalmology, Chandka Medical College during the duration of August 2014 to August 2016 was chosen. After examination by slit lamp and under anaesthesia, combined modified trabeculotomy and trabeculectomy was performed. **Results:** A total of 45 eyes of 29 patients with primary congenital glaucoma underwent modified trabeculotomy, 15 (51.72%) were males and 14 (48.28%) were females. Mean age of patients was  $2.29 \pm 3.70$  years. On the other hand, combined modified trabeculotomy and trabeculectomy was performed in 22 eyes of 17 patients out of which 08 (47.06%) were males and 09 (52.94%) were females. Mean age  $\pm$  standard deviation was  $3.37 \pm 4.40$  years. Statistically significant reduction in IOP, corneal diameter and axial length were found. **Conclusion:** Combined trabeculotomy-trabeculectomy has better outcomes than trabeculotomy alone. It requires greater surgical expertise and time. Higher success rates are reported in previous studies due to dual outflow of aqueous humour.

**Key words:** Combined Modified Trebeculotomy, Modified Trabeculotomy, Primary Congenital Glaucoma.

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## INTRODUCTION

Glaucoma is a group of optic nerve disease causing characteristic (cupping) nerve injury and its corresponding visual loss. Aqueous humour is produced by ciliary body, flows through the anterior chamber and exits through trabecular meshwork. Structural abnormalities in the trabecular meshwork or iridocorneal angle causes obstruction to its outflow and rise in intraocular pressure. This rise in intraocular pressure is single major factor responsible for developing glaucoma.<sup>2</sup> Although glaucoma is an ocular disease of adults, it is also a cause of visual disability in children. Primary congenital glaucoma is defined as glaucoma's that present before 3 years of age. On the other hand, secondary glaucoma is due to developmental

defects and structural abnormalities.<sup>3</sup> The most common form of paediatric glaucoma is primary congenital glaucoma which attributes to 18% cases of childhood blindness.<sup>4</sup> Other causes of early onset glaucoma are Axenfeld Rieger syndrome, mutation in genes CYP1B1, LTBP2, TEK.<sup>1</sup> Primary congenital glaucoma manifests as elevated IOP, corneal opacification, oedema and progressive optic nerve atrophy. Most commonly it presents with non-specific symptoms like tearing, irritability and light sensitivity and blepharospasm. Diagnosis can be made at its earliest and treatment improves the outcome. If left untreated, blindness occurs. Diagnosis is based on the clinical examination which includes elevated IOP, increased diameter of cornea, eye globe enlargement and deepening

of anterior chamber. The definitive treatment is surgical removal of obstruction by goniotomy, trabeculectomy, or combined modified combined trabeculectomy.<sup>5</sup> Goniotomy and trabeculectomy are the first line procedures, depending on the severity.<sup>6</sup> Goniotomy is the preferred procedure, being less invasive and it preserves the conjunctiva. The contraindication of goniotomy is cloudy cornea as compared to trabeculectomy which can be performed in complicated cases.<sup>7</sup> Trabeculectomy is relatively an easier and conventional process, not requiring much expertise. There are two kinds, conventional trabeculectomy and modified trabeculectomy. Conventional trabeculectomy extends all 360 degree after treatment whereas modified trabeculectomy opens around 120 degree and has less post-operative complications.<sup>8</sup> As compared to adults, there is a wide variation in post-operative outcome and complications. Apart from conventional surgeries, combined trabeculotomy-trabeculectomy and valve implantation are being studied for outcomes.<sup>9</sup> Some studies have provided evidence that combined trabeculotomy-trabeculectomy has better outcomes than conventional procedures.<sup>10</sup> Surgical complications in trabeculectomy are increased due to thin sclera and difficulty in identifying the limbus. Success rates of trabeculectomy range from 35 to 50% after one-year post-operation in adults, whereas a lower success rate in children.<sup>11</sup>

