



COMPARISON OF AESTHETIC OUTCOME BETWEEN SUBCUTICULAR SUTURES VERSUS STERILE TISSUE ADHESIVE STRIPS IN POST THYROIDECTOMY WOUND CLOSURE

General Surgery

Dr Mohneesh Pandey

Senior Resident Surgery Command Hospital Pune

Dr Nilanjan Roy

Professor Surgery Armed Forces Medical College Pune

Dr Chandan Thakur*

Assistant Professor Surgery Command Hospital Pune *Corresponding Author

Dr Swarup Prabhu

Senior Resident Command Hospital Southern Command Pune

ABSTRACT

Introduction: To study and compare aesthetic outcome between subcuticular sutures and sterile tissue adhesive strips in thyroidectomy wound closure using validated scoring system (POSAS). **Materials:** RCT study conducted in a tertiary care, teaching hospital on patients >18 years of age undergoing thyroidectomy. **Results:** 106 patients each were randomised into two groups with comparable baseline parameters. **Conclusion:** Cosmetic benefit and aesthetic outcome between both techniques were similar. Sterile tissue adhesive strips had less pain and excellent scar appearance following thyroidectomy surgery.

KEYWORDS

Cosmesis, scar appearance, minimal invasive surgery

INTRODUCTION:

Thyroid diseases are the most common endocrine disorders worldwide. According to various studies on thyroid disease, it has been estimated that about 42 million people in India suffer from thyroid disorders [1]. They are more commonly seen in females mostly women and young adults who are very cautious about their beauty and appearance [2]. Thyroid surgeries according to some studies are the most commonly performed surgery by general surgeons in the neck, via a collar neck incision [3]. Wound healing, the body's response to tissue injury is an essential and primitive process common to all multicellular organisms wherein the body attempts to restore the integrity of the injured part. Surgeons have pursued the search for an ideal suture material suitable for all purposes since ancient times. Various techniques have been used to improve the aesthetic outcome of the scar. For the last decade, remote access thyroidectomy and natural orifice transluminal endoscopic surgery (NOTES) have been popularised as they leave no visible scar on the neck and therefore are deemed to yield superior cosmetic result, however conventional thyroidectomy is still the mainstay of treatment for most of the thyroid diseases, particularly thyroid cancer.

Aesthetic outcome is particularly relevant in thyroid surgery since patients are mostly women and young adults and since the incision is in a highly sensitive and visible anatomic location. Cosmetic concern about the final scar appearance contributed to motivate the development of minimally invasive approaches for thyroid surgery and parathyroid surgery over the last decade. Minimally invasive thyroid surgery techniques (MIT) are different but all share the same goals: reduction of tissue trauma, early hospital discharge, and better neck wound cosmetic appearance, while maintaining the same surgical outcome as traditional thyroidectomy.

Even today, there is a search for ideal suture material. Suture materials can be broadly classified as naturally occurring and synthetic [4]. They can be further classified as monofilament or multifilament (braided), dyed or undyed, coated or uncoated. In the selection of a suture, a patient's health status, age, presence or absence of infection are as important as the biomechanical properties of the suture, anatomic location, and a surgeon's personal preference and experience in handling a suture material. Often there is more than one appropriate method of closure. The ultimate responsibility for the choice of the best material lies with the surgeon. Customarily monofilament sutures, either absorbable or non-absorbable, have been used for wound closure. Other different methods of wound closure popular among surgeons being tissue adhesive glue and tissue adhesive strips. The placement of a subcuticular suture probably requires more technical expertise than with tissue adhesive strips although not yet fully assessed. Tissue adhesive strips are primarily suitable for superficial laceration of face and fingers. Drawback of steri-strips being they

cannot be used whenever there is tension in wound or significant moisture [5-8].

As the optimal method of wound closure still remains ambiguous, the current study was planned to compare the efficacy of different methods of thyroid surgery wound closures. Hence the present study was done at our tertiary care centre to compare aesthetic outcome between subcuticular sutures and sterile tissue adhesive strips in thyroidectomy wound closure.

Methods:

This cross-section observational study was conducted in the Department of Surgery in a tertiary care, referral and teaching hospital in Western Maharashtra for a period of one and half years from April 2020 to October 2021. Patients of age 18 years or older from either gender undergoing thyroidectomy in this Hospital were recruited in the study after written informed consent. Patients with previous neck incision over site of intended incision or post radiotherapy patients, Cervical lymphadenopathy needing radical neck dissection, eczema or other dermatological conditions over the neck and non-consenting patients were excluded. The demographic data and clinical features of patients were recorded in a pre-designed format.

