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A Comparitive Study of Two Skin Closure Techniques Subcuticular Monocryl and Vertical Mattress Suture in Cases Posted For Inguinoscrotal Surgeries

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Abstract
Aim of the study*: To compare two skin closure techniques subcuticular Monocryl and vertical mattress suture in clean inguino-scrotal surgeries.*
Objectives of the study:
1. To compare the incidence of post-operative wound complications in subcuticular skin closure versus vertical mattress skin closure.
2. To compare the cosmetic outcome of subcuticular skin closure versusvertical mattress skin closure.
3. Time taken for closure.
4. To compare the post-operative pain in subcuticular skin closure versus vertical mattress skin closure.
Methodology*-First 200 Patients operated for inguino-scrotal swellings in Department of General Surgery in SRI VENKATESWARA RAM NARAYAN RUIA GOVERNMENT GENERAL HOSPITAL, TIRUPATI,during the period of 27-11-2017 to 30-12-2018. Patients who meet the inclusion criteria will be given consecutive numbers and all the subjects with odd number will be sutured by vertical mattress and the even number subjects will be sutured by subcuticular method.*
Conclusion*-we conclude that there is no superiority of subcuticular suturing over vertical mattress suturing in case of inguinoscrotal surgeries.*
Keywords: *subcuticular skin closure,vertical mattress skin closure,inguinoscrotal surgeries*

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I. Introduction

The history of sutures begins more than 2,000 years ago. Surgical and suture techniques evolved in the late 1800s with the development of sterilization procedures [1, 2, 4].It has been said that the *"scar is the autograph of a surgeon*." Every surgeon wants cosmetically acceptable scars along with optimal healing. A basic need for skin closure is a good approximation. Apart from cosmetically good scars, it is also necessary that the skin closure technique should be technically easy, acceptable, speedy and economical. Good tissue union and cosmetically acceptable scars are vital for ideal surgical practice. Today, wound closure techniques have evolved from early developments in suturing materials to advanced resources that include synthetic sutures, absorbable sutures, staples, tapes, and adhesive compounds. But still, traditional sutures are taken by a majority of surgeons. Wound closure by suture helps in healing by primary intention thereby decreasing the chance of infection and unnecessary dressing[1,2,3,4]The main reason for using vertical mattress suture is to produce greater wound eversion. Vertical mattress also closes dead space and provides increased strength across the wound. The advantage of Vertical mattress sutures in the elder age group is that the skin in this age group tends to get inverted and it needs to be everted for proper apposition. This technique helps to keep the skin adequately everted without undue tension across suture lines. The disadvantage of vertical mattress suture includes difficulty in approximating wound edges and prominent suture marks if the sutures are not removed sooner [5].The subcuticular technique is an elegant but difficult technique which was first described by Halsted. This technique is valuable when a suture is to be kept in place for more than one week, but suture scar must be ignored. The advantage of subcuticular sutures in young patients is as the skin in this age group is comparatively soft and supple, and this technique helps in good cosmetic appearance and also good healing tendencies of the people of this age group [6].The main aims of skin closure are good tissue approximation, ease of performance, good patient acceptability, less/minimal scar and good cosmetic appearance[2]. This study was aimed to compare

two skin closure techniques – vertical mattress sutures and subcuticular sutures in clean inguinoscrotal surgical wounds.

Aim of the study:
To compare two skin closure techniques subcuticular Monocryl and vertical mattress suture in clean inguino-scrotal surgeries.

Objectives of the study:
1. To compare the incidence of post-operative wound complications in subcuticular skin closure versus vertical mattress skin closure.
2. To compare the cosmetic outcome of subcuticular skin closure versusvertical mattress skin closure.
3. Time taken for closure.
4. To compare the post-operative pain in subcuticular skin closure versus vertical mattress skin closure.

