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Original Research Article

Implementation of an Enhanced Recovery after Cesarean Protocol at the Dalal Jamm National Hospital Center in Senegal

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Abstract: ***Introduction***: Enhanced recovery after surgery (ERAS) protocols are effective in optimizing perioperative outcomes. This study evaluated the adoption of ERAS protocols among adult women undergoing cesarean section at a referral hospital in Senegal. ***Methods*****:** This was a prospective, single-center interventional study conducted over four months at the Dalal Jamm National Hospital Center, from May 5th to September 4th. The primary objective was to reduce the length of hospital stays for patients, which averaged three days before the start of the study. Data were collected using questionnaires and analyzed using Excel 2019 and R version 4.5.0. ***Results***: Among 102 patients (mean age: 29.4 years), 72.6% were able to leave the hospital within 48 hours. The mean pain score remained below 3 at rest; the TAP block significantly reduced pain during mobilization between 10 and 20 hours. Mobilization was possible within 6 hours in 90% of patients, and urinary catheter removal in 97.06%. Bowel function returned within 32 hours in 91.2% of patients. The complication rate was 6.8%, and 100% of mothers reported being satisfied. ***Conclusion***: ERAS protocols following cesarean section have significantly reduced hospital stays and ensured effective pain management. Their implementation in a resource-limited setting has proven feasible, safe, and well-accepted by patients.

Keywords: Enhanced Rehabilitation, Cesarean Section, Dalal Jamm.

1. INTRODUCTION

Postpartum recovery is a crucial phase following childbirth. This recovery can be delayed by factors such as postoperative pain, reduced mobility, anesthesia-related complications, or infections. Each year, approximately 140 million women give birth worldwide, with cesarean section being among the most common surgical procedures [1]. Despite advances in medicine, up to 90% of women report health problems during the first year after delivery, and nearly 10% of those who have undergone a cesarean section experience incomplete recovery, even beyond 50 days [2, 3]. Enhanced recovery protocols, focusing on effective pain management, early mobilization, and complication prevention, have been proposed to reduce the length of postoperative hospital stays and improve recovery outcomes [4, 5]. Initially developed for colorectal surgery, enhanced recovery after surgery (ERAS) protocols have been adapted for the obstetric population, incorporating multimodal interventions aimed at reducing opioid consumption, promoting early feeding, and accelerating mobilization [6-9]. Dominant models favor standardized perioperative management, including preoperative counseling, no preoperative fasting, maintenance of normal body temperature during the procedure, and early postoperative mobilization to reduce the length of hospital stay [10, 9]. Recent studies have demonstrated that the implementation of multimodal analgesia techniques, such as transverse abdominal block (TAP), can significantly reduce postoperative opioid consumption and improve maternal comfort. Despite growing evidence supporting improved recovery after cesarean section, several limitations remain in existing studies [11-14].

The objective of this study was to evaluate the hypothesis that an Enhanced Recovery after Surgery (ERAS) protocol reduces the length of postoperative hospital stay in adult women (≥ 18 years) undergoing a planned or emergency cesarean section in Senegal.

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2. PATIENTS AND METHODS

This was a prospective, single-center interventional study conducted at the Dalal Jamm National Hospital Center in Senegal on apredefined period of four months, from May 5th to September 4th. Participants were adult women (18 years and older) scheduled for a planned or emergency cesarean section [15], during the recruitment period. Inclusion criteria specified the absence of high-risk obstetric complications or chronic medical conditions, thus targeting adult patients undergoing cesarean section without major pregnancy-related or systemic comorbidities. Exclusion criteria included severe preeclampsia [16], eclampsia, or any maternal decompensation such as diabetes, asthma, sickle cell disease [17], or heart disease. Women under 18 years of age and those who did not consent to participate were excluded. In addition, any patient for whom the essential steps of the established ERAS protocol [18], were not followed during the perioperative period was excluded from the final analysis.

During surgery, spinal anesthesia was preferred. This consisted of administering hyperbaric bupivacaine (7.5 mg) and fentanyl (25 µg). A bilateral TAP block under ultrasound guidance was performed with 0.2% ropivacaine or 0.25% bupivacaine (20 ml per side) as the first-line treatment. Infiltration of the surgical site was performed when a TAP block was not feasible. General anesthesia was reserved for specific cases and followed a precise induction and analgesia protocol.

The data were collected using a completed individual survey form and the analysis of the variables was done using Excel 2016 and R 4.5.0 software.

3. RESULTS

3.1 Descriptive Results

During the study period, 102 patients were included. The mean age was 29.4 years, with a range of 17 to 42 years. In our cohort, 43 patients were overweight with a BMI between 25 and 29.9 (42.16%). Morbid obesity was found in 2 patients (1.96%). Hypertension was the most frequent comorbidity, found in 10 patients, representing 9.8%, followed by diabetes (7.8%), asthma (2.9%) and sickle cell disease (2%).

