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Research Article

Comparison of Pfannensteil Kerr and Modified Misgav Ladach Methods of Caeserean Operation

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Abstract

Objective: In this study we aimed to compare the operation time, amount of bleeding, hospitalization time, postoperative infection, postoperative pain and amount of required analgesic between the two methods; Pfannenstiel Kerr and modified Misgav Ladach.

Material and Methods: The study is conducted with the participation of 60 patients who underwent cesarean operation emergent or electively. Half of the patients underwent PK technique and the other half underwent MML technique cesarean. The patients who had previous cesarean section or previous abdominal surgery, who had bleeding diathesis, who had fever over 38°C tympanic in the last 48 hours before surgery and patients with chorioamnionitis, preeclampsia were excluded from the study. Pearson Chi-Square and Fisher's exact tests were used for the comparison of categorical data between groups.

Results: Amount of bleeding(cc) and birth weight were found higher in PK group than the MML group and the results were statistically significant($p<0,05$). Mean VAS values of patients were 5,17 ± 1,34 in the 8th hour and 4,05 ± 1,55 in the 24th hour. Mean pre-operative Hb values were 11,81 ± 1,53gr/dl and mean post-operative Hb values were 10,25 ± 1,54gr/dl. The average difference between pre and post-operative Hb values was found to be 1.56 ± 0.82gr/dl.

Conclusion: The Misgav Ladach method of CS has advantages over the Pfannenstiel Kerr method with significantly reduced amount of bleeding and diminished postoperative pain.

Keywords: Cesarean section, Misgav Ladach, Pfannenstiel incision

Introduction

Cesarean section(CS) is the most common intraperitoneal surgical procedure in obstetric practice; accounting for about 10-35% of all deliveries [1,2]. Several CS skin incision and abdominal wall opening techniques have been developed during the years, yet a general consensus on the most appropriate approach, in terms of safety and morbidity, has not been yet reached. The choice of technique depends largely on the Surgeon's experience and preference and on the maternal-fetal clinical condition [3,4]. The Pfannenstiel incision, also known as the "bikini incision",and the Misgav-Ladach method (MML), mainly represented by the modified Joel-Cohen incision, are the most common skin incisions performed [5]. Joel-Cohen introduced a new method of opening the abdomen transversely [6] which has been further modified by Stark and used for CS [7]. The new operation technique is called the MML for CS after the hospital, in Jerusalem, where it was developed. Stark describes the operation as rapid retaining all the advantages of a transverse lower abdominal incision. The operation technique is described thoroughly by Stark and in a well illustrated article by Sjo ¨holm & Holmgren, 1996 [8]. The philosophy behind this technique is to cause the least damage to the tissues, to refrain from superfluous steps, and to make the intervention the simplest possible. While the short operative time is not the main goal, it is the most evident consequence [9,10]. The expected advantages of this method include a smaller incidence of fever and urinary tract infection, decrement in use of antibiotics and narcotics, faster reestablishment of normal bowel function, shorter maternal hospitalization and less postoperative adhesion formation [11,12].

In this study we aimed to compare the operation time, amount of bleeding, hospitalization time, postoperative infection, postopertaive pain and need for analgesic between the two methods; Pfannensteil Kerr and modified Misgav Ladach.

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Materials and Methods

This study is conducted with the participation of 60 patients who underwent emergent or elective cesarean section in Izmir Katip Celebi University Ataturk Education and Research Hospital Obstetrics and Gynecology Clinic between 14.11.2014 and 25.05.2015. Patients were randomised into two groups and 30 of them underwent cesarean section performed by the MML method and 30 of them by the PK method. All patients had informed consent to participate in this study. The trial was approved by the Medical Ethics Committee of the hospital. Ages of patients, gestational ages, birth weights and cesarean indications were recorded. The patients who had previous cesarean section or previous abdominal surgery, who had bleeding diathesis, who had fever over 38°C tympanic in the last 48 hours before surgery and patients with chorioamnionitis, preeclampsia, HELLP, ablatio placenta and placental invasion disorders were excluded from the study. For randomization of the subjects a restricted shuffled approach was used. Patients were randomized by a sealed envelope method to undergo either a Pfannenstiel kerr method or a modified misgav ladach method. A midwife opened the envelopes immmediately before the incision of the skin. The type of anesthesia employed was decided by the anesthesiologist, without knowledge of the study arm that patients were allocated.

