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ARAŞTIRMA/RESEARCH

Skin incision lengths in caesarean section

Sezaryende cilt insizyon uzunlukları

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Abstract

Purpose: This study aims to examine the factors affecting skin incision lengths in caesarean section.

Materials and Methods: We enrolled 201 pregnant women who delivered by caesarean section. Skin incision lengths in caesarean section were measured with a ruler on the first postoperative day. We categorized the patients into two groups, where group 1 had their caesarean sections performed by senior residents and group 2 by specialists. Demographic patient data, estimated fetal weights, and skin incision lengths were calculated.

Results: Patients age was 28.7±4.7 years, gravidity was 2.2±1.0, parity was 1.0±0.7, body mass index (BMI) was 25.2±4.3, and estimated fetal weight was 3.315±425 g. Skin incision lengths were 156.9±14, 159.5±13.1, and 154.5±14.8 mm for all surgeons, only senior residents and only specialists, respectively. Skin incision length was correlated with fetal weight, maternal BMI, gravidity, and parity. In additions, skin incisions made by specialists were smaller skin than those made by residents.

Conclusion: Surgical experience is not the only factor affecting the skin incisions in caesarean section; fetal weight, maternal BMI, gravidity, and parity also affect skin incision length.

Key words: Caesarean section, Pfannenstiel incision, skin incision length

Öz

Amaç: Bu çalışma, sezaryen cilt insizyonlarının etkileyen faktörleri araştırmayı amaçladı.

Gereç ve Yöntem: Çalışmaya sezaryen ile doğum yapan 201 gebe dahil edildi. Sezaryen sonrası cilt insizyon uzunlukları mezure ile postoperatif birinci günde ölçüldü. Hastalar iki grupta değerlendirildi, birinci grubu uzmanlık öğrencileri tarafından gerçekleştirilen sezaryenler oluştururken, ikinci grubu uzmanlar tarafından gerçekleştirilenler oluşturdu. Hastaların demografik verileri, beklenen fetal ağırlıkları ve insizyon uzunlukları değerlendirildi.

Bulgular: Hastaların yaşları 28.7±4.7 yıl, gravida 2.2±1.0, parite 1.0±0.7, vücut kitle indeksleri (BMI) 25.2±4.3 ve beklenen fetal ağırlık 3.315±425 gr idi. Cilt insizyon uzunlukları tüm cerrahlar için (sadece uzmanlık öğrencisi ve uzmanlar) 156.9±14, 159.5±13.1, ve 154.5±14.8 idi. Cilt insizyon uzunlukları, fetal ağırlık, maternal BMI, gravid ve parite ile korrele edildi. Ayrıca uzmanlar tarafından yapılan cilt insizyonları, uzmanlık öğrencilerine göre daha küçük idi.

Sonuç: Sezaryen cilt insizyon uzunuluğu sadece cerrahi tecrübe değil, ayrıca fetal ağırlık, maternal BMI, gravid ve paritede etkilemektedir.

Anahtar kelimeler: Sezaryen, Pfannenstiel insizyon, cilt insizyon uzunluğu

INTRODUCTION

Caesarean section is one of the most common major abdominal surgeries in Turkey, as well as many other countries around the world[1,2]. The caesarean rates were reported to be 32.7% and 50% in the United States and Turkey, respectively, in 2013[2,3]. This means that surgeons have been performing caesarean section operations on approximately 750.000 women in Turkey yearly.

However, caesarean section is not an aesthetic surgery. Thus, obstetric surgeons should incise the skin sufficientlyto take the baby out easily without dystocia. Delay in removing the baby from the

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abdomen is a concern to surgeons because of the possibility of fetal asphyxia or fetal trauma due to forced abdominal pressure needed to take out the baby. As a result, surgeons must incise the skin sufficiently to easily evacuate the baby according to their surgical sense and experiences.

There are some data in the English medical literature on incision length and caesarean section. First, Ayers and Morley proposed that a skin incision length of 15 cm is sufficient to take out the baby easily[4]. Moreover, Finan proposed a test called the "Allis test" to verify that the caesarean skin incision is large enough to take the baby out easily[5]. In our study, we wanted to investigate how the surgeons determine a sufficient length for skin incisions in caesarean section. Moreover, we wanted to provide data concerning skin incision lengths in caesarean section operations. Finally, we wanted to comparison the lengths of skin incisions made by residents and those made by specialists in caesarean section.

MATERIAL AND METHODS

Ethical approval was granted for the case controlled study and we enrolled 201 pregnant women who delivered by caesarean section between 1 June 2014 and 1 January 2015. All of the patients were operated on in our institute by our senior residents or specialists. Residents were in their last year (fourth year) and operated on the patients under the supervision of specialists. All of the surgeons operated on the patients using the same caesarean technique (Pfannenstiel). Skin incision length was measured with a ruler by a first-year resident on the first postoperative day. Surgeons were not informed about the study until the data collection was complete.

