



A COMPARATIVE STUDY BETWEEN SUBCUTICUALR AND MATTRESS SUTURES IN INGUINOSCROTAL SURGERIES

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Abstract-

Background: A good cosmetic scar gives patient good satisfaction along with mental ease to the surgeon performed the surgery. Cosmesis is an important aspect in present day to day scenarios. Scar is the only visible thing to patient but not the procedure of surgery. So a good cosmetic scar means good surgery for any patient. Latest advancements in surgical procedures like minimally invasive surgeries, laparoscopic surgeries and robotic surgeries are mainly to reduce the scar size for patients and to get a good cosmetic appearance. For only skin closure various techniques like various skin closure techniques, skin staples, clips, sterile strips and glue adhesives are available.

Methods: The study is conducted in 200 patients in S.V.R.R.G.G.H hospital, Tirupati in department of general surgery. First 200 patients operated for inguinoscrotal swellings who met all the inclusion criteria in Department of General Surgery in SVRRGGH, TIRUPATI. Patients was given consecutive numbers and all the patients with odd number were sutured by Mattress technique and even number were sutured by Subcuticular technique. In all the selected patients wound closure was done according to the depth in layer wise manner. Care was taken to secure good hemostasis and good approximation of wound edges. Wound size and time taken for wound closure was noted in all patients using Flexible scale and Stop watch. Post operative examination of wound was done on 3rd day, 5th day, 1 month, 2 months and 3 months. Closure by Mattress sutures in 50% of patients and by Subcuticular sutures in other 50% of patients.

Results: In present study comparison between vertical mattress and sub cuticular closure techniques in clean inguinoscrotal surgeries was done. In present study we get to know that, time taken for skin closure was significantly less for vertical mattress technique when compared to sub cuticular

technique. Post operative pain was more in vertical mattress technique when compared to subcuticular technique on post operative day 0, 1, 3 and 5. Post operative wound complications were more in vertical mattress technique when compared to subcuticular technique. Cosmesis of the scar is better in subcuticular technique when compared to vertical mattress technique.

Conclusion: From the above findings we can get a conclusion that except in time taken for procedure Sub cuticular technique is superior when compared to Vertical mattress technique. The time taken for closure can be reduced even in cases of sub cuticular technique by more and more practice of that technique.

Key words- Sub cuticular, Mattress, Monocryl, Ethylon.

INTRODUCTION

The term sutures history started more than 2000 years ago. Evolvment in late 1800's is the fastest development due to evolving sterilization techniques^{1,2,4}.

“Scar is the autograph of a surgeon” is the famous notion instilled in the mind of every surgeon. We want a cosmetically acceptable scar in every surgery we perform. The skin closure technique must be acceptable, easy, speedy and economically affordable along with good cosmetic scar. Today wound closure techniques have progressed a lot from developments in suture materials, skin staplers, adhesive tapes and tissue adhesive compounds. Still major number of surgeons follow traditional suturing technique. Wound closure by traditional suturing technique helps in healing by primary intention and decreases the wound infections. Traditionally followed suturing techniques for skin by surgeons are Vertical mattress suturing and Subcuticular suturing technique^{1,2,3,4}.

The Vertical mattress suturing technique produces good wound eversion, closes dead space and increases strength across the wound. Skin of old age group people tends to get inverted more often because of decreased elasticity of skin and it needs to be everted for good opposition which is achieved by vertical mattress suturing technique. This technique also reduces tension across the suture lines. The disadvantage of this technique is difficulty in approximating the wound edges and suture marks becomes prominent if sutures are not removed earlier⁵.

The subcuticular technique is an elegant but difficult technique to perform first described by Halsted. When sutures are to be kept in for more than a week and to get a good cosmetic scar subcuticular technique is valuable. In younger age group as the skin is comparatively soft this technique helps in achieving excellent cosmetic scar and also good healing tendencies of the people of younger age group⁶.

The main aims are good tissue approximation, easy to perform, patient acceptability, minimal scar and good cosmetic appearance in skin closure². This study was aimed to compare two skin closure techniques – Vertical mattress sutures and Subcuticular sutures in clean inguinoscrotal surgical wounds.

