

End Stoma Fashioning Techniques and Outcome in Laryngectomees

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Abstract

End tracheostoma fashioning after laryngectomy is a key step for respiration and voice rehabilitation. However, stomal stenosis affects the quality of patients' life.

Aim. To analyse the various techniques of stoma fashioning and the final outcome .

Methods . Prospective Observational study. 58 patients undergoing laryngectomy were included and followed up for 1 year . Intraoperative skin incision and prior tracheostomy incision were noted. Three separate skin incision with or without tracheal slitting at lateral ends were studied.

Results. 69% patients had separate stomal and laryngectomy incision. 16% had transverse slit , 41% had ellipse or smiley shaped skin excision and 12% had dumbbell incision, or H incision with or without lateral tracheal slits. Stenosing stoma within 2 months of surgery required serial dilatations. Only 7% required revision stomaplasty.

Conclusion. Separate laryngectomy and stomal incisions , with H or dumb bell shape technique results in adequately sized stomas.

Keywords- Endtracheostoma, Stomal stenosis

Date of Submission: 27-11-2018

Date of acceptance: 08-12-2018

I. Introduction

End tracheostoma fashioning after laryngectomy is a key step for both rehabilitation and airway maintenance. Release of sternal heads during laryngectomy with adequately sized stoma persisting postoperatively determines the patients' ability and ease to occlude stoma for TEP speech and maintenance of indwelling prosthesis. However stomal stenosis is not uncommon. Majority are tackled by serial dilatations with metal tracheostomy tubes .In rare instances, when refractory, surgical intervention like z plasties are sought Analysing various surgical techniques leading to the same, than revising stoma later, was the motivation for the study.

II. Aim

To analyse pre op tracheostomy incisions , Laryngectomy incision and end tracheostomal fashioning technique with post op outcome on follow up.

III. Materials And Methods

All patients undergoing laryngectomy at our institution (RCC, Trivandrum) with or without prior tracheostomy from August 2014 to June 2017 were included in the study and prospectively followed up for 2 years . Intraoperative skin incision and prior tracheostomy incision were noted. End tracheostoma fashioning technique were also noted and followed up for stomal stenosis and need for revision stomaplasty later. Stenosing stoma was defined those contracting stoma during the first 6 months of post operative period , where the diameter became less than 1 cm, but got adequately dilated with one or two episodes of serial dilatation with increasing tracheostomy tube sizes and remained stable thereafter. Statistical significance was ascertained using P value.

IV. Results

Of total 70 patients analysed,45% patients who were tracheostomised prior, were mostly done via vertical midline incision .60% were radiorecurrent salvages. 69% patients had transverse skin crease incision at level of lower third aspect of thyroid cartilage and separate stoma for tracheostomy about 2cm or more below, in the midline.28% had modified Gluck Sorenson incision .3% patients had hockey stick incision in view of assessing operability and they finally underwent near total laryngectomy with the same incision. Stoma fashioning techniques included single transverse incision 16%, ellipse or smiley shaped skin excision method 41%, dumbbell incision,H incision 12% with or without lateral vertical slits at tracheal end (at 3 and 6 o clock position). Rest 31% ,stoma was included in the main incision .76% of patients' stoma when fashioned with either transverse incision or elliptical skin excision , developed contracting/stenosing stoma against 61% when included in the main incision. 59% patients had stenosing stoma within 2 months of follow up that required serial dilatation with increasing sized tracheostomy tubes initially..Statistical significance was attained with p value of 0.0001 when the four techniques were correlated with incidence of stomal stenosis, proving stenosing stoma was comparatively lesser in H/ Dumbbell shaped incision .Only 7% required revision stomaplasty later at a mean period of 7.2 months. No statistical correlation was noted between salvage scenario and stomal stenosis.

Pre op tracheostomy done in 26 patients (45%)		
	Vertical	Transverse
Primary (70%)	89%	11%
Salvage (30%)	88%	12%

Table 1. Distribution of tracheotomy patients among salvage and primary cases with type of incision.

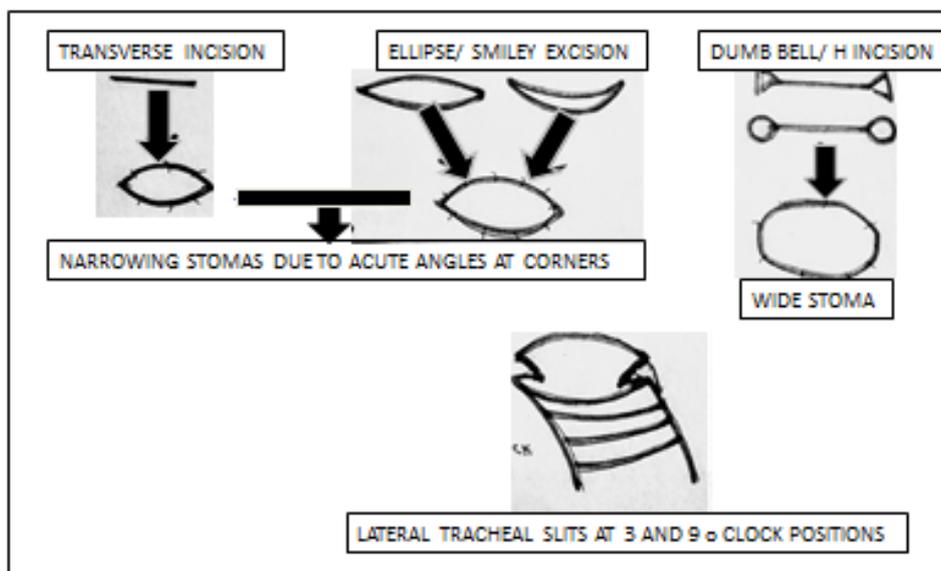


Figure 1., Diagrammatic representation of 3 different techniques of stoma fashioning in separate laryngectomy incision

