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CLINICAL STUDY

Long-term results of Ahmed glaucoma valve and Molteno implant in neovascular glaucoma

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Abstract

Aims **To evaluate the surgical success results of Ahmed glaucoma valve (AGV) and Molteno single-plate implant (MSPI) in cases of neovascular glaucoma (NVG).**

Methods **Between May 1997 and May 2002, 38 of 38 NVG patients that underwent implantation of AGV and 27 eyes of 27 NVG patients that underwent MSPI (a total 65 eyes of 65 patients) included to the study.**

Results **The cumulative probabilities of success were 63.2% at 1 year, 56.2% at 2 years, 43.2% at 3 years, 37.8% at 4 years, and 25.2% at 5 years in AGV group whereas the cumulative probabilities of success were 37.0% at 1 year, 29.6% at 2 years, 29.6% at 3 years, 29.6% at 4 years, and 29.6% at 5 years in MSPI group ($P = 0.141$). Preoperative visual acuity $<2/200$ ($P = 0.003$), diagnosis of diabetes mellitius ($P = 0.050$), and preoperative IOP ≥ 35 mmHg ($P = 0.038$) were found to be poor prognostic factors for surgical success.**

Conclusions **Both AGV and single plate MSPI were successful for early and intermediate-term of IOP control but in long term both implants were failed to achieve control of IOP in patients with NVG.**

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Keywords: neovascular glaucoma; Ahmed glaucoma valve; Molteno tube implantation; seton

Introduction

The management of neovascular glaucoma (NVG), represents a challenge and usually responds poorly to conventional glaucoma surgery. Several therapies have been used including trabeculectomy with antimetabolites,[1] cyclocryotherapy,[2] *ab interno* and *externo* laser cyclophotocoagulation[3] and each technique has demonstrated generally poor success rates. Artificial aqueous drainage devices have been advocated for primary surgical treatment of NVG but general success rates varied in different studies.[4–8]

In this retrospective study, we evaluated 5-year efficacy and safety of Molteno single-plate implant (MSPI) without pressure ridge and Ahmed glaucoma valve (AGV) in eyes with NVG and examined the factors that influence the outcome.

Patients and methods

Patients

After approval by the local Ethic Committe of Ankara Research and Education Hospital, the charts of all patients with NVG and operated with tube implantation from the period May 1997–May 2002 reviewed retrospectively. Total 65 consecutive patients of 65 eyes and 38 eyes of 38 patients treated with an AGV Model S-2 (New World Medical Inc., Rancho Cucamonga, CA, USA) and 27 eyes of 27 patients treated with a MSPI without the pressure-ridge are included the study (Molteno Ophthalmic Ltd, Dunedin, New Zealand). The demographic features of the patients are listed in Table 1.

A total of 37 (94.7%) patients in AGV group and 25 patients (92.6%) in MSPI group had undergone retinal photocoagulation or postequatorial cryoablation before surgical intervention. Only the first eye of patients who had bilateral surgery was considered in the analysis of surgical outcomes.

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Table 1 Demographic data

	Ahmed glaucoma valve N:38	*Molteno tube implant N:27*	P
Follow-up (mos) (mean ± SD)*	37.0 ± 18.4	41.9 ± 17.1	*P*** = 0.289
Range (mos)	(6–60)	(6–60)	
Age (years) (mean ± SD)	57.7 ± 10.9	58.3 ± 15.4	*P**** = 0.368
Range (years)	(24–74)	(14–77)	
Sex			
Female	17 (55.3%)	18 (66.7%)	*P*** = 0.355
Male	21 (44.7%)	9 (33.3%)	
Cause of neovascularisation			
Diabetic retinopathy	19 (50%)	15 (55.6%)	
Central retinal vein occlusion	17 (44.7%)	10 (37%)	
Ocular ischaemic syndrome	2 (5.2%)	1 (3.7%)	*P*** = NA
Coats' disease	—	1 (3.7%)	

*SD.
**Student's *t* test.
***Mann–Whitney *U* test.