AIM AND OBJECTIVES

AIM:

Comparative study between Sub cuticular and Mattress sutures in Inguinoscrotal surgeries.

Objectives:

1. To compare the incidence of post operative wound complications after subcuticular skin closure and mattress skin closure.
2. To compare the cosmetic outcome of subcuticular skin closure and mattress skin closure.
3. To compare the post operative pain after subcuticular skin closure and mattress skin closure.

MATERIALS AND METHODS

Type of Study: It is institution based Prospective Study

Study duration: One year from the Scientific and Ethical committee approval.

Source of Data: The patients admitted in Department of General Surgery, S.V.R.R.G.G. Hospital.
Sample size: 200

Inclusion Criteria:

1. Patients operated for Hernia and Non-Infected Hydrocele.

Exclusion Criteria

1. Patients operated for Pyocele.
2. Patients operated for Irreducible and Obstructed Inguinal Hernia.
3. Patients operated for Strangulated Inguinal Hernia.

Sample method

1. Data will be collected in standardized proforma from all the patients presenting to the Department of General surgery, S.V.R.R.G.G.H Tirupati.
2. Patients fulfilling the inclusion and exclusion criteria are selected.
2. Informed and written consent is taken from the patient and included in study.

OBSERVATION AND RESULTS

A) Age Distribution:

Table 1: Age distribution of patients

Patients were selected randomly in both groups of study. Table 1 shows the age distribution in the present study.

Age	Type of suturing			
	Vertical Mattress		Sub Cuticular	
	No. of Patients	Percent	No. of patients	Percent
Below 25	7	7.0	5	5.0
26-35	9	9.0	8	8.0
36-45	9	9.0	19	19.0
46-55	33	33.0	24	24.0
56-65	24	24.0	26	26.0
>65	18	18.0	18	18.0
Total	100	100	100	100
Mean Age	51.61 ± 15.95		52 ± 13.66	
t-value = 0.1857, p = 0.852 (p>0.05) Not statistically significant				

B) Gender Distribution:

Table 2: Gender Distribution of patients

Patients were selected randomly in both groups of study. Table 2 shows the gender distribution in the present study.

Gender	Type of Suturing			
	Vertical Mattress		Sub Cuticular	
	No.of Patients	Percent	No.of patients	Percent
Male	97	97.0	99	99.0
Female	3	3.0	1	1.0
Total	100	100	100	100
Chi-value = 1.0204, p = 0.312 (p>0.05) Not statistically significant				

C) Type of Surgery:

Table 3: In 200 patients taken for study, 149 patients underwent Hernioplasty (HP), 4 patients underwent Herniotomy (HO) and 47 patients underwent SPE for Hydrocele.

Type of Surgery	Type of Suturing			
	Vertical Mattress		Sub Cuticular	
	No. of Patients	Percent	No. of patients	Percent
HP	77	77.0	72	72.0
HO	3	3.0	1	1.0
SPE	20	20.0	27	27.0
Total	100	100	100	100
Chi-value = 2.2103, p = 0.331 (p>0.05) Not statistically significant				

D) Time taken for skin closure:**Table 4:** In both groups stopwatch is used to measure the time taken for skin closure. The mean time taken for each group is calculated and shown in table 4.

Type of Suturing	Average time taken for closure (in seconds)	Significance
Vertical Mattress	140.49 ± 32.386	<0.001* Statistically significant
Sub Cuticular	565.49 ± 126.96	

E) Comorbidities:**Table 5:**

Out of 200 patients 8 patients had only Type 2 Diabetes Mellitus (DM), 8 patients had only Hypertension (HTN) and 2 patients had both (DM + HTN). Out of 8 diabetic patients 6 patients underwent suturing by vertical mattress technique and 2 patients underwent suturing by sub cuticular technique. Out of 8 hypertensive patients 5 patients underwent suturing by vertical mattress technique and 3 patients underwent suturing by sub cuticular technique. 2 patients who were having both diabetes and hypertension underwent suturing by vertical mattress technique only.

