

ORIGINAL RESEARCH

Comparison of supra brow one stab with three stab frontalis sling surgery for cosmetic and functional outcome

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ABSTRACT

Aim: The purpose of this study was to compare the functional and cosmetic effects of suprabrow single-stab (SBSS) surgery to traditional 3-stab incision frontalis sling surgery.

Methods: From November 2018 to October 2020, all patients who presented to the outpatient department of ophthalmology at VSSIMSAR, Burla, were diagnosed with simple congenital ptosis with poor levator function ($\leq 4\text{mm}$). The current study includes 68 cases of congenital ptosis evaluated at VSSIMSAR in Burla, Odisha.

Results: In terms of functional outcome indicators, the study and control groups were comparable at all points in time. When the cosmetic outcomes were compared, the study group performed considerably better than the control group ($P = 3.092 \times 10^{-5}$ in adults and $P = 4.113 \times 10^{-5}$ in children, Mann-Whitney U test), owing to less scarring and a lower number of suprabrow scars.

Conclusions: While keeping the customary advantages and functional results of standard sling techniques, the SBSS frontalis suspension approach is associated with less intraoperative bleeding, less postoperative edoema and scarring, and a superior aesthetic end.

INTRODUCTION

Ptosis (Blepharoptosis) refers to upper eyelid drooping. True congenital ptosis includes levator muscle developing degeneration from an unknown source. True congenital ptosis is characterised by a lack of striated fibres in the levator muscle that exists from birth and persists throughout life [1, 2]. The levator and frontalis muscles work in tandem, with the frontalis muscle overacting to compensate for the levator's loss of elevating action. Ptosis is usually unilateral; however, it can also be bilateral. The choice of management is mostly determined by the levator function [3]. Evidence suggests that ptosis increases the chance of amblyopia. Surgery restores a stable, typically functioning eyelid as well as an improved superior vision field.

The frontalis sling is the most often used surgical procedure for treating congenital ptosis with limited levator function [4, 5]. Technique and sling material modifications have been described. A sling operation is by far the simplest of all ptosis surgeries. Though it has some drawbacks, it is the procedure of choice for certain cases of gross bilateral ptosis with poor levator function. Such as in the blepharophimosis syndrome, cases of mechanical ptosis, and severe unilateral ptosis covering the pupillary area to prevent amblyopia before a definitive levator operation can be performed [1, 2, 6].

Skin muscle flaps, non-absorbable sutures, retained sclera, reconstituted collagen, Silastic bands, and fascia lata have all been employed in sling surgery [7, 8, 9]. The various methods for passing the sling have been discussed. The slings were rhomboidal or pentagonal in design, and the operation required many incisions. We compared the SSBS (modified Pentagon) technique with the 3SFS (Fox Pentagon) technique to keep up with the aesthesis and functional outcome of the management of congenital ptosis.

MATERIALS AND METHODS

From November 2018 to October 2020, all patients who presented to the out-patient department of ophthalmology at VSSIMSAR, Burla, were diagnosed with simple congenital ptosis with poor levator function ($\leq 4\text{mm}$). The current study includes 68 cases of congenital ptosis evaluated at VSSIMSAR in Burla, Odisha.

INCLUSION AND EXCLUSION CRITERIA

Those patients who noticed ptosis since birth were included in this study. Those ptosis patients who had congenital ocular and systemic anomalies were also included. Patients with post traumatic, post inflammatory, post-surgical, apo neurotic, mechanical, pseudo ptosis and other acquired causes were excluded from this study.

DATA GATHERING

After negating frontalis activity, preoperative marginal reflex distance 1 (MRD1), vertical fissure height (VFH), and horizontal fissure width in primary gaze, levator palpebrae superioris function, and lid crease height (LCH) were measured in straight gaze. A thorough eye examination was performed, which included assessing best-corrected visual acuity, slit-lamp biomicroscopy, evaluating the Bell phenomenon, corneal feeling, the Schirmer test, the presence of the Marcus Gunn jaw-winking phenomenon, ocular alignment, and extraocular motility. All of these measures were tested again in the immediate postoperative period, as well as one week, three months, and six months after surgery.

All patients had preoperative and after clinical digital photos taken. Photographs that potentially reveal a patients' identities were used only with the patient's/express parent's permission, where applicable. In each case, a thorough history was gathered, as well as an eye and systemic examination. Ptosis was completely investigated as specified in the proforma, with special emphasis on the degree of ptosis, amount of levator activity, Bell's phenomenon, orbicularis muscle action, corneal feeling, staining, existence of jaw winking phenomena, and concomitant ocular and systemic anomalies. The amount of result in surgery was compared using pre and post operational photographic recording. Before undergoing surgery, adequate and necessary investigations were conducted.

SURGICAL TECHNIQUES

In our study, SBSS frontalis sling was applied to the eyelids of 68 consecutive patients with congenital ptosis and inadequate levator movement. We used Aurosling for the procedure and made a single stab incision on the frontalis muscle with prior delineation of the pentagon. The needle is pierced in through the medial mark on the lid margin to pass in the epitarsal tissue horizontally from medial to lateral and then pierced out through the lateral lid margin marking, about 2 mm above the lid margin, without producing any lid margin incisions.

