

Analysis of cosmetic and functional outcomes of cutler-beard procedure used for large upper eyelid defects

Apjit Kaur¹, Ajay Kumar Arya^{2,*}, MM Goel³

¹Professor, ²Senior Resident, Dept. of Ophthalmology, ³Professor, Dept. of Pathology,

***Corresponding Author:**

Email: drajayarya@gmail.com

Abstract

Background: Cutler-Beard is an established procedure for reconstruction of full thickness upper eyelid defects. This procedure involves the creation of an advancement flap from the lower lid that includes skin, orbicularis muscle and conjunctiva to fill the upper eyelid defect.

Aims and Objectives: The aim of this study is to analyse the cosmetic and functional outcomes of Cutler-Beard procedure used for large upper eyelid defects.

Methods: This is retrospective case series analysis of 74 patients who underwent Cutler Beard procedure for upper eyelid defects following excision of upper eyelid malignancy in department of ophthalmology, KGMU from Jan 2011 to July 2016. Data analysis included age and gender of patients, size and location of tumour, intra-operative width of defect, histopathological report, post-operative TBUT, palpebral fissure height measurement (in mid-pupillary line in millimetres) and cosmetic satisfaction. Cosmetic satisfaction was a subjective criterion.

Results: Upper eyelid reconstruction was successful without complications in all patients. Mean follow up of patients was of 18.14 months (6 weeks – 36 months). 57 cases showed good cosmetic satisfaction, 17 fair while none were unsatisfied. 22 patients had initial foreign body sensation. Majority showed straightening of upper eyelid curvature. All patients had adequate eyelid closure.

Conclusions: Cutler-Beard procedure provides good functional relief with minimal cosmetic issue.

Keywords: Advancement flap, Palpebral fissure height, Cosmetic satisfaction.

Introduction

Majority of moderate to large eyelid defects, arising from tumor resection, are repaired using the Cutler Beard procedure.⁽¹⁾ Cutler and Beard described a method of repairing a large upper eyelid defect. Originally introduced in 1955, this procedure involves the creation of an advancement flap from the lower lid that includes skin, orbicularis muscle and conjunctiva to fill the upper eyelid defect. Tissue borrowing from the lower eyelid alters the structure and physiology of the upper eyelid in terms of tarsal support, Meibomian gland function and eyelid margin integrity.

The authors analysed cases of the eyelid malignancy, which underwent eyelid reconstruction using Cutler Beard procedure, to evaluate the effects on cosmesis and eyelid and ocular surface function.

Materials and Methods

Retrospective analysis of computerised case records was done for 74 patients who underwent Cutler-Beard procedure for upper eyelid defects following excision of upper eyelid malignancy, in the Department of Ophthalmology, King George's Medical University, Lucknow from January 2011 to December 2015. All surgeries were performed by single surgeon. Data retrieved and analysed included age and gender of patients, size and location of tumour, intra-operative width of defect, histopathological report, post-operative TBUT at 6 weeks and 3 months, and palpebral fissure

height measurement (in mid-pupillary line in millimetres) and cosmetic satisfaction at 3 months.

For the purpose of the study, the eyelid defects were grouped into small (1/3 eyelid width, 40-60% defect), medium (2/3 eyelid width, 60-80% defect) and large (more than 2/3 eyelid width, >80% defect).

Post-operative TBUT and palpebral fissure height were considered as functional parameter.

Cosmetic satisfaction was a subjective criterion and was graded as good, fair and poor, good denoted acceptable outcome, fair denoted could be better and poor denoted outcome not acceptable.

Operative Procedure

The tumours were excised with 3 mm surgical safety margin in all cases with standard frozen section technique. The resultant defect were reconstructed with the Cutler-Beard flap from lower eyelid, separating the anterior and posterior lamellae and advancing the bridge flap to the superior eyelid below the lower eyelash margin. The flap was divided at 6 weeks, to separate the upper and lower eyelid.

Result

42 males and 32 females constituted the study group of 74 patients who underwent reconstruction by Cutler Beard Procedure for eyelid malignancy. Age range of the patients was 55-75 years. Mean follow up of patients was of 18.14 months (6 weeks – 36 months). Histopathologically tumor free margins were reported

in all cases and tumor recurrences were not encountered during the study period.

Sebaceous gland carcinoma was the commonest histopathological diagnosis (58/74 patients, 78.3% cases), followed by Squamous cell carcinoma (10/74 patients, 13.5% cases) and basal cell carcinoma (6/74 patients, 8.1% cases).

Tumor width and resultant eyelid defect width are shown in Table 1.

The location of the tumor was divided into 3 segments (medial 1/3, central 1/3 and lateral 1/3). The defect involved lateral 2 segments in 12(16.2%) cases, medial 2 segments in 9(12.16%) cases and extended to all 3 segments in 53(71.6%) cases.

Postoperatively all cases showed straightening of curvature of upper eyelid due to flap segment oedema at 1 month. At 3 month follow up the curvature was near normal in all except 6 cases (these cases had 3 segment defects).

All patients had foreign body sensation in the initial one week of stage 1 procedure, which resolved

spontaneously. After stage 2 procedure (6 weeks), 22 cases had foreign body sensation despite topical lubricants. All patients were above 65 years and 17/22 were females. At 3 month follow up none of the patients had foreign body sensation.

100% cosmetic satisfaction was reported at end of 3 months. 57(77%) cases reported good and 17(22.9%) had fair satisfaction.

