



A COMPARATIVE ANALYSIS OF THE MODIFIED MISGAV LADACH AND PFANNENSTIEL-KERR TECHNIQUES IN LOWER SEGMENT CESAREAN SECTIONS (LSCS) CONDUCTED AT A RURAL GOVERNMENT MEDICAL COLLEGE IN UTTAR PRADESH

Dr. Amrita Saha*

Professor, Narayana Medical College and Research Center, Kanpur.
*Corresponding Author.

Dr. Preeti

Consultant at SEEDS of Innocence, IVF.

Dr. Shashi Shukla

Assistant Professor in BBRA Medical College, Kannauj.

ABSTRACT

Background: The choice of surgical technique for cesarean section (CS) directly affects operative time, maternal recovery, and postoperative complications. The Misgav Ladach technique, derived from the Joel-Cohen incision, emphasizes gentle tissue handling and minimal dissection, while the traditional Pfannenstiel-Kerr approach remains widely practiced in India. **Methods:** This prospective randomized controlled study was conducted in the Department of Obstetrics and Gynaecology, Government Medical College, Kannauj, from March 2022 to February 2023. A total of 120 women undergoing elective or emergency CS were randomized to either the Pfannenstiel-Kerr (PFK, n=60) or Misgav Ladach (MML, n=60) technique. Operative time, extraction time, blood loss, postoperative pain (VAS), analgesic requirement, febrile morbidity, and neonatal APGAR scores were compared, with $p < 0.05$ considered statistically significant. **Results:** The MML technique showed a significantly shorter mean operative time (23.16 ± 4.09 vs. 34.52 ± 6.20 min, $p < 0.001$) and extraction time (3.08 ± 0.79 vs. 6.79 ± 1.67 min, $p < 0.001$). Postoperative pain scores and bowel restitution times were also lower in the MML group. The reduction in postoperative hemoglobin was smaller in the MML group (1.01 ± 0.30 vs. 1.19 ± 0.47 g/dl, $p = 0.015$). Febrile morbidity was lower in the MML group (1.7% vs. 8.2%), though not statistically significant. Neonatal APGAR scores at 5 minutes were significantly higher in the MML group ($p < 0.001$), though the absolute difference was small. **Conclusion:** In this study, the Misgav Ladach technique resulted in a shorter operative time and reduced postoperative analgesic needs, while maintaining comparable complication rates. These combined benefits make it a practical and reassuring option for both emergency and elective cesarean sections, particularly in resource-limited settings.

KEYWORDS : Cesarean section, Misgav Ladach, Pfannenstiel-Kerr, Joel-Cohen incision, operative time, postoperative pain.

INTRODUCTION

Cesarean section (CS) is one of the most commonly performed obstetric procedures worldwide. Historically, however, CS was associated with extremely high maternal mortality, reported to be as high as 75% a century ago. Surgical refinements over time have greatly improved outcomes. In 1897, Pfannenstiel introduced a curved transverse suprapubic skin incision, and later, in 1926, Kerr described the lower uterine segment transverse incision with double-layer uterine closure and peritoneal closure—an approach that became widely adopted.^{1,2}

In clinical practice, abdominal entry for CS is typically achieved either through a suprapubic transverse incision or a midline vertical incision. Among transverse approaches, the Pfannenstiel, Maylard, and Joel-Cohen incisions are commonly used.

In 1972, Joel-Cohen and colleagues proposed a higher transverse incision with minimal sharp dissection and greater reliance on blunt tissue separation. Over the following decades, additional refinements—such as single-layer uterine closure and non-closure of the visceral and parietal peritoneum—were introduced.^{4–15} These elements were formally evaluated together by Stark and colleagues in 1995, ultimately evolving into what is now known as the Misgav-Ladach technique.^{6–18}

The Misgav-Ladach technique differs from the Pfannenstiel-Kerr approach primarily in the location of the skin incision and the extensive use of blunt dissection to minimize tissue trauma. Built on the principles of surgical minimalism, the technique emphasizes gentle handling of tissues, a shorter incision, omission of peritoneal closure, and simplified uterine repair. These features have been associated with shorter operative time, reduced postoperative pain, lower febrile morbidity, faster return of bowel function, and an overall quicker recovery. Because of its efficiency and reduced tissue disruption, the technique is considered suitable for both elective and emergency cesarean sections, particularly in

high-volume or resource-limited settings.^{19–24}

METHODOLOGY

The objective of this study was to compare two commonly practiced cesarean section techniques—the Pfannenstiel-Kerr (PFK) approach and the Modified Misgav-Ladach (MML) technique derived from the Joel-Cohen incision. The goal was to identify which method offered a simpler and more efficient surgical experience by reducing operative time and minimizing tissue trauma. In addition, postoperative outcomes such as complications, analgesic requirements, changes in hemoglobin levels, and short-term neonatal outcomes (including skin-to-delivery interval and APGAR scores) were evaluated for both techniques.

