

Comparison Between the Knotless Suture Technique and The Conventional Technique in Rectus Sheath Closure of Cesarean Section

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ABSTRACT

Background: The rectus sheath is closed during a cesarean section using a variety of methods and suture materials. To ensure optimal healing and minimize problems, a few general guidelines should be followed while sealing the anterior abdominal wall. All sutures used to seal the musculofascial wall must be tightened to roughly resemble the incision's margins. The tissue will become ischemic and necrosis will form if a further strain is applied.

Objective: The purpose of this study was to compare the Knotless suture technique to traditional techniques in rectus sheath closure after a cesarean section.

Patients and Methods: In this randomized control study 90 patients undergoing cesarean section were divided into two equal groups in the Obstetrics and Gynecology Department at Al-Azhar University hospitals of Damietta for elective cesarean section.

Results: In the present study, there was no statistically significant difference between study groups as regards infection of wound dehiscence at 1st week. Also, there was a statistical increase in the number of granulomas and discomfort in group B than in group A.

Conclusion: In conclusion, we can say knotless suture for rectus sheath closure post-CS could save time and provide an effective method for closure of rectus sheath with a lower risk of complications, postoperative pain, and discomfort.

Keywords: Knotless Suture, Rectus Sheath, Cesarean Section, Pfannenstiel.

INTRODUCTION

One of the most frequent surgical procedures carried out globally is a cesarean section. The rectus muscles are separated from the rectus sheath through a modest transverse suprapubic incision in this operation (1).

The Pfannenstiel incision has grown in popularity and is currently used in the majority of obstetric and gynecological surgeries. This incision is currently utilized for the vast majority of cesarean procedures. This incision is currently utilized for the vast majority of cesarean procedures. The advantages of a horizontal incision over a vertical incision include a lesser risk of complications (2).

The Rectus sheath closure technique implies rectus sheath closure; many surgeons use a continuous suture to close the wound. A continuous suture has the advantages of speed, homogeneous tension distribution, less foreign material in the wound, and lower wound stress. Continuous sutures are just as safe as interrupted closure. Many studies have found that it provides a quick and safe closure of the rectus sheath, even in high-risk patients (3).

There are several possible suturing techniques and materials for closing the rectus sheath (fibrous material enclosing the muscles of the abdominal wall) in the UK conducted in 1999 discovered that most operators (73 percent) used a continuous non-locking suture with a single central lock and the remainder used a continuous locking suture (5 percent), interrupted suture (less than 1 percent). There are several possible suturing techniques and materials for closing the rectus sheath (fibrous material enclosing the muscles of the abdominal wall) in the UK conducted in 1999 discovered that most operators (73 percent) used a

continuous non-locking suture with a single central lock and the remainder used a continuous locking suture (5 percent), interrupted suture (less than 1 percent).

Vicryl was the most commonly utilized suture material (87%) (4).

For cesarean section operating methods or materials, there are no globally recognized standards. There is no trustworthy information available on how to close the skin following a cesarean operation. There are still outstanding questions about the optimum closing processes and outcomes. Women should be informed of post-operative wound concerns and scar morbidity following a cesarean section to receive the best obstetric care. There isn't enough information to say if one way of sealing abdominal wounds after a cesarean section is better than another (5).

This research compared the Knotless suture technique to traditional techniques in rectus sheath closure after a cesarean section.

PATIENTS AND METHOD

This randomized control study was conducted on 90 patients undergoing elective cesarean section. At Obstetrics and Gynecology department at Al-Azhar University hospitals of Damietta for elective cesarean section.

Inclusion criteria: Singleton term pregnancy scheduled for elective cesarean section.

Exclusion criteria: Emergency cesarean section, fat thickness more than 4 cm, or patients needing intraperitoneal drain during a cesarean.

Ethical consent:

The study was approved by the Ethics Board of Al-Azhar University and informed written consent

was taken from each participant in the study. This work has been carried out following The Code of Ethics of the World Medical Association (Declaration of Helsinki) for studies involving humans.

All patients were divided into two groups:

Group (A): 45 patients were undergoing a new technique of Pfannenstiel incision closure.

Group (B): 45 patients were undergoing the conventional method.

All patients were subjected to:

Routine Complete history taking includes Personal history, Any complaint, Obstetric history, Menstrual history, Past medical and past surgical history, and Family history.

Group A: were consisted of women were undergo a knotless suture technique of rectus sheath closure, As the following: knotless suture at the left angle of the rectus sheath, end of the thread was left in the line of incision and continue by simple running suture tell the right angle of rectus sheath which will be closed by knotless suture then the sutures were inverted to scarp's fascia and subcutaneous tissue.

Group B: women were undergoing conventional method, As the following knot suture at the left angle of the rectus sheath and continue by running simple suture tell the right angle of rectus sheath which were closed by knot.

Statistical analysis:

SPSS Software (version 23) was used to perform a statistical analysis of patient data. According to data distribution, descriptive data were expressed as either means with standard deviation or median with ranges. Frequency distributions were used to describe categorical variables. An independent sample t-test was used to detect differences in the means continuous variables and the chi-square test was used in cases with low expected frequencies. P-value <0.05 is considered significant.

RESULTS

The mean age in group A was 27.4 years while in group B was 25.8 years without any statistically significant (Table 1).

Table (1): Comparison of demographic characters between study groups

	Group A		Group B		P-Value
	Mean	SD	Mean	SD	
Age	27.4	4.4	25.8	3.9	0.28
Gravida	3.06	0.9	2.63	0.7	0.165
BMI	23.6	2.1	24.3	2.2	0.31
	N	%	N	%	
Previous operation	19	42.2	17	37.8	0.78

Table 2 showed that the mean pain score in group A was 5.06. While in group B 5.13 without statistically significant.

