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Original Research Article

Outcome of combined trabeculectomy-trabeculotomy in the treatment of primary congenital glaucoma

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Abstract: Congenital glaucoma is a developmental abnormality accompanied by high intra-ocular pressure since birth. It is potentially blinding and requires an early diagnosis and treatment which is mainly surgical. Among the surgical procedures, trabeculectomy and trabeculotomy can be performed either separately or in combination. The purpose of this study was to evaluate the outcome of the combined procedure in children.
Keywords: Congenital glaucoma, high intra-ocular pressure

INTRODUCTION

Congenital glaucoma is a major cause of blindness in children, despite its low incidence, 1:10,000 births. This category includes isolated congenital glaucoma (or primary congenital glaucoma) and glaucomas associated with other developmental anomalies, either systemic or ocular [1]. Congenital glaucoma appears in the first months of life, sometimes at birth. Isolated congenital glaucoma is characterized by minor malformations of the irido-corneal angle of the anterior chamber of the eye. The cause of congenital glaucoma is the presence of an obstacle to aqueous humor outflow and the treatment is primarily surgical [2]. Ophthalmologists throughout the world are faced with the diagnostic and therapeutic challenge of primary congenital glaucoma (PCG). Often, infants present with the classic triad of blepharospasm, epiphora, and photophobia. Characteristically, the patients are male (65%) with bilateral involvement (70%) and diagnosed within the first year of life (80%) [3]. Primary Congenital Glaucoma is responsible for 0.01 – 0.04% of total blindness and 5% of childhood blindness. It is an unusual, inherited anomaly of trabecular meshwork and anterior chamber angle which leads to obstruction of aqueous outflow, increased IOP, and optic nerve damage [4]. Primary congenital glaucoma is a bilateral disease in about 75% of cases, with males accounting for approximately 65% of cases. Most cases are sporadic in occurrence, with no evident hereditary pattern. In approximately 10% in which a hereditary pattern is evident, it generally is believed to be autosomal recessive [1]. Management is initially surgical, and is aimed at improving the facility of outflow by incising or cleaving the developmentally abnormal trabecular meshwork [5]. Many surgical procedures are applicable mainly goniotomy, trabeculotomy and trabeculectomy. The classic procedures have been goniotomy and trabeculotomy ab externo [6]. Goniotomy and trabeculotomy are both technically demanding and goniotomy requires an adequate view of the angle. In contrast, trabeculectomy has also been shown to achieve adequate control of intraocular pressure in congenital and infantile glaucoma and is technically easier [7]. Trabeculotomy creates a communication between Schlemm's canal and the anterior chamber. Trabeculectomy consists of opening the anterior chamber, under a scleral flap, to produce an aqueous humor outflow towards the subconjunctival space [8].

MATERIAL AND METHODS

A total of 15 children presented with primary congenital glaucoma underwent trabeculotomy ab externo and trabeculectomy as a primary procedure from January 2010 to December 2010. Children presented with secondary glaucoma were excluded. All patients had a complete ocular examination under general anesthesia including the following steps: anterior segment examination, cornea diameter measurement, IOP measurement with Perkins' tonometer and fundoscopy in case of clear cornea. Among the 15 patients, 11 had bilateral glaucoma, and 4 patients had unilateral glaucoma; 26 eyes were

involved. Surgical success criteria were IOP > 16 mmHg.

RESULTS

Of 15 children, 9 were males and 6 were females; the sex ratio male: female was 1.5. Age of patients ranged from 1 to 12 months (table 1). The preoperative IOP ranged from 22 to 39 mmHg (table 2), whereas the postoperative IOP ranged from 8 to 24 mmHg (table 3). In 24 eyes (92.3%), the postoperative IOP was < 16 mmHg (Fig.1).

About the complications, 3 patients (11.5%) had postoperative hyphema.

