

Original Article

Glaucoma filtering bleb dysesthesia

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ABSTRACT

Objectives: Dysesthesia is a sensation that people typically describe as painful, itchy, burning or restrictive and to determine the prevalence and risk factors for dysesthesia caused by glaucoma filtering blebs.

Materials and Methods: A prospective and cross-sectional observational study of consecutive patients having unilateral glaucoma filtering blebs resulting from trabeculectomy was conducted. A self-reported questionnaire was administered to these patients inquiring about the frequency and severity of the following symptoms: ocular pain, burning, foreign body sensation and watering. The following variables were also recorded from the case records: age, gender, diagnosis, date of glaucoma surgery and antifibrotic agent if used. The intraocular pressure and bleb characteristics in form of location, height, width, thickness, percentage coverage by the eyelid, presence of epithelial defects, or dellen were noted. Dysesthesia scores between the affected eye and control eye were compared using the unpaired student *t*-test. Risk factors for dysesthesia were identified using analysis of variance or Pearson correlation coefficient.

Results: A total of 104 patients were enrolled in the study. The mean dysesthesia score (\pm standard deviation, SD, range) in the affected eye was 5.42 (\pm 3.62, 0–12) and in the unaffected eye was 1.35 (\pm 2.90, 0–8, $P = 0.0001$). Factors that predisposed to dysesthesia included older age (71.15%), superior location of bleb (84.61%) and cystic and overhanging bleb.

Conclusion: Eyes with filtering blebs experience more dysesthesia than eyes without filtering blebs. Older age and a superior bleb location are more commonly associated with bleb dysesthesia.

Keywords: Bleb dysesthesia, Glaucoma filtering surgery, Trabeculectomy, Filtering bleb

INTRODUCTION

Glaucoma, a chronic optic neuropathy, is a major cause of irreversible blindness around the world and trabeculectomy is one of the most common surgeries performed for treatment of glaucoma. After the surgery, some bleb-related complications such as bleb leak, encapsulated bleb, bleb-related infections and bleb failure can occur. Bleb dysesthesia is a relatively uncommon complication in which a well-functioning but large filtering bleb causes ocular discomfort.^[1-4] An interrupted tear film distribution over the bleb and cornea can lead to pain, discomfort, foreign body sensation and even reduced visual acuity.^[5] The risk factors identified for bleb dysesthesia include young age, a superonasal or nasal bleb location, use of antimetabolites, size of bleb, amount of overhang and poor lid cover.^[6,7]

Mild chronic ocular irritation following trabeculectomy is common and can manifest as a constant bleb awareness with blinking, but often also as severe debilitating discomfort.

Bleb-related dysesthesia is an ocular surface disorder wherein a glaucoma filtering bleb interferes with the normal lid function and tear film distribution leading to development of signs and symptoms of dry eye syndrome. Proper prevention and management of dysesthetic blebs are equally essential for a trabeculectomy to be called successful. However, many patients do not disclose mild bleb dysesthesia unless specifically probed for it, as they have either adapted to the symptoms or due to ascertainment bias. The symptoms may also be attributed to other common ocular surface disorders. Treatment directed at those disorders may effectively relieve symptoms of dysesthesia so that the ophthalmologists underestimate prevalence of the true aetiology.

Although the aetiology of bleb dysesthesia is still not fully elucidated, two mechanisms have been described: one, a hypocellular tissue response probably related to the use of antimetabolites creating an avascular bleb which then reaches a larger size;^[2] and second, an extensive scarring reaction in a susceptible eye resulting into a connective tissue hypertrophy.^[2]

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Persistent ocular irritation, pain and watering can also affect the quality of life of these patients. Many treatment strategies have been suggested for managing dysesthesia. Intensive surface lubrication is universally used. Other nonsurgical methods that stimulate scarring such as surface laser application and cryocoagulation have also been tried but these can often lead to bleb failure and intraocular pressure (IOP) rise.^[2] Planned surgery in the form of meticulous bleb revision, in the case, it is needed, should ideally be effective in not only relieving the symptoms but also maintaining bleb function. Laser applications have been suggested, but these may require multiple sittings with resultant inflammation and a less predictable IOP control.^[2] Corneal dellen is an uncommon complication of extensive blebs^[8] and needs to be aggressively treated to prevent corneal ulceration and perforation.^[9] If lubrication is ineffective, a contact lens (conventional or bandage) can be used,^[9] but its adequate fitting can be challenging due to the size and irregularity of the bleb in which cases definitive reductive surgery may need to be considered.^[9]

Glaucoma filtering surgery is one of the most prominent and enduring procedures for glaucoma, but one of its potential drawbacks as a bleb producing procedure is the possibility of bleb associated discomfort (Bleb dysesthesia) which can happen shortly after surgery or years later. It is something that all ophthalmologists should be able to recognise early and treat to optimise patient care and quality of life. To emphasise this aspect, we have conducted this analysis of bleb dysesthesia following trabeculectomy in terms of subjective effect and risk factors.