The lateral needle is reinserted through the skin puncture, taking care not to cut the sling accidentally. It advances vertically forward, dipping below the septum slightly below the orbital rim and then ascending to the upper lateral corner of the pentagon. The needle is rotated toward the central mark of the pentagon and led in the same surgical plane to be exteriorized through the central supra-brow incision without being exteriorized. The identical

technique is performed on the opposite side of the pentagon, with the needle traversing upward to the upper medial corner of the pentagon before turning toward the central mark of the pentagon and exteriorizing through the central supra-brow incision. Patients were given oral antibiotics and NSAIDs after surgery. Antibiotic-containing topical ointment was prescribed for application to the wound. To treat lagophthalmos, frequent lubrication in the form of artificial tears and gel was advised. The first follow-up was performed on the first post-operative day, followed by visits at the first week, three months, and six months.

RESULTS

Table 1: Age Distribution of patients

Age distribution	3SFS		SBSS		Total	
	N	%	N	%	N	%
≤ 10 years	1	2.94	3	8.82	4	5.88
11-20 years	21	61.76	23	67.65	44	64.71
21-30 years	10	29.41	8	23.53	18	27.94
>30 years	2	5.88	0	0	2	1.47
Total	34	100	34	100	68	100

Thirty-four eyes of 34 ptosis patients were operated on with the study technique SBSS (study group: ≤10 yrs, 4 children; 11-20 yrs, 43 patients; 21-30 yrs, 19 patients and >30 yrs, 2 patients) and thirty-four eyes of 34 patients were operated on with the conventional technique 3SFS (control group: ≤10 yrs, 1 child; 11-20 yrs, 21 patients; 21-30, 10 patients; >30 yrs, 2 patients). Both the SBSS and 3SFS groups exhibited a prevalence of ptosis presentation in the age group 11-20 years.

Table 2: Sex Distribution of patients

Sex distribution	3SFS		SBSS		Total	
	N	%	N	%	N	%
Male	24	70.59	24	70.59	48	70.59
Female	10	29.41	10	29.41	20	29.41
Total	34	100	34	100	68	100

We observed male predominance (n=24) in each group of SBSS and SFS showing a percentage of 70.59% over females 29.41% in each group.

Table 3: Grading of ptosis

Grading of Ptosis	3SFS		SBSS		Total	
	N	%	N	%	N	%
Mild	1	2.94	4	11.76	5	7.35
Moderate	22	64.71	25	73.53	47	69.12
Severe	11	32.35	5	14.71	16	23.53
Total	34	100	34	100	68	100

When the study (SBSS) and control (3SFS) groups were examined, moderate ptosis was identified in 25 patients (73.53 percent) and 22 patients (64.71 percent), respectively, with a total of 47 patients having moderate ptosis. Severe ptosis was higher in the 3SFS group (N=11, 33.35 percent) than in the SBSS group (N=5, 14.71 percent). Mild ptosis had the fewest presentations of the three, with N=4 in the SBSS group (11.76 percent) and N=1 in the 3SFS group (2.94 percent). A P value of 0.12 indicated that there was no statistically significant difference between the two groups.

Table 4: Marginal Reflex Distance-1

MRD-1	3SFS		SBSS		Total	
	N	%	N	%	N	%
<1 mm	10	29.41	5	14.71	15	22.06
1 mm	2	5.88	2	5.88	4	5.88
1.5 mm	20	58.82	24	70.59	44	64.71
2.5 mm	2	5.88	3	8.82	5	7.35
Total	34	100	34	100	68	100

The comparison of two groups revealed that the majority of patients presented with MRD-1 of 1.5mm, with the SBSS group having more cases than the 3SFS group, with 24 (70.59 percent) and 20 (58.82 percent) cases, respectively. Patients with MRD-1 of 1mm were more common in the 3SFS group (N=10, 29.41 percent) than in the SBSS group (N=5, 14.71 percent). MRD-1 measurements of 1mm and 2.5mm were found to have an equal number of cases in both the study and control groups. The P value of 0.52 was determined to be insignificant. A comparable study by Jacob et al. found a significant difference in MRD1 in the postoperative period compared to the preoperative period, with no significant change in the subsequent mean postoperative MRD1 in both the study and control groups. However, a comparable study conducted by Mohammad et al. yielded better results using a single triangle approach.

Table 5: Marginal Reflex Distance-2

MRD-2	3SFS		SBSS		Total	
	N	%	N	%	N	%
5 mm	12	35.29	7	20.59	19	27.94
5.5 mm	22	64.71	27	79.41	49	72.06
Total	34	100	34	100	68	100

When MRD-2 data was examined, N=27 (79.41 percent) measured 5.5mm in SBSS against N=22 (64.71 percent) in the 3SFS group. MRD-2 measuring 5mm was marginally higher in the 3SFS group (N=12,35.29%) than in the SBSS group (N=20.59%). The p value of 0.17 indicated that there was a statistically significant difference.