Comorbidities	Type of Suturing			
	Vertical Mattress		Sub Cuticular	
	No. of Patients	Percent	No. of patients	Percent
Nil	87	87.0	95	95.0
DM	6	6.0	2	2.0
HTN	5	5.0	3	3.0
DM + HTN	2	2.0	0	0.0
Total	100	100	100	100
P = 0.164 (p>0.05) Not statistically significant				

F) Post Operative Pain:**Table 6:**

In both study groups post operative pain was measured using Visual Analog Scale (VAS) by themselves. VAS is calibrated from 0 to 10, 0 being no pain and 10 being severe pain. Post operative pain was observed on post op day 0, 1, 3 and 5.

Post Op Day	Post operative pain	Number	Mean ±SD	Min	Max	p-value
Day 0	Vertical Mattress	100	8.15 ± 0.83	6	9	0.307
	Sub Cuticular	100	8.03 ± 0.83	6	9	
Day 1	Vertical	100	6.1 ±	4	8	0.541

	Mattress		0.81			
	Sub Cuticular	100	6.03 ± 0.809	5	8	
Day 3	Vertical Mattress	100	3.45 ± 0.796	2	6	0.439
	Sub Cuticular	100	3.36 ± 0.847	2	7	
Day 5	Vertical Mattress	100	1.42 ± 0.878	0	4	0.401
	Sub Cuticular	100	1.31 ± 0.971	0	5	

G) Complications:

Table 7: The overall complications in both groups were shown in table 7. Maximum number of complications were noted in vertical mattress group patients.

Complications	Type of Suturing			
	Vertical Mattress		Sub Cuticular	
	Nil	Present	Nil	Present
Seroma	96	4	98	2
Erythema	97	3	96	4
Purulent discharge	96	2	98	2
Wound separation	96	2	98	2

H) Wound Cosmesis score:**Table 8:**

Wound cosmesis of patients in both groups were followed up at time of suture removal usually 10 days, 4 weeks, 8 weeks and 12 weeks. On 10th post operative day after suture removal wound cosmesis was assessed using Modified Hollander Cosmesis Scale which has 6 clinical variables as step-off borders, edge inversion, contour irregularities, excess inflammation, wound margin separation and good overall appearance.

After adding all the variables total score was calculated. For each variable scores 1 and 0 were given. 1 being the poor value and 0 being the good value. So as the total score increases it depicts that cosmesis of the wound is poor.

Table 8 shows the comparison of wound cosmesis on 10th post operative day using Modified Hollander cosmesis scale.

	Type of Suturing	Number	Mean	SD	p-value
Modified Hollander score	Vertical Mattress	100	1.08	1.160	0.595
	Sub Cuticular	100	1.06	0.962	Not significant

Table 9:

Table 9 shows the comparison of wound cosmesis at 4 weeks, 8 weeks and 12 weeks.

At 4 weeks, 8 weeks and 12 weeks, the wound cosmesis was assessed by visual analogue scale from 0 to 100 by blinded independent observer.

	Type of Suturing	Number	Mean	SD	p-value
Cosmesis 4 weeks	Vertical Mattress	100	71.05	4.814	<0.001*
	Sub Cuticular	100	70.37	4.07	Highly significant
Cosmesis 8 weeks	Vertical Mattress	100	81.50	4.482	0.117

	Sub Cuticular	100	82.43	3.869	Not significant
Cosmesis 12 weeks	Vertical Mattress	100	88.12	8.550	0.333
	Sub Cuticular	100	88.99	2.698	Not significant

DISCUSSION

Age Distribution:

In our study mean age of vertical mattress group is 51.61 ± 15.95 years and in sub cuticular group is 52 ± 13.66 . The minute age difference among these two groups was not significant as p value is >0.05 and it specifies that it has no influence on the outcome of this study. Mean age of total study population is 51.81 ± 14.82 years. In study conducted by M A Haribabu et al⁷ a comparative study of two skin closure techniques in cases posted for inguinoscrotal surgeries mean age was 47.46 ± 13.57 years. In study conducted by Geeta S Ghag et al⁸ a comparative study between three techniques in inguinal hernia incision closure mean age was 41 ± 13.5 years. In study conducted by S Karthikeyan et al⁹ stapler suturing versus conventional suturing in abdominal skin incisions mean age was 44.56 ± 14.9 years. In study conducted by Sathasivam Sureshkumar et al¹⁰ an open labeled randomized control trial of comparison between stapler and sub cuticular skin closure following Lichtenstein tension free mesh hernioplasty mean age was 49.89 ± 14.07 years.