The procedures were performed by or under the direct supervision of the same consultant with experience of at least hundred thyroidectomies. Patients were randomized by simple randomization table into two groups: those having their wounds closed by subcuticular sutures (Group A) or sterile tissue adhesive strips (Group B). Assessment of cosmetic appearance was done by using visual analogue scale (VAS) at the time of 6th week. Standardized technique was used for thyroid operations. Assessment of pain by verbal response and VAS for three consecutive postoperative days (PODs) were recorded. Assessment of mobility was done at 48 h and 1 week after surgery using verbal response and VAS. Cosmetic appearance was assessed using VAS at the time of the 6th week. Patients were reviewed for scar outcome in the out-patient clinic on the 1st, 3rd and 6th week post operatively using the Patient and Observer Scar Assessment Scale (POSAS). POSAS consists of a Patient Scar Assessment Scale (PSAS) and an Observer Scar Assessment Scale (OSAS). The observer scores six items: vascularization, pigmentation, thickness, surface roughness, pliability, and surface area whereas the patient scores six items: pain, pruritus, colour, thickness, relief, and pliability. All included items are scored on the same 10-point scale, in which a score of 1 is given when the scar characteristic is comparable to 'normal skin' and a score of 10 reflects the 'worst imaginable scar'. Both OSAS and PSAS have a 7th item about the overall opinion graded on a 10-grade scale as well. All items are summed to give a total scar score, and therefore, a higher score represents a poorer scar quality. The PSAS scoring was done by the patients/guardians whereas an

independent assessor blinded to the type of skin closure carried out the OSAS component of the POSAS scale. The mean POSAS score, the mean Patient and Observer Overall Opinion (POOO) score in the first week and the mean POSAS scores over the 6-week period were compared between the two groups.

The sample was calculated taking a precision of 5%, power of 80%, taking a prevalence of 50%, 53 patients per group was required to detect a significant difference and hence sample sizes of 106 patients were selected for the study. Quantitative data is presented with the help of Mean and Standard deviation. Comparison among the study groups is done with the help of unpaired t test as per results of normality test. Qualitative data is presented with the help of frequency and percentage table. Association among the study groups is assessed with the help of Fisher test, student 't' test and Chi-Square test. 'p' value less than 0.05 is taken as significant.

RESULTS:

A total of 118 patients were evaluated for the study. 7 patients were rejected due to exclusion criteria, refusal of consent or repeat surgery, five patients were lost to follow up. 53 patients each were randomised to the two groups. The CONSORT flow diagram for the RCT is depicted below:

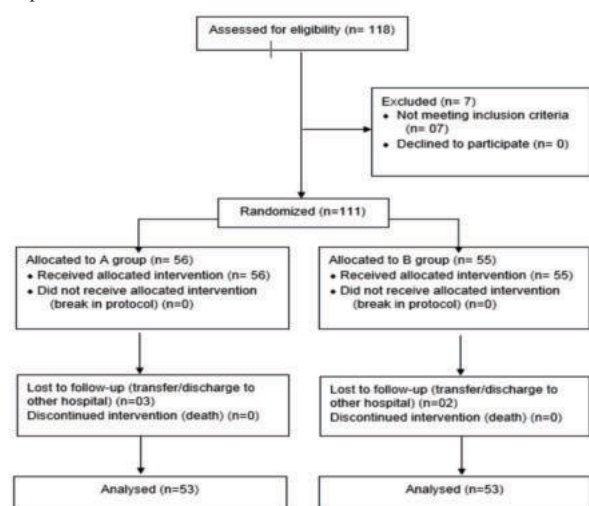


Table 1 depicts the demographic distribution, surgeries performed and comorbidities of recruited patients. The maximum distribution was in the age group of 31 to 50 years in both groups. The mean ages were 46.34 ± 14.56 years and 45.45 ± 14.01 years in **A (Subcuticular)** and **B (Steristrips)** groups respectively. The distribution did not have significant statistical difference. There was female predominance in both the groups (77.4% and 79.3% respectively) whereas male patients constituted 22.6% and 20.7% of study groups respectively. There was no significant association between the groups as per Chi-Square test ($p > 0.05$). commonest comorbidities in both the groups were Diabetes Mellitus (7.6% and 11.3% respectively) followed by Hypertension (1.9% and 7.6% respectively). 23 (43.5%) patients in Group A underwent near-total thyroidectomy while 19 (35.8%) and 11 (20.7%) patients underwent total thyroidectomy and subtotal thyroidectomy respectively. 26 (49.1%) patients in Group B underwent near-total thyroidectomy while 17 (32.1%) and 10 (18.8%) patients underwent total thyroidectomy and subtotal thyroidectomy respectively.

Table 1: Demographic parameters of participants.

