

Comparison Between Subcutaneous Tissue Closure V/S Nonclosure in Elective Surgery

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Abstract

Background and Objectives: Postoperative wound complication are one of the greatest issues in elective surgeries. Obesity, operative time, diabetes, age of the patient, anemia, associated infection and reduced nutrition are recognized risk factors for wound infections. With the seek to avoid wound infection, many research studies were performed and assessed the influence of subcutaneous tissue closure in the past 20 years suturing of subcutaneous tissue, the anatomy of the fragile subcutaneous tissue layer is imperfect and suturing leads to a decrease in perfusion to the fatty layer thereby compromising the blood supply to the subcutaneous layer leading to fat necrosis. This study was undertaken to study the various post-operative complications in elective surgery like ventral hernia, inguinal hernia and modified radical mastectomy closed with or without subcutaneous closure.

Materials and Methods: This study was undertaken from December 2018 to December 2020 in the department of General Surgery, Shree M. P. Shah Govt. Medical College and G.G. Govt. Hospital, Jamnagar. After completing major operative steps subcutaneous suturing using 2-0 polyglactin was done in 54 patients and subcutaneous suturing was not done in 46 patients. Total number of patients-100.

Keywords: Subcutaneous Tissue Closure; Elective Surgery; anemia; Ventral hernia.

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Introduction

Postoperative wound complication are one of the greatest issues in elective surgeries. Obesity, operative time, diabetes, age of the patient, anemia, associated infection and reduced nutrition are recognized risk factors for wound infections. With the seek to avoid wound infection, many research studies were performed and assessed the influence of subcutaneous tissue closure in the past 20 years.

The primary function of a suture is to maintain wound closure and promote wound healing when the integrity of the wound is most vulnerable. Principles of wound closure focus on relieving tension on the wound and bringing the skin edges together in an everted orientation.

In contradiction to the suturing of subcutaneous tissue, the anatomy of the fragile subcutaneous tissue layer is imperfect and suturing leads to a decrease in perfusion to the fatty layer thereby compromising the blood supply to the subcutaneous layer leading to fat necrosis.

Further more, suturing of subcutaneous tissue is also time consuming and leads to increase in total operating time and also requires absorbable suture material which lead to an increase in overall cost of the surgery. These pros and cons about the suturing of subcutaneous layer lead us to study them for the elective surgeries with special regards to operative time and wound related complications.

Materials and Methodology

- Study Settings: Department of General Surgery in a large teaching public health hospital.
- Study period: Two year.
- Sample Size: 100 Cases.
- Study Type: Retrospective + Prospective Study.

Inclusion Criteria

- Patient undergoing elective procedure will be included in the study
- Include both male and female
- Patient's age between 18 to 80 years

Exclusion Criteria

- Traumatic wound
- Incision which require to be closed under tension
- Patient's age below 18 years and above 80 years
- Patients with co-morbidities like diabetes

Method

1. All the patients fulfilling the inclusion criteria will be admitted.
2. A detailed history of the symptoms like seroma formation, wound infection and wound dehiscence over surgical site in post-operative patients of ventral hernia, inguinal hernia and modified radical mastectomy, duration of the symptoms, previous history of any surgical procedure and the postoperative course of the same with regarding any abdominal symptoms, wound infection, burst abdomen etc.
3. General physical and systemic examination.
4. Collection of blood will be done and detailed hematological and biochemical investigations will be done like hemoglobin, total and differential counts, serum bilirubin, serum urea, serum total proteins, serum creatinine, coagulation profile.
5. Radiology investigations like X ray chest and abdomen, USG abdomen and CECT abdomen
6. Results were calculated using seroma formation, wound infection, wound gaping and complete healing as criteria between subcutaneous closure and non-closure of the same.

Results

This study was undertaken from December 2018 to December 2020 in the department of General Surgery, Shree M. P. Shah Govt. Medical College and G.G. Govt. Hospital, Jamnagar.

