



Original research

Comparison of the long-term outcomes of resident versus attending performed trabeculectomy

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Abstract

Purpose: To compare the long-term outcomes obtained by residents and attending surgeons performing trabeculectomy.

Methods: After reviewing medical records of the patients, 41 residents performing trabeculectomy under supervision of attendings were compared to 41 attendings performing trabeculectomy. The primary outcome measure was the surgical success defined in terms of intraocular pressure (IOP) ≤ 21 mmHg (criterion A) and IOP ≤ 16 mmHg (criterion B), with at least 20% reduction in IOP, either with no medication (complete success) or with no more than 2 medications (qualified success). IOP, number of glaucoma medications, surgical complications, and visual acuity were analyzed as secondary outcome measures.

Results: Mean age of the patients was 59.5 ± 8.6 years in the resident group and 59.6 ± 12.31 years in the attending group ($P = 0.96$). Furthermore, mean duration of the follow-up was 62.34 ± 5.51 months in the resident group and 64.80 ± 7.80 months in the attending group ($P = 0.10$). The cumulative success according to criterion A was 87.8% in the resident group and 85.3% in the attending group ($P = 0.50$). Moreover, according to criterion B, it was 87.8% and 83% in the resident and attending groups, respectively ($P = 0.62$). Repeated glaucoma surgery was required in 12.2% and 2.4% of the patients in the resident and attending groups, respectively ($P = 0.09$). Rate of complications was 12.2% and 4.8% in the resident and attending groups, respectively ($P = 0.23$).

Conclusion: There were comparable results with respect to success rates and complications between residents and attending surgeons performing trabeculectomy in the long-term follow-up.

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Keywords: Glaucoma; Trabeculectomy; Intraocular pressure

Introduction

Glaucoma is the second leading cause of blindness globally. In addition, it is usually controlled by intraocular pressure (IOP)-lowering medications. However, surgical intervention becomes warranted in certain situations such as poor compliance with medications, progressive disease despite maximum medical therapy, or both.¹

Trabeculectomy has long been established as the gold standard in glaucoma filtering surgery and has almost been an effective procedure in glaucoma for lowering the IOP. Nevertheless, it is associated with numerous short-term and long-term complications, including, but not limited to, bleb leaks and infections, accelerated cataract progression, choroidal effusions or hemorrhage, and prolonged or permanent visual impairment from hypotonic maculopathy.^{2–5}

The technique of surgery and having a long-term experience in the management of glaucoma patients are the main factors in decreasing the failure rate and the complications of trabeculectomy. These experiences can be taught and transferred to the residents in their training period by closely supervising them during and after the surgery. In this regard,

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each residency program has its own strategy to reach these goals.

For instance, in the United States, each resident is required to perform a minimum of 5 glaucoma filtration/shunting surgeries as primary surgeon before graduation.⁶

According to previous studies, it appears that resident-performed glaucoma surgeries have acceptable outcomes in comparison to those performed by glaucoma specialists.^{7–9}

In the present study, we aimed to compare the long-term success rates and complications of resident- versus attending-performed trabeculectomy in a resident-based hospital. The results of these kinds of studies can contribute to understanding the weaknesses and strengths of the residency training program. Moreover, we can clarify the final results of the surgery for the patients and inform and reassure them that the quality of services in the resident-based hospitals is high. This will encourage the patients to refer more to these university hospitals, leading to increasing the number of surgeries done by residents, improving their skills in surgical management of glaucoma patients, and ultimately assisting the training centers in graduating more confident residents.