All tube implantation procedures were performed by three experienced glaucoma surgeons (ISY, UE, BS). We randomly selected the type of the implant for our patients.

Surgical technique

A fornix-based conjunctival flap was created between two adjacent recti muscles and extended 90°. Before placement of the tube implant body to the sclera, tube was irrigated with saline solution to open the valve mechanism. The implant's polypropylene body was sutured to sclera with 6.0 polyester suture. In MSPI group, tube was tied off with an absorbable 6.0 vicryl suture, 3 mm from plate, to prevent postoperative hypotony. The tube then trimmed and the anterior chamber was entered from 1 mm posterior to corneoscleral limbus with 23-gauge needle. A human donor pericardium was placed over the tube and sutured to the sclera with 10.0 nylon suture. The conjunctiva was sutured to the limbus.

Postoperative follow-up

The following information was documented for each patient preoperatively; age, gender, etiology of NVG, visual acuity, and intraocular pressure (IOP) before tube implant surgery. Postoperative visual acuity and IOP was recorded at each visit after tube implant surgery. The number of postoperative glaucoma medications, optic disc appearance, early (0–3 months) and late postoperative complications were also recorded. 'Hypertensive phase' has been defined as IOP greater than 21 mmHg in the first 6 postoperative months.

Criteria for success and failure

Surgical success was defined as IOP <22 mmHg and >5 mmHg without additional glaucoma surgery and without loss of light perception. Postoperative use of antiglaucoma medications was not accepted as a criterion of success or failure. The definition of hypotony in this study was IOP of 5 mmHg or less in two consecutive visits. Also, we compared the cumulative probablity of success rates in the patients according to age, gender, preoperative visual acuity, IOP, and aetiology of NVG.

Statistical analysis

WinSTAT for Microsoft Excel Version 2001.1 program was used for statistical analysis. The paired *t*-tests and Mann–Whitney *U* tests were used to assess differences in continiously scaled variables before and after surgery. Mantel–Haenszel χ^2 test was used for comparision of the qualitative data between the two groups. The cumulative probability of success was analysed by Kaplan–Meier life-table analysis and intercurve analysis was performed using the log-rank test. A statistically significant difference was defined as a *P*-value <0.05.

Results

Patient characteristics

A total of 38 patients in AGV group and 27 in MSPI group and a total of 65 patients were included in the study (Table 1).

Intraocular pressure

As shown in Table 2 and Figure 1 the mean preoperative IOP was 39.5±4.5 mmHg (31–56 mmHg) in AGV group, 39.3±3.9 mmHg (30–45 mmHg) in MSPI group ($P=0.882$).

The AGV group showed a greater decline in IOP at each visit postoperatively and it was statistically significant at 3 ($P=0.009$) and 6 months ($P=0.040$) postoperatively. The percentage of reduction in IOP was 52.6% in AGV group and 57.7% in MSPI group at last visit.

Hypertensive phase was present by 7/38 (18.4%) patients in AGV group whereas 8/27 (29.6%) patients in MSPI group, respectively. This period was controlled with antiglaucoma medications in all patients in both groups.

Surgical success

The Kaplan–Meier life-table analysis of the total 65 patients were 52.3% at 1 year, 44.8% at 2 years, 37.8% at 3 years, 34.6% at 4 years, 26% at 5 years in all implant groups. Mean survival time of the all patients by Kaplan–Meier survival analysis was 29 months (Figure 2).

The overall success rates of the AGV were 63.2% at 1 year, 56.1% at 2 years, 43.2% at 3 years, 37.8% at 4 years, and 25.2% at 5 years. Mean survival time of the AGV patients by Kaplan–Meier survival analysis was 34 months (Figure 3).

