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Difference between Pfannenstiel Incision and High Transverse Supra Umbilical Incision, During Elective Cesarean Section in Morbidly Obese Patients

Wael Soliman Taha
Obstetrics and Gynecology, Faculty of Medicine for Boys, Al-Azhar University, Cairo, Egypt

Mohamed Ahmed Abd El Moaty
Obstetrics and Gynecology, Faculty of Medicine for Boys, Al-Azhar University, Cairo, Egypt

Ali El-sayed Zaki El-gredly
Obstetrics and Gynecology, Faculty of Medicine for Boys, Al-Azhar University, Cairo, Egypt, alizaki636@gmail.com

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ORIGINAL ARTICLE

Difference between Pfannenstiel Incision and High Transverse Supra Umbilical Incision, During Elective Cesarean Section in Morbidly Obese Patients

Wael S. Taha, Mohamed A. Abd El Moaty, Ali E. Z. El-gredly *

Department of Obstetrics and Gynecology, Faculty of Medicine for Boys, Al-Azhar University, Cairo, Egypt

Abstract

Background: ***The cesarean section (CS) ranks as one of the most common surgeries carried out on women worldwide. Due to a variety of causes and circumstances, the incidence of CS births has rapidly increased over the past 20 years, from 12% in 1990 to 24% in 2008, without appreciably lowering the percentage of perinatal deaths and morbidities.***

Aim: ***To distinguish between the higher transverse supraumbilical incision and the Pfannenstiel incision during an elective CS in individuals who are morbidly obese.***

Patients and methods: ***A randomized clinical trial was conducted in the Obstetrics and Gynecology clinics of Al-Azhar University Hospitals from May 2021 to May 2022. Sixty women were randomized and separated into the Pfannenstiel incision group and the higher transverse supra umbilical incision group. Group A: 30 obese patients who underwent Pfannenstiel incision. Group B: 30 obese patients who undergo higher transverse incision.***

Results: ***Regarding intraoperative adhesions, we found no statistical variation between the two arms (p=0.228). Regarding surgical complications, we found no statistical variation between the two arms (p=0.775). Regarding wound infection, we found no statistical variation between the two arms (p=0.117). Regarding wound healing, we found no statistical variation between the two arms (p=0.757).***

Conclusion: ***The transverse supraumbilical incision demonstrated clear benefits, including faster recovery after surgery, decreased bleeding, less pain following the procedure, earlier return of bowel movement, earlier mobility, and a shorter stay in the hospital. The economy is another factor, which includes using less anaesthesia, preserving more time, and requiring fewer devices.***

Keywords: Pfannenstiel incision; Transverse supra umbilical incision; Cesarean section; obese patients

1. Introduction

Due to reduced sight and potential difficulties with subcutaneous tissue retraction, operations in obese gravidas can be a challenge. Individuals who are obese have higher rates of operational problems, including longer operating times, more bleeding, trouble getting enough neuraxial anaesthesia, and a higher rate of converting to general anaesthesia.[1]

Additionally, complications following surgery, such as fascial breakdown, hematomas, wound-related infections (such as cellulitis and sepsis), endometritis, and thromboembolism are more common in obese women. Relative to women of average weight, obese ones require more CS deliveries. Thus, a crucial component of care during pregnancy and after delivery care is reducing problems in this group of women.[2]

A woman's risk of developing gestational diabetes, macrosomia, cephalopelvic disproportion, failed vaginal delivery following a primary CS, and unsuccessful induction all rise when she is obese throughout her pregnancy.[3]

The most common and preferred incision for a CS is the Pfannenstiel incision. It was initially explained by Hermann Pfannenstiel in 1971. A low transverse supra-pubic incision is made two fingers above the pubic bone. It gives a better cosmetic appearance, less pain, a quicker healing period, and less bleeding, in addition to providing a proper view of the pelvic organs.[4]

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* Corresponding author at: Obstetrics and Gynecology, Faculty of Medicine for Boys, Al-Azhar University, Cairo, Egypt.
E-mail address: alizaki636@gmail.com (A. E. Z. El-gredly).