All patients fulfilling the inclusion criteria were admitted, examined and investigated. They were operated in an elective surgical setup. After completing major operative steps subcutaneous suturing using 2-0 polyglactin was done in 54 patients and subcutaneous suturing was not done in 46 patients.

The patients were followed up in the post-operative period and the status of the wound was observed and documented with the use of tables and graphs.

The Observations of our study were as follows:

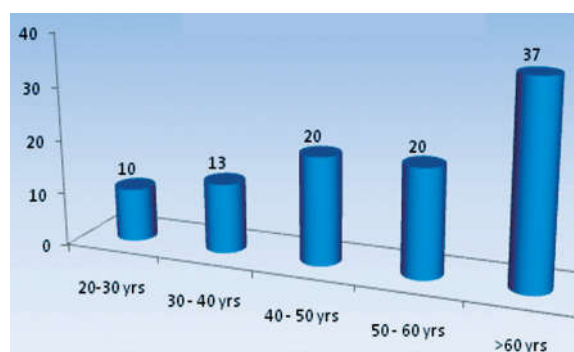
Total number of patients - 100.

Age Distribution

Table 1: Age distribution of cases.

Age Group	Frequency	Percent
20 - 30Yrs	5	5%
30 - 40 yrs	15	15%
40 - 50 yrs	22	22%
50 - 60 yrs	23	23%
>60 yrs	35	35%
Total	100	100%

Graph 1: Age Distribution



Out of 100 cases, the maximum number of cases were seen in the age group of more than 60 years followed by 50 to 60 years and 40 to 50 years age group in descending order.

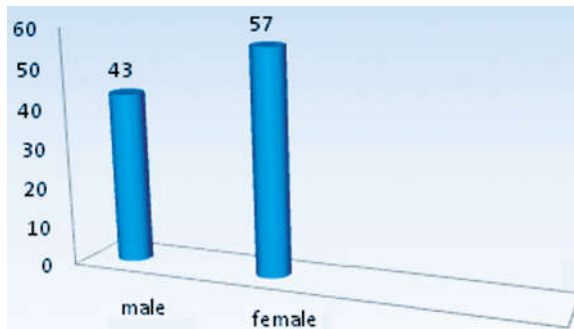
The least number of patients were found to be in the age group of 20 to 30 years. The youngest patient in our study was 21 years of age and the oldest patient was 79 years of age.

Gender wise distribution

Table 2: Gender wise distribution of patients.

Gender	Frequency	Percent
Male	43	43%
Female	57	57%
Total	100	100%

Graph 2: Gender Distribution.

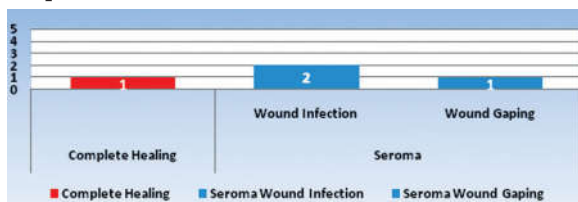


Out of 100 cases, 43 patients (43%) were male and 57 patients (57%) were female. This female preponderance might be due to selection of cases. Outcomes of subcutaneous suturing versus non suturing in Male patients.

Table 3: Incisional Hernia - Male.

Subcutaneous S Suturing	Complete Healing	Seroma with Wound Infection	Seroma with Gaping
Done 4 (9.3%)	1 (2.3%)	2(4.6%)	1(2.3%)
Not Done 0	-	-	-

Graph 3: Incisional Hernia - Male.



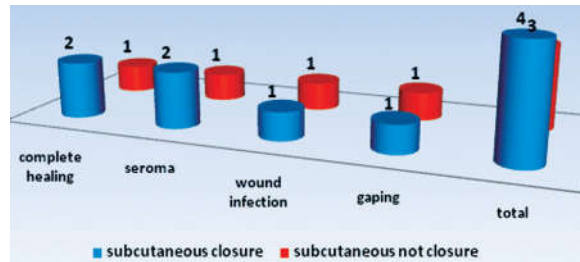
Out of 43 male patients, the total number of incisional hernia in male patients were 4 patients (9.3% of the male population) in which all patients subcutaneous suturing was done.

