

## Original Research Article

# A study of skin closure of surgical wound by subcuticular sutures with polyglactin 910 fast (rapide vicryl) in planned surgery

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## ABSTRACT

**Background:** The skin is the largest and among the most complex organs of the body. Although the skin functions simply as a protective barrier to interface with our environment, its structure and physiology are complex. Suturing is commonly used today as a mean by which wounds are closed to prevent infection and fasten healing with minimal scarring. Cosmetic results of healed wound are also important and as awareness is increasing among general population, they are more concerned with cosmetic scar. Various techniques are developed to give cosmetically better scar, like subcuticular suture, adhesive tapes, staplers, etc.

**Methods:** Study was randomized, prospective, observational and longitudinal including 100 patients, selected according to inclusion criteria.

**Results:** Cosmetic result of the study were good; 87% patients were having good to excellent cosmetic results. And 13% patients were having scar which was cosmetically not good (scar was either hypertrophied or thickened). complication was not significant (only 3% having on post-operative day 5).

**Conclusions:** Surgical wound closure with subcuticular suture with absorbable suture material gives excellent cosmetic results, cheaper and cost-effective compare to other technique of wound closure having similar cosmetic result. As the removal of suture is not required, no follow up visit needed, and it saves the extra time and expenditure of patient.

**Keywords:** Absorbable suture, polyglactin 910 fast (rapide vicryl), Skin closure, Subcuticular method

## INTRODUCTION

Skin is strong, elastic, and water-resistant. Although the skin functions simply as a protective barrier to interface with our environment, its structure and physiology are complex.<sup>1</sup> In its role as an environmental buffer, the skin protects against most noxious agents, such as chemicals, solar radiation, infectious agents. Its efficient ability to conserve or disperse heat makes the skin the major organ responsible for thermoregulation. Suturing is commonly used today as a mean by which wounds are closed to prevent infection and fasten healing with minimal scarring. With passage of time various methods of skin closure has evolved, with stress on better cosmetic

results. Any method of skin closure should provide adequate approximation to allow wound healing with minimal risk of infection and should produce an acceptable cosmetic result. The method should be simple, fast and cost effective. Cosmetic results of healed wound are also important and as awareness is increasing among general population, they are more concerned with cosmetic scar. For plastic and reconstructive surgery, scar is top priority. Various techniques are developed to give cosmetically better scar, like subcuticular suture, adhesive tapes, staplers, etc. Sutured or stapled wound should be covered with a protective non-adherent dressing for at least 24 to 48 hours, until enough epithelization takes place to protect the wound from gross

contamination.<sup>2</sup> Suture should be removed at the earliest possible time to prevent or minimize suture reaction and suture marks, but they should remain in place long enough to prevent wound dehiscence and scar spread.<sup>3,4</sup>

Polyglactin 910 fast suture is a synthetic absorbable sterile surgical suture composed of a copolymer made from 90% glycolide and 10% L-lactide.<sup>5</sup> Although this suture is a synthetic absorbable suture, its performance characteristics are intended to model the performance of collagen (surgical gut) suture. Suture is intended for use in soft tissue approximation where only short term wound support is required and where rapid absorption of the suture would be beneficial. Due to its absorption profile polyglactin 910 fast is useful for skin closure, particularly in pediatric surgery, episiotomies, circumcision and closure of oral mucosa. polyglactin 910 fast is also successful in ophthalmic surgery for conjunctival sutures. polyglactin 910 fast Suture is not intended for use in ligation, ophthalmic, cardiovascular or neurological procedures. polyglactin 910 fast typically falls off 7-10 days postoperatively or can be wiped off subsequently with sterile gauze. Normally the removal of the suture is not required. Progressive loss of tensile strength and eventual absorption of polyglactin 910 fast occurs by means of hydrolysis. Polyglactin 910 fast elicits minimal to moderate tissue reaction.

**METHODS**

In the present study which was randomized, prospective, observational and longitudinal. Protocol of trial procedure was formed along with proforma, patient information sheet and informed consent.

The study was carried out from 01-01-2015 to 30-11-2016, consisting 100 patients. Patients selection were done according to following criteria.