Variables	A (Subcuticular)		B (Steristrips)		p-value
1. Gender distribution					
M	41	77.4%	42	79.3%	>0.05
F	12	22.6%	11	20.7%	
2. Age distribution					
18-20 years	2	3.8%	3	5.6%	>0.05
21-30 years	7	13.2%	4	7.6%	
31-40 years	12	22.6%	13	24.5%	
41-50 years	12	22.6%	15	28.3%	
51-60 years	11	20.7%	11	20.7%	
61-70 years	6	11.3%	6	11.3%	
71-80 years	3	5.6%	1	1.9%	

Mean $\pm$ SD	46.34 $\pm$ 14.56 years	45.45 $\pm$ 14.01 years			
3. Comorbidities					
Diabetes Mellitus	4	7.6%	6	11.3%	>0.05
Hypertension	1	1.9%	4	7.6%	
Ischemic Heart Disease	0	-	1	1.9%	
4. Surgery performed					
Near-total thyroidectomy	23	43.5%	26	49.1%	>0.05
Total thyroidectomy	19	35.8%	17	32.1%	
Subtotal thyroidectomy	11	20.7%	10	18.8%	

Table 2 depicts assessment of cosmetic appearance was done by using visual analogue scale. It was observed that at post-op 6 weeks the cosmetic appearance in wound closure with sterile tissue adhesive strips (Group B) had higher number of excellent scar appearance compared to subcuticular sutures (Group A). However, there was no significant difference between the groups as per Chi-Square test ($p > 0.05$).

Table 2: Assessment of cosmetic appearance of patients at post-op 6 weeks using Visual Analogue Scale

Visual Analogue Scale	Group A		Group B		p Value
	N	%	N	%	
Excellent	29	54.7%	35	66.1%	>0.05
Good	24	45.3%	18	33.9%	
Total	53	100%	53	100%	

Table 3 depicts the patients' satisfaction score 6 weeks postoperatively using the patient's component of the POSAS score was found to be comparable and statistically not significant between the groups (43.32 ± 11.74 vs. 44.02 ± 9.88 ; $p > 0.05$). The observer's satisfaction score 6 weeks postoperatively using the observer's component of the POSAS score was found to be comparable and statistically not significant between the groups (46.85 ± 5.33 vs. 48.79 ± 8.32 ; $p > 0.05$).

Table 7: Assessment of cosmetic appearance of patients at post-op 6 weeks using POSAS score

POSAS score	Group A		Group B		p Value
	Mean	SD	Mean	SD	
Patient's component	43.32	11.74	44.02	9.88	>0.05
Observer's component	46.85	5.33	48.79	8.32	

DISCUSSION:

A hospital based randomised control trial was conducted with 106 patients to compare aesthetic outcome between subcuticular sutures and sterile tissue adhesive strips in thyroidectomy wound closure. The aesthetic appearance of an operative scar following wound healing is of cosmetic significance in patients who have surgery. In the present study, there was no significant difference between the groups as per Student t-test ($p > 0.05$). The mean age of the patients in group A was 46.34 ± 14.56 years whereas for group B it was 45.45 ± 14.01 years. There was female predominance in both the groups (77.4% and 79.3% respectively) whereas male patients constituted 22.6% and 20.7% of study groups respectively. There was no significant association between the groups as per Chi-Square test ($p > 0.05$). This is similar to the studies of Jayaram et al [9], Rao et al [10], Teoh et al [11] and Vinay et al [12].

Jayaram et al [9] prospective study comparing subcuticular suture, metal clips, and steristrips for wound closure after thyroid surgery based on the postoperative pain assessment, neck mobility, and cosmetic appearance found 13 men (14%) and 80 (86%) women with a median age of 43.3 years. Rao et al [10] prospective randomized Comparative Study of thyroidectomy wound closure using tissue glue versus subcuticular suture found out of the 74 patients, 11 were males and 63 were females. Teoh et al [11] double-blinded randomised controlled trial comparing the patients' and doctors' satisfaction scores in the aesthetic outcome between both methods of closure of thyroidectomy wounds found median age of the patients was 52 years old. Vinay et al [12] comparative study comparing steristrips and subcuticular sutures for wound closure after thyroid surgery found mean age group of the study subjects was 48.6 (range 24-76) years. The gender distribution showed a higher number of females (90%).

In our study, the commonest comorbidities in both the groups were

Diabetes Mellitus (7.6% and 11.3% respectively) followed by Hypertension (1.9% and 7.6% respectively). 1 (1.9%) patient in Group B had ischemic heart disease. There was no significant difference between the groups as per Chi-Square test ($p>0.05$). 23 (43.5%) patients in Group A underwent near-total thyroidectomy while 19 (35.8%) and 11 (20.7%) patients underwent total thyroidectomy and subtotal thyroidectomy respectively. 26 (49.1%) patients in Group B underwent near-total thyroidectomy while 17 (32.1%) and 10 (18.8%) patients underwent total thyroidectomy and subtotal thyroidectomy respectively. There was no significant difference between the groups as per Chi-Square test ($p>0.05$). Jayaram et al [9] prospective study found 8 underwent subtotal thyroidectomy, 75 near-total thyroidectomy and 10 total thyroidectomies.

