



## Comparing the Outcomes of Traditional and Misgav-Ladach Techniques in Caesarean Section

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**Abstract:** Comparing the Outcomes of Traditional and Misgav-Ladach Techniques in Caesarean Section. Background and Objective: Caesarean section constitutes the most common surgical procedure in obstetrics, and its application in rising worldwide. Pioneers of obstetric surgeries have made many modifications in the methods of Cesarean sections. The aim of the present study was to compare the outcomes of traditional and Misgav-Ladach techniques in caesarean section. Design: A randomized clinical trial. Setting: Maternity Research Center, Obs & Gynecology department of teaching Emam Reza Hospital, Kermanshah.Iran. Patients: 186cases of primary elective and emergency c-section over 37 weeks of gestation (Mean age  $27.18 \pm 6.2$ ). Methods: The pregnant women were randomized in to either of two groups: 1.traditional 2. Misgav-Ladach. Both groups were similar in terms of age and BMI. The major outcomes studied were duration of surgery , fetal extrusion time, blood loss during surgery, need for blood transfusion and analgesics, duration of bowel function restoration, persistent fever after surgery, use of antibiotics, endometritis and wound complications. The Kolomogorov-Smirnov (KS) test was used for evaluating the normality of quantitative data. Normal cases were analyzed using parametric (independent t-test) and non normal cases were analyzed using non-parametric (U-Manwithny test) approaches. Chi-square and Fisher's test were used for comparing qualitative variables between the two groups. P values < 0.05 were considered significant. Results: In the present study, the duration of surgery, time of fetal extrusion, frequency of need for antibiotics, and length of hospital stay were smaller for the Misgav-Ladach group compared to the traditional group. The former group also entailed no adverse outcome during and after surgery. Conclusion: We concluded that Misgav-Ladach technique may serve as an appropriate alternative for the traditional method in cases of elective or emergency c-section.

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### 1. Introduction

Caesarean section constitutes the most common surgical procedure in obstetrics, and its application in rising worldwide (1).

Although François Mauriceau was the first to introduce c-section in the seventeenth century, the greatest breakthrough in caesarean technique occurred in the latter part of the nineteenth century when suturing the uterine wall led to a pronounced decrease in mortality of c-section (2). In 1987, Pfannenstiel introduced the transverse incision of abdominal wall in the suprapubic region (3). In 1926,

Kerr described the transverse incision of the inferior segment of Uterus which included a double-layer suturing of uterine wall and repairing peritoneum (4). The Pfannenstiel incision is a transverse incision above symphysis pubis and curves upwards (5). The advantages of transverse incision include better cosmetic outcome and lower risk of incisional hernia (6, 7). Nevertheless, certain limitations of this technique, have led to the fact that despite its universal acceptance some pioneers of obstetric surgeries have modified it (5).

In 1972, Joel-Cohen introduced a new method

for opening the abdominal wall, consisting of a transverse incision on the skin 5 cm above symphysis pubis (above the Pfannenstiel incision) and blunt dissection of the abdominal wall (8). In late 1980s and 1993, single layer suturing of the uterus (9, 10, 11) and leaving the peritoneum unrepaired (12, 13, 14) were recommended. Stark was the first to evaluate these three surgical modifications in 1995, which came to be known as the Misgav-Ladach method after the name of the hospital where most of the patients were studied (15, 16, 17).

Some advantages of the Misgav-Ladach technique over the traditional (Pfannenstiel-Kerr) technique include shorter duration of surgery, lower rate of febrile morbidity and less post operative adhesion formation (15, 16), less blood loss so Misgav – Ladach technique became popular with obstetricians (18).