II. Materials & Methods

STUDY DESIGN: Observational Prospective Comparative study

STUDY SUBJECTS: First 200 Patients operated for inguino-scrotal swellings in Department of General Surgery in SRI VENKATESWARA RAM NARAYAN RUIA GOVERNMENT GENERAL HOSPITAL, TIRUPATI. Patients who meet the inclusion criteria will be given consecutive numbers and all the subjects with odd number will be sutured by vertical mattress and the even number subjects will be sutured by subcuticular method.

STUDY SETTING

Department of General Surgery, SRI VENKATESWARA RAM NARAYAN RUIA GOVERNMENT GENERAL HOSPITAL, TIRUPATI.

STUDY PERIOD

One year from the date of approval from institutional ethical committeei.e.,27-11-2017

STUDY METHODS

In all selected patients wound closure will be done in layer wise fashion according to wound depth and meticulous care will be taken to ensure proper and adequate haemostasis with good margin approximation. In all patients wound size and time taken for closure will be noted. Post-operative wound examination will be done on 3rd day, 7th day, at the end of 1 month, 2months and 3months. In 50% patients' skin closure will be done by vertical mattress stitches in other 50% patients the skin closure will be done by subcuticular stitches.

Vertical Mattress Suture method: Vertical mattress closure will be done with 3-0 Nylon from standard company within expiry date in 50% patients. The needle is initially inserted at a distance from the wound edge, crossing through the dermal tissue and exiting through the skin on the opposite side at an equal distance from the wound edge. This was the far-far portion. The needle was rotated 180 degrees in the needle holder and the direction of the Suture loop is reversed (backhanded). On the return, small bites are taken at the epidermal/dermal edges, which become approximated when the knot was tied. This was near-near portion of the suture, loop closes and everts the edges of the wound.

Subcuticular suture method: Subcuticular closure was done with 3-0 Monocryl from standard company within expiry date in 50% patients. It is initiated by placing needle through one wound edge. The opposite edge is everted and the needle is placed horizontally through upper dermis. This is repeated on alternating sides of wound. It is terminated by tying with remnant material over the wound or is looped through the last loop of opposite side.

FIG 1: TECHNIQUE OF VERTICAL MATTRESS SKIN CLOSURE

FIG 2: TECHNIQUE OF SUBCUTICULAR SKIN CLOSURE

Post closure care: Sutures will be covered with a protective non-adherent dressing for at least 48 hours. Sutured wounds will be kept clean and gently cleaned. Patients will be instructed to observe the wound for erythema, warmth, swelling and discharge, because this finding may indicate infection.

INCLUSION CRITERIA
Patients operated for hernia and non-infected hydrocele

EXCLUSION CRITERIA
Patients operated for infected hydrocele, obstructed and strangulated inguinal hernia

ETHICAL CONSIDERATIONS
Before collection of data all the subjects are briefed about the purpose of study and written informed consent will be obtained. All investigations will be done free of cost, all suture materials will be supplied for free of cost and no financial burden will be imposed on the patient.

III. Observations and Results

The present study is done to compare the efficacy between traditional vertical mattress skin suturing and subcuticular skin closure with Monocryl in clean inguinoscrotal surgeries. A total of 200 patients were recruited in the study from 1st December 2017 to 30th June 2018. All were clean elective inguinoscrotal surgery cases. The patients were randomly included in either vertical mattress group or subcuticular group and same antibiotic given for same duration.

In no case, in any group, any irritation of skin or any hypersensitivity reaction was noted. No generalized reaction was noted either. No toxicity wasobserved in any case in either of the groups

AGE: The patients in both the groups were selected randomly. Table 1 shows the age distribution in the present study.