MATERIALS AND METHODS

This prospective and observational study was performed at a tertiary referral centre in western India. Approval was obtained from the Institutional Ethics Committee to perform this study and tenets of the Declaration of Helsinki were abided by. All patients in this study were enrolled after their written informed consents. The study period was from January 2022 to June 2022. Patients between 18 and 70 years of age having unilateral glaucoma filtering bleb resulting from trabeculectomy done at our institute by the same surgeon were included in the study. During the surgery, a solution of 0.2 mg/mL mitomycin C was prepared, and a 4 × 4 mm surgical sponge soaked in the solution was applied subconjunctivally for 2 min. Subsequently, the entire area was irrigated with 40 mL of irrigating fluid. Complete suture removal is done at 1 week and 3 weeks with use of mitomycin C. During assessment, the likelihood of symptoms arising from presence of any suture was specifically looked at and excluded from the study. The exclusion criteria were patients not willing to give consent, those with a history of bilateral glaucoma surgery or re-surgery and those with pre-existing ocular surface disease. After inclusion, they responded to

a self-reporting dysesthesia scale.^[6] They were asked to rate the frequency (0–5) and severity (1–5) for each of the following symptoms in each eye: ocular pain, burning sensation, foreign body sensation and watering where 0 means no symptoms, 1 means mild and 5 means very severe symptoms and in frequency, 0 means no complaint, 1 means 1–2 h/day and 5 means throughout the day. Other data such as age, gender and affected eye, diagnosis, date of surgery and details of antifibrotic agent used were noted from the records. A thorough ophthalmic examination was done which included visual acuity assessment with Snellen's chart, slit-lamp biomicroscopic examination and Goldmann applanation tonometry. During slit-lamp examination, bleb characteristics such as size (small, medium and large), location, thickness (thin, medium and thick), percentage coverage by eyelid and the presence of epithelial defect or dellen were noted. Complete suture removal is done at 1 week and 3 weeks with use of mitomycin C. During assessment, the likelihood of symptoms arising from the presence of any suture was specifically looked at and excluded from the study. Dysesthesia scores between the affected eye and unoperated control eye were compared using unpaired *t*-test. A normal dysesthesia score is within two standard deviations of the mean dysesthesia score for the unoperated eye. Risk factors for bleb dysesthesia were identified using analysis of variance or Pearson correlation coefficient.

RESULTS

Our study included 104 patients, 63 of which were male and 41 were female. Among males as well as females, maximum number of patients was above 60 years of age [Table 1]. Out of the 104 patients, 53 patients had undergone the trabeculectomy in their right eye and 61 patients in their left eye. In 65 patients, mitomycin C had been used during the surgery while in the rest of the patients, no wound modulator had been used. Mean duration from the date of surgery to enrolment into study was 22.60 ± 12.45 days. The mean dysesthesia score (±SD, range) in the affected eye was 5.42 (±3.62, 0–12) and in the unaffected eye was 1.35 (±2.90, 0–8, *P* = 0.0001) [Tables 2 and 3]. Most common location of bleb was found to be superiorly (84.61%), followed by superonasal (14.42%) and superotemporal (0.96%). Bleb dysesthesia scores were high in superiorly located blebs (mean score – 7.5), followed by superonasal (mean score – 3.4) and superotemporal (score-1) locations.

Table 1: Age distribution of the patients.

Age distribution	Number of patients
18–40 years	5
41–60 years	25
More than 60 years	74
Total	104

Table 2: Severity of symptoms.

	Mean		Standard deviation		Frequency	
	Operated eye	Normal eye	Operated eye	Normal eye	Operated eye	Normal eye
Ocular pain	0.64	0.18	0.48	0.39	1	0
Foreign body sensation	0.64	0.19	0.48	0.4	1	0
Burning sensation	0.62	0.18	0.49	0.39	1	0
Watering	0.65	0.2	0.54	0.4	1	0

Table 3: Frequency of symptoms.

	Mean		Standard deviation		Frequency	
	Operated eye	Normal eye	Operated eye	Normal eye	Operated eye	Normal eye
Pain	0.64	0.19	0.48	0.4	1	0
Foreign body sensation	0.66	0.2	0.49	0.4	1	0
Burning sensation	0.62	0.2	0.49	0.4	1	0
Watering	0.66	0.2	0.53	0.4	1	0

Average size of bleb was 5*5 mm. Out of 104, 42 patients had an elevated diffuse bleb, 33 patients had localised cystic avascular bleb, nine patients had overhanging bleb and 22 patients had flat bleb [Figures 1 and 2]. Bleb dysesthesia scores were high in localised cystic blebs (mean score – 6.27), followed by overhanging blebs (mean score – 3.33) and diffuse blebs (mean score – 2.1). Localised cystic avascular bleb and overhanging blebs were more in patients who had been operated on for more than 100 days. None of the patients developed bleb induced dellen or epithelial defects. In 68.2% of patients, the blebs were well covered by the upper eyelid, while 31.8% of patients who had overhanging blebs were partially covered by the eyelid. All the patients had controlled IOP, with 87.5% not requiring any anti glaucoma medication, 7.69% requiring one and 3.84% requiring two anti-glaucoma drugs. Factors that predisposed to dysesthesia included older age ($P = 0.0005$), superior location of bleb ($P = 0.035$) and cystic and overhanging bleb ($P = 0.005$).

