Role of B-scan ultrasound in the postoperative evaluation after glaucoma drainage device implantation

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1 Case report

A 60-year-old patient presented with refractory neovascular glaucoma and proliferative diabetic retinopathy. His intraocular pressure (IOP) was 38 mm Hg with maximal medical therapy. He had undergone small incision cataract surgery and multiple intravitreal bevacizumab injections in the past. Since the superior conjunctiva was scarred, Aurolab aqueous drainage device (AADI) was implanted to control the IOP. The tube was ligated with two 6/0 polyglactin sutures. On post-operative day 1, applanation IOP was 25 mm Hg. Anti-glaucoma medications (AGM) were continued along with postoperative steroids and cycloplegics. At 4 weeks, IOP was 30 mm Hg and the “ridge” of the AADI plate was well-delineated (Fig. 1A), indicating that the tube ligature has not dissolved. At 7 weeks, IOP was 4 mm Hg, and the ridge was obliterated (Fig. 1B), suggesting tube patency. Once tube opening was confirmed, AGMs were stopped and steroids and cycloplegic drops were stepped up. At 6 months, IOP was 12 mm Hg. Serial B-Scan evaluation (Fig. 2A–D) showed gradual formation and maturation of bleb with fluid-filled echolucent spaces around the AADI plate.

2. Discussion

The limbal location of trabeculectomy blebs allows a detailed evaluation of the bleb morphology. On the contrary, the equatorial blebs of glaucoma drainage devices (GDD) make clinical examination slightly difficult. One has to rely on indirect clues to evaluate the function of GDD. In non-valved GDD, tube ligation with an absorbable suture or ripcord is essential to prevent hypotony.1 The approximate time of tube opening depends on the thickness and number of sutures used.

Once the ligature dissolves and the tube opens, aqueous starts flowing from the anterior chamber to the GDD plate. With aqueous flow, the “ridge” on the GDD plate gets obliterated.

Clinically, it is crucial to identify this clue as one has to stop AGM and step up steroids and cycloplegics at this juncture to counter the increased inflammation. The authors had previously reported on the importance of “ridge” on the GDD plate.2

In some deep-set eyes with tight orbit, identifying the ridge becomes difficult, even after lid retraction. B-scan ultrasonography is a simple non-invasive modality that can evaluate tube patency in these difficult situations. If the tube is patent after the dissolution of tube ligature, the fluid around the GDD plate will be seen as an echolucent space that can sometimes indent/flatten the sclera. This way of objective documentation of tube patency through serial imaging will help us understand the maturity of blebs over time. If a large fluid reservoir with flattening of sclera, is noticed in the setting of very high IOP, it can suggest the onset of the hypertensive phase.3 B-Scan also helps in identifying the etiology in a patient presenting with proptosis from a giant bleb reservoir.4

3. Conclusion

We report this case to highlight the importance of this simple tool to monitor suture dissolution, tube patency, and hence the bleb’s function after GDD implantation. It is critical to time the patient’s follow-up accordingly to avoid hypotony from extended use of AGM after tube opening.

Ethical approval

Aravind Eye Care System, Institutional Ethical committee, Madurai, India, confirmed the ethics approval, and the patient’s approval was also obtained to publish the image.

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Fig. 1. Slit-lamp photograph showing a flat profile of the bleb with well-delineated “ridge” (black arrow head) of the GDD plate (A); obliterated “ridge” (B) after the dissolution of tube ligature.

Fig. 2. B-scan ultrasonography showing absent bleb on POD 1, 4 weeks (A, B); early bleb on POD 7 weeks (C); well-formed filtering bleb (yellow arrow heads) around the GDD plate on POD 6 months (D). (For interpretation of the references to colour in this figure legend, the reader is referred to the Web version of this article.)
Authorship

All authors attest that they meet the current ICMJE criteria for authorship.

Declaration of competing interest

NIL.

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