TABLE -1

Age	Type of suturing					
	Subcuticular		Vertical mattress		Total	
	No. of Patients	Percent	No. of Patients	Percent	No. of Patients	Percent
Below 25	3	3.0	7	7.0	10	5.0
26 - 35 Year	21	21.0	13	13.0	34	17.0
36 - 45 Years	23	23.0	24	24.0	47	23.5
46 - 55 Year	23	23.0	27	27.0	50	25.0
Above 56 years	30	30.0	29	29.0	59	29.5
Total	100	100.0	100	100.0	200	100.0
Mean Age	47.76±13.08		47.15 ±14.10		47.46 ± 13.57	

P= 0.428 (p>0.05) Not significant;The mean age for subcuticular and vertical mattress group was almost same being 47.76±13.08 and 47.15 ±14.10 in years respectively

GENDER: The patients in both groups were selected randomly and sex distribution is shown in table 2

TABLE-2

Type of surgery	Type of suturing					
	Subcuticular		Vertical mattress		Total	
	No. of Patients	Percent	No. of Patients	Percent	No. of Patients	Percent
HP	68	68.0	59	59.0	127	63.5
HR	7	7.0	11	11.0	18	9.0
HO	3	3.0	6	6.0	9	4.5
SPE	22	22.0	24	24.0	46	23.0
Total	100	100.0	100	100.0	200	100.0

P= 0.268 (p>0.05) Not significant;

Among the 200 patients 177 were males and 23 were females. Among the 177 males 86 males were assigned to subcuticular group and 91 were assigned to vertical mattress group. Among the 23 females 14 belong to subcuticular and 9 belong to vertical mattress group.

Type of surgery: Table-3

Among the 200 patients taken for the present study, 127 patients had hernioplasty (HP), 18 patients had herniorrhaphy, 9 patients had herniotomy (HO), and 46 patients had surgery for hydrocele (SPE).

Gender	Type of suturing					
	Subcuticular		Vertical mattress		Total	
	No. of Patients	Percent	No. of Patients	Percent	No. of Patients	Percent
Male	86	86.0	91	91.0	177	88.5
Female	14	14.0	9	9.0	23	11.5
Total	100	100.0	100	100.0	200	100.0

P= 0.455 (p>0.05) Not significant; Out of 127 patients who had hernioplasty, 68 had skin closure by subcuticular and 59 by vertical mattress technique. Out of 18 patients who had herniorraphy, 7 had skin closure by subcuticular and 11 by vertical mattress. Out of 9 patients who had herniotomy, 3 had skin closure by subcuticular and 6 had mattress suturing.Out of 46 patients who had surgery for hydrocele, 22 had skin closure by subcuticular and 24 by vertical mattress technique.

Time taken for skin closure:Table:4

Type of suturing	Average time taken for closure(in sec)	Sig. (2-tailed)
Subcuticular	476.67 ± 101.73	P < 0.001
Vertical mattress	149.35 ± 61.079	Highly significant

The time taken for skin closure is measured using a stopwatch measured in number of seconds in both the groups. The mean time taken for skin closure is shown in table 4. The mean time taken for subcuticular skin closure is 476.67 ± 101.73 seconds. The mean time taken for vertical mattress skin closure is 149.35 ± 61.079 seconds. The p value is < 0.001 which is highly significant.

Comorbidities in patients: Table 5:

Comorbidities	Type of suturing					
	Subcuticular		Vertical mattress		Total	
	No. of Patients	Percent	No. of Patients	Percent	No. of Patients	Percent
Nil	88	88.0	90	90.0	178	89.0
DM	6	6.0	3	3.0	9	4.5
HTN	5	5.0	5	5.0	10	5.0
DM+ HTN	1	1.0	2	2.0	3	1.5
Total	100	100.0	100	100.0	200	100.0

P= 0.716 (p>0.05) Not significant;Out of 200 patients chosen for the study 9 patients had only type 2 diabetes mellitus, 10 patients had only hypertension and 3 patients had both type 2 diabetes and hypertension. Out of 9 diabetics, 6 had skin closure with subcuticular suture and 3 had skin closure by vertical mattress technique. Out of 10 hypertensives 5 had subcuticular skin closure and 5 had vertical mattress skin closure. Out 0f 3 patients who had both diabetes and hypertension, 1 patient had subcuticular skin closure and 2 patients had vertical mattress skin closure. P value calculated was 0.716 which is not significant.

