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Skin closure with Pfannenstiel incision in lower segment caesarean section; comparison of wound outcome with interrupted vs. subcuticular techniques

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ABSTRACT

Introduction: Caesarean section is the most common surgical procedure performed in the world. A vast majority of the procedures are carried out with Pfannenstiel incision. Different techniques and materials are used to approximate the skin in caesarean section. Each method has its own advantages and disadvantages. The objective of the study was to compare surgical wound outcome and satisfaction of women who underwent Pfannenstiel incision closure with interrupted vs. subcuticular suturing in caesarean sections.

Methods: A prospective comparison was carried out in 400 age and body mass index matched women who underwent lower segment caesarean section for the first time. Standard lower segment caesarean section was performed with assigning interrupted and subcuticular wound closure for 200 women in each group, following matching for BMI and age. Two arms were compared for wound complications, postoperative pain and overall satisfaction of the outcome.

Results: There was no statistically significant difference between groups for baseline characteristics (age, BMI and category of caesarean sections). According to visual analogue scale 91% of women reported to have moderate to severe pain in interrupted group compared to 80% in subcuticular group ($p<0.05$). Wound complications were present in 8% of interrupted group vs 3% in subcuticular group ($p<0.001$). Sixty four percent of women were satisfied with subcuticular method vs. 28% with interrupted method ($p<0.001$).

Conclusions: Women who had subcuticular suturing method had less post-operative pain, better wound outcome and more satisfaction compared to interrupted suturing.

Keywords: *Caesarean section, Pfannenstiel incision, wound closure, wound outcomes*

Introduction

Caesarean section is one of the most common surgical procedures performed worldwide. It was first described and performed by Hermann Pfannenstiel in 1900 (1). This involves low transverse suprapubic incision with the dissection of rectus muscles from the overlying rectus sheath. This has become popular and currently is the incision of choice in most of the obstetric and gynaecological surgeries. Currently a vast majority of caesarean sections are being performed using this incision (2, 3).

Advantages of this skin incision over a vertical incision are; low rate of complications (infection, haematoma and gaping) and rapid healing with cosmetically better appearance. This results in closing dead space, supporting and strengthening wound until healing is completed and approximating

skin edges for the aesthetic results minimizing bleeding and risk of infection (4). Skin union can be observed by 48 hrs of the surgery and complete union take place by the seventh post-operative day. Surgical closure also serves functional and aesthetic purposes, for example, the elimination of dead space by approximating the subcutaneous tissues; careful epidermal alignment resulting in minimisation of scar formation; and avoidance of a depressed scar by precise eversion of skin edges (5).

There are several techniques to close the skin; interrupted mattress, subcuticular adhesive types and staplers. Each technique has its own advantages and disadvantages. The subcuticular technique involves running a stitch through subcuticular or epidermal tissue. This is an easy method of approximation of skin. Interrupted vertical mattress stitch involves piercing the skin at four points at the same level for a single stitch with a good amount of subcuticular tissue and fat. This closure allows blood and serosanguinous tissues to drain. However, this technique is time consuming (6).

Caesarean section has no universally agreed standards on operative techniques or materials to use. There is no conclusive evidence about how the skin should be closed after caesarean section. Questions regarding the best closure techniques and outcome are remaining unanswered. Post-operative wound related complications and scar related morbidity following caesarean section is important to women for the optimal obstetric care. There is no conclusive evidence to say whether any particular technique for closing abdominal wound in caesarean section is better than the other.

In the current context due to limitations of the evidence particularly of skin closure, obstetricians use different closing techniques to approximate the skin during caesarean section. The aim of the study was to compare wound outcome and maternal satisfaction in subcuticular and interrupted techniques for skin closure in caesarean section.

Methods

The study was carried out in selected 400 women who had caesarean delivery with Pfannenstiel incision for the first time in a single obstetrics unit. There were three age categories (<25 years, 26-35 years and >35 years) and four BMI categories (underweight, average, overweight and obese). It was make sure to allocate approximately similar number of mothers consecutively for each category while assigning woman for two methods of suturing to get 200 mothers in each group for the prospective assessment of the outcome. Interviewer administrated questionnaire was used for the data collection. The questionnaire consisted of three sections. Section one was related to demographic data, section two contained data on wound related complications and last section was on patient satisfaction. Data collection was done at postoperative day 1, day 3 and day 14. Women were advised to seek immediate medical advice if there were any wound related complications during follow up period.

Women with diabetes, multiple pregnancies and maternal medical problems were excluded from the study. All caesarean sections had been performed by trained middle grade medical officers under the supervision of the obstetrician without giving any preference to either of the techniques. Group1 consisted of women with subcuticular suturing for incision closure with absorbable material (No. 3.0 polyglecaprone and group 2 consisted of women with interrupted suture with non-absorbable material (No. 0 Nylon). Perioperative antibiotics had been given prior to the procedure in all cases. Routine skin cleaning was done with povidone iodine and ethyl alcohol. Skin incision was performed with Joel-Cohen incision. Rest of the caesarean section was done in the standard way. On the post-operative day 3, the two groups of women were asked to indicate the level of post-operative pain using a visual analogue scale. The dressing was open on the third day and wound was inspected for any complications. Uncomplicated patients were discharged on post-operative day 3 and women in group 2 were advised to have suture removal on day 7. After two weeks of the surgery, mothers were assessed for wound related complications and their overall satisfaction was assessed using 1 to 5 satisfaction score. Categorical variable of satisfaction was ranging from not satisfied to highly satisfied.