Gender distribution:

In present study, among 200 patients 196 patients were male and 4 patients were female. Out of these 4 female patients 3 patients underwent by vertical mattress technique and 1 patient by sub cuticular technique. The gender distribution is not significant as p value is >0.05 and doesn't influence the outcome of the study. In study conducted by Sathasivam Sureshkumar et al³⁸ an open labeled randomized control trial of comparison between stapler and sub cuticular skin closure following Lichtenstein tension free mesh hernioplasty males were 97.3% and females were 2.7%. In present study, among 200 patients 196 patients were male and 4 patients were female. Out of these 4 female patients 3 patients underwent by vertical mattress technique and 1 patient by sub cuticular technique. The gender distribution is not significant as p value is >0.05 and doesn't influence the outcome of the study. In study conducted by Sathasivam Sureshkumar et al¹⁰ an open labeled randomized control trial of comparison between stapler and sub cuticular skin closure following Lichtenstein tension free mesh hernioplasty males were 97.3% and females were 2.7%.

Type of Surgery performed:

In present study three types of surgeries were performed on 200 patients. They were hernioplasty, herniotomy for inguinal hernias and Polar eversion for hydrocele. 149 patients underwent hernioplasty, 4 patients underwent herniotomy and 47 patients underwent SPE. The outcome of the study was not altered by the type of surgery as p value > 0.05 . Geeta S. Ghag et al⁸ has compared staplers versus sub cuticular versus simple interrupted closure of inguinal hernia incisions in their study. M A Haribabu et al⁷ has compared two skin closure techniques sub cuticular monocryl versus vertical mattress suture in cases posted for inguinoscrotal surgeries in their study. Krupal patel et al¹¹ has compared interrupted vertical mattress versus skin stapler versus sub cuticular closure in clean elective surgeries in their study. S Karthikeyan et al⁹ has compared stapler suturing versus conventional suturing on the outcome of wound closure in abdominal skin incisions in their study. Sathasivam Sureshkumar et al¹⁰ has compared skin closure technique with stapler and subcuticular suture in patients with inguinal hernia undergoing Lichtenstein tension free mesh repair in their study. Ahmed Abdul et al¹² has compared interrupted mattress and continuous sub cuticular skin closure in post appendectomy cases in their study. Deepa Joshi et al¹³ has compared subcuticular versus three mattress sutures for Pfannenstiel incision closure in OBG surgeries in their study.

Time taken for skin closure:

In present study mean time taken for vertical mattress skin closure technique is 140.49 ± 32.386 seconds. For sub cuticular skin closure technique is 565.49 ± 126.96 seconds. The p value is <0.001 for this, which means the time difference is very highly significant. In the factor of time taken for

skin closure vertical mattress suturing technique is very much faster compared to sub cuticular suturing technique. In study conducted by Geeta S. Ghag et al between stapler, sub cuticular and simple interrupted closure of inguinal hernia incision mean time taken was very minimum for stapler group (44.63 seconds) followed by simple interrupted closure (193.33 seconds) and sub cuticular closure (459.93 seconds) similar to present study results. In study conducted by M A Haribabu et al⁷ mean time taken for subcuticular suturing was 476.67 seconds and vertical mattress was 149.35 seconds similar to present study results. In comparison between vertical mattress and skin stapler study by Krunal Patel et al¹¹ stapler was faster compared to sub cuticular and vertical mattress suturing technique. No significant difference was noted between sub cuticular and mattress suturing technique. In study conducted by S Karthikeyan et al⁹ mean time taken for skin stapler technique was almost less than half compared to conventional suturing technique. In study conducted by Deepa Joshi et al¹³ in Pfannenstiel skin closure time consumed for 3 vertical mattress suturing was significantly less compared to time taken for sub cuticular suturing technique. In study conducted by Saba Nadeem et al comparison between sub cuticular stitches versus mattress sutures in the frequency of wound complications after C-sections, mean time taken for sub cuticular stitches and mattress sutures was almost same with slightly more time taken for mattress sutures, which is contrast to present study