Post-operative pain score: Table 6:

Post op Day	Post- operative pain	N	Mean ±SD	Min	Max	p-value
Day 0	Subcuticular	100	7.88±0.891	6	9	P>0.05
	Vertical mattress	100	8.01 ± 0.859	6	9	
Day 1	Subcuticular	100	6.42±0.912	5	9	P>0.05
	Vertical mattress	100	6.58±0.781	5	9	
Day 3	Subcuticular	100	4.72±1.102	2	9	P>0.05
	Vertical mattress	100	4.72±0.753	2	9	
Day 7	Subcuticular	100	2.94±1.340	0	8	P>0.05
	Vertical mattress	100	3.03±1.068	0	8	

The Post-operative pain is measured in both the groups using Visual Analog Scale by patients themselves. Visual Analog Scale (VAS) is calibrated from 0 to 10. 0 is marked for being no pain and 10 being sense of worst pain. The pain score is observed at 0hours, 24 hours, Day 3 and Day 7.Table-6 shows the Post-Operative Pain Visual Analogue Score at 0 hour after surgery. The mean in subcuticular group Post-Operative Pain Visual Analogue Score is 7.88±0.89 and that of vertical mattress suturing is 8.01 ± 0.859. This difference is of no significance with p value of >0.05 confidence. The Post-Operative Pain Visual Analogue Score at 24hours after surgery, the mean in subcuticular group is 6.58±0.781 and that of vertical mattress group is 4.72±1.102. This difference is also of not significance with p value of >0.05 confidence.The Post-Operative Pain Visual Analogue Score at 72 hours after surgery is as follows; mean in subcuticular group is 4.72±1.102 and that of subcuticular skin suturing is 4.72±0.753. This difference is also of no significance with p value of >0.05 confidence.The Post-Operative Pain Visual Analogue Score 7days after surgery is as follows; mean in subcuticular group is 2.94±1.340 and that of vertical mattress Skin suturing is 3.03±1.068. This difference is also of no significance with p valueof >0.05 confidence. As depicted in Table 7.

Table 7

Wound Complication	Type of suturing			
	Vertical mattress		Subcuticular	
	Nil	Present	Nil	Present
Seroma	98	2	96	4
Erythema	96	4	98	2
Purulent discharge	98	2	96	4
Wound Separation	98	2	96	4

The overall complication rates in both the groups were shown in table -7 and maximum number of complications is noted in subcuticular group. Out of 100 cases in vertical mattress group one patient had seroma which subsided on its own on compression bandaging after drainage of seroma. Another patient had seroma which subsequently got infected to produce purulent discharge and later sutures were removed to drain all the pus which led to complete wound separation. The wound was allowed to granulate and secondary suturing was done.

Out of 4 patients who developed erythema, 3 got relieved spontaneously without intervention but one got infected to form purulent discharge which subsequently needed drainage and secondary suturing.

Out of 100 cases in subcuticular group 4 cases developed seroma out of which 2 got infected which lead to purulent discharge and we had to open the wound and drained the pus and wound allowed to heal by secondary intention. Two cases out of 4 who developed seroma; percutaneous aspiration was done and compression bandaging done which led to complete resolution.

Out of 100 cases 2 cases developed erythema and both the cases got infected leading to wound separation and healed by secondary intention.

Wound Cosmesis score:

Patients in both the groups were followed up at time of suture removal usually 7days, 4 weeks, 8weeks and 12weeks and the wound is assessed for Cosmesis. On 7th post-operative day 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.

Modified Hollander Cosmesis Scale

Evaluation Characteristics	Yes (Poor)	No (Good)
a. Step-off Borders	1	0
b. Contour Irregularities	1	0
c. Wound Margin Separation	1	0
d. Edge Inversion	1	0
e. Excessive Inflammation	1	0
f. Overall Appearance	1	0

A total cosmetic score was derived by adding the scores of variables. A score of 1 is given to each variable if present in the wound, so a score of 0 was considered as optimal while 1 or more as sub-optimal. Any complications/infections, if present are also observed in both the groups. On the 4th week, 8th week and 12th week Wound Cosmesis is assessed by independent blinded observer and wound scoring is done using Visual Analog Scale of 0 to 100. Table-8 shows the comparison of wound Cosmesis at 7th day between vertical mattress group and subcuticular group.