Prophylactic cesarean sections were the most frequent (64%) (Table 1). The surgical indication was maternal in 51% of cases, and a scarred uterus was the most frequent surgical indication (21.57%) (table 2).

The analysis shows that 54% of patients were multiparous compared to 46% of patients who were primiparous.

In our cohort, 70 patients had no previous cesarean sections, representing a proportion of 68.63%.

The average gestational age was 38.2 weeks.

The majority of our patients were classified as ASA 2 (86%). Intraoperatively, antibiotic prophylaxis was administered with cefazolin in 99% of cases. Spinal anesthesia was the most frequently used anesthetic technique (87.25%, n=89) (table 1). Adverse effects were predominantly arterial hypotension (40.2%). The surgical approach used for all patients was a transverse Pfannenstiel incision. The hysterotomy was performed transversely, and the placenta delivered spontaneously. Finally, the incision was closed layer by layer. The average Apgar score was 7.2, with a range of 4 to 9. The average duration of the surgery was 49.54 minutes with extremes of 25 and 104.

Postoperatively, the TAP block was the most frequently used analgesic technique (84.30%). At rest, the mean pain threshold was less than 2, and during mobilization, the mean pain threshold was less than 3 (Figure). The time to first breastfeeding was between 2 and 6 hours in most cases, or 67%.

Urinary catheter removal was performed 6 hours post-surgery in almost all cases (97.06%). The first mobilization occurred 6 hours post-surgery in the majority of our patients (90%). The mean time to return of gas was 18.5 hours (table 3), and the mean time to return of bowel movements was 27.5 hours (Table 4). The incidence of post-operative nausea and vomiting (PONV) was 3.9%; no cases of urinary retention (UR) or post-partum hemorrhage (PPH) were noted, and no surgical revision was required. The mean length of hospital stay in our study was 48.2 hours (table 5). Maternal satisfaction was excellent in all cases (table 6).

Table 1: Distribution of clinical data

Clinical Data		Number of employees(n)	Frequencies (%)
Context	Emergency	65	64
	Prophylactic	37	36
ASA	ASA 2	88	86
	ASA 3	14	14
Anesthetic techniques	Spinal anesthesia General anesthesia	90 10	87.2 8.8
	Epidural anesthesia	2	4
Pain relief techniques	TAP block Infiltration	86 16	84.4 15.6

Table 2: Surgical indications

Indications	Number of employees (n)	Frequency (%)
Uterine scar	22	21.57
Non-reassuring fetal condition	18	17.65
Pelvic anomaly	13	12.75
Dystocic presentation	9	8.82
Circular cord	9	8.82
Fetopelvic disproportion	9	8.82
Polymalformative syndrome	6	5.88
Macrosomia	4	3.92
Cord strap	3	2.94
Growth retardation	2	1.96
Myoma previa	2	1.96
Pre-rupture syndrome	1	0.98
Chorioamnionitis	1	0.98
Triggering failed	1	0.98
Exudative ascites	1	0.98
Siamese pregnancy	1	0.98

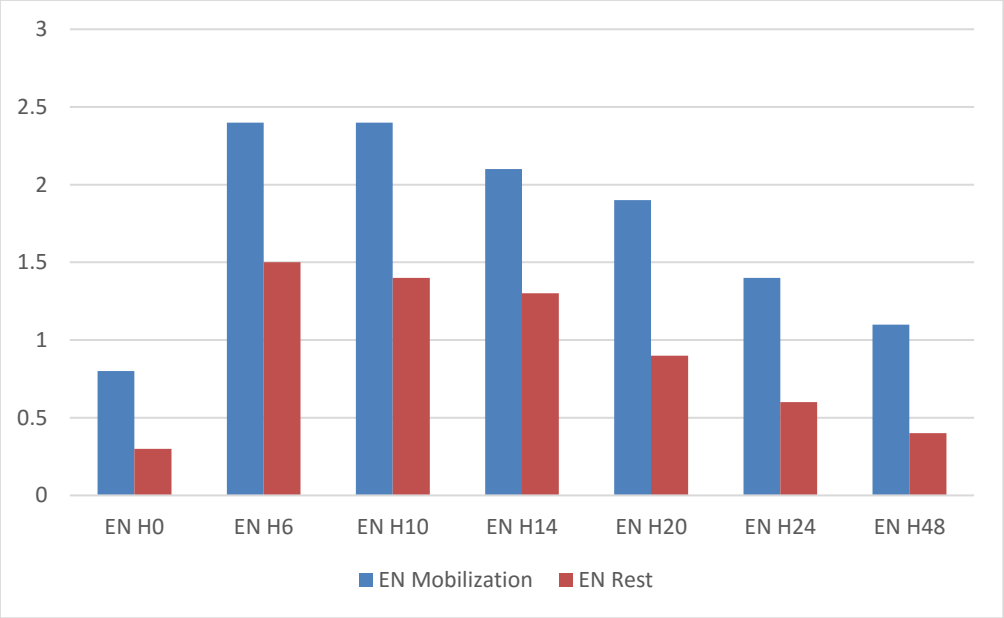

Figure: Evolution of pain at rest and during mobilization

Table 3: Gas Recovery Time

Delay (Hours)	Number (n)	Frequency (%)
<16	44	43.13
[16-32]	49	48.03
[33-48]	9	8.84
>48	0	0
Total	102	100