Out of 4 patients who underwent subcutaneous suturing, 1 patients (2.3%) were found to have complete healing of the surgical wound and in 3 patient (6.9%) were found to have seroma formation in which 2 patient (4.6%) found to be having seroma formation followed by wound infection and 1 patient (2.3%) having seroma formation followed by wound infection and wound gaping in the post-operative period.

Table 4: Umbilical Hernia - Male.

Subcutaneous Suturing	Complete Healing	Seroma	Wound Infection	Gaping
Done 4 (9.2%)	2 (4.6%)	2 (4.6%)	1 (2.4%)	1 (2.4%)
Not Done 3 (6.9%)	1 (2.3%)	1(2.3%)	1(2.3%)	1 (2.3%)

Graph 4: Umbilical Hernia - Male.



Out of 43 male patients, the total number of male umbilical hernia patients were 7 patients (16.2% of the total male population) in which 4 patients (9.2%) subcutaneous suturing was done and in 3 patients (6.9%) subcutaneous suturing was not done.

Out of 4 patients who underwent subcutaneous suturing, 2 patient (4.6%) was found to have complete healing of the surgical site, 2 patient (4.6%) developed seroma in the post-operative period in which 1 patient (2.4%) developed wound infection and gaping in the post-operative period.

Out of 3 patients who were not underwent subcutaneous suturing, 1 patient(2.3%) was found to have complete healing of the surgical site, 1 patient(2.3%) was found to have seroma formation and 1 patient(2.3%) was found to have wound infection and gaping.

Table 5: Inguinal Hernia - Male.

Subcutaneous Suturing	Complete Healing	Seroma	Wound Infection	Gaping
Done 17 (39.5%)	17 (39.5%)	1 (2.3%)	1 (2.3%)	1 (2.3%)
Not Done 18 (41.8%)	13 (30.2%)	1 (2.3%)	-	-
14 (32.2%)				

Graph 5: Inguinal Hernia - Male.



Out of 43 male patients, total number of inguinal hernia patients were 32 (74.4% of the total male

population). 18 patients (41.8% of total male population) underwent subcutaneous suturing and 14 (32.5%) patients did not undergo subcutaneous suturing.

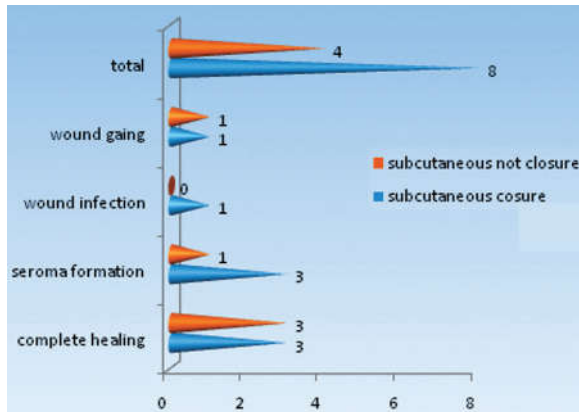
Out of 18 patients who underwent subcutaneous suturing, 17 patients (39.5 %) were found to have complete healing of surgical wound, 1 patients (2.3%) developed seroma followed by wound infection and wound gaping.

Out of 14 patients who did not undergo subcutaneous suturing, 13 patients (30.2%) were found to have complete wound healing of the surgical wound, 1 patients (2.3%) developed seroma in the post-operative period. Outcomes of subcutaneous suturing versus non suturing in Female.

Table 6: Incisional Hernia - Female.

Subcutaneous Suturing	Complete Healing	Seroma	Wound Infection	Gaping
Done 8 (14%)	3 (5.25%)	1 (1.75%)	1 (1.75%)	1 (1.75)
Not Done 4 (7%)	3 (5.25%)	1 (1.75%)	-	1(1.75)

Graph 6: Incisional Hernia - Female.