Study Design And Setting

This study was a prospective randomized controlled trial conducted from March 2022 to February 2023 in the Department of Obstetrics and Gynecology at Government Medical College and Hospital, Kannauj. A total of 120 women who required elective or emergency cesarean sections and met the inclusion criteria were enrolled after providing informed consent. All participants had undergone regular antenatal evaluations and routine laboratory investigations.

Participants were randomized into two groups: **Group A (PFK):** 60 women who underwent cesarean section using the Munro Kerr method with a Pfannenstiel incision. **Group B (MML):** 60 women who underwent cesarean section using the Misgav-Ladach technique based on a Joel-Cohen-style incision.

Surgical Techniques

The two approaches differed primarily in their incision placement and method of tissue handling. In the PFK technique, the peritoneum was entered sharply and the incision was extended cephalocaudally. In contrast, the MML technique involved blunt entry of the peritoneum, reducing sharp dissection and minimizing tissue trauma.

For the MML group, the incision was placed approximately 5 cm below the anterior superior iliac spine (ASIS)-a modified Joel-Cohen level. Although this position reflects a variation from the classic Joel-Cohen incision, it still aligns with the broader Misgav-Ladach principles of minimal sharp dissection and gentle tissue handling. The skin incision used in this approach was shorter, and both the peritoneal and muscle layers were left unclosed, consistent with the technique's aim of reducing operative manipulation. Closure was limited to the uterus-sutured in a single layer-and the rectus sheath.

RESULTS

Baseline demographics are present in table 1. The mean age of the PFK group was 25.79 ± 3.63 years and the mean age of MML group was 26.10 ± 3.96 years. Table 2 represents the **Intergroup Comparison of Pre operative & Post Operative Hb level and Hb Change**. No significant difference was found in mean Pre operative Hb level between the groups ($p=0.132$). No significant difference was found in mean Post Operative Hb level between the groups ($p=0.568$). The **mean change in Hb level** of the PFK group was 1.19 ± 0.47 gm/dl while in MML group it was 1.01 ± 0.30 gm/dl. The significant difference was found in mean change in Hb level between the groups. ($p=0.015$)

Table – 1 : Comprehensive Descriptive Summary Of Age And Gestational Age Of Study Participants.

Parameter	PFK		MML		Significance	
	Mean	SD	Mean	SD	t-value	p-value
Age (yr)	25.79	3.63	26.10	3.96	-0.45	0.651
Gestational Age (wk)	38.75	1.88	38.41	1.94	0.97	0.332

Table – 2: Intergroup Comparison of Pre Operative & Post Operative Hb level and Hb Change:

Hb Change	PFK		MML		Significance	
	Mean	SD	Mean	SD	t-value	p-value
Pre Op hb	10.66	0.99	10.38	1.08	1.52	0.132
Post Op hb	9.48	0.97	9.37	1.09	0.57	0.568
change	1.19	0.47	1.01	0.30	2.48	0.015

Table 3 describes the Intergroup Comparison of Intraoperative Parameters. PFK group total operative time was 34.59 ± 6.20 min while in MML group it was 23.16 ± 4.09 min. The significant difference was found in mean total operative period between the groups ($p<0.001$). The significant difference was found in mean extraction time between the groups ($p<0.001$). A statistically significant disparity was observed in the mean number of sutures employed between the groups ($p<0.001$).

Table – 3 : Intergroup Comparison of Intraoperative Parameters:

Intraop parameters	PFK		MML		Significance	
	Mean	SD	Mean	SD	t-value	p-value
Total operative period	34.52	6.20	23.16	4.09	14.76	<0.001
Extraction time	6.79	1.67	3.08	0.79	15.56	<0.001
Blood loss	583.11	176.89	562.50	148.33	0.69	0.489
N sutures	4.09	0.94	3.52	0.58	4.02	<0.001

Table 4 enlists the details on Intergroup Comparison of Postoperative Parameters. The APGAR score difference (8.59 vs 8.88) is statistically significant but extremely small in absolute terms. Although statistically significant, the difference is small and likely not clinically significant. The significant difference was found in mean VAS in 6-12 hours between the groups ($p<0.001$). Mean bowel restitution between the groups ($p<0.001$) was statistically significant. Mean analgesic use in 6 hours between the groups was not significant. The significant difference was found in mean analgesic use in 12 hours between the groups ($p<0.001$).