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For uncomplicated cesarean deliveries, a Pfannenstiel incision is typically utilized. As this incision is made behind the panniculus, it may be in a humid, low-oxygen environment, which raises the possibility of infection and inadequate wound healing. A vertical supraumbilical incision is an alternate incision for obese women. This kind of incision eliminates the fold under the panniculus, but because it has less access to the inferior uterine region, it increases the chance of a traditional hysterotomy incision.[5]

This study aims to differentiate between Pfannenstiel incision and higher transverse supra umbilical incision during elective CS in morbidly obese women.

2. Patients and methods

This randomized clinical trial included 60 obese pregnant women who attended the Obstetrics and Gynecology clinics of Al-Azhar University from May 2021 to May 2022. Patients were divided randomly into the Pfannenstiel incision group (30) and the higher transverse supra umbilical incision group (30). Our study followed the Helsinki Declaration principle. Ethical approval was obtained from our institution (Institutional Research Board IRB), Department of Ethics Committee in the Faculty of Medicine on 25/12/2022. Prior to recruitment, each patient provided written informed consent.

Inclusion criteria: Pregnant women who are obese and submitted for Pfannenstiel incision or higher transverse incision throughout elective CS. BMI more than 30 kg, m2, no obstetric emergency, e.g. ROM, contractions, Fetal distress, severe preeclampsia and surgical history (free Regardless of Previous CS.

Exclusion criteria: Patients with a BMI less than 29 kg/m2, patients with other types of incision and women whose membranes have ruptured for more than eighteen hours.

Data collection

Complete medical history (personal, obstetric, gynaecological), general examination, and local obstetric examination were made at the baseline. Routine laboratory investigations were also done at the baseline, including (CBC, Liver and kidney functions, and lipid profile). The BMI Kg/m2 will be measured by subdividing the weight (kg) on the length square (m2). The study's primary outcome is the difference between Pfannenstiel incision and higher transverse incision in elective CS surgery according to the risk of infection. Secondary outcomes include the surgery time, time of antibody taking, and the complication of the scar.

Surgical technique

Pfannenstiel Incision

During this procedure, the patient can choose a customized dorsal supine lithotomy, lithotomy, and supine position. The semicircular Pfannenstiel incision was made just above the pubic bone, approximately 12 cm in length. It is crucial to ensure hemostasis is achieved before entering the peritoneal cavity. A transverse opening of the rectus fascia was made.

The rectus muscles were detached and dissected from the peritoneum following the opening of the rectus fascia. The rectus muscles should be divided if lateral retraction cannot adequately separate them. Women with a history of term pregnancy generally had easier muscles to separate. Obtaining sufficient exposure in certain patients with robust and taut rectus muscles might not be possible without cutting the muscle. Before dissecting the muscle, the inferior epigastric vessels on its lateral boundary had to be secured with clamps cut and ligated if the muscle was going to be transacted.

The peritoneum was lifted using tissue forceps and then cut open longitudinally or transversely.

Transverse supra umbilical incision

The high transverse incision makes the rectus abdominalis fascia easier to reach. The fat tissues above the panniculus are not very thick. The parietal peritoneum and the aponeurosis underwent a horizontal incision.

After that, it was easier to proceed towards the lower part of the uterus. A suprapubic valve is used to preserve the bladder after separating it from the uterus, and a Ricard retractor is implanted. The aid was positioned between the woman's legs. A transverse segment hysterotomy was performed except in cases of extremely premature births (vertical hysterotomy). The baby was extracted. The placenta was delivered by hand, and the uterus was checked manually for remnants. The hysterotomy was closed with hemi-continuous sutures with Polysorb 0.