## METHOD

This is a comparative study done to compare the outcomes of trabeculectomy and combined trabeculotomy and trabeculectomy. An interventional case series study done in paediatric ophthalmology department, Chandka Medical College from June 2016 to June 2017 was chosen. Patients presenting with primary congenital glaucoma from birth till 14 years of age were part of the study. Examination by slit lamp and under anaesthesia was performed in every case and modified trabeculectomy was performed. For comparison a prospective interventional study conducted in paediatric ophthalmology, Chandka Medical College during the duration of August 2014 to August 2016 was

chosen. After examination by slit lamp and under anaesthesia, combined modified trabeculotomy and trabeculectomy was performed. Several parameters were measured pre-operatively and post-operatively which included corneal clarity, corneal diameter, intraocular pressure and axial length. Corneal haziness was graded on following parameters:

Grade I: Mild corneal haziness

Grade II: Moderate corneal haziness

Grade III: Severe corneal haziness or scarring

Surgery was marked as successful if improvement was found in two or more of above mentioned parameters. All the patients were being followed up at day 1, 2 week and 1 month post-operatively. Monthly follow-up till 2 years of age was recommended. Patients lost to follow-up were excluded from the study. SPSS version 20 was used for data entry and analysis. For numerical values like age, corneal diameter, axial length and IOP. Paired-t test was used for comparing preoperative and postoperative corneal clarity, average corneal diameter, axial length and intra ocular pressure. P-value  $\leq 0.05$  was considered significant.

## RESULTS

A total of 45 eyes of 29 patients with primary congenital glaucoma underwent modified trabeculotomy, 15 (51.72%) were males and 14 (48.28%) were females. Mean age of patients was  $2.29 \pm 3.70$  years. On the other hand, combined modified trabeculotomy and trabeculectomy was performed in 22 eyes of 17 patients out of which 08 (47.06%) were males and 09 (52.94%) were females. Mean age  $\pm$  standard deviation was  $3.37 \pm 4.40$  years. Preoperatively and postoperatively changes in parameters were showed in Table-I,II and III.

In primary congenital glaucoma treated by modified trabeculotomy 31% of cases had no corneal haziness post-operatively. After regular follow-up, 39 eyes (86.67%) fit into the criteria for successful surgery. Few complications like hyphemia and iridodialysis were reported in some cases only. In contrast to this, 90.9% of the cases fulfilled the criteria of successful surgery

treated by combined modified trabeculectomy and trabeculotomy. Post-operatively 12 eyes (54.54%) had no haziness. Complication rates were even lesser than previous interventional study discussed, and all these were managed conservatively.

## DISCUSSION

Trabeculectomy was the procedure of choice, it was first reported in 1960 as treatment for primary congenital glaucoma. It is a better procedure than goniotomy in terms of treatment response. Trabeculectomy is also easier to perform and doesn't require surgical expertise and is compatible with cloudy and opaque corneas.<sup>12</sup> Medical therapy aids in the management of PCG, but surgical treatment is foremost necessary.<sup>13</sup> Success rates of 87% have been achieved by modified trabeculotomy in a study conducted previously.<sup>14</sup> In Pakistan success rates of 80% have been reached by this procedure.<sup>15</sup> Despite its advantages there are few limitations of this procedure as well. It is invasive and destructive process of conjunctiva, making revision surgeries difficult for the surgeon.<sup>16</sup> Complications reported following trabeculotomy are iridodialysis, hyphema, iris prolapse, shallow anterior chamber and retinal detachment.<sup>10</sup> Trabeculectomy is an effective option in places where surgical gonio lens are not available. A study done in

Nigeria demonstrated 40% reduction in IOP and significant reduction of corneal haziness.<sup>17</sup> Combined Trabeculotomy-Trabeculectomy was reported in 1980, since then it has been used in cases of primary congenital glaucoma. Nowadays it has been the procedure of choice as it has higher success rates. Success rates of 90.91% are reported in few studies and its higher than trabeculotomy alone. Adjunct treatment by mitomycin C can also be added to the conventional procedures.<sup>10</sup>

In our study there was Mean age of patients was  $2.29 \pm 3.70$  years in both group. However the study of Paaraj Dave<sup>18</sup> reported that the mean age at surgery was  $15.4 \pm 4.9$  months.

