

A comparative study of subcuticular versus three mattress sutures for pfannenstiel skin closure in obstetrics and gynaecological surgeries

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Abstract

Objective: To compare application of subcuticular sutures, with three mattress sutures for pfannenstiel incision closure.

Materials and Methods: Cross sectional study comparing subcuticular sutures to three mattress sutures for pfannenstiel wound closure was done in tertiary hospital from January 2012 till December 2013 on 100 patients with 50 in each group. All women undergoing primary elective and emergency caesarian section or hysterectomy through pfannenstiel incision were included after due informed consent. Sutures were applied using monofilament vicryl 3-0 for subcuticular skin closure. Mattress sutures were applied by using Nylon 3-0. A total of 3 sutures were applied with one suture at each end of the incision and one in the middle.

Results: Average suture application time was less in mattress suture group as compared to subcuticular suture group. Cost of suture was less in 3 mattress suture group due to usage of nylon sutures. Post-operative pain analyzed was more in subcuticular suture group with 56 % patients requiring additional analgesia versus 20 % in three mattress suture group. Post-operative infection rate was similar in both groups.

Conclusion: The use of mattress sutures gives advantage over subcuticular sutures on less severity of pain, shorter duration of pain, lower requirement of additional analgesia, cost of suture and significantly lesser time required for skin closure. Application of three mattress sutures is skill independent and can be used in limited resource settings also.

Keywords: Mattress, Subcuticular, Suture, Pfannenstiel incision

Introduction

The purpose of suturing is wound closure. Ideally, suturing should approximate the wound edges so that final scar is aesthetic and functional.⁽¹⁾ 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 post-operative pain, quick to apply, with minimum complications and satisfactory cosmetics.

The resurgence of mattress sutures in our study is for reducing the cost of therapy in tertiary referral centre as well as periphery without affecting quality of treatment.

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.^(2,3) This inspired us to apply knowledge practically and use three mattress suture of nylon for our study.

Aims and Objectives

To compare subcuticular suture with three mattress sutures for skin closure in obstetrics and gynaecological surgeries in terms of:

1. Intraoperative:

- average time of suturing
- cost of suturing

2. Postoperative

Immediate:

- Post-operative pain
- Additional post-operative analgesics required
- Postoperative infection and inflammation delayed
- Cosmetics of wound after 1 month

Material and Methods

Site of study: Choithram Hospital and Research Centre Indore.

Duration of study: January 2012 - December 2013

Number of patients: 100 women [50 in each Group]

Type of study: Cross sectional Study

Sampling method: Simple Random Sampling

Sampling technique: Lottery method

Statistical analysis: Done by applying chi-square test. The values were calculated for mean, standard deviation and their percentage.

Ethical issues: Ethical committee approval was taken from the institute.

Study involved procedure as part of routine surgical protocol so no extra financial burden on patient or institute was there.

Inclusion criteria: The pregnant women undergoing elective or emergency Caesarian section and those undergoing hysterectomy through pfannenstiel incision were included in the study after w5ritten informed consent.

Exclusion criteria:

1. Previous scar

2. Body mass index >30kg/m²
3. HIV infection
4. Uncontrolled gestational diabetes mellitus
5. Cancers of any type
6. Pre-existing febrile illness
7. Pre-existing skin infection at suture site.

Suturing technique:

Mattress sutures: Vertical mattress stitch placed in “far-far-near-near” order of bites with nylon 3-0 suture, two sutures one at each corner and one suture in middle. The far-far loop enters and exits the skin surface at 90 degree angle and passes deep into the dermis including whole of the fat layer.⁽³⁾ Fat layer was not sutured separately. If required, Allis tissue forceps was used to approximate edges in between suture hold for few seconds. Dressing was opened on fifth postoperative day and left open. Suture removal was done on 8th post-operative day.

Subcuticular: The dermo-epidermal sutures taken with monocryl 3-0. Fat layer sutured separately. Dressing was done on fifth day and left open.