It was observed in our study that assessment of cosmetic appearance was done by using visual analogue scale. It was observed that at post-op 6 weeks the cosmetic appearance in wound closure with sterile tissue adhesive strips (Group B) had higher number of excellent scar appearance compared to subcuticular sutures (Group A). However, there was no significant difference between the groups as per Chi-Square test ($p>0.05$). Jayaram et al [9], Ulasi et al [13], Gurusamy et al [14], Selvadurai D et al [6] and Rao et al [10] noted similar observations in their studies. Jayaram et al [9] prospective study observed thirty-one patients had steri-strips closure, metal clip closure, and subcuticular closure. According to VAS and verbal analog scale (VAS) patients in steri-strips group experienced less pain compared to metal clips and subcuticular sutures on POD 1, 2, and 3 respectively. Patients with steri-strips closure had easy neck mobility and cosmetic appearance after 6 weeks according to VAS found that wounds closed by steri-strips were superior to subcuticular and metal clips closure. Ulasi et al [13] prospective comparative analytical study showed ninety-five percent of the patients had a fine linear scar and only three (5%) patients (all in Group B), had hypertrophic scars.

Gurusamy et al [14] study involving non caesarean surgical procedures observed that non-closure of subcutaneous fat tissue does not increase the occurrence of infectious or non-infectious wound complications. Selvadurai et al [6] study reported patients in the metal clip and subcuticular suture groups experienced similar degree of pain on the first three post-operative days and there were no statistically significant differences between the two groups using either visual analogue or verbal response scales. Rao et al [10] prospective RCT showed no significant difference in the scar healing in the immediate and early postoperative period with either of the technique with significant difference in the mean ranks of pain score using visual analogue scale (VAS) between OCA and subcuticular in the immediate postoperative period. The scar appearance improved over the period of 3 weeks with both the closure techniques.

In the present study, the patients' satisfaction score 6 weeks postoperatively using the patient's component of the POSAS score was found to be comparable and statistically not significant between the groups (43.32 ± 11.74 vs. 44.02 ± 9.88 ; $p>0.05$). The observer's satisfaction score 6 weeks postoperatively using the observer's component of the POSAS score was found to be comparable and statistically not significant between the groups (46.85 ± 5.33 vs. 48.79 ± 8.32 ; $p>0.05$). Similar observations were noted in the studies of Hussein et al [15], Ulasi et al [13], Teoh et al [11] and Consorti et al [16]. Hussein et al [15] randomised controlled trial on Suture closure versus non-closure of subcutaneous fat and cosmetic outcome after Caesarean Section observed long term cosmetic benefit of non-closure of the subcutaneous tissue versus suture closure of the subcutaneous tissue is similar with no significant difference in the POSAS and Vancouver Scar Scale (VSS) Scores who underwent caesarean section. Ulasi et al [13] prospective comparative analytical study assessing post-operative scar of two wound closure techniques observed mean POSAS score in Group A was 108.44 ± 20.32 , and 113.91 ± 26.18 in Group B. The cumulative opinion score of both the patients and the observer showed that out of a maximum score of 60, participants in Group A and Group B had a score of 19 and 21 respectively with no statistically significant difference observed between participants in both groups. No statistically significant difference in POSAS score and overall patient and observer opinion scores exists between the two groups both at weeks 1, 3 and 6.

Teoh et al [11] study revealed satisfaction score 3 months postoperatively using the patient's component of the POSAS score was not statistically significant, with a median score of 9 (interquartile

range from 6 to 34) ± 6.5). There was no statistical significance in all the other components, with a median score of 1, except for the colour of the scar. The observer's satisfaction component from the POSAS score was also not statistically significant with a median score of 14 (IQR 5-34) ± 6.2). The rank score between both arms showed no significant difference with a rank sum of 2337.00 (glue) and 2319.00 (suture). Consorti et al [16] study reported no significant difference as to PSAS. The mean value for subcuticular suture was 11.44 ± 11.5 versus 11.00 ± 9.8) for octyl-cyanoacrylate. The best predictive multivariate regression model for OSAS accounted for 61% of the variance. The significantly contributing factors were pain, colour, and thickness. No difference was observed between the total score of men (11.55 ± 9.9) and women (11.48 ± 11.1), regardless of the technique of skin closure and no correlation at all was observed between age and total PSAS score.

CONCLUSION:

The cosmetic benefit and aesthetic outcome between subcuticular sutures and sterile tissue adhesive strips in thyroidectomy wound closure in both techniques are similar. Sterile tissue adhesive strips had less pain and excellent scar appearance following thyroidectomy surgery. POSAS score provides a good measure in assessing patients' own satisfaction scale based on the symptoms patients experienced.

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