Inclusion criteria includes in planned surgeries.

**Exclusion criteria**

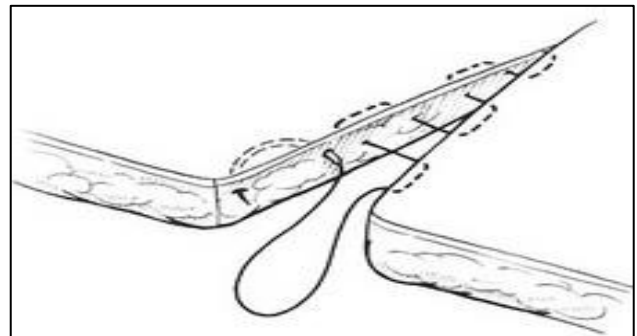
- Emergency procedure,
- Any underlying skin disorders,
- Spillage of contaminated contents in wound,
- Patient not giving consent.

Follow up of the patients was done on 3<sup>rd</sup> day, 5<sup>th</sup> day, 7<sup>th</sup> day, 14<sup>th</sup> day and at the end of 1month to evaluate the cosmetic result and associated complication (if present) of study

**Procedure**

After taking subcutaneous suture, 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. Authors have used polyglactin 910 (vicryl rapide) for study. No removal of suture is required because it is an absorbable suture (polyglactin 910 fast).<sup>6</sup>



**Figure 1: Subcuticular suturing method.<sup>7</sup>**

**RESULTS**

Post operatively local wound of all the patients were observed and examined on 3<sup>rd</sup>,5<sup>th</sup>,7<sup>th</sup> day and during follow up on 14<sup>th</sup> day and 1 month. Patients were divided according to age and sex as shows in Table 1.

**Table 1: Distribution according to age and sex (n=100).**

Age (yrs)	No. of patients	
	Male	Female
0-10	16	0
11-20	5	9
21-30	4	11
31-40	6	9
41-50	14	7
51-60	7	3
61-70	7	1
71-80	0	1
Total	59	41

Patients were divided into various age group of 10-year duration, 81% patients are from 0-50-year age group and 19% patients are from 51-60 year of age group. And also divided according to sex, 59% male and 41% female. So, it includes both the sex and all the age group of patients. As the age is one factor which affect the healing of wound and ultimate result and cosmesis (Table 1).

Complications and cosmetic results were calculated according to age group of 10 years duration and shown in Table 2 and Table 3.

In present study, only 8% patients were having collection/infection in various groups of patients. Maximum (20%) of infection was in 51-60 years age group. In other age group it was (13.3%) or less. So, infection was less between 0-50 years of age group. (Table 2).

**Table 2: Relation of age with infection (n=100).**

Age	No. of cases	Infected cases	%
0-10	16	1	6.25
11-20	14	1	7.14
21-30	15	0	0
31-40	15	2	13.3
41-50	21	1	4.76
51-60	10	2	20
61-70	8	1	12.5
71-80	1	0	0

**Table 3: Relation of age with cosmetic results (n=100).**

Age	No. of cases	Excellent result	%
0-10	16	12	75
11-20	14	11	78.57
21-30	15	10	66.67
31-40	15	9	60
41-50	21	13	61.90
51-60	10	7	70
61-70	8	2	25
71-80	1	1	100

Overall cosmetic result was excellent in 65% patient in all age group, out of that 73% patients were 0-30 year of age. So, it suggests that in younger age group cosmetic results are excellent. In this study, we have found good to excellent results between (31-60) year of age group. So, in our study age is not the only factor to affect the cosmetic results. It suggests cosmetic results with polyglactin 910 fast are excellent in most of the patients of younger age group and elderly age also (Table 3).

Findings of the local wound were divided in two:

- Including redness, oedema, induration only, shown in Table 4.
- Local wound having infection/collection/necrosis/pus/gaping etc. (Table 5).