Factors such as nutrition status, common diseases of each region, frequent complications of surgery in different societies, economic status of different societies and anatomic differences in individuals of different societies have made researchers evaluate different techniques of surgery in order to identify the most appropriate technique, particularly for c-section (18, 19). Despite the fact that previous studies have confirmed the convenience and advantages of Misgav-Ladach technique its application still faces certain challenges, especially as few clinical trials have assessed it and its long-term outcomes remain unknown. Rupture of uterine scar is a dangerous complication of c-section, particularly after a normal delivery following c-section. The rate of uterine scar rupture is higher in Africa compared to North America (20, 21). It has been suggested that double-layer uterine repair entails a lower risk of uterine rupture compared to single-layer repair, although no advantages have been reported for double-layer repair over single-layer repair (22, 23). No randomized clinical trial has been conducted to study the risk of scar rupture in subsequent pregnancies. One study conducted in 2007 reported that with single-layer uterine repair, long-term morbidities, such as adhesion, will be less frequent compared to the traditional technique; however, the integrity of scar tissue with single-layer uterine repair was not assessed in women who underwent normal delivery after c-section. This is an issue which requires further studies with larger number of patients (24). In recent years, great modifications in c-section techniques has been made (25).

Considering the small number of studies addressing this issue, as well as the ethnic differences and the high prevalence of c-section in developing

countries, such as Iran, we conducted the present study to compare the outcomes of c-section during and after surgery between the traditional and Misgav-Ladach techniques.

## 2. Methods

A randomized clinical trial was conducted in Maternity Research Center, Obs & Gynecology department of teaching Emam Reza Hospital, (in 2010). The study was approved by the ethics committee of Kermanshah University of medical sciences and registered under code IRCT138933044025N1 in the Iranian Center of Clinical Trials. Our study population consisted of all pregnant women over 37 weeks of gestation who underwent elective or emergency c-section for the first time. The sample size was calculated to be 93 patients in each group, yielding a total of 186 patients for the study (26). Informed consent was obtained from all patients. All surgeries were equally performed for both groups by two surgeons. Table 1 summarizes the differences in surgery between the two groups.

The first group underwent c-section with the traditional technique and the second group was operated on using the Misgav-Ladach technique. The exclusion criteria were: Hospital stay of over 24 hours prior to c-section; Previous surgery with a midline incision below umbilicus; Temperature of over 38°C during the 48 hours before surgery; Using antibiotics during the week before surgery; Multiple pregnancy; History of previous c-section; History of diabetes, hypertension, cardiovascular diseases, coagulative disorders or other systemic diseases. All surgeries were performed under spinal or general anesthesia. Both groups were similar in terms of age, height, and weight and body mass index. Duration of surgery was measured from skin incision to the end of surgery, and fetal extrusion time was measured from skin incision to delivery. Blood loss during surgery was measured as the amount of blood suctioned. Fever was defined as temperature over 38°C for at least 48 hours. Wounds were examined for complications by a study collaborator on all days of hospital stay and on day 15 after surgery. The amount and frequency of administering antibiotics and analgesics were measured.

The management of pre and post operative cares was identical for both groups. During the 12 hours after surgery, fluids were provided intravenously and then shifted to oral nutrition. Patients were allowed out of bed 12 hours after surgery. All patients were administered 1 g prophylactic Keflin immediately after cord clamped, and 50 mg pethidine after surgery for pain control.

Subsequent doses were adjusted according to patient's needs. In addition, bowel sounds were auscultated until the restoration of bowel function.

The major outcomes studied were duration of surgery, fetal extrusion time, blood loss during surgery, need for blood transfusion, need for analgesics, time of bowel function restoration, persistent fever, use of antibiotics, endometritis and wound complications.

The Kolmogorov-Smirnov (KS) test was used for evaluating the normality of quantitative data. Normal cases were analyzed using parametric (independent t-test) and non normal cases were analyzed using non-parametric (U-Mannwithny test) approaches. Chi-square and Fisher's test were used for comparing qualitative variables between the two groups. P values < 0.05 were considered significant.