Description of the modified Misgav-Ladach technique

After a modified Joel-Cohen incision Pfannenstiel skin incision, the subcutaneous tissue is opened upward in the midline, so as to reach the rectus sheath above the insertion of the pyramidalis muscles. Lateral extension of the subcutaneous tissue, rectus sheath incision, and separation of the two rectus muscles are performed digitally. If the rectus sheath was opened below the insertion of the pyramidalis muscles, a single cut with the scissors is performed in the midline so as to allow the separation of these two structures. Opening of the parietal peritoneum at the upper level of the intermuscular space is performed digitally. A transverse 2-3-cm lower uterine segment incision in the midline, using a scalpel and involving both peritoneum and myometrium is accomplished with subsequent dissection of the remaining uterine fibers and opening of the fetal membranes using a Kelly's clamp. After lateral digital extension of the uterine incision, the fetus is extracted and the placenta is removed by transabdominal uterine massage combined with light cord traction. The uterine fundus can optionally be removed from the abdominal cavity if this is thought to aid suturing. Closure of the uterine incision is accomplished with a one-layer continuous #1 poliglactin 910 (Vicryl1, Ethicon, Inc., Somerville, Massachusetts, USA) suture, using additional hemostatic stitches if required. After the inspection of the peritoneal cavity and removal of accessible blood and clots, the visceral and parietal peritoneum is left unsutured. The rectus muscles, subfascial space, and subcutaneous tissue are inspected for hemostasis, and the rectus sheath is closed using a continuous #1 polyglactin 910 suture. The subcutaneous tissue is sutured if its depth exceeds 2cm. The skin is closed with continuous subcuticular suture [13].

Description of the Pfannenstiel-Kerr technique

The skin is opened with a Pfannenstiel incision, extended through the subcutaneous tissue with a scalpel until the rectus sheath is exposed and the latter is then opened in the midline. Scissors are used to extend the rectus sheath incision laterally and to separate it from the pyramidalis and rectus muscles. After the digital separation of the two rectus muscles, the parietal peritoneum is opened with scissors after being elevated between two Kelly's clamps. A transverse low uterine segment peritoneal incision is performed with a scalpel in the midline and then extended laterally with scissors. The peritoneum is dissected downward with scissors to create a bladder flap. The myometrium is incised in the midline with a scalpel, and the remaining uterine fibers and fetal membranes are opened with a Kelly's clamp. After lateral extension of the uterine incision with uterine scissors, fetal extraction and removal of the placenta using transabdominal uterine massage combined with light cord traction is performed. Closure of the uterine incision is accomplished with a two-layer continuous #1 polyglactin 910 suture, using additional hemostatic stitches if required. The visceral peritoneum is closed with a continuous #2/0 polyglactin 910 suture. After the inspection of the peritoneal cavity and aspiration of all accessible blood and clots, the parietal peritoneum is closed in a similar fashion. The rectus muscles, subfascial space, and subcutaneous tissue are checked for hemostasis, and the rectus sheath is closed with a continuous #1 polyglactin 910 suture. The subcutaneous tissue is sutured if its depth exceeds 2cm. The skin is closed with, continuous subcuticular suture [13].

The main purpose of the study is defined as to determine whether there is a difference about operation time, hospital stay, amount of bleeding, need for analgesia, wound infections, postpartum endometritis between two groups. All patients in two goups were given intravenous (iv) ringer lactate and 5% dextrous solution at intraoperative and postoperative time. In all patients after the delivery of the fetus, antibiotic prophylaxis with 1g of cefazolin sodium (Cefozin Bilim İlaç, Türkiye) and a 15UI of oxytocin intravenous infusion were given immediately after the umbilical cord was clamped. Duration of surgery was measured with a chronometer by the anesthetist present in the operating theater and was defined as the time elapsed between skin incision and skin closure. Both groups did not have routine postoperative antibiotic therapy. Postoperative analgesic acetaminophen was used as three intravenous doses of 500 mg per day in the first 24 hours period. Blood samples for complete blood count examination were taken from all patients in the post-operative 24th hour. For assessment of the pain the Visual Analog Scale (VAS) was used during the 8th and 24th hour of the surgery. The VAS was recorded by a midwife who did not otherwise participate in the study. From 0 to 10 points pain scores were chosen by the patients from the VAS charts. A score of 0 refers to no pain. A score of 10 refers to pain as bad as it could possibly be. Samples were taken from the wound for culture in postoperative 48th hour. Wound complications were evaluated on the seventh postoperative day. They were classified as mild if serous drainage, erythema, and/or induration of the skin incision were found. Purulent drainage, hematoma, and/or dehiscence were considered severe wound complications. Postpartum endometritis is defined as the presence of malodorous vaginal discharge, uterine tenderness, and the fever above 38°C tympanic. After the first 24 hours iv treatment was stopped and oral liquid intake was started. After restoration of bowel movements solid food intake was started. On the 7th day of the operation the skin sutures were taken out.