After the confirmation of hemostasis and the adnexa, the peritoneal cavity was cleansed. The peritoneum was then closed using a continuous suture with Polysorb 2/0, while the aponeuroses were closed using two hemi-continuous sutures with Polysorb1. The skin was closed with staples.

Statistical analysis:

The Windows SPSS software (Version 25) was used to code, process, and analyze the data gathered. The following descriptive statistics were computed: means, medians, ranges, percentages, and standard deviations. Independent t-tests were applied to contrast the means of regularly distributed data for continuous variables, chi-square tests were applied to categorical data, and Mann-Whitney U tests were applied to evaluate the median differences of data that were not normally distributed.

3. Results

Table 1. Age distribution among the study population.

	PFANNENSTIEL GROUP (N=30)	HIGHER TRANSVERSE GROUP (N=30)	TEST OF SIG.	P
AGE (YEARS)			t=0.827	0.412
MEAN±SD.	31.1±4.13	30.17±4.6		
MEDIAN (IQR)	31 (28.5-34.75)	30.5 (26.25-34)		
RANGE (MIN-MAX)	14 (23-37)	16 (22-38)		
AGE DISTRIBUTION			X2=2.584	0.108
- 20-29 YEARS	8 (26.67%)	14 (46.67%)		
- 30-40 YEARS	22 (73.33%)	16 (53.33%)		

Age (years) in the Pfannenstiel group ranged from 23 to 37 with mean±SD =31.1±4.13, while in the higher transverse group, the Age (years) ranged from 22 to 38 with mean±SD=30.17±4.6 without substantial variation (p=0.412) between the two arms. Regarding Age distribution, we discovered no discernible difference between the two arms under study (p=0.108).

Table 2. Clinical data among the study population.

	PFANNENSTIEL GROUP (N=30)	HIGHER TRANSVERSE GROUP (N=30)	TEST OF SIG.	P
BMI			t=1.595	0.116
MEAN±SD.	48.29 ± 3.35	46.95±3.17		
MEDIAN (IQR)	47.75 (46.2 - 50)	47.25 (44.92-48.78)		
RANGE (MIN-MAX)	12.6 (41.6 - 54.2)	11.4 (41.1-52.5)		
MEDICAL DISORDER			X2=0.352	0.839
- PE	2 (6.67%)	2 (6.67%)		
- DM	2 (6.67%)	1 (3.33%)		
- FREE	26 (86.67%)	27 (90%)		

BMI in the Pfannenstiel group ranged from 41.6 to 54.2 with mean±SD =48.29 ± 3.35, while in the higher transverse group, the BMI ranged from 41.1 to 52.5 with mean±SD=46.95±3.17 without substantial variation (p=0.116) between the two arms. Regarding medical disorders, we discovered no discernible difference between the two arms under study (p=0.839).

Table 3. Number of previous pregnancies and CS among the study population.

	PFANNENSTIEL GROUP (N=30)	HIGHER TRANSVERSE GROUP (N=30)	TEST OF SIG.	P
NUMBER OF PREVIOUS PREGNANCIES			t=0.366	0.716
MEAN±SD.	2.53±0.73	2.47± 0.68		
MEDIAN (IQR)	2 (2-3)	2.5 (2-3)		
RANGE (MIN-MAX)	3 (1-4)	3 (1-4)		
NUMBER OF PREVIOUS CS			t=0.138	0.891
MEAN±SD.	1.83±0.91	1.8±0.96		
MEDIAN (IQR)	2 (1-2.75)	2 (1-2)		
RANGE (MIN-MAX)	3 (0-3)	3 (0-3)		

The number of pregnancies in the Pfannenstiel arm ranged from 1 to 4 with mean±SD=2.53±0.73, while in the higher transverse arm, the number of pregnancies ranged from 1 to 4 with mean±SD=2.47±0.68 without substantial variation (p=0.716) between the two arms. The number of previous CS in the Pfannenstiel arm ranged from 0 to 3 with mean±SD=1.83±0.91, while in the higher transverse arm, the number of previous CS ranged from 0 to 3 with mean±SD=1.8±0.96 without substantial variation (p=0.891) between the two arms.