Table 1- differences between two techniques of c-section

Stages	Group 1 Traditional N=93	Group 2 Misgav-Ladach N=93
Skin incision	Pfannenstiel	Joel Cohen
Subcutaneous tissue	Sharp dissection	Blunt
Rectus Fascia	Sharp dissection	Blunt
Rectus muscle	Cutting and separation from sub-fascia	Blunt
Peritoneum	Sharp dissection	Blunt
Uterine incision	Sharp dissection	Blunt
Uterine sutures	Double layers	Single layer
Muscle sutures	<i>Figure of Eight 8 Suture</i>	<i>Figure of Eight 8 Suture</i>

Table 2- demographic data (obstetric characteristics of patients)

The average	Group 1 Traditional N=93	Group 2 Misgav- Ladach N=93	Total groups N=186	P.Value
Age (years)	26.39	27.97	27.18	0.102
Body mass index (Kg/m <sup>2</sup> )	28.12	27.98	28.05	0.928
Gravid	1.69	1.97	1.83	0.61
Parity	0.40	0.74	0.57	0.002
Gestational age (weeks)	38.48	38.93	38.69	0.020

Table 3- indications of c-section

indications	Frequency	Percent
<b>Cephalopelvic disproportion(CPD)</b>	52	28.3
<b>fetal distress</b>	37	19.9
<b>Breech presentation</b>	24	12.9
<b>Meconium passage</b>	23	12.4
<b>post term pregnancy</b>	13	7
<b>Previous history of Infertility</b>	8	4.3
<b>others</b>	8	4.3
<b>Previous history of anterior-posterior repair</b>	6	3.2
<b>macrosomia</b>	5	2.7
<b>oligohydraminos</b>	4	2.2
<b>failure to progress labor</b>	4	2.2

## 4- Intra operative findings and Post operative outcomes

The average	Group 1 Traditional N=93	Group 2 Misgav- Ladach N=93	Total groups N=186	P.Value
<b>Duration of operation (min)</b>	40.23±7.4	36.17± 1.2	38.2	< 0.001
<b>Intra operative blood loss (ml)</b>	324.08	313.97	319.03	0.88
<b>Fetal extrusion time (min)</b>	3.31	1.86	2.58	< 0.001
<b>Frequently prescribed analgesic</b>	2.87 ± 1.37	3.16± 1.29	3.01	0.156
<b>Resumption of Bowel function (hours)</b>	8.36	8.60	8.48	0.189
<b>use of antibiotics (mg)</b>	15.25	7.34	11.3	< 0.001
<b>Duration of hospital stay (hours)</b>	56.00	49.04	52.54	< 0.001

### 3. Result

The two groups were not significantly different in terms of age, body mass index or gravidity – 25<BMI<30 was more frequent in the traditional group, while BMI<25 and BMI > 30 were more frequent in the Misgav-Ladach group (p=0.29). (Table 2) The number of multiparous women was higher in the Misgav-Ladach group.

The indications for c-section were not significantly different between the two groups (table 3). Both groups were identical in terms of anesthesia. Most patients received spinal anesthesia (p=0.896) using marcaine with P.Value < 0.05 considered significant, the Misgav-Ladach group had significantly smaller duration of surgery, fetal extrusion time, antibiotics use, and length of hospital stay after surgery compared to the traditional group. (table 4).

The two groups were not significantly different in terms of number of analgesic administration, duration of bowel function restoration, and blood loss during surgery. 98% of patients in the traditional group and 100% of those in the Misgav-Ladach group required analgesics after surgery (p=0.498). Moreover, 2 patients (2.2%) in the traditional group and 1 patient (1.1%) in the Misgav-Ladach group (yielding a total of 3 (1.6%) patients) developed persistent fever after surgery (p=0.621). No case of endometritis was found in either group.

Only 2.2% of patients in the traditional group and no patient in the Misgav-Ladach group needed blood transfusion (p=0.497).

The wound complications were seroma in 8 patients, hematoma in 1 patient (0.5%), wound opening in 1 patient (0.5%), wound infection in 1 patient (0.5%), and seroma with wound opening in 1 patient (0.5%).