Table1: Age group distribution of patients

Age group (month)	N	%
0-3	5	33.3
4-7	7	46.7
8-12	3	20.0
Total	15	100

Table2. Preoperative IOP distribution

Age (month)	N	%
22-27	12	46.1
28-33	10	38.5
34-39	04	15.4
Total	26	100

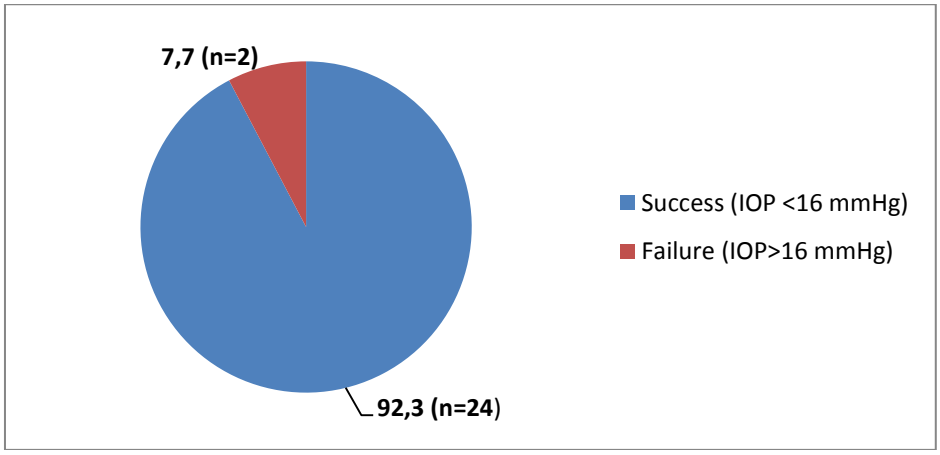

Fig. 1: Outcome of surgical procedure

Table 3: Post operative IOP

IOP (mmHg)	N	%
8-10	8	30.8
11-13	11	42.3
14-15	05	19.2
≥16mmHg	02	07.7
Total	26	100

DISCUSSION

15 patients (26 eyes) underwent combined trabeculectomy-trabeculotomy with a success rate of 92.3% (n=24); in 2 patients (7.7%), the procedure was unsuccessful. Our study has some limitations including the small number of patients and the short follow-up period. Our success criteria was post operative IOP <16mmHg. Some authors like Bruce et al. and Mandal et al. set the same success criteria in their studies [9, 10]. In the study of Autrata et al., surgical success was defined as intraocular pressure (IOP) less than 21 mmHg, with or without glaucoma medication. Of 38 eyes that underwent trabeculotomy, 76% were successful whereas of 45 eyes that underwent trabeculectomy 42% had successful pressure control. The overall success rate was significantly higher in the trabeculotomy group [11]. The results found by Autrata revealed the effectiveness of trabeculotomy in

comparison with trabeculectomy and reasonably their more effectiveness if combined as it was the case in our study (92.3% of success). The treatment of glaucoma in children poses a major challenge. The main goals of treatment are to control IOP and to preserve vision. The optimal surgical procedure remains controversial. Traditionally, goniotomy and trabeculotomy are well accepted, with success rates of 80% or more [12]. Some surgeons consider the results of primary trabeculectomy in children to be less satisfactory [13]. Goniotomy and trabeculotomy remain the standards in congenital glaucoma. Both procedures are successful and have been assessed in large numbers over long periods of time [14]. The combined trabeculectomy-trabeculotomy in our satudy was successful in 92.3% (n=24). This resultant can be compared to those of some authors; Elder MJ who found that the cumulative chance of success at 24 months was 93 5%, Turut found 70% success [12, 14, 15]. The efficacy of combined trabeculectomy-trabeculotomy in comparison with each procedure taken separately is debatable according to some authors. In a small series of seven Arab Bedouin infants with congenital glaucoma, Bienderq observed no difference between trabeculotomy and combined trabeculotomy-trabeculectomy [16, 17]. This assertion is not very convincible, for in the literature, many publications showed that trabeculectomy is less effective than trabeculotomy; so logically, the combined method must be more effective that isolated trabeculectomy [13, 11]. Combined trabeculectomy-trabeculotomy offers two outflow pathways of the aqueous humor. In one hand, trabeculectomy creates a direct continuity between the Schlemm's canal and the anterior chamber. In the other hand, trabeculotomy allows the aqueous humor bypass Schlemm's canal to be drained out of the anterior chamber [18]. About the complications, hyphema was noted post operatively in 6/26 eyes (23%). Hyphaema is not an uncommon complication in such a procedure, for it was found by many authors after performing this method [14].

CONCLUSION

Combined trabeculectomy-trabeculotomy is an effective method in the surgical management of primary congenital glaucoma with relatively few complications. It is a good alternative to goniotomy which requires clear cornea and seems to be technically more difficult.

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