Comorbidities:

In present study out of 200 patients, 8 patients had only Hypertension, 8 patients had only type 2 diabetes mellitus and 2 patients had both hypertension and type 2 diabetes mellitus. In patients with hypertension only 5 patients underwent suturing by vertical mattress technique and remaining 3 patients by Subcuticular technique. In patients with type 2 diabetes mellitus only 6 patients underwent suturing by vertical mattress technique and remaining 2 patients by subcuticular technique. In 2 patients with both hypertension and type 2 diabetes mellitus vertical mattress suturing technique was followed. In present study a total of 6 patients got purulent discharge and wound gaping. Out of them 3 patients were having type 2 diabetes mellitus and 1 patient have both type 2 diabetes mellitus and hypertension. Rest of the 2 patients have no relation with both comorbidities. From above data we can get information that wound complications are being most commonly seen in type 2 diabetes mellitus patients substantiating the information that diabetes has been proven to cause poor wound healing and has increased wound infection rates. In present study the relation between the suturing techniques and comorbidities was not statistically significant as p value is >0.05 , hence we can say that comorbidities have no significant effect on the outcome of the present study. In study conducted by M A Haribabu et al⁷ also it is concluded that comorbidities have no significant effect on the wound healing and final cosmetic appearance of scar.

Post-operative pain score:

In present study post-operative pain is measured by using visual analogue scale by patients themselves on POD-0,1,3 and 5. Visual analogue scale ranges from 0 to 10, with 0 being no pain and 10 being worse pain. On all these post operative days mean of pain score was almost similar in both groups with vertical mattress group patients having slightly more pain than sub cuticular group patients. But this data is statistically not significant on all these days. So we cannot get any superiority of one suturing technique over other technique with respect to post operative pain factor in present study. There are many reasons for occurrence of post operative pain in patients. One the important reason is post-operative wound infection. In present study more wound complications were seen among the vertical mattress group patients, which may be one of the reason for slight increase of post-operative pain among this group when compared to sub cuticular group patients. In study conducted by Karia J et al similar to our study, pain was seen more in vertical mattress group compared to sub cuticular group on post-operative day 3. In study conducted by Geeta S Ghag et al⁸ the mean post-operative pain by visual analogue scale at 48 hours was more in simple interrupted skin closure when compared to both sub cuticular and skin stapler closure and these results were statistically significant. In study conducted by M A Haribabu et al⁷ post-operative pain on POD-0,1,3 and 7 in sub cuticular and vertical mattress groups were almost similar with vertical mattress group slightly more than sub

cuticular group similar to our study results. In study conducted by Krunal Patel et al¹¹ vertical mattress group had more pain compared to sub cuticular group by analyzing using visual analogue scale. In study conducted by Anil Mehta et al in closure of Pfannensteil incision by sub cuticular suture versus interrupted mattress sutures. Sub cuticular suturing group patients had lesser pain and required fewer analgesics when compared to interrupted mattress suturing patients similar to our study. In study conducted by S Karthikeyan et al⁹ pain score at the time of discharge after suture removal was more in conventional method group compared to sub cuticular group patients. In study conducted by Deepa Joshi et al¹³ for Pfannenstiel skin closure in OBG surgeries severe pain is seen more in sub cuticular group patients compared to vertical mattress suture group patients and these results were highly significant and they are contrast to our present study.

Post-Operative wound Complications:

In present study more number of wound complications were seen in vertical mattress suturing group patients. Out of 100 patients in vertical mattress group 4 patients developed seroma. Out of them seroma of 1 patient was relieved following compression bandage application and drainage of seroma. 3 patients developed erythema out of them 1 got relieved spontaneously, 2 patients subsequently got infected and produced purulent discharge and later wound separation occurred due to removal of sutures for drainage of purulent discharge. Secondary suturing was done at a later date once granulation tissue fills the wound. Out of 100 patients in sub cuticular group 2 patients developed seroma, out of them 1 patient got relieved and other got erythema followed by production of purulent discharge and subsequently wound separation due to removal of sutures for drainage of purulent discharge. Out of 4 patients who developed erythema, 1 patient has erythema after formation of seroma which later infected. In remaining 3 patients, 2 patients have relieved spontaneously and 1 patient got infected leading to purulent discharge and subsequent wound separation due to suture removal for drainage of abscess. Later secondary suturing of the wound is done once it granulates. In study conducted by Shwetha B R et al comparison between vertical mattress and subcuticular suture for skin closure in caesarean section patients more wound complications was seen in vertical mattress group patients similar to our study. In study conducted by Moustafa I Ibrahim et al superficial surgical site infection rate after cesarean section in obese women: A Randomised control trial of sub cuticular versus interrupted skin suturing closure more wound complications were seen in vertical mattress group similar to our study. In study conducted by Deepa Joshi et al¹³ a comparative study of subcuticular versus mattress sutures for Pfannenstiel skin closure, wound complications in mattress sutures patients are more than sub cuticular suturing patients similar to our study. In study conducted by Karia J et al a comparative study of vertical mattress versus sub cuticular suturing in type 1 surgery, more wound complications were seen in vertical mattress group similar to our study. In study conducted by S Karthikeyan et al⁹ stapler suturing versus conventional suturing in abdominal skin incisions, more wound complications were seen in conventional suturing group patients. In study conducted by Saba Nadeem et al comparison between sub cuticular stitches versus mattress sutures in the frequency of wound complications after C-sections, statistically significant more wound complications were seen in mattress sutures group than sub cuticular stitch group similar to our study. In study conducted by Anil Mehta et al in closure of Pfannensteil incision by sub cuticular suture versus interrupted mattress sutures, more wound complications were seen in interrupted mattress suture patients compared to subcuticular suture patients and these results were statistically significant. This study results were similar to our study. In study conducted by Padmavathi Narahari et al, a comparative study on the outcome of vertical mattress and sub cuticular sutures in OBG patients, more wound complications were seen in sub cuticular group patients contrast to our study. In study conducted by M A Haribabu et al⁷ contrast to our study more wound complications were seen in sub cuticular group patients. In study conducted by Geeta S Ghag et al⁸ a comparative study of stapler versus subcuticular versus simple interrupted closure of inguinal hernia incision, more wound complications were seen in sub cuticular group patients contrast to our study. In study conducted by Ahmed Abdul et al¹² comparative study between interrupted mattress and continuous sub cuticular skin closure in post appendectomy patients similar rate of complications were seen in both groups of

patients. In study conducted by Onwuanyi ON et al skin closure during appendicectomy by sub cuticular and interrupted suture techniques rate of wound infection was same in both groups, but when all complications are combined, there was higher incidence by interrupted method and findings were statistically significant. By analyzing all above studies we do not get any superiority of one technique over other as results are varying in each study. In present study more number of complications were seen in vertical mattress group patients. Even though the most severe complication was purulent discharge and wound gaping, it initially starts from stage of seroma. Seroma was more commonly seen in wounds with dead space inside the wound. In subcuticular technique we will place a sub cutaneous closed stitch to approximate the sub cutaneous layers of skin reducing the dead space in the wound, thereby leading to less chance of seroma formation and less number of wound complications. Another reason for seroma formation inside a wound is presence of more sub cutaneous fat (Obese patient). In our study we haven't taken BMI into consideration, so this may be a confounding factor which needed to be eliminated in further studies conducted and an outcome can be expected.

Wound cosmesis score:

In present study wound cosmesis was assessed on 4 occasions. 1st on post-operative day 10 after suture removal followed by assessment at 4 weeks, 8 weeks and 12 weeks. On 10th post-operative day cosmesis assessment was done by modified Hollander cosmesis scale. This scale has 6 variables named step-off borders, irregular contour, wound gaping, inversion of edges, inflammation and overall appearance of wound. Each variable is given score of 1 or 0. 1 being the poor status and 0 being the good status. So if the score of the wound is more it means that cosmesis of the wound is less. Assessment at 4 weeks, 8 weeks and 12 weeks was done by a blinded independent observer by using visual analogue scale from 0 to 100. More the score, better is the cosmesis of the wound. On 10th post operative day assessment by modified Hollander cosmesis scale mean score of vertical mattress group patients were 1.08 ± 1.160 and that of sub cuticular group patients were 1.06 ± 0.962 . Even though these values were not significant, sub cuticular group patients have slightly good cosmetic appearance when compared to vertical mattress group patients. At 4 weeks assessment by blinded independent observer using a visual analogue scale from 0 to 100, vertical mattress group patients have better scar compared to sub cuticular group patients with statistically significant results. At 8 weeks and 12 weeks assessment by independent blinded observer using a visual analogue scale from 0 to 100, sub cuticular group patients have a better scar than vertical mattress group patients. But these values were not statistically significant. In study conducted by Shwetha B R et al between vertical mattress and sub cuticular sutures in caesarean sections, excellent scars were seen in more number in sub cuticular group patients compared to vertical mattress group patients and these results were statistically significant. In study conducted by Karia J et al between vertical mattress and sub cuticular stitches in type 1 surgery, excellent cosmetic look of scar was seen more in sub cuticular group patients compared to vertical mattress group patients. In study conducted by M A Haribabu et al⁷ a comparative study of two skin closure techniques in cases posted for inguinoscrotal surgeries significantly good cosmetic scar was seen in sub cuticular group patients at 4 weeks time and significantly good cosmetic scar in vertical mattress group patients at 12 weeks time. In study conducted by Geeta S Ghag et al⁸ a comparative study between three techniques in inguinal hernia incision closure cosmetically acceptable scar was seen in sub cuticular group patients when compared to both stapler and vertical mattress suturing group patients. These results were statistically significant. In study conducted by Krupal Patel et al¹¹ comparison between vertical mattress, skin stapler and sub cuticular closure for skin in clean surgeries mean modified Hollander score was more in vertical mattress group patients when compared to both sub cuticular group patients and skin stapler group patients. In study conducted by Anil Mehta et al comparison of wound outcomes with mattress and sub cuticular suture in closure of Pfannenstiel incision, good cosmetic appearance of scar is seen more in sub cuticular group patients when compared to mattress group patients. In this study 50% of mattress group patients had thick and puckering scar. In study conducted by Deepa Joshi et al¹³ a comparative study between sub cuticular and three mattress sutures for Pfannenstiel skin closure,

excellent cosmesis was seen in mattress suture group patients compared to sub cuticular suture group patients. In study conducted by Sathasivam Sureshkumar et al¹⁰ an open labeled randomized control trial of comparison between stapler and sub cuticular skin closure following lichenstein tension free mesh hernioplasty well healed good cosmetic scar is seen in sub cuticular group patients compared to stapler group patients.

CONCLUSION

A good cosmetic scar gives patient good satisfaction along with mental ease to the surgeon who performed the surgery. Cosmesis is an important aspect in present day to day scenarios.

Scar is the only visible thing to patient but not the procedure of surgery. So a good cosmetic scar means good surgery for any patient.

Latest advancements in surgical procedures like minimally invasive surgeries, laparoscopic surgeries and robotic surgeries are mainly to reduce the scar size for patients and to get a good cosmetic appearance.

For only skin closure various techniques like various skin closure techniques, skin staples, clips, sterile strips and glue adhesives are available.

In present study comparison between vertical mattress and sub cuticular closure techniques in clean inguinoscrotal surgeries was done under the following headings

1. Time taken for skin closure
2. Post-operative pain
3. Post-operative wound complications – seroma, erythema, wound gaping
4. Cosmetic outcome of scar

In present study we get to know that

1. Time taken for skin closure was significantly less for vertical mattress technique when compared to sub cuticular technique.
2. Post operative pain was more in vertical mattress technique when compared to subcuticular technique on post operative day 0, 1, 3 and 5.
3. Post operative wound complications were more in vertical mattress technique when compared to subcuticular technique.
4. Cosmesis of the scar is better in subcuticular technique when compared to vertical mattress technique.

Hence from the above findings we can get a conclusion that except in time taken for procedure. Sub cuticular technique is superior when compared to Vertical mattress technique.

The time taken for closure can be reduced even in cases of sub cuticular technique by more and more practice of that technique.

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