### 4. Discussion:

Due to the high rate of c-sections performed, any effort aimed at reducing morbidity will be valuable in terms of obstetric health and cost. In the present study duration of surgery was significantly different between the two groups, with a mean duration of 40.23 ± 7.4 minutes for the traditional and 36.17 ± 1.2 minutes for the Misgav-Ladach group (p<0.001). In a study by Ponam Banerjee (26) duration of surgery was also significantly shorter for the Misgav-Ladach group 16 minutes vs. 28 minutes. Shorter duration of surgery means a shorter time of anesthesia. This finding is corroborated by Gutierrez (27) and Xavier P (19). Similarly, Redich A (28) reported a significantly shorter duration of surgery

with Misgav-Ladach technique 29.8 min. vs. 49.3 min. (p<0.001). The present study showed fetal extrusion time was significantly shorter for the Misgav-Ladach group (1.86 minutes) compared to the traditional group (3.31 minutes, p<0.001). This issue is beneficial for the neonate, particularly in cases of fetal distress. The mean fetal extrusion time in the Ponam study consistent with our study was 1.30 min. for the Misgav-Ladach group and 3 min. for the traditional group (26).

The Misgav-Ladach technique entails smaller amounts of blood loss compared to the traditional technique (1, 2, 26). The mean blood loss during c-section with Misgav-Ladach technique was 350 mL in the Ponam study and 313.97 mL in the present study, whereas in the traditional method, Ponam reported 600 mL and we found 324.08 mL blood loss. Our findings do not indicate a significant difference in blood loss between the two techniques (p=0.88).

Similarly, Minerva G (29) did not find a significant difference in blood loss between the two techniques (11). Ginecol reported smaller amounts of blood loss with Misgav-Ladach technique (27). Multiple factors influence blood loss during surgery With Misgav-Ladach technique, hemorrhage from abdominal wall is smaller which may be accounted for by the avoidance of hemorrhage of perforating vessels. The shorter duration of surgery also affects blood loss (26).

Single-layer uterine repair also shortens duration of surgery, with better homeostasis and less febrile morbidity compared to double-layer uterine repair (30).

Regarding the short-term complications of surgery, the two groups were not significantly different in terms of number of analgesic administration or duration of bowel function restoration (p=0.156 and p=0.189, respectively). Nevertheless, the difference in antibiotics use was significant (p<0.001). Minerva G (29) and Ansaloni L (31) reported considerably less pain with Misgav-Ladach. Similarly, Gutterz (27) found less pain with Misgav-Ladach. On the other hand, Moreina P (32) did not find a significant difference between the two groups in terms of need for analgesics, which is consistent with our findings. In the study by Stark M (33), the Misgav-Ladach group required fewer antibiotics, which is in line with our findings; however, previous studies (19, 34, 35) did not find a significant difference. Regarding bowel function restoration, Xavier and Naki MM (19, 35) did not report a significant difference, which is similar to our finding. However, Minerva reported faster physiologic restoration with Misgav-Ladach



(29).

Regarding wound complications, a total of 10 patients were involved, consisting of 7 patients in the traditional group and 3 in the Misgav-Ladach group. In 2006, Ponam reported wound infection in 15 patients (13 in the traditional group and 2 in the Misgav-Ladach group), while we observed only one infection in the Misgav-Ladach group. Seroma was found in 6 patients in the traditional group and 2 patients in the Misgav-Ladach group.

Hospital stay was significantly shorter in the Misgav-Ladach group compared to the traditional group (49.04 hours vs. 52.54 hours,  $p < 0.001$ ), whereas previous studies did not report a significant difference in length of hospital stay between the two groups (26, 29). This may be accounted for shorter duration of surgery time in the Misgav-Ladach group.

### 5. Conclusion:

The findings of the present study indicated that the Misgav-Ladach technique involves shorter duration of surgery time, faster fetal extrusion, less need for antibiotics and shorter hospital stay compared to the traditional technique. Although no adverse complication was found on short-term follow-up, this technique must be followed up on a long-term scale to evaluate the risk of abdominal adhesions or uterine rupture following subsequent cesarean deliveries. We recommend the Misgav-Ladach technique to replace the traditional technique in patients who do not wish to become pregnant in the future or those who wish to perform tubal ligation during cesarean section.

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