TABLE-8:

	Type of suturing	N	Mean	Std. Deviation	p-value
Modified Hollander score	Subcuticular	100	.59	1.147	0.157 not significant
	Vertical mattress	100	.80	.932	

The mean modified Hollander score for subcuticular group is 0.59 with standard deviation of 1.147 while for vertical mattress group is 0.80 and 0.932 respectively. The p value is 0.157 which is not significant.

TABLE 9:

	Type of suturing	N	Mean	Std. Deviation	p-value
Cosmesis 4 weeks	Vertical mattress	100	69.58	3.355	0.000**
	Subcuticular	100	72.23	4.805	
Cosmesis 8 weeks	Vertical mattress	100	81.51	4.494	0.261[@]
	Subcuticular	100	82.24	4.656	
Cosmesis 12 weeks	Vertical mattress	100	87.78	3.506	0.014*
	Subcuticular	100	81.87	4.49	

**P<0.001; *p<0.05

Further, in the follow-up of 4weeks, 8weeks, and 12weeks, the Wound Cosmesis is assessed by a blinded independent observer and was scored in a Visual Analogue Scale from 0 to 100.

Wound Cosmesis Score at 4weeks, in vertical mattress the minimum score was 55 and maximum was 77 with a mean of 69.58±3.355. In subcuticular group, minimum score was 53 and maximum was 79 with a mean of 72.23±4.805. This difference is of great significance with a P value of <.0001.

Wound Cosmesis Score at 8weeks, vertical mattress group has a minimum score of 60 and maximum of 89 with a mean of 81.51±4.49, while in subcuticular group the minimum was 60 and the maximum was 89 with a mean value of 82.24±4.656. The p value was 0.261 which is not significant.

Wound Cosmesis Score at 12weeks, vertical mattress group has a minimum score of 60and maximum of 89 with a mean of 81.875±4.57, while in subcuticular group the minimum was 70 and the maximum was 94 with a mean value of 89.1±4.03. The p value was 0.014 which is not significant.

IV. Discussion

For the surgeon, a scar may be the only index of the surgical procedure performed, as Fitz Gibbon has stated, "By your scars you will be judged." (Fitz Gibbon, 1968).[(20)] There are many factors that may affect the cosmetic outcome of scars.

The following factors are important in comparing the various methods that are available for skin closure: -

- Time taken to close the wound.
- Post-operative pain
- Incidence of complications like seroma, erythema, wound dehiscence
- Cosmetic results
- Ease of dealing with complications should they occur

In our study a total of 200 patients were taken and half of them were assigned to vertical mattress group and remaining half to the subcuticular group. We have performed herniotomy, herniorrhaphy, hernioplasty and hydrocele surgeries for the present study.

The comparison of these two groups was done in relation to:

1. Time taken for closure
2. Post-operative pain
3. Post-operative wound complications
4. Cosmetic outcome

Patient's Characteristics:

In our study, the differences among age and sex were not significant and did not affect the results of other variables. The mean age in subcuticular group was 47.76±13.08yrs and in vertical mattress group was 47.15 ±14.10yrs. This is comparable with the randomized controlled study by Malekpour F et al[(7)] wherein the mean study agewas 45 ± 18 years.

Among the 200 patients in our study, 177 were males and 23 were females. Among the 177 males 86 males were assigned to subcuticular group and 91 were assigned to vertical mattress group. Among the 23 females 14 belong to subcuticular and 9 belong to vertical mattress group. Majority of inguinal hernia occur in males as compared to females. Of inguinal herniarepairs, 90% are performed in males and 10% in females. And hydrocele surgeries are exclusive to male population. As in prospective randomized trial by Brown JK et.al[(8)].patients were predominantly male (82%).

Type of surgery performed:

In our study among the 200 patients, 127 patients had hernioplasty (HP), 18 patients had herniorrhaphy, 9 patients had herniotomy (HO), and 46 patients had surgery for hydrocele (SPE).