The success rates of MSPI were 37, 29.6, 29.6, 29.6, 29.6%, respectively. Mean survival time of the MSPI patients by Kaplan–Meier survival analysis was 22 months (Figure 3).

Although the success rates always higher in AGV group in all periods of time, the log-rank test indicated no significant difference between the two groups ($P=0.141$).

Success and age

Patients older than 50 years of age were more likely to have a successful results (Age<50 years 21.43% *vs* Age⩾50 years 41.18%) in all groups but it was not statistically significant ($P=0.925$).

We also compared surgical success rates between AGV and MSPI groups in 50 years older and younger NVG patients but it was not statistically significant ($P=0.144$).

Table 2 Mean IOP Profile before and after placement of Ahmed glaucoma valve and Molteno single plate implant in patients with neovascular glaucoma

	Ahmed glaucoma valve IOP±SD** N:38 (mmHg)*	*Molteno tube implant IOP±SD N:27 (mmHg)*	P***
Preoperative	39.5±4.5 (31–56)	39.3±3.9 (30–45)	0.882
Postoperative			
3 months	15.6±8.0 (4–35)	21.3±9.6 (3–38)	0.009[a]
6 months	17.8±7.2 (5–34)	20.9±6.8 (6–34)	0.040[a]
1 year	19.7±6.7 (4–36)	20.8±7.7 (4–36)	0.552
2 years	21.5±6.9 (6–34)	21.0±6.5 (10–30)	0.851
3 years	21.6±5.9 (6–32)	22.2±5.4 (12–29)	0.758
4 years	21.5±5.6 (6–28)	21.1±4.3 (14–27)	0.596
5 years	20.8±8.6 (2–35)	22.7±4.2 (13–27)	0.447

[a]denotes statistical significance.
*Intraocular pressure
**SD.
***Mann–Whitney *U* test.

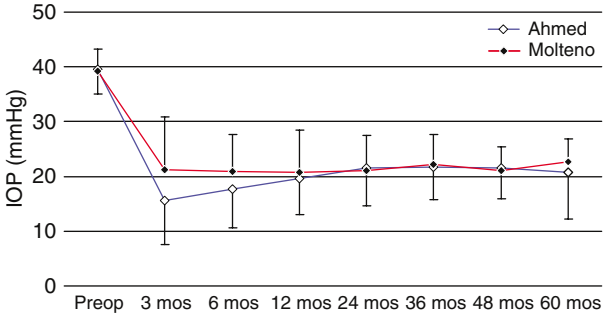

Figure 1 Mean Intraocular Pressure changes from baseline to 60 months follow-up between the groups.

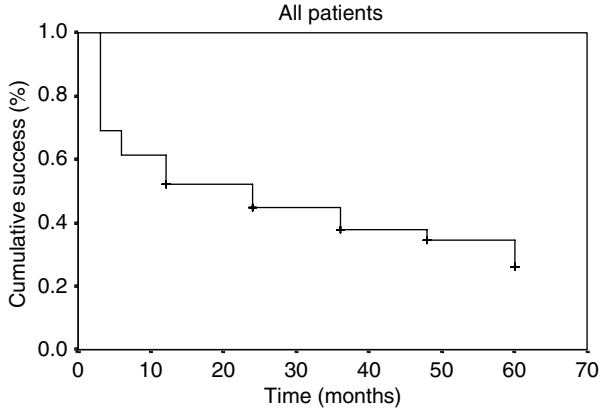

Figure 2 Cumulative probability of success of the all implant patients over a 5-year period.