DISCUSSION

In this study, we observed a total of 104 patients who underwent trabeculectomy. The mean dysesthesia score (\pm SD, range) in the affected eye was 5.42 (\pm 3.62, 0–12) and in the unaffected eye 1.35 (\pm 2.90, 0–8, $P = 0.0001$). Using a similar self-reporting questionnaire on 97 patients, Budenz *et al.*^[6] noted that chronic ocular discomfort exists in a majority of patients having filtering blebs with the mean total dysesthesia score (\pm SD, range) in the affected eye being 11.1 (\pm 9.4, 0–42) and in the unaffected eye being 3.4 (\pm 4.9, 0–25, $P = 0.001$). In our study, the most common location of bleb was found to be superior. Mean average size of bleb was 5*5 mm. Jason^[10] concluded that more symptomatic and disabling bleb dysesthesia was associated with larger, dysmorphic blebs, including (1) anterior, markedly elevated, thin-



Figure 1: Superior thin avascular cystic bleb.

walled and ischaemic blebs limited by the ring of steel; (2) exuberant blebs extending into the interpalpebral fissure and occasionally circumferentially and (3) overhanging blebs. In our study, out of 104, 42 patients had an elevated diffuse bleb, 33 patients had localised cystic avascular bleb, nine patients had overhanging bleb and 22 patients had flat bleb. Bleb dysesthesia scores are high in superior location (mean score – 7.5), followed by superonasal location (mean score – 3.4) and superotemporal location (score-1). Localised cystic avascular bleb and overhanging blebs were more in patients who were operated on for more than 100 days. Histological studies have reported a dense cellular connective tissue even within functioning blebs which if presented subconjunctivally, encourage the formation of dysesthetic blebs physically contributing to the bleb height and facilitating the formation of a subconjunctival aqueous reservoir under its smooth surface.^[2] In our study, MMC was used in 65 patients while

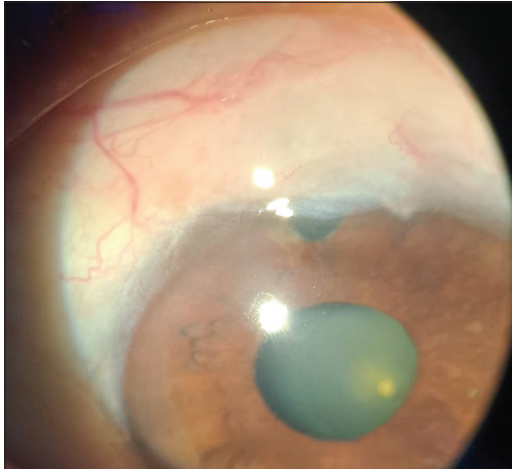


Figure 2: Superior diffuse elevated, vascular bleb.

the rest were operated without use of any wound modulators which explains mechanism for bleb dysesthesia, in which a hypocellular tissue response probably related to the use of antimetabolites creates an avascular bleb that then reaches a larger size. In their case report, Leung *et al.* concluded that bleb dysesthesia was related to a large nasal bleb in the interpalpebral fissure leading to the development of a corneal dellen.^[11] In our study, bleb dysesthesia was more in a superior location (mean score – 7.5), followed by superonasal location (mean score – 3.4) and superotemporal (score-1). Budenaz and Salmon^[12] commented in one case report that bleb dysesthesia and corneal dellen seem to be more commonly associated with larger, more elevated blebs and may be related to poor wetting of the cornea adjacent to the bleb. In our study, bleb dysesthesia scores high in localised cystic bleb (mean score – 6.27), followed by overhanging bleb (mean score – 3.33) and diffuse bleb (mean score – 2.1).

Some of the limitations of our study are that, in our study, other risk factors like environment and hormonal changes which can also cause or enhance ocular discomfort were not included in the study. Objective assessment for dry eye and quality of life assessment of patients was not done. Nevertheless, with very few Indian studies having been done on this aspect, our study yields important results on this apparently ignored complication.

CONCLUSION

Bleb dysesthesia is an uncommon complication after trabeculectomy in which a large filtering bleb causes ocular discomfort and associated tear film disturbances can lead to pain, foreign body sensation and even reduced visual acuity

and eventually affect the quality of life of the patient. In our study, bleb dysesthesia was more commonly associated with older age, superior location and overhanging bleb. Precautions may be taken perioperatively to avoid large blebs and if they result, the patient may be monitored for symptoms and signs of dysesthesia.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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