Small upper eyelid notch at the junction of flap and host tissue was seen in 11(14.8%) cases and lower lid pucker at site of flap was noted in 7(9.4%) cases at 3 month of follow up. At 6 weeks TBUT was normal in 62(83.7%) cases and reduced in 12(16.2%) cases. But at 3 months it was normal in 66(89.18%)cases while it was reduced in 8(10.8%) cases. 22 cases reported foreign body sensation, 12 of these 22 has abnormal TBUT (Table 1 and 2). Complications like exposure keratopathy, severe dry eye or visual loss were not seen among any patients.

Table 1

Diagnosis (n=74)	Sebaceous gland carcinoma 58(78.3%)	Squamous cell carcinoma 10(13.5%)	Basal cell carcinoma 6(8.1%)
Location of tumor in upper lid (n=74)	Medial 1/3 with central1/3 involvement 9(12.16%)	Lateral 1/3 with central1/3 involvement 12(16.2%)	Central 1/3 with more than one segment involvement 53(71.6%)
Tumor width (n=74)	10-15 mm 23(31%)	16-20 mm 36(48.6%)	21-25mm 15(20.2%)
Intra operative upper lid defect (n=74)	16-21mm (40-60%) 25(33.7%)	22-26 mm (60-80%) 34(45.9%)	27-31mm (>80%) 15 (20.24%)

Table 2: Post-operative outcome at 6 weeks and 3 months

(n=74)	At 6 weeks	At 3 month
Foreign body sensation		
Present	22(29.72%)	00
Absent	52(70.27%)	74(100%)
TBUT		
Normal	62(83.78%)	66(89.18%)
Reduced	12(16.21%)	8(10.8%)
Eye lid closure		
Adequate	100%	100%
Cosmetic satisfaction		
Good	--	57 (77%)
Fair	--	17(22.97%)
Poor	--	00
Upper eyelid position		
Normal	--	68(91.8%)
Reduced palpebral fissure	--	6(8.1%)
Upper eyelid notch		
Present	--	11(14.86%)
Absent	--	63(85.13%)
Lower eyelid pucker		
Present	--	7(9.4%)

Absent	--	67(90.54%)
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Fig. 1: Sebaceous gland carcinoma involving medial 1/3 rd of upper lid



Fig. 2: Post-operative view of patient after first stage of cutler beard procedure



Fig. 3: Post-operative view of patient of stage -2 cutler beard procedure

Discussion

Cutler Beard procedure is a well-established method for reconstruction of large upper eyelid defects. It has the advantage of using compatible tissue from the vicinity. This prevents major complications such as dry eye, exposure keratitis, and cosmetic deformities.⁽²⁻⁴⁾ The authors evaluated the cosmetic and functional outcomes following the procedure, based on computerised records of 74 patients of eyelid malignancy treated with Cutler Beard procedure.

In cases of defects up to 75%, Mustarde's lid switch flap and Cutler Beard technique can be used.⁽⁵⁾

For the reconstruction of upper lid defect, lower lid tissue is perfect because these have same properties like upper lid. These are well vascularised with skin, muscle and conjunctiva.⁽⁶⁾ Thus, if the defect is between 50-95%, it is preferable to do a Cutler Beard procedure from an anatomical and physiological perspective.⁽⁷⁾ Complications of this procedure include abnormal upper lid position, upper lid notch, lower lid pucker, dry eye, cosmetic defects and eyelash loss.^(8,9,10)

In our study, majority of cases were of sebaceous gland carcinoma. Worldwide basal cell carcinoma is most common lid malignancy but in India sebaceous gland carcinoma is more prevalent.⁽¹¹⁾ All patients in this study have large upper eyelid defect, defect width being more than 60% in about 65% of the patients.

Results of the study revealed that all patients were cosmetically satisfied. There was an initial flattening of the eyelid curvature after stage 2 procedure. This was due to the lymphatic oedema that resolved satisfactorily by 3 months in majority of cases. 68 patients reported normal upper lid position at 3 month of period. Upper lid notch and lower lid pucker were reported in a small segment(14% and 9%) of the patients. Similar observations have also been made by Wang.⁽¹²⁾ On 36-month follow-up period, no recurrence, lagophthalmos, hypertrophic scar or bulky appearance was noted in any of the patients. Flap take up was satisfactory in all patients. Eyelid closure was adequate without scleral or corneal exposure.

Functionally, at 6 week of follow-up, 22 patients had foreign body sensation but only 12 patients had reduced TBUT. This could be explained by the scar induced irritation on the conjunctival surface. After 3 month of followup, 90% of the patients have normal TBUT. This could be due to resolution of oedema in fornix which leads to opening of lacrimal ducts. In our study, age range of the patients was 55-75 years. Dry eye is especially common in the elderly, occurring in approximately 5-30% of the general elderly population, and affects women more commonly than men.^(13,14,15)

Ocular surface is an important refractive medium of the eye as well as the only source of nutrition and excretory medium for the cornea. Retaining a near normal ocular surface in patients with large lid defects is a great achievement for the patient and the surgeon and a huge advantage of the procedure, as seen in this study.

Conclusion

The authors conclude that the Cutler Beard procedure is suitable for reconstruction of large upper eyelid defects. It provides good functional outcome and satisfactory cosmetic results. The efficacy, cost-effectiveness and low complication rates of this procedure can make it advantageous everywhere,

especially in those spaces with unimpeded access to varied tissues options.

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