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Comparative analysis of modification of Misgav-Ladach and Pfannenstiel methods for caesarean section in the Department of Feto-Maternal Medicine, Polish Mother's Memorial Hospital, between 1994 and 1999

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ABSTRACT

Objective: Comparative analysis of modification of Misgav-Ladach (MML) and Pfannenstiel methods for caesarean section in the material of Fetal-Maternal Medicine Clinical Department PMMH-RI between 1994–99.

Material and methods: Study group consists of 242 patients. All women from this group were subjected to caesarean section using modification of Misgav-Ladach method. The control group numbering 285 women were subjected to caesarean section applying Pfannenstiel method. To analyse clinical postoperative course in both groups we assessed several parameters.

Results: Statistical analysis revealed that most of clinical postoperative course parameters was significantly better in the study group in whom we performed caesarean section using a modification of Misgav-Ladach method.

Conclusions: The benefits of modification of Misgav-Ladach method, with less pain post-operatively and quicker recovery, are all favourable characteristics doing the least harm during surgery and removing every unnecessary step. This method is appealing for its simplicity, ease of execution and its time-saving advantage.

Key words: caesarean section; Pfannenstiel; Misgav Ladach

INTRODUCTION

Caesarean section is one of the most common operation performed in obstetrics accounting for about 10–35% of all deliveries. Two decades ago, the maternal death rate following caesarean section was estimated to be 75%. At present caesarean section is a relatively safe method of delivery with less incidences of surgical and anaesthetic adverse events.

When Murdoch Cameron (Glasgow) in 1878 performed eight consecutive caesarean sections without a single maternal death by suturing the uterus (refining the classical uterine incision of Sanger) this was seen as a major breakthrough. Earlier, Porro in Milan (1876) had introduced the caesarean section technique with sub-total amputation of the uterus. This manoeuvre saved the life of the mother but precluded any further pregnancies. Munro Kerr in Glasgow had modified an operation developed by Kronig (transperitoneal lower incision in 1911 and introduced his method of transverse incision in the lower uterus. He further refined this method and it gained international acceptance, since 1949 it was accepted as the standard procedure.

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One variation in his method was to use the lower transverse abdominal incision introduced by Pfannenstiel in 1896. Due to cosmetic considerations and a decrease in wound hernias, this method has gradually become a standard procedure in many developed countries. However, it has some disadvantages. It may be considered too slow for emergency sections since the subaponeurotic dissection of the rectus sheath takes time. Sometimes it is also accompanied by troublesome bleeding from perforating vessels. Postoperative hematomata and abscess formation are not uncommon such that some surgeons routinely drain this space. The Pfannenstiel method does not strictly follow Langer's lines and may be accompanied by unsightly guttering when the patient stands erect especially if the repair at the end of operative procedure is not performed meticulously. Subsequently, a new method grew out of an approach to perform a straight transverse abdominal incision was developed in 1954 by Professor Joel Cohen for abdominal hysterectomy and was popularised in his monograph "Abdominal and Vaginal Hysterectomy" in 1972[1]. This method of opening the abdomen has been practised by a number of obstetricians for caesarean sections following Stark's lead but to this he has added a number of new features which combine to make a package of refinements that have not been previously employed. It is noteworthy that in the Pfannenstiel method the body is perceived as static and the incision cuts its way through with disregard to structural anatomy whereas in the Joel-Cohen incision the anatomical structures are considered and the opening follows the principles of minimal surgical incision. The claimed advantages of the Misgav-Ladach method as shown in non-randomised trials are impressive: it is said to be less traumatic for the mother with quicker post-operative recovery[2], less febrile reactions[1,3], less need for antibiotics[3], a shorter period before normal bowel function returns, less peritoneal adhesions and less scarring of the abdominal layers[2,3]. It is said to cause less bleeding in the abdominal wall[4], and is observed to be so quick that it can be used for both planned and emergency sections[2]. It is also a method that is easy to adopt for trainees.

MATERIAL AND METHODS

Investigations were performed in Fetal-Maternal Medicine Clinical Department of Polish Mother's Memorial Hospital between 1994–1999. The study group consists of 242 patients, in whom caesarean section was performed using modifications of the Misgav-Ladach method. This operative procedure was applied to both elective and emergency caesarean section. The control group comprised 285 women undergoing caesarean section with the Pfannenstiel method regardless of indications to this treatment. In order to analyse clinical postoperative course we took into account the following parameters: early postoperative complications (intraabdominal bleeding, uterus contraction problems, hematomas, injury of urether, bowels), fever, infections or urinary tract, treatment with antibiotics (excluded intraoperative administration of single dose), pain symptoms requiring prolonged administration of analgesic drugs and dehiscences. Only patients with first laparotomy were included in the study groups and in normal controls.