Table 4. Gestational age and hemoglobin fall among the study population.

	PFANNENSTIEL GROUP (N=30)	HIGHER TRANSVERSE GROUP (N=30)	TEST OF SIG.	P
GA			t=2.942	0.005
MEAN±SD.	38.43±0.97	37.63 ± 1.13		
MEDIAN (IQR)	38 (38-39)	38 (37-38)		
RANGE (MIN-MAX)	4 (36-40)	5 (35-40)		
HB FALL (GM/DL)			t=3.83	<0.001
MEAN±SD.	0.77±0.31	0.5±0.23		
MEDIAN (IQR)	0.7 (0.6-0.98)	0.5 (0.4-0.7)		
RANGE (MIN-MAX)	1 (0.3-1.3)	0.7 (0.1-0.8)		

GA in the Pfannenstiel arm ranged from 36 to 40 with mean±SD=38.43± 0.97, while in the higher transverse arm, the GA ranged from 35 to 40 with mean± SD=37.63±1.13 with substantial variation (p=0.005) between the two arms. HB fall (gm/dl) in the Pfannenstiel arm ranged from 0.3 to 1.3 with mean± SD=0.77 ± 0.31, while in the higher transverse arm, the HB fall (gm/dl) ranged from 0.1 to 0.8 with mean±SD=0.5±0.23 with remarkable substantial variation (p=<.001) between the two arms.

Table 5. Time from skin incision to fetal delivery time and to closure time among the study population.

	PFANNENSTIEL GROUP (N=30)	HIGHER TRANSVERSE GROUP (N=30)	TEST OF SIG.	P
SKIN INCISION TO FETAL DELIVERY TIME (MIN)			t=6.083	<0.001
MEAN±SD.	9.03±0.67	7.8±0.89		
MEDIAN (IQR)	9 (9-9)	8 (7.25-8)		
RANGE (MIN-MAX)	2 (8-10)	4 (5-9)		
SKIN INCISION TO CLOSURE TIME (MIN)			t=1.475	0.146
MEAN±SD.	77.83±9.67	74.3±8.87		
MEDIAN (IQR)	80.5 (71.25-85.5)	75.5 (69.25-78.75)		
RANGE (MIN-MAX)	34 (56-90)	31 (58-89)		

Skin incision to fetal birth time in the Pfannenstiel arm ranged from 8 to 10 with mean±SD=9.03±0.67, while in the higher transverse arm, it ranged from 5 to 9 with mean±SD=7.8±0.89 with remarkable substantial variation (p=<.001) between the two arms. Skin incision to closure time in the Pfannenstiel arm ranged from 56 to 90 with mean±SD=77.83±9.67, while in the higher transverse arm, it ranged from 58 to 89 with mean±SD=74.3±8.87 without substantial variation (p= 0.146).

Table 6. Apgar score and NICU admission among the study population.

	PFANNENSTIEL GROUP (N=30)	HIGHER TRANSVERSE GROUP (N=30)	TEST OF SIG.	P
APGAR 5 MIN			t=2.788	0.007
MEAN±SD.	8.47±1.01	7.77±0.94		
MEDIAN (IQR)	8 (8-9)	8 (7-8)		
RANGE (MIN-MAX)	4 (7-11)	3 (6-9)		
NICU ADMISSION			X2=0.351	0.554
YES	2 (6.67%)	1 (3.33%)		
NO	28 (93.33%)	29 (96.67%)		

Apgar 5 min in the Pfannenstiel arm ranged from 7 to 11 with mean±SD=8.47±1.01, while in the higher transverse arm, the Apgar 5 min ranged from 6 to 9 with mean±SD=7.77±0.94 with substantial variation (p=0.007) between the two arms. Regarding NICU admission, we discovered no discernible difference between the two arms under study (p= 0.554).