Table 6: Lagophthalmos Score

	Lag score	3SFS	SBSS	P value
POD-1	>3mm	26(76.47%)	1(2.94%)	P<0.0001 HS
	1-3 mm	8(23.53%)	33(97.06%)	
	<1 mm	(0%)	(0%)	
POD-7	>3mm	5(14.71%)	0(0%)	P P<0.0001 HS
	1-3 mm	29(85.29%)	0(0%)	
	<1 mm	0(0%)	34(100%)	
POD-3M	>3mm	0(0%)	0(0%)	P<0.0001 HS
	1-3 mm	34(100%)	0(0%)	
	<1 mm	(0%)	34(100%)	
POD-6M	>3mm	0(0%)	0(0%)	P<0.0001 HS
	1-3 mm	34(100%)	0(0%)	
	<1 mm	(0%)	34(100%)	

The lag score was observed to be higher in the SBSS group after surgery. POD-1 in SBSS lag score of 1-3mm was reported in 33 patients (97.06%) compared to 8 patients who improved from the 3SFS group. In POD-7, POD-3month, and POD-6month, the 3SFS group showed greater improvement in Lag Score ($p \leq 0.0001$). A comparable study by Jacob et al. found no

significant difference in post-operative lagophthalmos. Mehta et al study revealed a considerable improvement in the lagophthalmos score.

DISCUSSION and CONCLUSION

This study included 68 cases of congenital ptosis detected clinically and presented to the Department of Ophthalmology, VSSIMSAR, Burla, Odisha between November 2018 and October 2020. The findings of this investigation revealed that the age group between 11 and 20 years presented the highest number of patients (64.71 percent) of the 68 cases compared to the other age groups included in our study. We found male predominance (24 instances) in each SBSS and SFS group with a percentage of 70.59 percent over females (10 cases) with a percentage of 29.41 percent in each category.

According to our findings, RE was slightly more affected than LE, with 55.88 percent and 44.12 percent, respectively [10, 11, 12, 13]. Moderate ptosis was detected in 25 patients (73.53 percent) in the SBSS group and 22 patients (64.71 percent) in the 3SFS group, for a total of 47 (69.12 percent) of the 68 patients. It was followed by severe ptosis, which was more prevalent in the 3SFS group (33.35 percent) than in the SBSS group (14.71 percent). Mild ptosis had the lowest percentage of presentation of the three, at 7.35 percent. The majority of patients had MRD-1 of 1.5mm, with the SBSS group having more cases than the 3SFS group, with 24 (70.59 percent) and 20 (58.82 percent) cases, respectively [14, 15].

MRD-2 data was found to be greater in SBSS, with (79.41 percent) measuring 5.5mm compared to (64.71 percent) in 3SFS. The majority of cases with congenital ptosis presented to us with a PFH of 7mm. When the two groups were compared, SBSS had a higher number of instances (70.59 percent) than 3SFS (52.94 percent). In the SBSS group (47.06 percent), the number of instances with a Levator function of 4mm was higher than in the 3SFS group (26.47 percent) [16, 17].

The difference in BCVA between the two groups was 6/6 in the majority of patients, with (88.24 percent) in the SBSS group and (85.29 percent) in the 3SFS group. MRD-1 in SBSS was considerably greater (3.890.18) than 3SFS (3.49 0.16) at 3 months POD. When comparing the two groups, the VFH indicated a highly significant difference with $p \leq 0.0001$ in POD-1, POD-7, POD-3months, and POD-6months, with maximum patients measuring 8-9mm in 3SFS (34 instances) in POD-1 as compared to SBSS (17 cases) [18]. During the POD-3month and POD-6month follow-ups, the majority of cases (34 instances) in the SBSS group had 10-11mm VFH, indicating a substantial difference from the 3SFS group.

Post-operatively, on POD-1, the SBSS group had a greater lag score (1-3mm in 97.06 percent), which was substantially higher than the 3SFS group (23.53 percent). However, when followed up on POD-7 and subsequent follow up, the 3SFS group performed better (85.29 percent). As a result, the 3SFS approach resulted in a superior outcome with an improvement in the lagophthalmos score [19]. As a result, the cosmetic score remains high. In comparison to 3SFS(30 cases,88.24 percent), lid crease demonstrated considerable improvement in POD-1 in SBSS patients with 4mm (32 cases, 94.12 percent).

POD-7 revealed that 33 SBSS patients had lid creases measuring 10-11mm, which was considerably better than 3SFS ($p \leq 0.0001$) [11, 16, 19]. The same outcome was observed when the patients were followed up on after 3 and 6 months, respectively, with a good cosmetic score. Both physically and physiologically, eyelids serve as protective shutters for the eyes. As a result, any little abnormality should be corrected right away, and the lids' functional and aesthetic values should be adequately protected and preserved.

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