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Comparison of Subcuticular Sutures versus Interrupted Sutures in Terms of Postoperative Wound Outcome and Cosmetic Outcome

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Abstract:

Background: Wound closure is the intention of stitching. Ideally, the wound edges should be approximated by suture such that the final scar is aesthetic and functional. The healing process and cosmetic result can be influenced by skin wound and incision closure techniques. The goal of this research is to compare two widely used skin closure techniques, i.e. interrupted and subcuticular sutures, to determine which of them is superior in terms of wound healing and cosmetic outcome in clean wound, clean contaminated wound, contaminated wound.

Objectives:

To compare subcuticular suture versus interrupted sutures for skin closing in terms of:

1. Intraoperative:
- Average time of suturing
- Type of suture material
- Cost of suturing
- Separate subcutaneous fat closure

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2. Postoperative
- Post-operative wound pain
- Additional post-operative analgesics required
- Postoperative wound infection and delayed fat necrosis.
- Any secondary procedure needed for wound closure.

3. Late sequelae and cosmetic outcome after 3 months

Methodology: It is a prospective randomized controlled trial, done on the patients with incision closure due to any surgical cause. It will be conducted at Dept. of surgery, J.N.M.C and AVBRH, Sawangi (Meghe), Wardha.

The study will be conducted on patients of incision closure due to any surgical cause. Informed and written consent will be obtained from all the patients and institutional ethical committee approval, DMIMS (DU) will be taken.

Results: The result would be undertaken in SPSS software

Conclusion: Conclusion will be based on findings of study protocol

Keywords: Subcuticular suture, interrupted sutures, scar, surgical incisions.

INTRODUCTION:

As a barrier between the internal systems and the outside world,theskin is exceptionallyvulnerable to injury, either by accidental injury or by scheduled surgical incision. Today, as surgery rises in complexity, and heightened public understanding of scar cosmesis and skin healing need to be maximize to ensure the overall success of the an operation.

The technique of skin closure has become progressively significant in the creation of rapid he aling and the strain put on surgeons to minimize the duration of stay in the hospital. After any surgical operation, wound complication are one of the main causes of illness that can extend the patient's stay or result in re-admission.[(1)] The suture technique, which is a wound closure procedure ,is thousands of years old.Athough suture thingsand strategies have altered and the aims persist the similar: closing dead space, supporting wound s till healing rises their tensile strength, approximating skin edges for an esthetically attractive and practical result, and lessening the risks of bleeding and infection.. During an operation,the degree of bacterial contamination is related to the risk of incisional infections[(2)]. Effective suturing method shouldremovedead area in subcutaneouslayer , reduce stress that triggers the parting of wounds. It requires proper location of wounds with regards to relaxed lines of tension. [(3)]

Wound closure is the intention of suturing. Preferably, suturing should approximate the wound edges so that final scar is aesthetic and functional .[(4)] Surgeon should approximate the wound with minimum tension on skin and handling the tissues gently. Until now there has been no ideal skin closure technique which is cost effective and causes good approximation with minimum postoperative pain, quick to apply, with minimum complications and satisfactory cosmetics. Pathophysiology of wound healing suggests that more inert the material lesser the tissue reaction, lesser the foreign material better is wound healing and lesser is the pain and fibrosis.[(5)] In general, simple interrupted method of wound closure are usually carried out, as it is easy to learn and master. It is thought to be time-consuming

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however, with high level of complication and inferior cosmetic outcome. In the other side, subcuticular method is considered an elegant but strenuous technique of suturing.Often,running subcuticular closure takes time and does not evert wound edges well. The aim of this study is to comparison two frequently used methods of skin closure, i.e. interr upted and subcuticular sutures, to determine which of them is superior in terms of wound heal ing and cosmetic outcome in clean wound, clean contaminated wound, contaminated wound.

OBJECTIVES:

To comparsionsubcuticular suture versus interrupted sutures for skin closure in terms of:

1. Intraoperative:
- Average time of suturing
- Type of suture material
- Cost of suturing
- Separate subcutaneous fat closure

2. Postoperative
- Post-operative wound pain
- Additional post-operative analgesics required
- Postoperative wound infection and delayed fat necrosis.
- Any secondary procedure needed for wound closure.