Table 7. Surgical complications and pain score among the study population.

	PFANNENSTIEL GROUP (N=30)	HIGHER TRANSVERSE GROUP (N=30)	TEST OF SIG.	P
INTRAOPERATIVE ADHESIONS			X2=1.456	0.228
YES	5 (16.67%)	2 (6.67%)		
NO	25 (83.33%)	28 (93.33%)		
SURGICAL COMPLICATIONS			X2=2.51	0.775
ANGLE HAMATOMA	1 (3.33%)	1 (3.33%)		
BLADDER INJURY	1 (3.33%)	0 (0%)		
BROAD HEMATOMA	1 (3.33%)	0 (0%)		
UTERINE ARTERY INJURY	1 (3.33%)	1 (3.33%)		
UTERINE ATONY	2 (6.67%)	1 (3.33%)		
NO	24 (80%)	27 (90%)		
PAIN SCORE			t=5.981	<0.001
MEAN±SD.	5.97±0.81	4.9±0.55		
MEDIAN (IQR)	6 (6-6)	5 (5-5)		
RANGE (MIN-MAX)	4 (4-8)	2 (4-6)		

No discernible difference between the two arms under study (p=0.228). Regarding surgical complications, we discovered no discernible difference between the two arms under study (p=0.775). Pain score in the Pfannenstiel arm ranged from 4 to 8 with mean±SD=5.97±0.81, while in the higher transverse arm, the pain score ranged from 4 to 6 with mean±SD=4.9±0.55 with a remarkable substantial variation (p=<.001) between the two arms.

4. Discussion

Our study showed that BMI in the Pfannenstiel arm ranged from 41.6 to 54.2 with mean±SD=48.29±3.35, while in the higher transverse arm, the BMI ranged from 41.1 to 52.5 with mean±SD=46.95±3.17 without substantial variation (p= 0.116) between the two arms. Regarding medical disorders, we discovered no discernible difference between the two arms under study (p= 0.839).

Our results agreed with those of Stewart et al. (2017), who investigated 21 CS. Their mean BMI was 50 (40-61.7), as 95.0% had an abdominal panniculus in the supine "apron" position, and 57.1% had a scarred uterus.[6]

Also, our study agreed with Elsayed et al. (2020), who discovered no discernible difference between the two arms under study regarding BMI.[7]

According to the number of previous pregnancies and CS among the study population. The number of pregnancies in the Pfannenstiel arm ranged from 1 to 4 with mean±SD=2.53±0.73, while in the higher transverse arm, the number of pregnancies ranged from 1 to 4 with mean±SD=2.47±0.68 without substantial variation (p=0.716) between the two arms. The number of previous CS in the Pfannenstiel arm ranged from 0 to 3 with mean±SD=1.83±0.91, while in the higher transverse arm, the number of previous CS ranged from 0 to 3 with mean±SD= 1.8±0.96without substantial variation (p=0.891) between the two arms, which is in agreement with Elsayed et al., (2020) who discovered no discernible difference between the two arms under study regarding number of previous pregnancies and CS.[7]

In terms of gestational age (GA) and haemoglobin (HB), they fall among the study population. GA in the Pfannenstiel arm ranged from 36 to 40 with mean ± SD=38.43±0.97, while in the higher transverse arm, the GA ranged from 35 to 40 with mean±SD=37.63±1.13 with substantial variation (p=0.005) between the two arms. HB fall (gm/dl) in the Pfannenstiel arm ranged from 0.3 to 1.3 with mean±SD=0.77±0.31, while in the higher transverse arm, the HB fall (gm/dl) ranged from 0.1 to 0.8 with mean±SD=0.5±0.23 with remarkable substantial variation (p=<.001) between the two arms. This agrees with Allah et al. who found a substantial variation between the studied arms concerning HB. On the contrary, they discovered no discernible difference between the two arms under study concerning GA.[8]