Statistical Analysis

Statistical analysis of the data is performed by IBM SPSS Statics Version 22 package software. Pearson Chi-Square and Fisher's Exact tests were used to compare the cathegoric data between groups, Mann Whitney U ve İndependent Sample t tests were used to compare the continous data due to normal distrubution of data, Wilcoxon Signed Ranks statistical analysis is used to compare the diffences in pre and post-operative Hb values and differences in VAS values between 8th and 24th hours. Also, Repeated Mesure Anova statistical analysis is used to evalute the changes in Hb and VAS values in each group. P<0,05 is applied as statistically significant.

Results

Total 60 patients were included in this study. Mean age was 24,25 ± 5,11 years. Mean gestational was 274,68 ± 12,52 days. 15 patients (25%) underwent general anesthesia and 45 patients(75%) underwent regional anesthesia. Mean operation time was 60,3 ± 11,71 minutes. 8th hour mean VAS values was 5,17 ± 1,34 and 24th hour mean VAS values was 4,05 ± 1,55. Mean pre-operative Hb values was 11,81 ± 1,53 gr/dl and mean post-operative Hb values was 10,25 ± 1,54 gr/dl. Mean difference in pre and post-operative Hb is found 1,56 ± 0,82 gr/dl. No patient required transfusion. Mean require for analgesic was 4600 ± 1141,66 mg parasetamol in the study. Mean birth weight was 3377,47 ± 588,76 gr. Mean hospitalization time was 51,77 ± 8,41 hours. Wound cultures were positive at 6 patients (Figures 1 and 2, Tables 1-4).

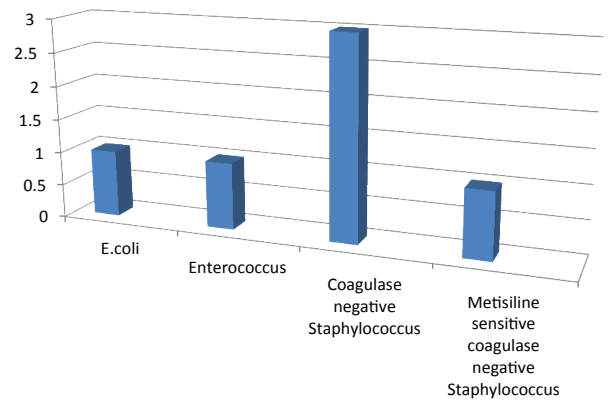

Figure 1: Microorganisms in positive wounds Culture

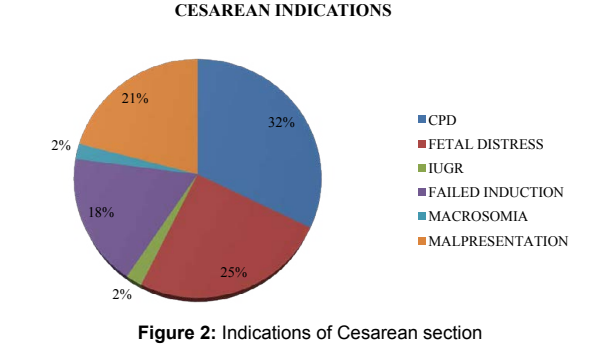

Figure 2: Indications of Cesarean section

Age	24,25 ± 5,11
Pre-operative Hb (gr/dl)	11,81 ± 1,53
Post-operative Hb (gr/dl)	10,25 ± 1,54
Preop-Postop Hb (gr/dl)	1,56 ± 0,82
Operation Time (minutes)	60,3 ± 11,71
8.Hour VAS	5,17 ± 1,34
24.Hour VAS	4,05 ± 1,55
Required Analgesic (gr)	4,6 ± 1,141
Hospitalization Time (Hour)	51,77 ± 8,41
Birth Weight (gr)	3377,47 ± 588,76
Gestational Age (days)	274,68 ± 12,52

Cesarean indications of the patients are shown in Figure 2.

Table 1: Distribution demographic and clinical characteristics of cases.