Methods

In this retrospective cohort study, the medical records of 132 eyes of 132 patients with a history of trabeculectomy (60 cases were performed by the attending glaucoma specialist (N.N), and 72 cases were performed by the third- and the fourth-year residents under the supervision of the same attending surgeon at a resident-based hospital) were evaluated from February 2008 to February 2010. This study followed the tenets of the Declaration of Helsinki and the ethics committee of the Rassoul Akram hospital approved the study protocol. The inclusion criteria were a history of first time trabeculectomy and at least 5 years of follow-up. The exclusion criteria were age less than 30, a history of previous glaucoma, intraocular surgery except uncomplicated phacoemulsification, or history of any surgeries unrelated to the trabeculectomy or its complications including phacoemulsification or deep vitrectomy during the follow-up period. All patients in attending group were selected from the private clinic (Markazi Clinic, Tehran, Iran) of the attending physician (N.N), and all patients in resident group were selected from Rassoul Akram Hospital, Iran University of Medical Sciences, Tehran, Iran. By reviewing the medical records, pre- and post-operative data required for this study were collected. The cases in the resident and attending groups were also matched based on age and subtype of glaucoma. By considering the inclusion and exclusion criteria, 41 out of 72 cases (56.94%) in the resident group and 41 out of 60 cases (68.33%) in the attending group were finally enrolled in the present study.

There were 7 post-operative follow-up visits within 6 months after the surgery for all patients, including the 1st, 7th, 14th, 30th, 60th, 90th, and 180th days. A window of ± 10 days was allowed for all time points of visits after the 1st month. After 6 months, follow-up visits were scheduled according to the clinical judgment of surgeon. Follow-up visits

were performed both by residents and attending in the residents group and by the attending glaucoma specialist in the attending group. In each visit, the examination included measurements of best corrected visual acuity and IOP, slit-lamp bio-microscopy, assessment of anterior chamber cell and flare, bleb evaluation, and funduscopy. Type and number of IOP lowering medications, complications, and any post-operative interventions were also recorded.

The primary outcome measure was the surgical success defined in terms of IOP measurement by the following two criteria: (A) $5 \leq \text{IOP} \leq 21$ mmHg with at least $\geq 20\%$ reduction in IOP without glaucoma medication (complete success) or with no more than 2 medications (qualified success), and (B) similar to previous criteria with the exception of 16 mmHg being the maximum IOP cut-off point. The cumulative success was defined as the sum of complete and qualified success. The surgery was classified as failure when: neither complete nor qualified success was met in at least 2 consecutive visits 3 months after the surgery, vision became no light perception, or reoperation was required due to the failure to achieve the target pressure. Bleb needling or minor interventions such as resuturing of the conjunctiva were not considered a failure.

Surgical technique

All surgeries were carried out under either general or retrobulbar anesthesia. Each patient underwent a fornix-based trabeculectomy with the similar technique in both resident and attending groups. The surgeries in the resident group were performed under the direct supervision of an experienced attending glaucoma surgeon. The surgery was consisted of the use of a half-thickness trapezoidal scleral flap (3×2 mm) in the supranasal quadrant. For all eyes after peritomy and creation of the scleral flap, mitomycin C (MMC) 0.02% (0.2 mg/mL) was applied, using multiple thin sponges under the scleral flap and between the sclera and tenon capsule for 2–3 min. The sponges were then removed, and the surgical field was irrigated with copious amounts of balanced salt solution. Sclerectomy was conducted with a Kelly-Descemet punch, and peripheral iridectomy was created with a Vannas scissors (Katena Products, Inc., Denville, New Jersey, USA). The scleral flap was closed with two 10-0 nylon sutures by the releasable technique. At the end of the surgery, the conjunctiva was closed with 10-0 nylon sutures. In all trabeculectomy surgeries which were performed by residents, the attending surgeon, supervised the resident in all steps of the surgery. At each step the attending may have intervene by his discretion. From the first day after the surgery, all patients were treated with ciprofloxacin eye drop (4 times a day for 2 weeks) and betamethasone eye drops every 2 h for 2 weeks that were tapered off slowly over 6–8 weeks. Releasable sutures were removed by considering the morphology of the bleb, the IOP, and the assigned target pressure. Subsequent to the surgery, IOP lowering medication was added if necessary based on the targeted IOP. In addition to the resident in charge of the surgery, the attending surgeon was also directly involved in all post-operative visits. Ocular Massage was performed

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