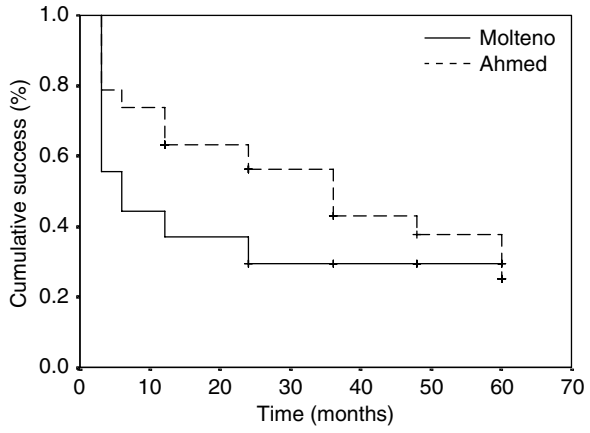

Figure 3 Cumulative probability of success of the Ahmed Glaucoma Valve group and Molteno Single Plate Implant group over a 5-year period in NVG patients. ($P = 0.141$, Log-rank test).

Success and gender

The success rate of male gender was 41.03% and female gender was 30.77% in all groups and it was not statistically significant ($P = 0.267$). There was also no statistically significant difference between the two groups in terms of gender ($P = 0.074$).

Success and preoperative visual acuity

We compared all patients according to their preoperative visual acuities better than 2/200 or worse. The patients with preoperative visual acuity better than 2/200 achieved statistically significant surgical success than visual acuity <2/200 ($P = 0.003$).

Success and diagnosis

Patients with CRVO had a better surgical outcome than DM, and this was statistically significant ($P = 0.050$, log-rank test). Success rate of CRVO was 48.15% 50 *vs* 23.53% in DM group in all patients. According to implant type, CRVO patients was more successful than DM patients in both groups (48.15 and 52.94% in AGV group *vs* 23.53 and 26.32% in MSPI group) ($P = 0.083$).

Success and preoperative IOP

The success rate of the patients with preoperative IOP $\geq$ 35 mmHg in all group was not statistically significant ($P = 0.106$, log-rank test) but AGV patients were more successful than MSPI patients according to preoperative IOP $\geq$ 35 mmHg ($P = 0.038$).

Glaucoma medications

The mean number of glaucoma medications was reduced from 3.4 ± 0.5 in the preoperative period to 1.7 ± 1.6 in last postoperative visit in AGV group ($P = 0.000$) and from 3.4 ± 0.5 to 1.8 ± 1.2 ($P = 0.000$) respectively, in MSPI group.

Visual acuity

All patients had a preoperative visual acuity of at least light perception. A decrease in the visual acuity of more than two Snellen lines of the best corrected visual acuity on at least two postoperative visits was defined as failure. Visual acuity was improved in five patients (13.2%) in AGV group and three patients (11.1%) in MSPI group. Visual failure was 9/38 (23.6%) in AGV group and 9/27 (33.3%) in MSPI group. Only three (7.8%) of these patients in AGV group and four (14.8%) of these patients in MSPI group demonstrated inadequate control of IOP (ie, >21 mmHg) at most recent follow-up. In most cases, decreased visual acuity was attributed to progression of the underlying retinal disease. Five (13%) patients in AGV group and six (22.2%) patients in MSPI group lost light perception during the follow-up period pre- and postoperative visual acuity changes were not statistically significant between the groups ($P = 0.485$) (Table 3).

Complications

The most common complication in the early postoperative period (0–3 months) was hyphema in both groups (Table 4). All the hyphemas were reabsorbed without any surgical intervention. Tube occlusion occurred in three (7.9%) eyes in AGV group and four

Table 3 Postoperative change in visual acuity

Visual acuity	*Ahmed glaucoma valve N:38 (%)*	*Molteno tube implant N:27 (%)*	P*
Same	24 (63.2)	15 (60)	0.413
Decreased	9 (23.6)	9 (33.3)	0.126
Improved	5 (13.2)	3 (11.1)	0.457

*Mann–Whitney *U* test.