		CESAREAN TECHNIQUE				Total		p
		MML		PK				
		n	%	n	%	n	%	
ANESTHESIA TYPE	GENEL	4	(13,3)	11	(36,7)	15	(25,0)	***0,037***
	SPİNAL	26	(86,7)	19	(63,3)	45	(75,0)	
WOUND CULTURE	POSITIVE	3	(10,0)	3	(10,0)	6	(10,0)	1,000
	NEGATIVE	27	(90,0)	27	(90,0)	54	(90,0)	
Total		30	(50,0)	30	(50,0)	60	(100,0)	

The average age distribution and clinical parameter values by Caesarean techniques shown in Table 3.

Table 2: Distrubition of anesthesia type and positive culture results according to the cesarean technique

	MML	PK	P value
Age	24,17 ± 5,62	24,33 ± 4,65	0,563**
Pre-operative Hb (gr/dl)	11,57 ± 1,61	12,04 ± 1,42	0,236*
Post-operative Hb (gr/dl)	10,09 ± 1,48	10,4 ± 1,6	0,559**
Preop-Postop Hb (gr/dl)	1,48 ± 0,91	1,64 ± 0,72	0,453*
Operation Time (minutes)	58,3 ± 7,91	62,3 ± 14,43	0,314**
8.hour VAS	5,07 ± 1,26	5,27 ± 1,44	0,349**
24.hour VAS	3,73 ± 1,55	4,37 ± 1,5	0,059**
Required Analgesic (gr)	4383,33 ± 1031,26	4816,67 ± 1221,1	0,439**
Hospitalization Time (hour)	50,33 ± 6,69	53,2 ± 9,74	0,322**
Birth Weight (gr)	3225,93 ± 515,23	3529 ± 626,3	*0,045**
Gestational Age (days)	272,3 ± 14,26	277,07 ± 10,19	0,272**

**İndependent Sample t test, **Mann Whitney U analizi*

Pre and post-operative Hb difference and 8th-24th hour VAS values were statistically significant between two groups (p<0,05) (Table 4).

Table 3: The distribution average age and clinical parameter values by Caesarean technic

	MML	***P****	**PK**	**P***
Pre-op Hb	11,57 ± 1,61	***0,001***	12,04 ± 1,42	***0,001***
Post-op Hb	10,09 ± 1,48	***0,001***	10,4 ± 1,6	***0,001***
VAS 8 Saat	5,07 ± 1,26	***0,001***	5,27 ± 1,44	***0,003***
VAS 24 Saat	3,73 ± 1,55	***0,001***	4,37 ± 1,5	***0,003***

**Wilcoxon Signed Ranks analizi*

In the variance analysis of Hb and VAS changes; pre and post-operative Hb changes and 8th hour and 24th hour VAS changes were statistically significant (p<0,05). However there was no statistically significant difference between MML and PK group on other changes.

Table 4: Pre and post-operative Hb rates and VAS values change between MML and PK groups

Discussion

Cesarean section is one of the major abdominal operations performed frequently in developed and developing countries,