The Pfannenstiel method for caesarean section is widely known in clinical practice and has been included in this investigation[1].

The modification of the Misgav-Ladach method performed in this study is given below. Briefly, a curve transverse incision similar to the Pfannenstiel method is performed. The subcutaneous tissue is left undisturbed. The rectus sheath is separated along its fibres and the rectus muscles are separated by pulling and the peritoneus is opened by stretching with index fingers. The uterus is opened with a knife and is enlarged between the index fingers. Closure of the uterus is carried out with a one-layer continuous locking-unlocking stitch. The visceral and parietal peritoneal layers are eft open. The rectus sheath is stitched with a continuous locking-unlocking stitch. Finally the skin is closed with continuous or single stitches (Table 1).

Statistical analysis was performed using the Fisher's exact test.

TABLE 1
The Misgav-Ladach method of cesarean section

• Modified Joel-Cohen opening of the abdomen
• Parietal peritoneum opened transversely
• No intraabdominal swab used
• Lower uterine segment transverse incision
• Uterus sutured continuously in one layer
• Visceral and parietal peritoneum left open
• Non-locking continuous closure of the fascia
• Few widely-spaced skin stitches

RESULTS

The patient characteristics for the study group subjected to the Misgav-Ladach method and controls which were operated by Pfannenstiel procedure is given in Table 2. It is noteworthy that patients in both groups were evenly distributed for adequate statistical analysis. Elective caesarean section was performed

for 62/242 (25.6%) in the study group compared with 73/285 (25.6%) for the control group; with 18/242 (74.3%) and 212/285 (74.3%) respectively for patients subjected to the emergency caesarean section. The comparative analysis of postoperative complications by the Misgav-Ladach and Pfannenstiel methods is given in Table 3. A significantly reduced incidence of subfascial hematomas (2/10), subcutaneous hematomas (2/12), fever (23/55), urinary tract infections (12/26), pain (45/102), dehiscencies (5/19) and requirement of antibiotics (32/58) were clearly observed in women operated by the modified Misgav-Ladach method compared to the Pfannenstiel procedure.

DISCUSSION

Modification of Misgav-Ladach method for caesarean section gives the opportunity for a simple operative procedure and less prevalence of surgical complications. It allows for rapid foetal extraction in emergency caesarean sections, usually less than 1 min, decreases intraoperative bleeding, and reduces the duration of anaesthesia. Many steps of this surgical procedure are performed without scalpel which enables opening abdominal layers in parts with minimal resistance, resulting in reduced damage of tissues including blood vessels, nerves and muscles.

Firstly, opening the skin and subcutaneous tissue to rectus muscle fascia reduces the incidence of bleeding using only fingers thus not injuring blood vessels. It could prevent future appearance of subcutaneous hematoma in postoperative follow-up[1,2,3,5]. In our surgical experience the appearance of subcutaneous hematomas was 2 and was significantly lower from control group ($p = 0.013$). Appearance of other

TABLE 2
Characteristics of study and control groups

	Study group	Control group
Number of patients	242	285
Mean age (ys)	24.38 ± 3.5	24.68 ± 3.8
Elective cs	62	73
Emergency cs	180	212

TABLE 3
Comparative analysis of postoperative complications in modification of Misgav-Ladach (MML)and Pfannenstiel methods for caesarean section.

Parameter	MML method	Pfannenstiel method	Significance* p =
Intraabdominal bleeding	0	5	0.045
Puerperial uterus contraction problems	23	38	0.1
Perimetrial hematomas	0	6	0.024
Subfascial hematomas	2	10	0.035
Subcutaneous hematomas	2	12	0.013
Urinary bladder injury	0	0	1
Urether injury	0	1	0.54
Bowels injury	0	0	1
Fever	23	55	0.001
Infections or urinary tract	12	26	0.046
Antibiotics treatment	32	58	0.019
Pain symptoms	45	102	0.00007
Dehiscencies	5	19	0.0087

*Statistics – Fisher's exact test; p – significance

hematomas (perimetrial and subfascial) was significantly lower as well (0 vs 6; p = 0.024 and 2 vs 10; p = 0.035 respectively). Opening rectus muscle fascia, muscles and both peritoneum without preparation makes time to deliver foetus significantly shorter. By using the fingers to open the parietal peritoneum we avoid injury to the underlying bowel. This recommended procedure to open the visceral peritoneum has been noted to avoid damage to the bladder. In both our groups of patients we did not observe bowel or urinary bladder injury. Manual ablation of placenta reduces the duration of the third stage of labour and possibly reduces bleeding[4]. In our study series the prevalence of postoperative intraabdominal bleeding requiring repeat laparotomy in the control group was 5. All intraabdominal bleeding was caused by uterine bleeding. In patients operated using the modification of Misgav-Ladach method no such serious postoperative adverse events was observed. This difference in operative procedures significantly favours the Misgav-Ladach method (p = 0.045).