Table (2): Comparison of follow-up on first day postoperative between study groups

	Group A		Group B		P-Value
	Mean	SD	Mean	SD	
Pain	5.06	0.8	5.13	0.8	0.84

On the third day of postoperative follow-up pain score in group A was 2.9 while in group B was 3.06 without significance. 33 (73.3%) cases in group A showed discomfort while in group B 22(48.9%) cases with a statistically significant lower number in group B (Table 3).

Table (3): Comparison of follow-up at third day postoperative between study groups:

Third day	Group A		Group B		P-Value
	Mean	SD	Mean	SD	
Pain	2.9	0.6	3.06	0.9	0.7
	N	%	N	%	
Discomfort	33	73.3	22	48.9	0.015

There was no statistically significant difference between study groups regarding infection of wound dehiscence in 1st week (Table 4).

Table (4): Comparison of 1st week of postoperative follow-up between study groups:

1st Week	Group A		Group B		P-Value
	N	%	N	%	
Infection	9	20	4	8.9	0.115
Dehiscence	6	13.3	2	4.4	0.133

There was a statistical increase in the number of granulomas and discomfort in group B than in group A (Table 5).

Table (5): Comparison of 4th-week follow-up between study groups

4th week	Group A		Group B		P-Value
	N	%	N	%	
Granuloma	3	6.7	22	48.9	0.001
Discomfort	9	20	22	48.9	0.004

DISCUSSION

Several methods and suture materials are used to seal the rectus sheath during a cesarean section. To facilitate optimal healing and avoid problems, a few fundamental rules should be followed while sealing the anterior abdominal wall. All sutures used to seal the musculofascial wall must be knotted tightly enough to

approach the incision margins. When further strain is applied, the tissue becomes ischemic and necrosis develops. Sutures should be put 1 to 1.5 cm from the wound's edge. Sutures should be placed 2 cm from the incision's edge in patients who are at high risk of wound disruption ⁽⁶⁾.

Running sutures are faster since knots only need to be tied at two or three spots. Interrupted and figure-of-eight sutures have the benefit of not breaking apart if insecurely knotted and can be utilized for strengthening thin rectus sheaths. However, these sutures are linked to an increased risk of buttonhole hernias and sinus development, which leads to greater wound discomfort. To avoid slippage, take care when tying the knots ⁽⁷⁾.

Some numerous suturing procedures and materials may be used to close the rectus sheath. **Tully et al.** ⁽⁸⁾ discovered that most operators (73 percent) used a continuous nonlocking suture, 21 percent used a continuous nonlocking suture with a single central lock, and the remainder used a continuous locking suture (5 percent), interrupted sutures (less than 1 percent), or more than one technique in a 1999 survey of techniques used in cesarean section operations by obstetricians in the UK ⁽⁹⁾.

In our study, the mean pain score in group A was 5.06. While in group B 5.13 without statistically significant.

On the third day of postoperative follow-up pain score in group A was 2.9 while in group B was 3.06 without significance.

A prospective, double-blind, randomized controlled trial of women getting primary CS was conducted. In all, 63 women were randomized at random, with 35 receiving conventional rectus muscle reapproximation and the remaining 28 not. 72 hours after surgery, the rectus muscle reapproximation group showed higher Silverman integrated assessment ratings ⁽¹⁰⁾.

In our work, there was no statistically significant difference between study groups regarding infection of wound dehiscence at 1st week.

Also, there was a statistical increase in the number of granulomas and discomfort in group B than in group A.

For rectus muscle re-approximation, the novel modified undermining suture method was used in conjunction with a regular CS process. After surgery, the patient's pain level was 2/10, and there were no signs of hematoma, seroma, or infection. The patient also had good mobility ⁽¹¹⁾.

If the knots generate a bulge under the skin and puncture through the skin, the rectus sheath closure using nonabsorbable or delayed absorbable monofilament material, such as nylon, polypropylene, or polydioxanone, can cause the patient much suffering and sorrow ⁽¹²⁾.

The knot can be prevented by burying it beneath the rectus sheath. By beginning the stitch from

the inside out, the knot at the beginning of the closure may be easily hidden behind the rectus sheath. The researchers looked at 132 cesarean sections done between 2000 and 2001. They had two incidences of sinus development that required the suture material to be removed. They experienced no issues with any of their patients. This is a straightforward and effective approach for burying knots while closing the rectus sheath ⁽¹²⁾.

The introduction of knotless barbed sutures has shortened wound closure timeframes. Their use in tendon surgery is still being studied in experimental animals. This research used six animals. One incision was closed with 2-0 Quill polydioxanone barbed suture and the other with 1-0 PDS II control suture (polydioxanone). There were no wound infections or hernias in the incision ⁽¹³⁾.

No trials were investigating alternative suture methods or materials for rectus sheath closure in the Cochrane review.

So, we can say knotless suture for rectus sheath closure post-CS could save time and provide an effective method for closure of rectus sheath with a lower risk of complications, postoperative pain, and discomfort.

CONCLUSION

In conclusion, we can say knotless suture for rectus sheath closure post-CS could save time and provide an effective method for closure of rectus sheath with a lower risk of complications, postoperative pain, and discomfort.

Conflict of interest: The authors declare no conflict of interest.

Sources of funding: This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Author contribution: Authors contributed equally to the study.

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