3. Late sequelae and cosmetic outcome after 3 months

METHODOLOGY:

It is a prospective randomized controlled trial, done on the patients of incision closure due to any surgical causeIt will be performed at the Surgery Department, J.N.M.C.,
and Acharya Vinoba Bhave Rural Hospital, Sawangi (Meghe), DMIMS Wardha (DU).
The study will be conducted on patients of incision closure due to any surgical cause. A detailed history, physical examination and investigations, informed and written consent, wi ll be collected from all patients as per proforma and prior approval will be taken from the inst itutional ethical committee, DMIMS (DU).

Study design: Prospective Randomized Controlled study.
Study Setting: A.V.B.R.H. Sawangi (Meghe) Wardha.
Groups:
Group A : 65 patients with subcuticular suture skin closure.
Group B :65 patients having skin closure with interrupted sutures.
Sample Size :
Group A:65
Group B:65

Study Population:
Inclusion Criteria:-

- Patients of any age with incision closure due to any surgical cause.
- The pregnant women undergoing elective or emergency caesarian section and those undergoing hysterectomy

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- **Type of incision** – kocher incision, Midline incision, Mcburney incision, Lanz incision, Paramedian incision, Transverse incision, Rutherford Morrison incision, Pfannenstiel incision

Exclusion Criteria:-

- History of autoimmune diseases such as diabetes, rheumatological and other skin dise ases
- Long term steroid intake history
- History of suture substance allergies
- Coagulation disorder
- HIV infection

Study Protocol:-

On the basis of the inclusion and exclusion criteria set out above, all patients admitted for any surgical cause will be evaluated for participation in the study. Prior to registration, written in formed consent will be collected from the patient.

Initial Evaluation:

ComprehensiveProfile of demographics will be recorded and full history including history of current disease, history of infection, history of smoking, hypertension, hypercholesterolemia, advanced age, obesity, hypothyroidism, diabetes mellitus, peripheral arterial and venous diseases, anticoagulant and coagulation disorders; pervious history of treatment, , surgical interventions , and other relevant detail will bedocumeted.Baseline checks, including total blood count, tests for kidney function and tests for liver function, will be performed.

Clinical Examination:

- Inspection - Blood pressure should be measured. A thorough, systemic clinical examination, condition of skin in incisional area

Randomization:

Patients will then be randomized into two classes by simple randomization, using com putergenerated software at a 1:1 ratio. Using computer software, a random allocation sequenc e will be created and sequential patient consent to take part in the study will be allocated in th e corresponding arm according to the allocation sequence.

Group A: 65 patients wound closure was done with subcuticular method
Group B: 65 patients wound closure was done with interrupted method.

Study Protocol:

After randomization patients will be divided into Group A and Group B.

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Group A:

Subcuticular: The dermo-epidermal sutures taken.Using absorbable vicryl 2-0 on the cutting needle 'Fat layer sutured separately, the skin was closed with subcuticular sutures. Dressing was finished.

Group B:

Interrupted sutures:

Using non absorbable ethylon2-0 at a distance of 1 cm from each other, the skin was closed with interrupted sutures and stitches were placed in the far-far-near near order of bites with 24 ethylon 2-0 sutures.The far loop enters and leaves the surface of the skin at an angle of 90 degrees and continues deep into the dermis.The needle reaches one layer of the wound and pierces deep into the dermis or subcutaneous layers in order to place a simple interrupted suture. This technique can be used for wound edges of irregular thickness by changing the depth or angle of the needle. The needle is then transferred to the contrary layer of the wound through the subcutaneous layer and exists at the edge of the wound such that the final suture structure is flask-shaped.(6)

Outcomes:

Post-operative pain: Pain was determined by using numerical rating scale from second postoperative day. Patient was asked to score pain from 1-10 and their acceptable level of pain. Pain was categorized as mild, moderate and severe. Treating doctor determined appropriate intervention in response to numeric pain rating.

Immediate outcome(Wound infection) Oozing from wound, hematoma, seroma, pus, fever [98.6 degree Fahrenheit], swelling, erythema, gaping and induration were recorded.