Puerperal uterus contraction problems was noted in 23 patients operated using modification of Misgav-Ladach method and in 30 patients operated using Pfannenstiel method. This difference was, however, not statistically significant (p = 0.1).

Suturing the uterus wound with continuous locked-unlocked stitch provides the optimal conditions for wound healing thus reducing the possibility of ischaemia. This procedure is very important for maintaining the quality and resistance of postoperative cicatrix.

Leaving visceral peritoneum open can reduce postoperative hematomas in the place of suturing uterus wall and is the reason why the healing of the wound is better and prevalence of febrile postoperative episodes are decreased. The same trend connected to febrile postoperative event was noted in our investigation. Prevalence of this adverse effect in study group was 23 vs 55 in the control group (p = 0.001).

Leaving visceral peritoneum open also reduces urine retention in the bladder, dysuria and rate of infection in lower urinary tract. The rate of infection in lower urinary tract was significantly lower in patients from study group compared to the control group (12 vs 26; p = 0.046). Also the number of patients requiring postoperative antibiotic therapy was significantly lower among women from study group in which the Misgav-Ladach method was used (32 vs 58; p = 0.019).

The obvious feature of this method of caesarean section is that the correct anatomical position of urinary bladder is not changed and it prevents intraoperative injury to a large extent[5–11]. Leaving the wall of the peritoneum open is most appropriate way to prevent the development of adhesions. A new peritoneum will develop within a short time. It is therefore possible that stitching of the peritoneum could lead to local ischemia which stimulates a repair response by adhesion formation. Patients with unsutured wall peritoneum do not experience painful symptoms in the early postoperative period[6–9].

Also unsuturing the rectus muscles can prevent accidentally injury to blood vessels which can cause subfascial hematomas.

Using continuous locked-unlocked stitch in rectus muscle fascia suturing instead of locked stitch or single cross-stitches makes better conditions for healing without ischaemia. It also reduces postoperative pain symptoms and allows the patient to walk earlier. In our investigation a significantly lower postoperative pain symptoms was observed in the group of women undergoing Misgav-Ladach procedure when compared to those women subjected to the Pfannenstiel method (p = 0.00007).

Besides, the operative procedure avoiding suturing of subcutaneous tissue decreases the rate of subcutaneous hematomas.

In our study of patients subjected to modification of Misgav-Ladach method we observed low number of dehisciencies (n = 5), which was statistically significant when compared to 19 patients from control group (p = 0.0087). The early removal of skin stitches reduces the risk of infection and keloids.

Overall, the modified Misgav-Ladach method when compared with the Pfannenstiel and Cohen method of laparotomy allows a quick recovery period with a shorter duration of hospitalisation[1] and is cost-effective. This operative procedure also has less postoperative and anaesthetic complications (thrombosis, infection and ileus).

CONCLUSIONS

The Misgav-Ladach method is based on the principles of minimal surgical intervention and working in harmony with the body's anatomy and physiology. It allows for rapid foetal extraction in emergency caesarean sections, usually less than 1 min, decreases intraoperative bleeding, makes duration of anaesthesia shorter. It could also prevent future appearance of subcutaneous hematoma in postoperative follow-up.

Opening the rectus muscle fascia, muscles and both peritoneum without preparation renders time to deliver foetus significantly shorter. Using the fingers to open

the parietal peritoneum could avoid injury of underlying bowel and bladder.

Suturing the uterus wound with continuous locked-unlocked stitch gives the optimal conditions for wound healing thereby reducing the possibility of ischaemia. It is also very important for the quality and resistance of postoperative cicatrix.

Leaving visceral peritoneum unsutured can reduce postoperative hematomas in place of suturing the uterus wall and this could be the explanation for better would healing, and reduced postoperative febrile episodes. Leaving the wall of peritoneum open is most important to prevent adhesion formation. The benefits of the method, with less pain post-operatively and quicker recovery, are due to minimal surgical intervention. This method is appealing for its simplicity, ease of execution and is time-saving as well as cost-effective, requiring shorter hospitalisation.

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