In our study male is dominant, 15 (51.72%) were males and 14 (48.28%) were females, with male to female ratio of 1.07:1. However in the study of Prashant Bhushan was reported that 72.22% children were male and 27.7 % were female.<sup>19</sup> In our study we observed postoperative slightly reduced diameter in combined Trabeculotomy-Trabeculectomy  $14.15 \pm 1.13$  mm (Pre operative  $14.47 \pm 1.10$  mm). However the study of Hazem Helmy<sup>20</sup> also supported the study postoperative diameter same or slightly reduced.

|  | Pre-Operative Corneal Diameter | Post-Operative Corneal Diameter | P-Value |
|--|--------------------------------|---------------------------------|---------|
| Modified Trabeculotomy                           | $13.90 \pm 1.18$ mm            | $13.63 \pm 1.15$ mm             | < 0.001 |
| Combined Modified Trebeculotomy & Trebeculectomy | $14.47 \pm 1.10$ mm            | $14.15 \pm 1.13$ mm             | < 0.015 |

Table-I. Change in corneal diameter

|  | Pre-Operative IOP      | Post-Operative IOP     | P-Value |
|--|------------------------|------------------------|---------|
| Modified Trabeculotomy                           | $14.58 \pm 5.27$ mm Hg | $10.59 \pm 3.98$ mm Hg | < 0.001 |
| Combined Modified Trebeculotomy & Trebeculectomy | $15.05 \pm 6.75$ mm Hg | $8.00 \pm 3.76$ mm Hg  | < 0.001 |

Table-II. Change in intraocular pressure (IOP)

|  | Pre-operative Axial Length | Post-Operative Axial Length | P-Value  |
|--|----------------------------|-----------------------------|----------|
| Modified Trabeculotomy                           | $23.45 \pm 3.29$ mm        | $23.34 \pm 3.31$ mm         | < 0.0658 |
| Combined Modified Trebeculotomy & Trebeculectomy | $25.30 \pm 3.59$ mm        | $25.02 \pm 3.77$ mm         | < 0.011  |

Table-III. Change in axial length

In our study observed the markedly reduction in intraocular pressure (IOP) from  $15.05 \pm 6.75$  mm Hg preoperatively to  $8.00 \pm 3.76$  mm Hg ( $p < 0.001$ ) and corneal diameters were more significant in in combine trabeculotomy-trabeculectomy than trabeculotomy alone for the management of primary congenital glaucoma. Moreover, we had a primary success rate of 90.9% in combine trabeculotomy-trabeculectomy procedure. However results of this study are compared the study of Mandal<sup>21</sup> that included 299 patients with primary congenital glaucoma in which primary combined trabeculotomy trabeculectomy was performed. Results are showed markedly decreased IOP from  $26.6 \pm 6.2$  mmHg to  $14.4 \pm 4.9$  mmHg and also support the study. Variation in IOP can be due to anaesthesia effects, halothane specifically. In growing children axial length is not a specific parameter to be measured, so corneal clarity can be measured as marker of successful surgery. If the corneal diameter exceeds 16mm, it is labelled as severe PCG and cyclophotocoagulation is its treatment.

## CONCLUSION

Combined trabeculotomy-trabeculectomy has better outcomes than trabeculotomy alone. It requires greater surgical expertise and time. Higher success rates are reported in previous studies due to dual outflow of aqueous humour. Currently there has been various studies done on management of PCG but still the outcome lies on decision making by the clinician.

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The **problem** is not the **problem**;  
the problem is your **attitude** about the problem.



*“Captain Jack Sparrow”*

#### AUTHORSHIP AND CONTRIBUTION DECLARATION

| Sr. # | Author-s Full Name   | Contribution to the paper  | Author=s Signature |
|-------|----------------------|--|--------------------|
| 1     | Shabeer Ahmad Bhutto | Conception and design, Statistical expertise, Critical revision of the article for important intellectual content. |                    |
| 2     | Naeem Akhtar Katpar  | Data collection critical revision of the article for important intellectual content.                               |                    |
| 3     | Safdar Ali Abbasi    | Drafting of the article.   |                    |