

Is it Time to Overthrow Trabeculectomy as an Initial Surgical Procedure for Non High Risk Open Angle Glaucomas?

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Introduction

Surgical practice patterns for managing glaucoma have changed the last decade since popularity of tube shunt implantation has progressively increased and that of trabeculectomy has decreased [1]. Specifically, Medicare fee-for-service data claims that between 1995 and 2004 trabeculectomies in eyes without previous surgery or trauma decreased 53% whereas the number of aqueous shunting devices placed rose 184%[1]. Also, according to a survey of the American Glaucoma Society there was a rise in the proportion of surgeons using tube shunts and a decline in the popularity of trabeculectomy (1996: Tubes 17.5% vs Trabeculectomy 80.8%, 2008: Tubes 50.8%vsTrabeculectomy 45.5%) [2].

Nevertheless, trabeculectomy still remains the gold standard surgical procedure for non- high risk glaucoma cases [3], while in refractory glaucomas with high risk for filtration failure, the use of a Glaucoma Drainage Device (GDD) is strongly indicated [4]. The for mentioned surgical practice shift came as a necessity because of a high incidence of early and late postoperative complications of trabeculectomy. In an effort to try answering the title's challenging question we should rely on both Evidence-based Medicine and the surgeon's personal experience. The basic design of all GDDs is based on a silicone tube through which the aqueous drains; the proximal end of the tube is inserted into the eye through a sclera opening and the distal end is connected to an end plate with or without a valve mechanism [2]. Since the most common used GDD are the Baerveldt glaucoma implant (BGI) (Abbott Medical Optics, Inc., Santa Ana, CA) which is non-valved implant and the Ahmed Glaucoma Valve (AGV) (New World Medical, Cucamonga, CA), our evidence based Medicine approach will be done using the

data of two major studies, the Trabeculectomy vs BGI (TVT study) and Trabeculectomy vs AGV (Tan HaiBo et al., Meta Analysis review).

Trabeculectomy vs BGI: The most important information comes from the Tube Versus Trabeculectomy (TVT) Study after five years of follow-up [5]. There are also few other studies relevant to it [6, 7]. The TVT study is a Randomized Control Trial (RCT), studying 212 patients who were suffering from uncontrolled Glaucoma and who had previously undergone either cataract with intraocular lens implantation or failed glaucoma surgery or both. Patients were randomized either to receive a 350-mm² Baerveldt glaucoma implant or trabeculectomy with MMC. Both groups showed same decrease of IOP, same number of antiglaucoma medications postoperatively and same number of post operative complications. Reoperations were 9% in patients with tubes and 29% in patients with trabeculectomy, whereas treatment failures were 33% in patients with tubes and 50% in patients with trabeculectomy. It is interesting however that hypotony (which was considered as a cause of treatment failure), was 13% in tubes and 31% patients with trabeculectomies [5]. This can be attributed, at least partially, due to the fact that the strength of MMC used in the study was 4mg/ ml for 4 min, almost double than the strength and time used today (2mg/ml for 2 min). That change in both concentration and exposure time of MMC was found to be necessary in order to avoid hypotony, and has in the recent years been established as the common practice among glaucoma surgeons.

Additionally, we have to be very cautious when trying to come to any decisions concerning the best initial glaucoma procedure only by taking into account the findings of the TVT study. The reasoning is hidden in the

study design since the majority of patients participating in the study (174/212, or 82%) had some sort of previous conjunctival surgery (trabeculectomy, intracapsular or extracapsular cataract surgery, or scleral tunnel phacoemulsification)[8].

Trabeculectomy vs AGV: In an excellent Meta-Analysis review, Tan HaiBo et al. [9] reviewed two RCTs and four Non-RCT studies [10-15]. In all of these studies besides the Wilson's study, patients suffered from highrisk glaucomas (COAG, CACG, NVG, PG, PEX, and Aphacic). Wilson's study is actually the only study that deals with patients with low risk glaucomas (COAG, CACG) and patients without previous operation [15]. The results from these studies showed the same efficacy for decrease of IOP, the same number of antiglaucoma medication and the same success rate. Although they had the same complications, AVG patients had less complication rate, since there were less hypotonies and less leakages.

Conclusion

In conclusion from literature review, the efficacy of trabeculectomy vs tubes besides minor differences is about the same. Concerning safety, there are some complications related to tubes, as tube occlusions (0.8% - 5.7%), persistent diplopia (12%), corneal edema (20%) and tube erosion (1% - 3%) [16]. However, there is not a long - term RCT to compare the safety and efficacy of tube surgery to trabeculectomy with mitomycin C in eyes that have not been operated previously. Definitely, the Primary TVT study which is under development will help. And most important, there is also a lack of a large RCT dealing of how trabeculectomy behaves in patients with a failed tube. Cost is another important point. According to Kaplan et al, the mean costs for trabeculectomy, and tube insertion were \$7872 and \$10075, respectively with a cost difference of \$2203 (95% CI, \$2121-\$2261) [17].

Surgeon's personal experience: Trabeculectomy has been first described in the mid 1960's and the success rates have significantly improved with the widespread use of antimetabolites in the last decades. As a surgical procedure has its limitations and while surgeon dependent, it is safe to claim that if a surgeon has standardized the procedure and if he knows how to avoid most of the early and late complications, trabeculectomy may be a safe and predictable procedure with significant success rate in lowering the IOP in unoperated eyes with "low risk" disease.

In conclusion, since we still do not know if trabeculectomy has better or same efficacy with a tube insertion in a non high risk eye and how trabeculectomy behaves after a failed tube (lack of a large RCT "Trab after failing Tube"), trabeculectomy has to be the initial procedure in a 'virgin' non high risk eye. Otherwise, we risk to eliminate from our armamentarium the 'gold standard' operation for COAG.

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