Karia J et.al [(9)] in their study has compared between vertical mattress suturing versus subcuticular suturing in Type-1 surgeries like excision biopsy, thyroid surgeries, mastectomy, appendectomy etc.,

Seyed Mohammad Reza Javadi et.al [(10)] have compared subcuticular and interrupted suturing Methods for skin closure after appendectomy.

Anjali Choudhary et.al [(9)] and Shwetha B R et.al [(10)]have done comparison of wound outcomes with interrupted mattress vs. subcuticular suture in closure of pfannensteil skin incisions in caesarean sections.

Geeta S. Ghag et.al [18] has done their study by comparing stapled vs subcuticular vs simple interrupted closure of inguinal hernia incision

Time taken for surgery:

In the present study the mean time taken for subcuticular skin closure is 476.67 ± 101.73 seconds. The mean time taken for vertical mattress skin closure is 149.35 ± 61.079 seconds. The p value is < 0.001 which is highly significant.

Deepa Joshiet.al [11] in their study, have concluded that time taken for 3 mattress suture was significantly less than subcuticular sutures in caesarean sections. This result is also comparable to Holmgren G et al[12] works on MisgavLadach technique for cesarean section where 3 sutures for skin closure reduced time of caesarean section.

Karia J and colleagues in their study[9] concluded that subcuticular stitches are complicated and time consuming. Similar were the results of Shwetha B R et al study [10]

Comorbidities in patients:

Out of 200 patients chosen for the study 9 patients had only type 2 diabetes mellitus, 10 patients had only hypertension and 3 patients had both type 2 diabetes and hypertension. Out of 9 diabetics, 6 had skin closure with subcuticular suture and 3 had skin closure by vertical mattress technique. Out of 10 hypertensive patients, 5 had subcuticular skin closure and 5 had vertical mattress skin closure. Out 0f 3 patients who had both diabetes and hypertension, 1 patient had subcuticular skin closure and 2 patients had vertical mattress skin closure.

P value calculated was 0.716 which is not significant to cause any difference in results to compare between vertical mattress and subcuticular groups.

Out of 6 infected cases with purulent discharge, 3 patients had only diabetes and 2 patients had both diabetes and hypertension. Although there are no studies to prove that hypertension cause poor wound healing, diabetes has been proven to cause poor wound healing and increased chances of wound infection.[21]

Post-operative pain:

The Post-operative pain is measured in both the groups using Visual Analog Scale by patients themselves. 0 is marked for being no pain and 10 being sense of worst pain. The pain score is observed at 0hours, 24 hours, Day 3 and Day 7.

The results were not significant on all the days.

Deepa Joshiet.al [11] in their study has assessed the severity of pain by visual analog scale and concluded that mattress suture group was associated with significantly lesser degree of pain when compared to subcuticular group. A similar study done by Ibrahim MI and colleagues concluded that subcuticular stitches in Caesarean section was associated with significantly more post-operative pain as against interrupted sutures.[13] The results in the present study is in contrast to the study by Deepa Joshi et.al and Ibrahim MI et.al.

Krunal Patel et.al [14] in their study of Comparison between interrupted vertical mattress suture versus skin stapler versus subcuticular suture for skin closure in clean surgery have found that VAS score was high in stapler group as compared to subcuticular group and Vertical mattress group. They have found that pain VAS scores in subcuticular and vertical mattress groups were comparable and there is no significant difference which supports our present study.

Wound complications:

Out of 100 cases in vertical mattress group one patient had seroma which subsided on its own on compression bandaging after drainage of seroma. Another patient had seroma which subsequently got infected to produce purulent discharge and later sutures were removed to drain all the pus which led to complete wound separation. The wound was allowed to granulate and secondary suturing was done.

Out of 4 patients who developed erythema, 3 got relieved spontaneously without intervention but one got infected to form purulent discharge which subsequently needed drainage and secondary suturing.