Stomal incision	N=58	Stenosing Stoma		Revision stomaplasty	
		Primary	Salvage	Primary	Salvage
Transverse	16%	89%		11%	
		N=2	N=6	0	N= 1
Smiley / Ellipse	41%	54%		12.5%	
		N=8	N=5	N=2	N=1
H/ Dumb bell shape	12%	28%		0	
		0	N=2	0	0
Incorporated in laryngectomy incision	31%	61%		0	
		N=6	N=5	0	0

Table2. Distribution of different end stoma fashioning technique and stomal stenosis in primary and salvage group



Figure 2. Stomas in salvage (H tech) and primary cases (H tech) with separate laryngectomy incision



Figure 3. EndStoma (Ellipse tech) in previously tracheostomised and after adjuvant radiotherapy

V. Discussion

The era of laryngectomy begins from 1873, as popularized by Billroth. Permanent stoma with no tube to stent, is an important post op aspect of the procedure that helps the patient to clear secretions, occlude for speech and allow effortless respiration. However, 4-42% incidence of stomal stenosis have been reported in literature¹, as against 7% in our study.

Though no universal definition exist for the same, some consider a contracting stoma warranting stenting with tubes/ stomal button for more than 3 months or those requiring revision surgery as stomal stenosis 2. The rest has been considered as stenosing stoma in our study. Its significance lies, when a stoma contracts to 50% especially in a COPD patient, it causes respiratory compromise. The pathophysiology is turbulent flow leading to increase in resistance and airflow speed, dehydrating the tracheal mucosa, predisposing to crusting and tracheitis.

Types of stomal stenosis include concentric, the most common type due to scar contracture; vertical due to prominent sternal heads of sternomastoid muscle and superior or inferior shelf due to redundant skin³.

Various risk factors have been studied in literature with conflicting results. These include gender, race, wound infection and prior tracheostomy. Females due to smaller diameter of trachea², Blacks with increased tendency for keloids⁴, adjuvant radiotherapy⁵ and wound infection causing obliterative endarteritis, poor healing followed by scarring predispose to stomal stenosis. Other than aforementioned patient factors, surgical factors also play a role. The technique of tracheal transection whether straight, beveled and including interposing skin flap technique has a bearing of 6-30%^{5,6}, 15% and 0-13% incidence of stomal stenosis respectively^{1,7,8}. Only bevelling or fish mouth technique of tracheal transection was adopted in our study. Inclusion of separate stomal incision reports an incidence of 6-13% of stomal stenosis⁶⁻⁸, which is in

concordance with 10% incidence in our study. But some authors report questionable significance^{1,9}. A 20-30% incidence of stomal stenosis has been noted when Primary TEP is performed⁸. Post op usage of tracheotomy tubes as stent for stenosing stomas and incidence of stomal stenosis have debatable results. Usage of Patch PMMC flap for reconstruction has 26% chance of stomal stenosis but lacks universal acceptance⁵.

Stomal stenosis is a distressing sequelae rather than a complication of the procedure and usually revised around 1st year of follow up^{2,10,11}, after recurrence is ruled out as in our study. Treatment options include usage of stomal button or repeated dilatation- though not preferable when TEP insitu as it hinders its usage. Revision surgeries like v plasty, z plasty¹², skin flap interposition after tracheal slit¹, laser excision of scar are other options with success rates quoted to be 90%.

VI. Conclusions

Transverse skin crease incision is an equally good option during laryngectomy with advantage of a strip of skin below it that can curb leaks into the trachea and avoid aspiration pneumonia. Unlike the time tested and proven Gluck Sorenson incision, there is a theoretical possibility of the skin bridge necrosis due to vascularity issues, though not seen in our study.

Exposed tracheal ring cartilage remains major cause of stomal stenosis in the immediate post op period that requires frequent wound care till epithelialisation is complete.

Incorporation of lateral tracheal slits prior to stoma creation prevents stomal stenosis. Stenosing stomas in immediate post op period is transient and are easily dealt with serial dilatations.

Pre op tracheostomy when done with the transverse skin crease incision especially in radiorecurrent scenario provides option of selecting either of the laryngectomy incisions.

SUMMARY

- Mid neck transverse skin crease incision is a better option with regard to exposure, cosmesis and avoiding post op leaks in salvage cases, while tracking into the stoma.
- Avoiding acute angles at the lateral ends of the skin being sutured to the end tracheostoma, has an implication on incidence of stoma stenosing in the post op period, showing H shaped/ Dumb bell incision are better options.
- Most stomal stenosis can be managed with serial dilatations and rarely require revision stomaplasty.

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Dr Deepak Janardhan. "End Stoma Fashioning Techniques and Outcome in Laryngectomees."
IOSR Journal of Dental and Medical Sciences (IOSR-JDMS), vol. 17, no. 12, 2018, pp 76-79.