The Ahmed Versus Baerveldt (AVB) Study

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Glaucoma drainage devices are being increasingly used in the treatment of advanced glaucoma refractory to medical therapy or in cases that have failed trabeculectomy with antimetabolite. The Ahmed Versus Baerveldt (AVB) Study is an international, multicenter, randomized clinical trial comparing the two most frequently used devices. Five-year results have been recently published providing high quality evidence to guide a surgeon’s decision on which device to use.

The treatment of glaucoma usually begins with the use of topical antiglaucoma medications or laser trabecuoplasty, with surgery reserved for cases refractory to, or at high-risk of failing medical management.1 Trabeculectomy with antimetabolite has traditionally been considered the preferred first-line filtration procedure.1 However, failure rates of approximately 50% at 5 years have been reported, as well as complications including hypotony, wound leak, and infection.2,3 Furthermore, 5-year results of the Tube Versus Trabeculectomy (TVT) Study found Baerveldt implantation had a higher success rate and lower rate of reoperation that trabeculectomy, with a similar intraocular pressure (IOP) reduction and need for glaucoma medications.4 As a result, there has been a significant change in practice patterns over the past two decades, with declining rates of trabeculectomy and an increase in the use of glaucoma drainage devices.5 In particular, glaucoma drainage devices are being increasingly used in patients who have failed trabeculectomy, or who have disease at high risk of failing trabeculectomy (e.g. neovascular or uveitic glaucoma).6

The two most frequently used glaucoma drainage devices are the Ahmed valve implant (New World Medical Inc, Rancho Cucamongo, CA, US) and the Baerveldt implant (Abbott Medical Optics, Santa Ana, CA, US). These devices differ in that the Ahmed implant has a venturi-based valve system which opens at 5–18 mmHg was used based on data suggesting IOP >18 mmHg may result in progression.14

Both devices were effective in lowering IOP and the need for glaucoma medications. At 5 years, the mean IOP was 16.6 mmHg in the Ahmed group (47% reduction) and 13.6 mmHg in the Baerveldt group (57% reduction, p=0.001). Mean medication use was 1.8 in the Ahmed group (44% reduction) and 1.2 in the Baerveldt group (61% reduction, p=0.03). De novo glaucoma surgery was required in 18% of the Ahmed group and 11% of the Baerveldt group (p=0.22). The 5-year cumulative failure rate was 53% in the Ahmed group and 40% in the Baerveldt group (p=0.04). Hypotony resulted in failure in five patients...
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(4%) in the Baerveldt group compared to none in the Ahmed group. Visual outcomes were similar in both groups (p=0.88), with a modest decrease in vision from a median of 20/100 at baseline to 20/200 at 5 years.

The AVB Study results reinforce that both the Ahmed valve implant and the Baerveldt implant are effective treatments for refractory and high-risk glaucoma. The Ahmed group had a lower failure rate and a lower IOP on fewer glaucoma medications than the Ahmed group, but carried a risk for hypotony. These results are similar to those of the Ahmed Baerveldt Comparison (ABC) Study, a concurrent multicenter randomized trial.15 The ABC Study found similar rates of failure between groups at 5-years (45% Ahmed, 39% Baerveldt, p=0.65) but found the Baerveldt group achieved a lower IOP (Ahmed: 14.7 mmHg, Baerveldt: 12.7 mmHg, p=0.02) on a similar number of medications (Ahmed: 2.2, Baerveldt: 1.8, p=0.28). However, the Baerveldt group had a greater number of failures due to safety issues including persistent hypotony, explantation of the implant or loss of light perception (Ahmed: 8%, Baerveldt: 17%, p=0.03).

The results of the AVB and ABC Studies may be used by surgeons to individualize care for patients. If a patient requires an immediate postoperative IOP reduction and has a moderate long-term IOP target or has risk factors for postoperative hypotony—an Ahmed implant may be a good choice. If a patient has a low long-term IOP target or is intolerant or non-compliant with glaucoma medications—a Baerveldt implant may be a good choice. Ultimately, selecting a device should balance patient factors including goals of treatment and compliance with medical therapy with surgeon factors including their experience with each device and postoperative results.