In 76% of patient local redness/oedema/induration was observed but there was no collection/infection. Out of 41% patients having redness on 3<sup>rd</sup> day, only in 6 patients it persisted on 5<sup>th</sup> day and in 1 patient persisted up to 7<sup>th</sup> day and after that it disappeared. On 3<sup>rd</sup> day, 6 patients were having oedema, which persisted up to 5<sup>th</sup> day and 1 more patient had oedema on 5<sup>th</sup> day. In 2 patients oedema persisted up to 7<sup>th</sup> day. In 29 patients Induration was observed on 3<sup>rd</sup> day, and it persisted up to 5<sup>th</sup> day and 7 patients were added having Induration. On 7<sup>th</sup> day Induration disappeared on 7<sup>th</sup> day persisted in 15 patients, and 3 patients persisted on 14<sup>th</sup> day. In rest of the patients Induration disappeared on 14<sup>th</sup> day. Anyone these patients were not having pus/collection/infection and wound healed well and does not require any interventional treatment.

This suggest that this may be due to handling of skin tissue and may be due to tissue reaction, which has regressed and disappeared completely and wound healed well. This suggests subcuticular with polyglactin 910 fast may have minimal/some tissue reaction but does not lead to infection (Table 4).

**Table 4: Tissue reaction associated with technique (n=100).**

Complications	No. of cases			
	3 <sup>rd</sup> day	5 <sup>th</sup> day	7 <sup>th</sup> day	14 <sup>th</sup> day
Redness	41	6	1	0
Oedema	6	7	2	0
Induration	29	36	15	3

Post operatively suture line was observed and in 5 patient's collection/infection/necrosis was found on 3<sup>rd</sup> day and 3 patients, it was found on 5<sup>th</sup> day. Total 8 patients were having collection/infection. Out of that, 1 patient was having pus collection, 1 patient was having necrosis. In both patients there was wound gaping. Patients having serosanguinous collection were drained without opening wound and discharge disappeared within 48 hours and wound healed well. In 5 patients, minimum discharge was coming, which was drained and responded to antibiotics, and does not require opening of wound. No gaping was found in these patients, but healing of wound was not good. In rest 2 patients required opening of wound, drainage of pus and regular dressing, and Antibiotics were given. Gaping was seen in these 2 patients. Wound was healed by hypertrophic scar.

Infection has no relation with skin closure by subcuticular sutures using polyglactin 910 fast. Infection may be because of other factors (Table 5).

**Table 5: Complications in follow up (post-operative day) first detected (n=100).**

Complications	No. of cases			
	3 <sup>rd</sup> day	5 <sup>th</sup> day	7 <sup>th</sup> day	14 <sup>th</sup> day
Infection	1	2	0	0
Serosanguinous collection	3	0	0	0
Necrosis	1	0	0	0
Frank pus	0	1	0	0

Overall, 87% patients were having good to excellent cosmetic results. And 13% patients were having scar which was cosmetically not good. (Scar was either hypertrophied or thickened). This was in the patients in whom, edema or Induration persisted up to 14<sup>th</sup> day or there was wound gap. Out of them, 1 patient was having tendency for hypertrophic scar.

In majority of patients, subcuticular skin closure with polyglactin 910 fast is giving good to excellent results. (Table 6).

**Table 6: Results of subcuticular closure of surgical wound with (polyglactin 910 fast).**

Cosmetic results	No. of cases
Excellent	65
Good	22
Fair	9
Hypertrophic scar	4

**DISCUSSION**

In present study of skin closure of surgical incision by subcuticular sutures with polyglactin 910 fast, collection/infection were present in only 8% patients and cosmetically good to excellent (linear) scar in 87% of patients. In other 13 patients wound healed well, but cosmetic result of wound was not good (including

hypertrophic scar). Authors have compared the results of our study with other studies.

Results of present studies are compared with other studies. In present study authors have used subcuticular suturing technique with polyglactin 910 fast (rapide vicryl). So, authors have compared our result with their result of subcuticular group (Table 7).

In the study of Patel et al, they have compared result of stapler with subcuticular suture and mattress suture in clean surgery.<sup>8</sup> They have observed stapler is faster and VAS score is high, local infection is more, pain during removal is more and cosmetic result of scar is comparable. They have also observed that subcuticular stitches take more time, VAS score is less than stapler, Infection rate is less (5%), pain during removal is less.