Surgical technique

Spinal or epidural anesthesia was administered for all caesarean section operations in the study. Two grams of cefazolin sodium (Cefozin 1 gram iv vial, Bilim Ilac, Istanbul, TURKEY) was given about 60 minutes before surgery to all patients except those with drug allergy. No antibiotics were prescribed to patients postoperatively. Patients were discharged on the second day after the operation.

Caesarean sections were performed through a Pfannenstiel skin incision 3 cm above the symphysis pubis and curved laterally like a "smile" incision with a scalpel. Subcutaneous tissue was opened via blunt and sharp dissections. The fascia was opened using a scalpel or scissors. The parietal peritoneum was opened using sharp dissection. The skin, rectus muscles, and parietal peritoneum were expanded laterally using two fingers of the surgeon and assistant. Transverse lower uterine incision was performed. Then, the uterine incision was expanded laterally using the surgeon's two fingers after amniotomy with a scalpel. The baby was delivered with the assistance of fundal pressure created by the assistant. The placenta was removed manually. Following this, the uterine incision was closed in a two-layer continuous manner with 2/0 polyglactin 910 Coated Vicryl (ETHICON Co.), and the parietal peritoneum was closed in a continuous manner with 3/0 polyglactin 910 Coated Vicryl (ETHICON Co.); the rectus muscles were not approximated. The fascia was closed with no. 1 polyglactin 910 Coated Vicryl (ETHICON Co.) and subcutaneous tissue was approximated with 3/0 polyglactin 910 Coated Vicryl (ETHICON Co.). Finally, skin was sutured with 4/0 polyglactin 910 Vicryl Rapid (ETHICON Co.) intradermally.

Pregnant women older than 18 years old with singleton, vertex presentation, term pregnancies (> 37 gestational weeks) were included in the study. Caesarean indications were previous caesarean section, cephalopelvic disproportion, maternal request for any reason. Caesarean section operations were performed by our senior residents and specialists in the working hours. Caesarean sections performed with general anesthesia, deeply fetal head engagements, breech presentation, placenta previa, multiple pregnancy, or different caesarean techniques from those explained above were excluded. Women who had hypertrophic scarring on the incision site were also excluded. Caesarean section operations in which it was difficult to take out the baby easily, or where there was forced pushing or skin incision expansion with a scalpel, were also excluded. Finally, emergency caesareans were excluded.

All of the pregnant women's gestational ages were calculated from the date of the last menstrual period and confirmed by first trimester ultrasound. Operation times were not collected for the study.

All surgeons were divided into two groups retrospectively. The first group comprised senior residents who were in their fourth year of residency,

while the second comprised specialist who had at least five years of experience after their residency. Demographic data, incision lengths, fetal weights, and surgeons' experience levels was calculated.

Statistical analysis

SPSS version 15.0 (Chicago, IL, USA) was used for all statistical analyses. All values were initially examined graphically for departures from normality. Data were expressed as mean±standard deviation. The Mann–Whitney U test was used for comparison of subgroups for age, estimated fetal weight, maternal body mass index (BMI), gravidity, parity, and incision length. To assess correlation, the Spearman rank correlation coefficient was used. Differences were considered significant when $p<0.05$ for the both tails.

RESULTS

Patient age was 28.7±4.7, gravidity was 2.2±1.0, parity was 1.0±0.7, BMI was 25.2±4.3, and estimated fetal weight was 3,315±425 g. Group 1 (residents) operated on 96 patients and group 2 (specialists) operated on 105 patients. Incision lengths were 156.9±14, 159.5±13.1, and 154.5±14.8 mm for all surgeons, residents, and specialists, respectively. Demographic data are given in Tables 1 and 2. There were no differences between group 1 and group 2 in terms of age, gravidity, parity, or maternal BMI. In all groups, incision length directly correlated with estimated fetal weight ($r=0.209$, $p=0.003$), maternal BMI ($r=0.276$, $p<0.001$), gravidity ($r=0.316$, $p<0.001$), parity ($r=0.313$, $p<0.001$), and surgeon experience ($r=-0,180$ $p=0.011$), but did not correlate with first or previous caesarean section (Table 3).

Table 1. Demographic characteristics for all patients

Characteristics	Mean±Sd	Min-Max	25%	75%
Age (Years)	28.7±4.7	18-39	21	31
BMI (kg/m2)	25.2±4.3	14.9-39.7	21.9	28.3
Gravidity	2.2±1.0	1.-6	2	3
Parity	1.0±0.7	0-4	1	1
Estimated Fetal Weight (gr)	3315±425	2500-4922	2990	3581
İncision length (mm)	156.9±14	127-195	146	165

BMI: Body mass index, The results are expressed as means ± Standard Deviation (S.D.)