Out of total 57 female patients, total number of incisional hernia patients are 12 (21 % of total female population) in which 8 patients (14%) underwent subcutaneous suturing and 4 patients (7%) did not undergo subcutaneous suturing. Out of 8 patients who underwent subcutaneous suturing, 3 patient (5.25%) was found to have complete wound healing, 3 patient (5.25%) developed seroma in which 1 patient (1.75%) developed wound infection and wound gaping.

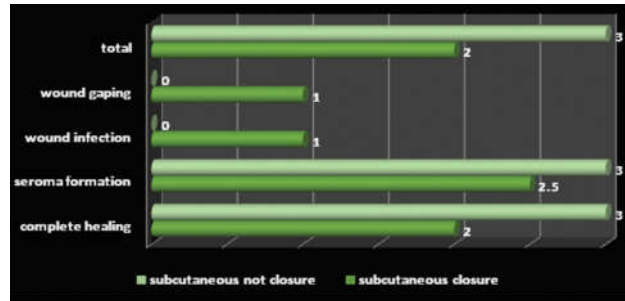
Out of 4 patients who did not undergo subcutaneous suturing, 3 patients (5.25%) were found to have complete wound healing, 1 patient (1.75%) developed seroma and wound gaping.

Here non suture group has edge above suture group with 3 out of 4 complete healing compared to 3 out of 8 in suture group.

Table 7: Umbilical Hernia -Female.

Subcutaneous Suturing	Complete Healing	Seroma	Wound Infection	Gaping
Done 2 (3.5%)	1 (1.75%)	1 (1.75%)	1 (1.75%)	1 (1.75)
Not Done 3 (5.25%)	3 (5.25%)	-	-	-

Graph 7: Umbilical Hernia -Female.



Out of 57 female patients, total number of female umbilical hernia patients are 5 (8.75% of the total female study population) in that 2 patients (3.5%) underwent subcutaneous suturing and 3 patients (5.25%) did not undergo subcutaneous suturing.

Out of 2 patients who underwent subcutaneous suturing, 1 patients (1.75%) were found to have complete wound healing, 1 patient (1.75%) developed seroma, wound infection and gaping.

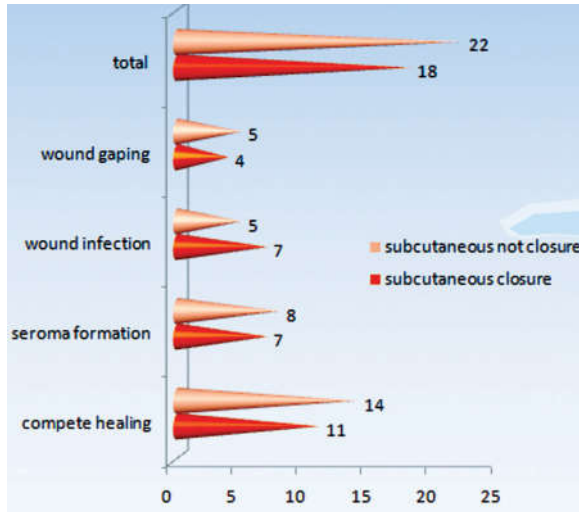
Out of 3 patients who did not undergo subcutaneous suturing, 3 patients (5.25%) were found to have complete wound healing in the post-operative period. Here also non suture group showed advantage.

Table 8: Breast Carcinoma.

Subcutaneous Suturing	Complete Healing	Seroma	Wound Infection	Gaping
Done 18 (31.5%)	11 (19.25%)	7 (12.25%)	7(12.25%)	4 (7%)
Not Done 22 (38.5%)	14 (24.5%)	8 (14%)	5 (8.75%)	5 (8.75%)

Out of 57 female patients , total number of Breast Carcinoma were 40 patients (70% of the total female study population) in which 18 patient (31.5%) underwent subcutaneous suturing,11 patient (19.25%) had complete recovery whereas,7 patient (12.25%) developed seroma formation (12.25%) and wound infection in which 4 patients (7%) developed wound gaping.