Table 4 Early (0–3 months) postoperative complications

	Ahmed glaucoma valve number (%) N:38	*Molteno tube implant number (%) N:27*
Hyphema	7 (18.4)	7 (25.9)
Tube occlusion	3 (7.9)	4 (14)
Choroidal effusion	2 (5.3)	5 (18.5)
Shallow AC	2 (5.3)	4 (14.8)
Hypotonia	2 (5.3)	2 (7.4)
Tube-cornea touch	1 (2.6)	1 (3.7)
Suprachoroidal haemorrhage	—	1 (3.7)

Table 5 Late (>3 months) postoperative complications

	Ahmed glaucoma valve number (%) N:38	*Molteno tube implantation number (%) N:27*
Phthisis Bulbi	3 (7.9)	4 (14.8)
Encapsulated plate	3 (7.9)	3 (11.1)
Tube/plate exposure	2 (5.3)	3 (11.1)
Corneal decompansation	2 (5.3)	3 (11.1)
Diplopia	—	1 (3.7)

(14%) eyes in MSPI group and treated with tube irrigation (five eyes 18.5%) and argon laser photocoagulation to iris around the tube (two eyes 5.3%). Choroidal effusion was developed in two (5.3%) eyes in AGV group and five (18.5%) eyes in MSPI group. All the eyes had peripheral serous choroidal detachments and none of these was drained. One (3.7%) patient in MSPI group had a suprachoroidal haemorrhage and it was drained surgically. Hypotonia occurred in two eyes (5.3 and 7.4%, respectively) in both groups. Two eyes (5.3%) in AGV group and four eyes (14.8%) in MSPI group developed shallow anterior chambers. The anterior chamber of the two eyes in MSPI group was reformed during the first postoperative week because of lens-corneal touch.

The main late postoperative complication of the both groups was phthisis bulbi in three eyes (7.9%) in AGV group and four eyes (14.8%) in MSPI group. (Table 5) Phthisis bulbi was secondary to progression of the proliferative retinopathy in all cases. Three eyes (7.9%) with encapsulated bleb, two underwent needling + Mitomycin-C injection in AGV group and three eyes (11.1%) of all underwent same procedure in MSPI group.

Discussion

The aim of surgical treatment in NVG is reducing IOP with preserving visual functions and reducing pain.[6–8] In this study, MSPI and AGV implants are achieved a marked IOP lowering effect (Figure 1). These reductions were statistically significantly lower in AGV group in 3 and 6 months postoperatively than MSPI group ($P<0.005$). A period of transient elevation of IOP, termed the 'hypertensive phase' has been described after glaucoma drainage implant surgery.[9,10] This phase was present by 15.8 and 18.4% patients in AGV group whereas 33.3 and 29.6% patients in 3 and 6 months in MSPI group, respectively. The lower level of hypertensive phase may be due to to the intermediate-sized plate of the AGV implant than MSPI in our study. Ayyala *et al*[10] noted a 83.5% hypertensive phase of AGV *vs* 43.5% of double plate Molteno implant in patients with advanced glaucoma. The low rate of this phase could be related to medications that we used in this period or ciliary ischaemia in NVG.