Our findings showed that skin incision to fetal birth time in the Pfannenstiel arm ranged from 8 to 10 with mean±SD=9.03±0.67, while in the higher transverse arm, it ranged from 5 to 9 with mean± SD=7.8±0.89 with remarkable substantial variation (p=<.001) between the two arms. Skin incision to closure time in the Pfannenstiel arm ranged from 56 to 90 with mean±SD=77.83±9.67, while in the higher transverse arm, it ranged from 58 to 89 with mean±SD= 74.3±8.87 without substantial variation (p=0.146).

In agreement with our results, Allah et al. (2023) found a substantial variation between the studied arms regarding skin incision and fetal delivery time (minutes) (p=<.001). They discovered no discernible difference between the two arms under study regarding skin incision and closure time.[8]

According to the Apgar score and NICU admission among the study population. Apgar 5 min in the Pfannenstiel arm ranged from 7 to 11 with mean± SD=8.47±1.01, while in the higher transverse arm, the Apgar 5 min ranged from 6 to 9 with mean±SD = 7.77±0.94 with substantial variation (p=0.007) between the two arms.

Regarding NICU admission, we discovered no discernible difference between the two arms under study (p=0.554), which is consistent with Allah et al. (2023), who demonstrated a substantial variation between the studied arms regarding Apgar score, and they discovered no discernible difference between the two arms under study concerning NICU admission.[8]

In the present study regarding intraoperative adhesions, we discovered no discernible difference between the two arms under study (p=0.228). Regarding surgical complications, we discovered no discernible difference between the two arms under study (p=0.775). Pain score in the Pfannenstiel's arm ranged from 4 to 8 with mean±SD=5.97±0.81. In contrast, in the higher transverse arm, the pain score ranged from 4 to 6 with mean±SD=4.9±0.55 with a remarkably substantial variation (p=<.001) between the two arms, which agreed with Allah et al., who discovered no discernible difference between the two arms under study concerning adhesions.[8]

In the present study, wound infection and healing are among the study population. Regarding wound infection, we found no substantial variation between the studied arms (p=0.117). We found no substantial variation in wound healing between the studied arms (p=0.757).

In agreement with our results, Allah et al. showed that the rate of complications during surgery did not change significantly. However, there were notable variations in the study groups' wound infection rates after one week. According to their research, no noteworthy variations were found in the wound between the tested groups after six weeks.[8]

According to the latest data from 150 countries, 18.6% of all births occur by CS, ranging from 6% to 27.2% in the least and most developed regions. Latin America and the Caribbean region have the highest CS rates (40.5%), followed by Northern America (32.3%), Oceania (31.1%), Europe (25%), Asia (19.2%) and Africa (7.3%). Based on the data from 121 countries, the trend analysis showed that between 1990 and 2014, the global average CS rate increased by 12.4% (from 6.7% to 19.1%), with an average annual increase of 4.4%. The largest absolute increases occurred in Latin America and the Caribbean (19.4%, from 22.8% to 42.2%), followed by Asia (15.1%, from 4.4% to 19.5%), Oceania (14.1%, from 18.5% to 32.6%), Europe (13.8%, from 11.2% to 25%), Northern America (10%, from 22.3% to 32.3%) and Africa (4.5%, from 2.9% to 7.4%). Asia and Northern America had the highest and lowest average

annual rate of increase (6.4% and 1.6%, respectively).[9]

4. Conclusion

The transverse supraumbilical incision demonstrated clear benefits, including faster recovery after surgery, decreased bleeding, less pain following the procedure, earlier return of bowel movement, earlier mobility, and a shorter stay in the hospital. The economy is another factor, which includes using less anaesthesia, preserving more time, and requiring fewer devices.

Disclosure

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