Table 2. Demographic charecteristics for subgroups

	Group 1 (Residents) (n:96)	Group 2 (Specialists) (n:105)	p value
Age	28.6±4.6	28.7±4.1	NS
BMI (kg/m2)	25.1±4.3	25.3±4.3	NS
Gravidity	2.3±1.0	2.2±1.0	NS
Parity	1.0±0.7	1.0±0.7	NS
Estimated Fetal Weight (gr)	3307±377	3322±466	NS
İncision length (mm)	159.5±13.1	154.5±14.8	<0.05

BMI: Body mass index, The results are expressed as means ± Standard Deviation (S.D.)

DISCUSSION

There are limited data in the literature about the skin incision length in caesarean section. However, it should be known how long an incision needs to be to take the baby out of the abdomen easily. In 1987, in an attempt to determine a cut-off point for caesarean section skin incision length, Ayers and Morley suggested that Pfannenstiel skin incision of 15 cm long should be used to deliver a baby easily[4].

In 1991, Finan et al. suggested using the Allis test to remove the baby from the abdomen easily [5]. They used an Allis clamp to determine whether the incision would be sufficient to deliver the baby according to Ayers and Morley's findings. Allis clamps are generally 15 cm long all over the world. Thus, Finan et al. considered that delivery would be made easier if the incision were similar length with an Allis clamp[5].

In our study, we calculated that the Pfannenstiel skin incision length for all surgeons was 156.9±14

mm (min–max 127–195 mm). In addition, we compared skin incisions between residents and specialists. Residents' mean incision length was 159.5±13.1 mm (min–max, 132–195 mm), while that of specialists was 154.5±14.8 mm (min–max, 127–195 mm). There was a tendency to perform smaller incisions among specialists, and there was a statistically significant difference between residents and specialists (p=0.011). However, there was no statistical difference between group 1 and group 2 in terms of estimated fetal weight, gravidity, parity, or maternal BMI (Table 2). According to these findings, the specialists' smaller incisions could be explained in relation to their greater experience in surgery (minimum five years after residency).

Table 3: Results of Spearman correlation analysis of relationships between "skin incison length" level and other laboratory parameters.

	Skin incision length (r) n=201	P
BMI (kg/m2)	0.276	<0.001*
Gravidity	0.316	<0.001*
Parity	0.313	<0.001*
Estimated Fetal weight (gr)	0.209	0.003*
First and Previous section	0.087	0.217
Resident and Specialist	-0.180	0.011*

BMI: Body mass index, *Statistical Difference

In our study, we found that estimated fetal weight is an important factor for caesarean skin incision length. Estimated fetal weight had a positive correlation with skin incision length for both residents and specialists (p=0.011; Table 3). In both groups, surgeons used bigger incisions in the caesarean section operation. We considered that higher estimated fetal weight makes surgeons anxious, and thus they use larger incisions. Surgeons may suppose that will be greater difficulty in removing a heavier baby from a smaller incision.

BMI is an important co-morbid condition in caesarean surgery. Obesity is associated with major complications such as wound infections and fetal macrosomia6. Panniculus can cause a wet, warm area on the skin and can lead to wound infection after a caesarean section. It can also cause separation of the wound. Thus, in this situation, incision length is an important factor when it comes to wound healing postoperatively. Skin incision length in obese patients represents a challenging decision for surgeons because of dystocia and wound infection problems. However, smaller incision and abdominal obesity could cause difficulty when taking the baby out during the operation. Consequently, surgeons made bigger incisions in obese patients in our study. We found that there is a positive correlation with longer incisions and maternal BMI (p<0.001; Table 3). Gravidity and parity had positive correlations with skin incision length in caesarean section for both groups (p<0.001). On the other hand, there was no statistical difference between group 1 and group 2 concerning gravidity or parity (2.3±1.0 and 2.2±1.0, 1.0±0.7 and 1.0±0.7. We considered that fetal losses or abortuses in previous pregnancy could make surgeons anxious during caesarean section, and this could be a cause of bigger skin incisions. We also found that first caesarean section or previous caesarean had no correlation with skin incision length.

We excluded cases in which it was difficult to take the baby out or where was a need to expand the skin incision. In all of the caesarean section cases investigated here, the baby was taken out easily. Thus, we can say that the average skin incision needed to take out the baby out easily is 156 mm in caesarean section.

We did not investigate postsurgical pain in the incision site and groin in our study. However, postsurgical pain could be related to iliohypogastric or ilioinguinal nerve injury6. There are some investigations about postsurgical pain with caesarean in the literature7. However, there are no available data related to skin incision length and postsurgical pain. This overlooked issue should be investigated in the future.

As a conclusion, we found that there is a positive correlation with BMI, estimated fetal weight, gravidity, and parity. In addition, experienced surgeons make incisions smaller in cases of caesarean section.

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