Table – 4: Intergroup Comparison of Postoperative Parameters:

Post Operative Parameters	PFK		MML		Significance	
	Mean	SD	Mean	SD	t-value	p-value
Apgar 5	8.59	0.50	8.88	0.32	-3.84	<0.001
Vas 6	4.15	1.03	3.12	0.58	6.75	<0.001
Vas 12	6.52	1.39	4.70	1.05	8.16	<0.001
Bowel restitution	9.02	2.05	7.13	1.19	6.16	<0.001
Analgesic use in 6 hours	2.33	0.51	2.07	0.41	3.12	0.204
Analgesic used in 6-12 hours	5.08	0.82	3.80	1.02	7.61	<0.001

Comparison of febrile morbidity in between two groups of caesarean section is described in Table 5. Febrile morbidity and wound sepsis were observed at rates of 8.2% in the PFK group and 1.7% in the MML group. The incidence was lower in the Misgav Ladach group; however, this difference was not statistically significant.

Table 5- Comparison Of Febrile Morbidity In Between Two Groups Of Caesarean Section.

Wound infection	PFK		MML		chi sq	p-value
	No.	%	No.	%		
No	55	91.8%	59	98.3%	2.74	0.098
Yes	5	8.2%	1	1.7%		
Total	60	100.0%	60	100.0%		

DISCUSSION

Every obstetrician recognizes the importance of reducing operative time during a cesarean section. In our study, the Misgav-Ladach technique led to a substantial reduction in operative and extraction times-almost a 50% decrease compared to the Pfannenstiel-Kerr method. This is particularly valuable in emergency settings, where every minute influences maternal and fetal outcomes. A shorter procedure also reduces the duration for which the abdomen remains open, which may help lower the risk of infection.¹⁹⁻²³

Our findings align with earlier research by Naki, Gedikbasi, and others, which similarly reported shorter operative times with the Misgav-Ladach approach.^{19, 20} In addition, women in the MML group required fewer sutures and less postoperative analgesia, echoing trends seen in studies by Sharma and Mani, Darj, and Ferrari.²¹⁻²³

The lower postoperative pain scores in the MML group are consistent with the understanding that the Pfannenstiel technique involves more sharp dissection and tissue handling, which can contribute to greater postoperative discomfort and inflammation. The significantly smaller drop in hemoglobin and faster return of bowel function in the MML group further support the idea that this technique causes less tissue trauma and supports smoother postoperative recovery.

Although the rates of postoperative fever and wound sepsis were lower in the MML group, the difference was not statistically significant. The slightly higher 5-minute APGAR scores in the MML group mirrored findings from previous trials, though the difference in absolute terms was small and likely not clinically meaningful.

The Misgav Ladach technique has shown several clear advantages that make it a practical choice for cesarean deliveries. By relying more on gentle, blunt dissection and less on sharp cutting, it causes less tissue damage and bleeding. Surgeons often find the procedure quicker to perform, and mothers generally experience less postoperative pain and recover faster. Because fewer sutures are needed and the peritoneum is left unclosed, bowel movements return sooner and hospital stays can be shorter. Overall, the Misgav Ladach approach combines surgical simplicity with improved maternal recovery, making it a thoughtful evolution of

cesarean technique.¹⁶⁻²⁴

Given its simplicity, reduced operative time, and faster postoperative recovery, the Misgav Ladach technique can be adopted in high-volume or resource-limited centers as a standard approach for both elective and emergency cesarean sections. One of the strengths of our study was that it reflected the realities of a rural Indian healthcare setting. Because the trial and all procedures were performed by the same surgical team, variation in technique was reduced and the results more accurately reflected the true differences between the two methods.

Limitations of the study includes Single-center study with a modest sample size. Short postoperative follow-up. No long-term data on adhesion formation or future fertility outcomes. Larger multicentric trials assessing long-term maternal outcomes and cost-effectiveness of the Misgav Ladach technique in Indian settings are warranted.

CONCLUSION

The Misgav Ladach technique was associated with a shorter operative time, lower postoperative analgesic requirements, and comparable complication rates when measured against the Pfannenstiel-Kerr method. Overall, this approach offered quicker recovery and proved to be a practical option for both emergency and planned cesarean sections.

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