Cosmetics: After 3 month of surgery cosmetics was observed by patient and physician and patients decision was considered in case of discrepancy to prevent bias.

DISCUSSION:

In the production of hypertrophic scars and hyperpigmentation at the repaired site, the repair technique may play an important role.(7) The scar and scab formation may be affected by the wound depth as well as wound extension, infection and local discomfort.Form of suture and technique are a major element that can influence the affects of wound closure.(8)Methodology of the closing should be short, easy, price effective and modest, while optimizing cosmesis of wounds and patient happiness. Skin closure and sufficient healing is the ultimate aim of any skin closure technique with minimal wound complications such asdiscomfort, inflammation, scarring.[9]

Skin suturing can be continuous or interrupted. Usually, continuous sutures are subcuticular, while the interrupted sutures include the totaldepth of the skin [10]. Both of them can be absorbable or non-absorbable[11]. Absorbable sutures do not require elimination, therefore, can decreaseunease of patient postoperatively. Suture methods and their complications can disturb the cosmesis of the Surgical site. If sutured appropriately, it can nearby the ends of the wound by eliminating the dead area between the tissues[12]. Lessenedwound healing can rise the charge of the treatment and lessen the cosmesis of the surgical sitein clean wound ,clean -

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contaminated wound, contaminated wound.
It is the most basic wound closing technique used in skin surgery and is a simple interrupted s uture. Procedure:The needle reaches one edge of the wound in order to doa simple interrupted suture and penetrates deep into the dermis or subcutaneous tissue. This approach can be used for wound edges of unequal thickness by adjusting the depth or angle of the needle.The need le is then shifted to the opposite edgeof the wound through the subcutaneous layer and exists near to the wound edge such that the flaskshaped ultimate form of the suture is[13].The primar y drawback to this method is that it appears to dispense a pattern of linear marks. If they are n ot correctly positioned, interrupted sutures tend to promote wound inversion, which can be av oided by positioning the suture in the flasklike configuration. Interrupted sutures are simple t o insert, have better tensile strength and have reduce
probability to cause wound swelling and decrease blood flow.

Vertical mattress sutures :This is one of the finest suturing methods available for wound evers ion and minimization of severe wound stress.
Procedure: The 0.51 cm lateral to the wound edgeof vertical mattress suture is started.To clo se the dead space, the needle is pierced down to the thickness of the wound.
The needle is then moved to the deep tissue to the marginof the opposite wound, where the sk in exits equidistant to the insertion on the opposite side. In the needle holder, the needle is the n inverted and the skin is pierced over on the edge from which the suture has just exited but n ear to the edge of the wound.It is transferred to opposite edge more superficially, exiting near to the wound edge (1-3 mm of wound
edge). Useful for optimizing wound eversion, eliminating dead space, and decreasing wounds tress. The technique of horizontal mattress suture helps to reduce wound strain, close the dead space and promote eversion of the wound edge. Procedure: 5-10 mm from the margin
of the wound to reach the flesh.
The needle is then moved dermally or subcutaneously to the opposite margin of
the wound then it reaches the subcutaneous or dermal layer at the same level.
Leave the opposing wound margin
equidistant from the insertion through the epidermis. At the identical distance from the woun d margin, reenter the skin on the same side but several millimeters laterally. The needle is the n moved to the side of the early penetration, dermally or subcutaneously.It is effective under high stress for wounds.
To temporarily approximate wound edges, this suture may also be used as a stay stitch .Prior t o a possible excision, horizontal mattress suture can be used as a skin expansion technique to minimize stress.

The technique of subcuticular suture is useful for enhancing the cosmetic outcome and is useful for closing wounds of equal tissue thickness and where there is virtually no stress. Procedure: By inserting a needle through one edge of the wound, it is started. The opposite edge is modified and the needle is positioned horizontally through the upper dermis.On alternating sides of the wound, this is replicated. Similar to the subcutaneous running suture at the distal end of the wound, the suture is terminated. In infants, absorbable subcuticular sutures can be used to prevent suture removal. If the sutures are to be left for extended

periods, it is possible to use non-absorbable sutures such as nylon.Few of the studies on suturing materials and techniques were reported[14-16]. Studies on cosmetic wound healing were reviewed [17,18].

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