Time of suturing: Time for suturing of skin was recorded by nurse in theatre using stop watch from picking up the instrument for skin closure till they were kept down. Subcuticular fat suturing was included as a part of skin approximation.

Post-operative pain: Pain was determined by using numerical rating scale⁽⁴⁾ from second post-operative day.

Women was asked to score her pain from 1-10 and her acceptable level of pain. Pain was categorized as mild, moderate and severe.

Treating doctor or nurse determined appropriate intervention in response to numeric pain rating.

Post-op analgesia: All women in our study received continuous intravenous non steroid anti-inflammatory drugs [NSAIDS] for first twenty-four hours of surgery. All additional opiate and non-opiate drug usage and its duration was recorded.

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

Cosmetics: After 1 month of surgery cosmetics was observed by patient and physician and patients decision was considered in case of discrepancy to prevent bias.

Results

Table 1: Distribution of women according to time required for suturing

| Time required for suturing | Mattress suture | | Subcuticular suture | |
|----------------------------|-----------------|------------|---------------------|------------|
| | Number | Percentage | Number | Percentage |
| 0-5min | 17 | 34 | 0 | 0 |
| 5-10min | 33 | 66 | 2 | 4 |
| 10-15min | 0 | 0 | 48 | 96 |

$\chi^2 = 92.46, p < 0.0001$, significant

Table 2: Presence of wound discharge and induration

| Wound Discharge | Mattress sutures | | Subcuticular sutures | |
|-----------------|------------------|------------|----------------------|------------|
| | Number | Percentage | Number | Percentage |
| Present | 8 | 16 | 6 | 12 |
| Absent | 42 | 84 | 44 | 88 |

$P > 0.05$, not significant

Table 3: Severity of pain

| Severity of pain | Mattress suture | | Subcuticular suture | |
|------------------|-----------------|------------|---------------------|------------|
| | Number | Percentage | Number | Percentage |
| Mild | 26 | 52 | 10 | 20 |
| Moderate | 14 | 28 | 12 | 24 |
| Severe | 10 | 20 | 28 | 56 |

P=0.0004, significant

Table 4: Requirement of Additional Parental Analgesics according to suturing type

| Additional Analgesic Requirement | Mattress suture | | Subcuticular suture | |
|----------------------------------|-----------------|----------------|---------------------|----------------|
| | Number | Percentage (%) | Number | Percentage (%) |
| No | 40 | 80 | 22 | 44 |
| Yes | 10 | 20 | 28 | 56 |

$\chi^2=12.27, p=0.0005$, significant

Table 5: Cosmesis

| Cosmesis | Mattress suture | | Subcuticular suture | |
|-----------|-----------------|------------|---------------------|------------|
| | Number | Percentage | Number | Percentage |
| Excellent | 19 | 44.1 | 14 | 35 |
| Good | 14 | 32.5 | 14 | 35 |
| Fair/poor | 10 | 23.25 | 12 | 30 |

$p>0.05$, not significant



Fig. 1: Picture showing 3 Mattress Suture: Application Technique



Fig. 2: Picture showing 3 Mattress Suture: Post Application Technique

Discussion

In the present study, time taken for 3 mattress suture was significantly less than subcuticular sutures. This result is comparable to Holmgren G et al⁽⁵⁾ works on Misgav Ladach technique for cesarean section where 3 sutures for skin closure reduced time of cesarean.

Karia J and colleagues in their study⁽⁶⁾ concluded that subcuticular stitches are complicated and time consuming. Similar were the results of Shetha B R et al study.⁽⁷⁾

In the present study severity of pain was assessed by visual analog scale. Mattress Suture group was associated with significantly lesser degree of pain. The additional analgesics were needed by only 20% of patients in mattress group as against 56% patients in subcuticular group.

A similar study done by Ibrahim MI and colleagues concluded that subcuticular stitches in Caesarian section was associated with significantly more post-operative pain as against interrupted sutures.⁽⁸⁾

Holmgren G and colleagues also concluded that three mattress sutures led to significantly lesser pain.⁽⁵⁾

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⁽⁹⁾ showed monofilament non-absorbable nylon suture to be least infective for closing abdominal incisions.