Out of 100 cases in subcuticular group 4 cases developed seroma out of which 2 got infected which lead to purulent discharge and we had to open the wound and drained the pus and wound allowed to heal by secondary intention. Two cases out of 4 who developed seroma; percutaneous aspiration was done and compression bandaging done which led to complete resolution.

Out of 100 cases 2 cases developed erythema and both the cases got infected leading to wound separation and healed by secondary intention.

Although not significant, number of wound complications is more with subcuticular group. If there is a localised collection in vertical mattress group a single suture can be removed and the collection can be drained. But this cannot be achieved with subcuticular group, as it is a continuous suture. The whole suture has to be removed which leads to wound separation and poor cosmetic outcome.

Deepa Joshiet.al [11] in present study there was no statistically significant difference in wound infection [discharge and induration] rate between the two groups. Mattress suture group is found to be no inferior with respect to wound morbidity.

Study results by Bucknell TE[15] showed monofilament non-absorbable nylon suture to be least infective for closing abdominal incisions.

Corder AP, et al[16] observed statistically insignificant difference in subcuticular and interrupted skin closure.

Onwuanyi O N[17] and colleagues found in their study that wound infection rate was same in both groups but overall wound complications were higher in interrupted suture group.

Wound cosmesis score:

Patients in both the groups were followed up at time of suture removal usually 7days, 4 weeks, 8weeks and 12weeks and the wound is assessed for Cosmesis.

On 7th post-operative day 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.

Further, in the follow-up of 4weeks, 8weeks, and 12weeks, the Wound Cosmesis is assessed by a blinded independent observer and was scored in a Visual Analogue Scale from 0 to 100.

The 7th post op day results were comparable and no significant cosmetic superiority noted either in subcuticular group or vertical mattress group.

At 4weeks, there was significant difference in the cosmetic appearance of the scar and subcuticular wound scar was superior when compared to vertical mattress wound scar.

At 8weeks and 12weeks, there was no significant difference in the appearance of the scar in between subcuticular group and vertical mattress group.

This shows that although subcuticular sutured scars appear better in early days when compared to vertical mattress sutured scars, over a period of time there wont be significant cosmetic difference between them.

Deepa Joshiet.al [11] in their study has compared cosmesis after one month of surgery and no statistically significantdifference was found in two groups. Nylon mattress sutures faired equally well with subcuticular sutures.

In study by Anate M[18] and colleagues' appearance of wound and scar were better in absorbable subcuticular group as compared to interrupted non absorbable suture.

Study by Karia J[9] also had results favoring better cosmesis in subcuticular group as compared to mattress group.

Geeta S. Ghag et.al [19] has found in their study of comparing stapled vs subcuticular vs simple interrupted closure of inguinal hernia incision that the best cosmetic appearance of skin was with subcuticular followed by simple interrupted andcomparatively worst with stapler.

In another prospective randomized trial performed by Brown JK et al[8] where they compared subcuticular suture to skin adhesive, observed that there was no difference in cosmetic outcome in subcuticular suture and skin adhesive and subcuticular stitch provided adequate skin apposition for proper healing.

V. Conclusion

Cosmesis is an important aspect in this day and age. A cosmetic scar not only gives patient satisfaction but also mental ease to the surgeon.

Several methods of skin closure are available to close the skin incisions in place of sutures like staples, clips, and steristrips and glue adhesives.

Sepsis is the great hazard in any surgery as it can lead to disastrous consequences.

Preventing wound infection is of utmost importance as it may lead to the failure of surgery and severe morbidity to patient.

In our study, comparison of inguinoscrotal skin closure between vertical mattress and subcuticular suturing was done.

We found that:

1. There is no significant difference in post-operative pain.
2. Time taken for closure was less with vertical mattress.
3. There is no significant increase in post op wound infections in either subcuticular or vertical mattress suturing.
4. Although cosmesis in early period is better with subcuticular but in the long run there is no significant difference in the appearance of the scar if sutures removed earlier in vertical mattress group to avoid railroading.

Hence, we conclude that there is no superiority of subcuticular suturing over vertical mattress suturing in case of inguinoscrotal surgeries.

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