Graph 8: Breast Carcinoma.



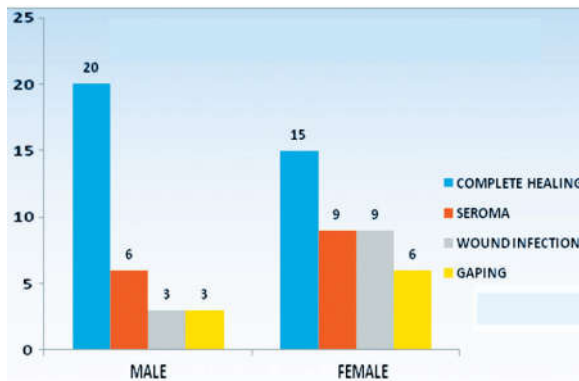
Out of 57 female patients, 22 patients (38.5%) who did not undergo subcutaneous suturing, 14 patient (24.5%) had complete recovery whereas 8 patient (14%) developed seroma formation in which 5 patient (8.75%) developed wound infection and wound gaping in post-operative period. As far statistics are concern, here also, the non-suture group has better outcome.

Total outcome in patients undergoing subcutaneous suturing.

Table 9: Subcutaneous Suturing Done.

	Complete Healing	Seroma	Wound Infection	Gaping
Male	20 (76.9%)	6 (23%)	3 (11.5%)	3 (11.5%)
Female	15 (53.5%)	9 (32.1%)	9 (32.1%)	6 (21.4%)

Graph 9: Outcomes of subcutaneous suturing.



Out of 100 patients, total number of patients undergoing subcutaneous suturing are 54 (54% of the total study population).

Out of 54 patients, total number of male patients were 26 (48% of the total patients undergoing

subcutaneous suturing) and total number of female patients were 28 (52%).

Out of 26 male patients, the patients who were found to have complete healing were 20 patients (76.9% of total male patients who underwent subcutaneous suturing), 6 patients (23%) developed seroma, 3 patients (11.5%) developed wound infection and 3 patients (11.5%) developed wound gaping.

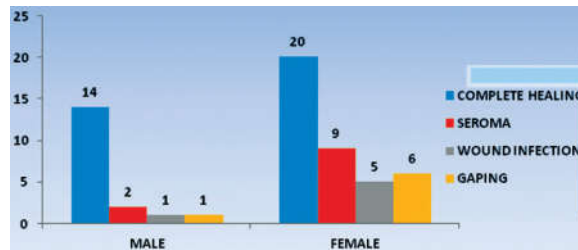
Out of 28 female patients, the patients who were found to have complete healing were 15 patients (53.5 % of the total female patients who underwent subcutaneous suturing), 9 patients (32.1%) developed seroma, 9 patients (32.1 %) developed wound infection ,and 6 patients (21.4%) developed wound gaping in the post-operative period.

Total outcome in patients not undergoing subcutaneous suturing.

Table 10: Subcutaneous Suturing not done.

	Complete Healing	Seroma	Wound Infection	Gaping
Male	14 (82.3%)	2 (11.7%)	1 (5.9%)	1 (5.9%)
Female	20 (68.9%)	9 (31%)	5 (17.2%)	6 (20.6%)

Graph 10: Outcomes in non-suturing of subcutaneous suturing.



Out of 17 male patients (100%) who did not undergo subcutaneous suturing, 14 patients (82.3% of the total male study population who did not undergo subcutaneous suturing) were found to have complete wound healing, 2 patients (11.7%) developed seroma and 1 patient (5.9%) developed wound infection and 1 patient (5.9%) were found to have wound gaping.