Corder AP, et al⁽¹⁰⁾ observed statistically insignificant difference in subcuticular and interrupted skin closure.

Onwuanyi O N⁽¹¹⁾ 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.

In our study cosmesis was compared after one month of surgery and no statistically significant

difference was found in two groups. Nylon mattress sutures faired equally well with subcuticular sutures.

In study by Anate M⁽¹²⁾ and colleagues' appearance of wound and scar were better in absorbable subcuticular group as compared to interrupted non absorbable suture.

Study by Karia J⁽⁶⁾ also had results favoring better cosmesis in subcuticular group as compared to mattress group.

Conclusion

The use of 3 mattress suture gave advantage over subcuticular suture in less severity of pain, shorter duration of pain, lower requirement of additional analgesics, cost of suture material, comparable cosmesis and significantly lesser time required to perform skin closure.

Furthermore, use of three mattress suture was not inferior to subcuticular suture in terms of wound discharge and induration.

Thus three mattress sutures can be easily taught to resident doctors and those working in low resource setting and also for those patients in whom time of anesthesia is to be reduced as it is easy to learn and quick to apply.

References

1. Mohan H. Kudur, Sathish B. Pai, H. Sripathi, Smitha Prabhu: Sutures and suturing techniques in skin closure; Indian J Dermatol Venereol Leprol | July-August 2009 | Vol 75 | Issue 4:425-34.
2. Stadelmann WK, Digenis AG, Tobin GR. Physiology and Healing dynamics of chronic cutaneous wounds. American journal of surgery 1998;176(2ASuppl):26S-38S.
3. Nguyen DT, Orgill DP, Murphy GF. Chapter 4: Pathophysiologic Basis for Wound Healing and Cutaneous Regeneration. Biomaterials for treating skin loss. Woodhead Publishing (UK/Europe) and CRC Press (US), Cambridge/ Boca Raton,2009,p.25-57.
4. Mc Caffery M, Pasero C. Pain: Clinical Manual, 0-10 numeric pain rating scale, St. Louis,1999,P.16.
5. Holmgren G, Sjöholm L, Stark M .The Misgav Ladach method for cesarean section: method description. Acta Obstet Gynecol Scand 1999 Aug;78(7):615-21.
6. Karia J, Patel A, Jadav H.A Comparative study of vertical mattress vs sub-cuticular stitches in type 1 surgery. JPSBR: Volume 4, Issue 1: 2014 (106-109).
7. Shwetha B R, Rema V Nair, Janaki Thankam M Pillai, Prashant V Solanke. Comparison between interrupted vertical mattress versus subcuticular suture for skin closure in caesarean section at SMIMS: IJRR, vol:3, year 2016, month: 02, pages:33-36.
8. Ibrahim MII, Moustafa GF, Al-Hamid AS, Hussein MR. Superficial incisional surgical site infection rate after cesarean section in obese women: a randomized controlled trial of subcuticular versus interrupted skin suturing: Gynecol Obstet. 2014 May; 289(5):981-6. doi: 10.1007/s00404-013-3098-z. Epub 2013 Nov 24.
9. Bucknall TE Teare L, Ellis H. The choice of a suture to close abdominal incisions. Eur Surg Res. 1983;15(2):59-66.
10. Corder AP, Schache DJ, Farquharson SM, Tristram S. Wound infection following high saphenous ligation. A trial comparing two skin closure techniques: subcuticular polyglycolic acid and interrupted monofilament nylon mattress sutures: R Coll Surg Edinb. 1991 Apr;36(2):100-2.
11. Onwuanyi ON, Evbuomwan I. Skin closure during appendicectomy: a controlled clinical trial of subcuticular and interrupted transdermal suture techniques. J R Coll Surg Edinb. 1990 Dec;35(6):353-5.
12. Anate M: Skin closure of laparotomy wounds: absorbable subcuticular sutures vs. non-absorbable interrupted sutures. West Afr J Med. 1991 Apr-Jun;10(2):150-7.