especially in women of reproductive age [14]. The long history of CS may explain the availability of several variants in surgical technique commonly in use today. Due to its wide diffusion, CS techniques should be analysed in order to reduce postoperative pain and blood loss, minimize morbidity and ensure the best possible outcome. In line with the consideration of cephalopelvic disproportion among the frequent indications for cesarean section in developing countries [15]. Cephalopelvic disproportion and fetal distress were found to be the main indications for primary C/S in our study population. Studies in recent years indicate that regional anesthesia is primarily preferred more due to risks and complications of general anesthesia [16,17]. In our study, the choice of anesthesia is determined by the anesthetist. 25% of patients underwent general anesthesia and 75% underwent regional anesthesia. 26,6% of general anesthesia was in MML group and 73,4% was in PK group. 57,7% of regional anesthesia was in MML group and 42,3% in PK group. Postoperative pain is an important factor that affects the return of the patients to normal life. The expected advantages of the Joel-Cohen incision are less postoperative pain and less blood loss [18-20]. Although not accompanied with a concomitant increase in the analgesic need, transient but high perception of pain identified by women underwent MLM seems to contradict the minimal trauma offered by MLM via pushing aside of blood vessels and nerve fibers rather than damaging them [21]. In fact, variations in the patient compliance to scoring procedure and the apparent subjectivity of the method may have a role in this controversy concerning VAS-based scoring of pain perception. Anyhow, postoperative morbidity, pain, and discomfort after a cesarean section was reported to depend more on the lack of rationalization of the method than on the type of abdominal incision performed [3]. In a study performed by Murat Naki et al, 6th hour VAS values were compared between MML and PK groups and VAS value was 20,55 ± 14,80 in MML group and was 27,13 ± 21,09 in PK group. The difference was statistically significant and 6th hour pain score was lower in MML group. In the comparision of 24th hour VAS scores, in MML group it was 15,43 ± 14,97 and 14,95 ± 12,06 in PK group and the difference was not statistically significant [22]. In our study, 8th hour VAS values were 5,07 ± 1,26 in MML group and 5,27 ± 1,44 in PK group. 24th hour VAS values in MML group were 3,73 ± 1,55 and 4,37 ± 1,5 in PK group. 8th and 24th hour VAS values in MML group were found to be statistically less than PK group. These rates were consistent with the literature. Morbidity rates after cesarean are directly related to surgical techniques and intraoperative complications (bleeding, infection, etc.) [23]. Nabhan, et al. compared the Joel-Cohen incision (MML) and the Pfannenstiel incision. They reported that decreases in hemoglobin levels in the Joel-Cohen incision group were 0.680 gr/dl and in the Pfannenstiel group 1.005 gr/dl [24]. In a study, pre-operative Hb rate was 11,40 + 1,53gr/dl and post-operative Hb rate was 9,75 + 1,21 gr/dl for PK group. In the same study pre-operative Hb rate was 11,58 + 1,31gr/dl and post-operative Hb rate was 9,88 + 1,40 gr/dl in MML group [22]. In our study mean pre-operative Hb rate was 11,57 ± 1,61 gr/dl and post-operative Hb rate was 10,09 ± 1,48 gr/dl in MMLgroup. Mean pre-operative Hb rate was 12,04 ± 1,42 gr/dl and post-operative Hb rate was 10,4 ± 1,6 gr/dl in PK group. Mean difference in pre and post-operative Hb was 1,48 ± 0,91 gr/dl in MML group and 1,64 ± 0,72 gr/dl in PK group. Pre and post-operative difference in Hb rates were statistically significant. This proportion was consistent with the literature. A reduction in operative time was reported by past studies comparing non-closure and closure of the peritoneal layers during C/S and reduction in the operative time was shown to be associated with economic benefits due to less suture costs, less anesthesia requirements, and a shorter hospitalization [25]. Reduction in the need for postoperative analgesics, postoperative febrile morbidity, wound infections as well as a shortened hospital stay [15] and fewer adhesions at subsequent C/S [26] were the factors associated with non-closure of the peritoneum in the MML technique, leading to superiority of this technique to the classical PK. In our study duration of operation and hospitalization time was shorter in MML group; however it was not statistically significant. It was determined that the average operation time was longer than 15 minutes when compared to the literature. Mean operation time was 58,3 ± 7,91minutes in MML group and 62,3 ± 14,43 minutes in PK group. We think that the reason for longer operation time at our study is that, our hospital is an education and research hospital so operations are being performed by assitant physicians accompanied by experts and emergent and elective operations are not distributed equally between two groups. In our study mean required amount of analgesic was 4383,33 ± 1031,26gr in MML group and 4816,67 ± 1221,1 gr in PK group. Required amount of analgesic was lower in MML group but the difference was not statistically significant. Mean hospitalization time was 51,77 ± 8,41 hours and this was consistent with the literature. In our study, postpartum endometritis is not detected in both groups. In a study by Igor Hudic et al, they compared postoperative wound infections between MML and PK groups and detected at 1,64% in MML group and at 4,9% in PK group. They reported postpartum endometritis 0,11% in MML group and 0,65% in PK group [27]. In our study wound cultures were positive at 6 patients and all were treated with appropriate antibiotics. No negative effects were reported during the study. We did not evaluate the long-term consequences of both techniques and there is still a controversy regarding the impact of the single versus double-layer closure of the uterus on the risk of uterine rupture at the next pregnancy and adhesions at subsequent C/S.

Conclusion

Our study suggests that a modified Misgav-Ladach cesarean technique might lead to better postoperative outcomes, especially resulting in reduction of pain and postoperative blood loss compared to Pfannenstiel- Kerr technique. So the Misgav-Ladach method of cesarean section is suitable for emergency and elective procedures, but studies including future births after Misgav Ladach CS are required.

Acknowledgments

None

Conflict of interest

None

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