Difficulty often exists in comparision of intermediate-term and long-term follow-up studies because of lack of uniform success criterias and uniform patient demographics. Mermoud *et al*[6] have studied the long-term results of single-plate Molteno implants in NVG. Success rates at the 1- to 5-year intervals were 62.1–10.3%, respectively in this study. These results up to the 5-year postoperative period are higher than MSPI and lower than AGV and all groups (MSPI + AGV) in our study. We noted a substantial decrease in success rates starting at 2 years after surgery (Figures 2 and 3). The surgical success rate was influenced significantly by preoperative visual acuity $<2/200$ ($P=0.0003$), IOP ≥ 35 mmHg ($P=0.038$) and the diagnosis of diabetes mellitus ($P=0.050$) in all groups. These above findings contrast with those reported by Mermoud *et al*,[6] in which preoperative age less than 55, and diagnosis of central vein occlusion were more predictive of poor surgical outcome. Similarly, Sidoti *et al*,[7] found that poorer preoperative visual acuity was significant predictors of surgical failure with the Baerveldt glaucoma implant in NVG. They also[7] reported that implant size had no significant effect on surgical outcome. The need for a larger surface area for aqueous drainage in NVG may be minimized because of subnormal aqueous production secondary to ciliary body ischaemia. In our study, we did not find statistically significant difference in term of success in both implants in all time periods. Britt *et al*[11] found that 350-mm^2 Baerveldt implant is more successful than the 500-mm^2 implant for IOP control in refractory glaucoma in long-term follow-up. Also, Broadway *et al*[12] found no statistical difference between single and double plate Molteno implant in terms of clinical success in refractory glaucoma cases over a 10-year follow-up. The high rate of surgical failure is mainly due to the loss of vision secondary to progression of underlying disease in neovascular patients.[6,7] In our series five (13%) patients in AGV group, and six (22.2%) patients in MSPI group lost light perception during the follow-up period. Loss of light perception was reported between 11 and 48% of eyes after tube implantation in NVG.[4–7] Second cause of failure was phitisis bulbi in three eyes (7.9%) in AGV group and four eyes (14.8%) in MSPI group in our study. Phthisis bulbi was secondary to progression of the proliferative retinopathy in all cases. Recently, Delgado *et al*[13] reported loss of light perception 17.6% of all eyes treated with noncontact transscleral Nd:YAG laser cyclophotocuagulation in NVG.

Hyphema was the most common complication in early postoperative period. It was reported between 8 and 20%

with tube implantation in NVG.[6,7] All the hyphemas resorbed without surgical intervention in both groups. Hypotony was seen in two patients in each group (5.3% and 7.4%, respectively) (Table 4). Postoperative hypotony was found between 8 and 13% with AGV.[14,15] Krishna *et al*[16] found 5% hypotony maculopathy and flat anterior chamber 14% after implantation of 350-mm^2 Baerveldt implant. Hypotony and related complications were quite similar in both implant groups in our study. We think that since performing tube ligation techniques in nonvalved implants, hypotony has not become a dreadful complication at early postoperative period. Corneal decompansation was seen in 5.3% patients in AGV and 11.1% patients in MSPI group (Table 5). Corneal decompansation following placement of drainage implants has been reported up to 27% of eyes.[17–21] In our patients corneal decompansation was not a major contributing factor for loss of vision and tube failure.

In conclusion, both AGV and MSPI are effective for lowering IOP in NVG patients. However, in long-term follow-up, both implants were poor for maintaining clinical success survival because underlying retinal disease progression. Preoperative poor visual acuity, diagnosis of diabetes mellitus and preoperative high IOP levels were main bad prognostic factors for tube implantation in NVG.