In present study also, infection rate is only 8%, little more than above study. Good to excellent scar is seen in 87% of the patients in present study compare to 98% in their study.

**Table 7: Comparison with other studies.**

Name of study	Post- operative wound infection	Cosmetic results	Cost factor
Patel K et al, <sup>8</sup> (comparison of wound closure by stapler with subcuticular and vertical mattress suture)	5%	98%	Subcuticular is cheaper than stapler.
Rao VV et al, <sup>9</sup> (comparison b/w subcuticular and adhesive glue)	Not done	Cosmetic results in both groups are similar	Subcuticular is cheaper than adhesive glue.
Ademuyiwa AO et al, <sup>10</sup> (Comparison of tissue glue and subcuticular suturing.)	No complication	84%	Subcuticular is cheaper than adhesive glue.
Ong CC, et al <sup>11</sup> (Comparing wound closure using tissue glue versus subcuticular suture for pediatric surgical incisions)	No complication	93.93%	Subcuticular is cheaper than adhesive glue.
Present study	8%	87%	Overall, compare to other subcuticular is cheaper.

Suture material used is double to three times than wound length but once the strip of suture material is opened and can be used in one patient only, it is costly. As it does not require removal of suture, no question of pain during removal and need not to come for removal, so time, expenditure of patient is saved, and overall compliance is good.

In the study of Rao V et al, they have compared octyl-cynoacrylate (OCA)with subcuticular suturing technique in thyroidectomy wound closure.<sup>9</sup> They have not found infection in any patients; cosmetic results are equal in both techniques, but OCA is costlier than subcuticular suture. OCA does not require removal. In this study, they

have used non-absorbable suture for subcuticular suture and it required removal. So, patient has to come, and it will have extra expenses to patient.

In present study, infection is present in 8% of patients; cosmetic results are good to excellent in 87% of patients. and authors have used absorbable suture materials. It does not require removal. So, patient need not to come for follow up, and time and expenses of patient is saved, and overall patient’s compliance is good. In the study of Ong CC et al, they have compared result of 2-OCA (octyl-cynoacrylate) with standard subcuticular suture in paediatric age group.<sup>10</sup> They have found no rash/dehiscence/infection in any patient. No difference in

time, cosmetic results are equal, no difference in parent's satisfaction results. In present study, infection is present in 8% of patients; cosmetic results are good to excellent in 87% of patients. and authors have used absorbable suture materials. It does not require removal. So, patient need not to come for follow up, and time, expenses of patient is saved, and overall patient's compliance is good.

In the study of Ademuyiwa et al, they have compare result of wound closure by using 2-OCA (octyl-cyanoacrylate) with subcuticular suture using absorbable suture material polyglycolic acid (DEXON).<sup>11</sup> They have observed redness/erythema at wound edges in both group which resolves spontaneously within a week, no infection was found. There was no significant difference in cosmetic outcome in both methods and in subcuticular group it is (84%). Parent's satisfaction is equal in both groups. Both methods do not require removal, so no follow up is required, no extra expenditure on patient except for the cost of OCA (glue). Use of glue is superior to the subcuticular suturing technique but cost is major limiting factor. In present study, 8% patients were having infection compare to above studies. Cosmetic results are comparable to results of subcuticular suturing technique of above study. It is cheaper and cost effective. It does not require removal. So, there is no pain or anxiety about suture removal. So, patient need not to come for follow up, and time, expenses of patient is saved, and overall patient's compliance is good.

## CONCLUSION

Cosmetic results are better with younger age group compare to older age group. Duration of surgery parse does not have any relation with complication of the wound closure. More number of patients was having redness and induration in early post-operative day, but it resolves spontaneously during follow up. Cosmetic result is good to excellent in 87% of patients; which is comparable to other study. This is cheaper and cost-effective than other technique of wound closure having similar cosmetic result. As the removal of suture is not required, no follow up visit needed, and it saves the extra time and expenditure of patient. Patient's satisfaction is good.

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