COMINED TRABECULECTOMY & TRABECULOTOMY VS DEEP SCLERECTOMY IN CONGENITAL GLAUCOMA

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INTRODUCTION

- Congenital glaucoma is a challenging, potentially blinding disease, which is often refractory to medical treatment.
  
  *Morad et al. Ophthalmol 2003*

- Treatment is typically surgical, unlike adult glaucoma management where medications are usually initiated before moving on to surgical treatment.

  *Englert et al. BJO 1999*
CONGENITAL GLAUCOMA

**PRIMARY**
Maldevelopment of the aqueous outflow system without associated systemic &/or predisposing factors

**SECONDARY**
Damage to the aqueous drainage system due to maldevelopment of other portions of the eye or the body
PATHOGENESIS

**PRIMARY**
- Isolated trabeculodysgenesis
- No other ocular anomalies
- No systemic association
- No associated syndromes

**SECONDARY**
- Iridotrabeulodysgenesis
- Corneotrabeulodysgenesis
- Systemic
- Syndromes
GONIOTOMY:

- Described by Barkan in 1936
- Incise through the trabeculum to remove obstructing tissue
- Need a clear view to the angle. So, it is not indicated in corneal haze & almost 50% will be excluded

**TRABECULOTOMY:**

- Described by Burian & Smith in 1960
- The Schlemm’s canal is cannulated externally & a tear is made through the TM to the anterior chamber. But the canal is not found in 11-15% of procedures

*Harms et al. Trans Ophthalm Soc 1970*

- Corneal clarity is not much needed as in goniotomy

*Burian et al. Am J Ophthalmol 1960*
*Smith et al. BJO 1960*
TRABECULECTOMY:

• Described in 1967
• Had a limited success in pediatric glaucoma patients of 37% to 85% depending on patients population & series

  Englart et al. JAAPOS 1999

• MMC was introduced in 1983, but it’s application was not popular until 1991. Since that time, it increased the success rate of trabeculectomy of 67% - 100%

  Beck et al. JAAPOS 2003
COMBINED TRABECULECTOMY & TRABECULOTOMY:

• Add the advantage of direct inflow of aqueous to the Sclemm’s canal by trabeculotomy + the subconjunctival outflow by trabeculectomy
DEEP SCLERECTOMY:

- In the 1980s, Fyodorov, Kozlov & Zimmerman modified the NPGS to have a scleral flap with the excision of portion of the Schlemm’s canal


- Had a similar success rate to conventional surgeries with lower rates of intraoperative & postoperative complications
DEEP SCLERECTOMY
Although deep sclerectomy has shown considerable success rates in congenital glaucoma, there is still a debate about its comparability to traditional combined procedure. We still need a concrete evidence about such uncertainty as little is known about comparing both procedures in a clinical trial design.
COMINDED TRABECULECTOMY & TRABECULOTOMY VS DEEP SCLERECTOMY IN CONGENITAL GLAUCOMA
Purpose:

- To compare the efficacy & safety of combined trabeculectomy + trabeculotomy & deep sclerectomy as a first procedure in congenital glaucoma
- To detect different types of complications in both groups
- To improve the guidelines for management of congenital glaucoma

Design: Ongoing prospective comparative study.
Inclusion criteria were:
• Congenital glaucoma
• Vergin eyes
• Complete 6 months of regular follow-up

Exclusion criteria were:
• Previously operated eyes
• Incompliance with follow-up
CRITERIA FOR SUCCESS:

**Complete success:**
- IOP ≤ 21mmHg without antiglaucoma medications.
- No additional glaucoma surgeries.
- No visually devastating complications.

**Qualified success:**
- IOP ≤ 21mmHg with antiglaucoma medications.

**Failure:**
- IOP > 21mmHg for 2 follow-ups despite antiglaucoma medications.
- Needed further glaucoma surgery.
- Developed visually devastating complications.
METHODS:

- The majority of congenital glaucoma cases presented with a bilateral disease
- One of the two procedures: deep sclerectomy or Combined trabeculectomy & trabeculotomy was randomly assigned to the first operated eye
- Pre & postoperative demographic & clinical data was collected after filling a formal consent by the patient parents/guardian
CTT VERSUS DEEP SCLERECTOMY IN CONGENITAL GLAUCOMA

MAJOR OUTCOME MEASUREMENTS:

• Reduction in IOP
• Reduction in the Haze scale
• Reduction in the number of antiglaucoma medications
• Improvement (if any) in the cup/disc ratio
• Improvement (if any) in the corneal diameter
• Difference in the success rates & complications
SAMPLE DESCRIPTION:

- 28 eyes of 14 patients
- 8 (57.1%) males & 6 (42.9%) females
- Mean age at surgery 45.4 days (+54), range (3 days – 5 months)
- Mean follow-up was 8.4 months (+4.3), range (3 -14.4)
- 5 (35.7%) had family history of glaucoma
- 1 (7.1%) had Haab’s striae
<table>
<thead>
<tr>
<th>INDEX</th>
<th>Group 1 (DS) MEAN (±SD)</th>
<th>GROUP 2 (CTT) MEAN (±SD)</th>
<th>P VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>PREOP. IOP</td>
<td>30.3 (±5.8)</td>
<td>29.6 (±6.1)</td>
<td>0.7</td>
</tr>
<tr>
<td>HCD</td>
<td>12.6 (±0.9)</td>
<td>12.1 (±1.2)</td>
<td>0.206</td>
</tr>
<tr>
<td>PREOP. HAZE</td>
<td>2.2 (±0.9)</td>
<td>1.9 (±0.9)</td>
<td>0.501</td>
</tr>
<tr>
<td>PREOP. C/D RATIO</td>
<td>0.71 (±0.5)</td>
<td>0.58 (±0.5)</td>
<td>0.500</td>
</tr>
<tr>
<td>CORNEAL THICKNESS</td>
<td>667 (±231)</td>
<td>579 (±414)</td>
<td>0.513</td>
</tr>
<tr>
<td># OF MEDICATIONS</td>
<td>1.9 (±0.7)</td>
<td>1.8 (±0.7)</td>
<td>0.909</td>
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</tbody>
</table>
# RESULTS

<table>
<thead>
<tr>
<th>INDEX</th>
<th>GROUP 1 : DS</th>
<th></th>
<th>GROUP 2 : CTT</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PREOP</td>
<td>POSTOP</td>
<td>P VALUE</td>
<td>PREOP</td>
</tr>
<tr>
<td>IOP</td>
<td>30.3(±5.8)</td>
<td>18.5(±7.5)</td>
<td>0.006</td>
<td>29.6(±6.1)</td>
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<tr>
<td>DEGREE OF HAZE</td>
<td>2.2(±0.9)</td>
<td>0.57(±0.85)</td>
<td>0.002</td>
<td>1.9(±0.9)</td>
</tr>
<tr>
<td>C/D RATIO</td>
<td>0.71(±0.5)</td>
<td>0.46(±0.52)</td>
<td>0.113</td>
<td>0.58(±0.5)</td>
</tr>
<tr>
<td># OF MEDS</td>
<td>1.9(±0.7)</td>
<td>0.38(±0.96)</td>
<td>0.005</td>
<td>1.8(±0.7)</td>
</tr>
</tbody>
</table>
POSTOPERATIVE COMPLICATIONS

DS
• No complications

CTT
• Induced cataract (1)
• Vitreous loss (1)
• Zonular dialysis (1)
• Hyphema (3)
• Shallow chamber (5)
## RESULTS

<table>
<thead>
<tr>
<th>VARIABLE</th>
<th>GROUP 1 : DS</th>
<th>GROUP 2 : CTT</th>
<th>P VALUE</th>
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</thead>
<tbody>
<tr>
<td>COMPLETE SUCCESS RATE</td>
<td>78.6%</td>
<td>71.4%</td>
<td>0.997</td>
</tr>
<tr>
<td>OVERALL SUCCESS RATE</td>
<td>85.7%</td>
<td>78.5%</td>
<td>0.997</td>
</tr>
<tr>
<td>RATE OF COMPLICATIONS</td>
<td>0%</td>
<td>36.5%</td>
<td>0.044</td>
</tr>
<tr>
<td>REDUCTION IN IOP</td>
<td>11.8 (±9.5)</td>
<td>9.7 (±11.8)</td>
<td>0.536</td>
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<tr>
<td>REDUCTION IN C/D RATIO</td>
<td>0.25 (±0.33)</td>
<td>0.03 (±0.34)</td>
<td>0.338</td>
</tr>
<tr>
<td>REDUCTION IN HAZE</td>
<td>1.6 (±1.2)</td>
<td>1.3 (±0.8)</td>
<td>0.171</td>
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<tr>
<td>REDUCTION IN # OF MEDICATIONS</td>
<td>1.5 (±1.3)</td>
<td>1.2 (±1.4)</td>
<td>0.212</td>
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</tbody>
</table>
**DISCUSSION**

- There was no difference in the IOP reduction in both groups as well as the complete & overall success. But the rate of complications was zero in the deep sclerectomy group compared to 36.5% in the combined TT group.

- Denis et al reported a success rate of 82% in deep sclerectomy in a 38.2 months follow-up *J Fr Ophthal 2008*

- Mullaney et al reported 78% success rate in 49 eyes in combined trabeculectomy & trabeculotomy which is comparable to our results *Archive Ophthalm 1999*
**DISCUSSION**

- Al Hazmi et al reported 75% success rate at the end of 20 years follow-up in 85 patients (148 eyes) *BJO2005*

- In our study, complications were observed in the combined group (36.5%) & mostly was shallow chamber followed by hyphema

- Al Hazmi et al & Dietlein et al reported the same rate of complications in combined surgery but with more devastating outcome *Ophthalmology 1998 – BJO 1999*
DISCUSSION

- The safety profile of deep sclerectomy seems to exceed combined trabeculectomy & trabeculotomy as proven in our results with the same IOP reduction.

- Roche et al. reported a success rate of 83% in 22.8 months follow-up in *Ophthalmology 2007*.

- Trixier et al. reported 75% success rate in 10 months follow-up which is comparable to our study in *J Fr Ophthalm 1999*. 
**CONCLUSION**

- The safety profile of deep sclerectomy seems to exceed combined trabeculectomy & trabeculotomy.

- The pressure reduction is almost the same in both deep sclerectomy & the combined trabeculectomy & trabeculotomy groups.

- Long term follow-up is needed to assess the outcome of both procedures.
Thank you