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References

1 Tsai JC, Feuer WJ, Parrish II RK, Grajewski AL. 5-Fluorouracil filtering surgery and neovascular glaucoma. Long-term follow-up of the original pilot study. *Ophthalmology* 1995; **102**: 887–893.
2 Krupin T, Mitchell KB, Becker B. Cyclocryotheraphy in neovascular glaucoma. *Am J Ophthalmol* 1978; **86**: 24–26.
3 Uram M. Ophthalmic laser microendoscope ciliary process ablation in management of neovascular glaucoma. *Ophthalmology* 1992; **99**: 1832–1838.
4 Eid TE, Katz LJ, Spaeth GL, Augsburger JJ. Tube-shunt surgery *vs* neodymium:YAG cyclophatocoaculation in the management of neovascular glaucoma. *Ophthalmology* 1997; **104**: 1692–1700.
5 Krupin T, Mandell A, Ritch R, Asseff C, Podos SM, Becker B. Filtering valve implant surgery for eyes with neovascular glaucoma. *Am J Ophthalmol* 1980; **89**: 338–343.
6 Mermoud A, Salmon JF, Alexander P. Molteno tube implantation for neovascular glaucoma. Long-term results and factors influencing the outcome. *Ophthalmology* 1993; **100**: 897–902.
7 Sidoti PA, Dunphy TR, Baerveldt G, LaBreeet L, Minckler DS, Lee PP *et al*. Experience with the Baerveldt glaucoma implant in treating neovascular glaucoma. *Ophthalmology* 1995; **102**: 1107–1118.
8 Sivak-Callcott JA, O'Day DM, Gass JDM, Tsai JC. Evidence-based recommendations for the diagnosis and treatment of neovascular glaucoma. *Ophthalmology* 2001; **108**: 1767–1776.
9 Ayyala RS, Zurakowski D, Smith JA, Monshizadeh R, Netland PA, Richards DW *et al*. A clinical study of the Ahmed glaucoma valve implant in advanced glaucoma. *Ophthalmology* 1998; **105**: 1968–1976.
10 Ayyala RS, Zurakowski D, Monshizadeh R, Hong CH, Richards DW, Layden WE *et al*. Comparision of Double-plate Molteno and Ahmed glaucoma valve in patients with advanced uncontrolled glaucoma. *Ophthalmic Surg Lasers* 2002; **33**: 94–101.
11 Britt MT, LaBree LD, Lloyd MA, Minckler DS, Heuer DK, Baerveldt G *et al*. Randomized clinical trial of the 350-mm^2 *vs* the 500-mm^2 Baerveldt implant: Longer term results. Is bigger better? *Ophthalmology* 1999; **106**: 2312–2318.
12 Broadway DC, Iester M, Schulzer M, Douglas GR. Survival analysis for success of Molteno tube implants. *Br J Ophthalmol* 2001; **85**: 689–695.
13 Delgado MF, Dickens CJ, Iwach AG, Novack GD, Nychka DS, Wong PC *et al*. Long-term results of Neodymium:Yttrium-Aluminum-Garnet cyclophotocoagulation in neovascular glaucoma. *Ophthalmology* 2003; **110**: 895–899.
14 Huang MC, Netland PA, Coleman AL, Siegner SW, Moster MR, Hill RA. Intermediate-term clinical experience with the Ahmed Glaucoma valve implant. *Am J Ophthalmol* 1999; **127**: 27–33.
15 Coleman AL, Hill R, Wilson R, Choplin N, Kotas-Neumann R, Bacharach J *et al*. Initial clinical experience with Ahmed glaucoma valve implant. *Am J Ophthalmol* 1995; **120**: 23–31.
16 Krishna R, Godfrey DG, Budenz DL, Escalona-Camaano E, Gedde SJ, Greenfield DS *et al*. Intermediate-term outcomes of 350-mm^2 Baerveldt Glaucoma Implants. *Ophthalmology* 2001; **108**: 621–626.
17 Taglia DP, Perkins TW, Gangnon R, Heatley GA, Kaufman P. Comparision of the Ahmed glaucoma valve, the Krupin eye valve with disk and the Double-plate Molteno Implant. *J Glaucoma* 2002; **11**: 347353.
18 Krupin eye valve with disk for filtration surgery. The Krupin Eye Valve Filtering Surgery Study Group. *Ophthalmology* 1994; **101**: 651–658.
19 Lloyd MA, Sedlak T, Heuer DK, Minckler DS, Baerveldt G, Lee MB *et al*. Clinical experience with the single-plate Molteno implant in complicated glaucomas: update of a pilot study. *Ophthalmology* 1992; **99**: 679–687.
20 Topouzis F, Coleman AL, Choplin N, Bethlem M, Hill R, Yu F *et al*. Follow-up of the original cohort with the Ahmed glaucoma valve implant. *Am J Ophthalmol* 1999; **128**: 198–204.
21 Mills RP, Reynolds A, Emond MJ, Barlow WE, Leen MM. Long-term survival of Molteno glaucoma drainage devices. *Ophthalmology* 1996; **103**: 299–305.