Ethical approval was obtained from Ethical Review Committee, Faculty of Medicine, University of Ruhuna. Informed written consent was obtained

from all participants. Data were stored in password protected database and were analysed for the statistical significance by chi-square test for qualitative data and t-test for quantitative data.

Results

Table 1 summarizes baseline characteristics of the study groups. There were 400 women recruited for the study with 200 in each group. Approximately two third of women belong to age category of 26-35 years in both study groups. Approximately 40% of women in both groups were within the normal range for BMI. More than 90% of women were Sinhala Buddhists. Half of the women in both groups had studied up to A/L. In both groups almost half of women underwent elective caesarean sections. There was no statistically significant difference in study groups with regards to baseline characteristics.

Table 2 summarizes outcome of different suture techniques. In both groups, a vast majority of women experienced moderate to severe pain and it was significant in women with interrupted suture technique compared to subcuticular technique (91.5% vs. 80.5%, ($p<0.05$). Overall wound complications were observed more in interrupted group than in the subcuticular group (8% vs. 3%, ($p<0.001$). There was a clinically significant difference in wound complications in interrupted group than in subcuticular group. There was a statistically significant difference of overall satisfaction with 64.5% of women in subcuticular group vs. 28% in interrupted group ($p<0.001$).

Table 1: Socio-Demographic characteristics of the participants (n=400)

Demographic Characteristics	Category	Subcuticular		Interrupted		p value
		Frequency (n=200)	Percentage (%)	Frequency (n=200)	Percentage (%)	
Age (years)	≤ 25	37	18.5	40	20	0.92
	26 - 35	138	69	135	67.5	
	> 35	25	12.5	25	12.5	
BMI	Under wt.	42	21	40	20	0.35
	Normal	84	42	88	44	
	Over wt.	39	19.5	31	15.5	
	Obese	35	17.5	41	20.5	
Race	Sinhalese	186	93	184	92	0.7
	Other	14	7	16	8	
Religion	Buddhist	185	92.5	184	92	0.85
	Other	15	7.5	16	8	
Educational level	≤ O/L	119	59.5	102	51	0.09
	≥ A/L	81	40.5	98	49	
Category of LSCS	Emergency	88	44	97	48.5	0.37
	Elective	112	56	103	51.5	

Table 2: Outcome of different suture techniques

Outcome variables	Categories	Subcuticular		Interrupted		p value
		Frequency (n=200)	Percentage (%)	Frequency (n=200)	Percentage (%)	
Pain (visual analogue scale)	< 5 (mild)	39	19.5	17	8.5	< 0.05
	> 5 (moderate to severe)	161	80.5	183	91.5	
Overall wound complications	Present	6	3	16	8	< 0.001
	Not present	194	97	184	92	
Different types of Wound complications	Seroma	3	1.5	4	2	-
	Hematoma	1	0.5	3	1.5	
	Gaping	4	2	9	4.5	
Overall Satisfaction	None	192	96	184	92	< 0.001
	Satisfied	129	64.5	56	28	
	Not satisfied	71	35.5	144	72	

Discussion

Current study showed that women who had subcuticular suturing technique had less post-operative pain, better wound outcome and more satisfaction compared to interrupted suture technique.

As caesarean section is the most common surgical procedure performed worldwide, incision related morbidity is of paramount importance for the overall improvement of maternity care. Out of other modalities of deliveries, caesarean section related pain is worse. Skin closure significantly contributes for the severity of pain. In this study, subcuticular group had less pain score than interrupted group. This may be due to involvement of more tissue bulk with tightening in the interrupted suturing technique.

Approximately 10% of women suffered from wound related morbidity, mostly due to approximation of the skin. Our study found that occurrence of wound complications in interrupted group more than in the subcuticular group. Choudhary A, *et al.* has reported that subcuticular absorbable material offered better skin approximation and healing than interrupted suture which needed re-suturing more often (7). Makeen, *et al.* in their systematic review of Cochrane database on techniques and material for closure of caesarean section found that non absorbable staples were associated with increased risk of separation and resuturing than absorbable subcuticular suturing (6).

In randomized controlled trials performed by Brown JK, *et al.* they compared subcuticular absorbable suturing to skin adhesives. They had observed that there was no difference in cosmetic outcome in skin closure provided adhesive skin approximation for proper healing. Skin adhesives on the other hand are more expensive than suturing though it reduces operating time (8).

It was found that subcuticular suture is not only cost effective but also saves operating time when compared to interrupted mattress. A study done by Choudhary A, *et al.* in 2017 revealed that subcuticular absorbable suture is superior to interrupted mattress when wound outcome is considered. Time taken for skin closure was less and approximation was better without tension. Women were discharged earlier since there was no need for suture removal (7).

Guruswami, *et al.* in their systematic review in Cochrane database compared continuous vs. interrupted mattress for non obstetric surgeries found that superficial wound adhesions may be reduced by using subcutaneous continuous sutures. This observation is in agreement with our findings of

lesser incidence of wound gapping with subcuticular techniques (9).

This study also shows that women's satisfaction score was much higher in subcuticular group than interrupted group. This reflects overall less postoperative pain and minimal wound related morbidity in subcuticular group than interrupted group. Similar finding was reported by Aliya I, *et al.* in 2011(10).

Limitations

There are some limitations of this study. We have considered the BMI of these patients but not the other parameters such as skin thickness and variability of the thickness of abdominal fat layer which could have influenced the wound outcome more than the BMI. Further, the sections were performed by different medical officers under the supervision of an obstetrician rather than a single surgeon performing the technique in all patients.

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