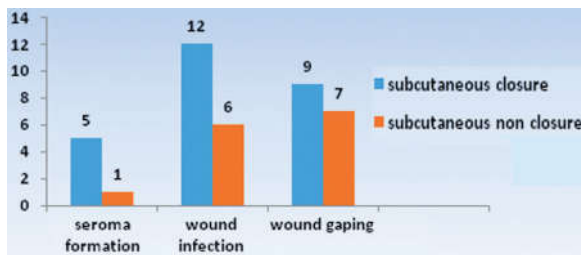
Out of 29 female patients who did not undergo subcutaneous suturing , 20 patients (68.9% of the total female study population who did not undergo subcutaneous suturing) were found to have complete wound healing , 9 patients (31%) developed seroma and 5 patients (17.2%) developed wound infection and 6 patients (20.6%) were found to have wound gaping. In comparison with suture group the non-suture group has more number of patients with complete healing.

Association of complication with subcutaneous closure and non-closure.

Table 11: Association of complication with subcutaneous closure and non-closure.

Complication		Subcutaneous closure n=54	Subcutaneous non closure n=46	Chi square test (p-value)
Seroma	Yes	15	11	0.193(0.66)
	no	39	35	
Wound infection	Yes	12	6	1.41(0.23)
	No	42	40	
Wound gaping	Yes	9	7	0.03(0.84)
	no	45	39	

Graph 11: Association of complication with subcutaneous closure and non-closure.



The chi square test did not show any statistical advantage in non-sutured group. But as far as time taken for surgery and wound related complications as concerned, the non-sutured group has better figure. However a larger study can give a clearer picture.

Discussion

The major goal of any surgical procedure is to produce relief of symptoms to the patient with minimal or no post-operative complications. The recent trend that has been introduced in the field of surgery is to produce the most acceptable surgical scar and various studies have been undertaken by implementation of various surgical techniques for the benefit of the patient.

The major goal of subcutaneous suturing has always been for the balanced approximation of the layer of friable subcutaneous tissue and to promote faster healing with perfect approximation of the surgical wound. Due to the variations in blood supply after the incision of the general surgical procedure, there are anatomical disturbances within the subcutaneous tissues which can lead to a hindrance in the complete wound healing. Hence,

recent studies have shown there is no benefit over subcutaneous layer suturing during the wound closure at the end of the surgical procedure.

From the above statistics it has been found that the study population who underwent subcutaneous suturing had a decreased frequency of complete wound healing in comparison to the study population who did not undergo subcutaneous suturing. The incidence of post-operative surgical site wound complications were also found to be increased in the study population who underwent subcutaneous suturing.

Suturing of subcutaneous tissue was found to have a negative effect on the complete wound healing. Since there are multiple factors which lead to the production of post-operative surgical site complications, the suturing of subcutaneous tissue is found to produce an increased incidence of complications in the surgical site.

Mean total duration of subcutaneous closure in elective surgery are more than mean total duration of not doing subcutaneous closure in elective surgery. The difference mainly due to less consumption of time in not doing subcutaneous closure in elective surgery.

Conclusion

Complete healing of the surgical wound depends on many factors and utmost care should always be undertaken during the closure of the surgical wound to prevent post operative complications. Perfect approximation of the tissues during the closure of the surgical wound has been found to be a vital factor in the complete healing of the same. Suturing of subcutaneous tissue has always been in debate during the closure of the surgical wound.

The suturing of subcutaneous tissue is not the only important factor in the complete healing of the surgical wound. Instead, the presence of an additional foreign body, which is the absorbable suture, is also a contributing factor in the development of post operative complications related to the surgical wound. The variations in blood supply of the subcutaneous layer caused due to the presence of any suture will lead to the formation of areas of patchy partial necrosis in the subcutaneous layer. It produce nidus for the development of exudate collection which leads to post operative complications.

Complete healing of the surgical site relies on multiple factors and the suturing of subcutaneous tissue layer during wound closure is not the only

factor. There are multiple factors which cause surgical site complications that have not been analyzed in this study and need an additional evaluation in further studies.

With limited small data of our study we could conclude that the suturing of subcutaneous tissue layer can be deferred during regular wound closure in elective surgical procedures, and further analysis can be carried on.

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