Table 4: Time to return of bowel movements

Delay (Hours)	Number (n)	Frequency (%)
<16	9	8.84
[16-32]	61	59.8
[33-48]	29	28.4
>48	3	2.96
Total	102	100

Table 5: Distribution of patients according to length of hospital stay

Length of hospital stay (Hours)	Number (n)	Frequency (%)
[24-48]	74	72.6
[49-72]	23	22.6
>72	5	4.8
Total	102	100

Table 6: Maternal satisfaction

Score (out of 10)	Satisfaction	Number of employees (n)	Frequency (%)
[0-5]	Not satisfied	0	0
[6-7]	Satisfied	46	45
[8-10]	Very satisfied	56	55
Total	-	102	100

3.2 Analytical Results

The average pain level during mobilizationin patients who benefited from a TAP Block is lower than that of the infiltration group at H10, H14 and H20.

This difference is statistically significant because the P values are strictly less than 0.05 (table 7).

There is no statistically significant difference in the length of hospital stay according to the anesthetic techniques.

There is a statistically significant difference in length of hospital stay according to the time to resumption of gases with a P-value of 0.0001.

Table 7: Analysis of pain during mobilization according to the analgesic technique

Numerical Scale (EN)	Infiltration M (AND)	TAP block M (AND)	P value
EN at rest at H10	1.69 (0.87)	1.44 (0.71)	0.302
EN at rest at H14	1.56 (0.73)	1.31 (0.69)	0.22
EN at rest at H20	1.44 (0.73)	0.85 (0.64)	0.007
EN to the effort at H10	2.88 (0.89)	2.31 (0.69)	0.027
EN to the effort at H14	2.62 (0.72)	2.08 (0.75)	0.012
EN to the effort at H20	2.38 (0.72)	1.81 (0.82)	0.01

4. DISCUSSION

The results of this study are consistent with current data indicating that enhanced recovery protocols can reduce the length of postoperative hospital stay after cesarean section [6-9]. The majority of patients in this cohort were discharged within 48 hours, in line with literature data demonstrating that implementation of the ERAS protocol reduces the length of hospital stay [6-9]. Furthermore, early removal of urinary catheters, early mobilization (6 hours post-procedure), and rapid restoration of gastrointestinal function are comparable to the results of previous studies reporting accelerated functional recovery with ERAS protocols [10]. Postoperative pain is one of the most important aspects of enhanced recovery after cesarean section (ERAS) because many other aspects depend on managing postoperative pain. In addition to the patient's experience and quality of life, pain has detrimental effects on the body by amplifying the inflammatory and immune cascade resulting from the surgical trauma.

It is initially at its maximum and decreases within 2 to 3 days, leading to an increased neuroendocrine response. This limits patient mobility, increases postoperative fatigue, and exacerbates sleep disturbances. Therefore, it is crucial to address this very important factor in order to regulate and modulate the inflammatory and immune response to the surgical trauma.

The use of multimodal analgesia, including the high frequency of TAP block administration, allowed for effective pain control without reported severe pain, confirming previous data that TAP block can be an effective non-opioid analgesic technique [20]. In our study, the TAP block was performed as an analgesic technique, or, failing that, wound infiltration with bupivacaine or ropivacaine at the end of the procedure. One of these techniques was combined with the prescription of common analgesics such as paracetamol, nefopam, and AINS. In our pain management protocol, multimodal analgesia was provided to all patients. Thus, the mean pain during mobilization in patients who received a TAP block was lower than that in the infiltration group at 10, 14, and 20 hours. This difference was statistically significant.

This difference could be explained by several factors, notably the significant difference in sample size between the two groups (84.30% vs. 15.60%). Our study found effective and consistent analgesia during the first 24 hours.

The significant improvement in pain scores during mobilization with the TAP block corroborates existing findings highlighting its analgesic superiority over traditional infiltration [21]. Furthermore, the high rate of maternal satisfaction reflects the results of studies where structured perioperative protocols have improved patient experience [14, 9]. It is worth noting that the low complication rate observed confirms previous findings that ERAS protocols do not increase perioperative risk [8]. While the results generally confirm current knowledge, they also provide new data from a resource-limited setting, where the use of ERAS protocols remains less documented, thus reinforcing their applicability worldwide [12]. This study, lacking randomization and a control group, does not allow for establishing a causal link or comparison with standard care. Being single-center and unblinded, it is subject to institutional and observational biases. These results demonstrate that enhanced recovery protocols, including standardized analgesia, early mobilization, and rapid removal of the urinary catheter, are effective in significantly reducing the length of postoperative hospital stay after a cesarean section, with 72.6% of patients discharged from the hospital within 48 hours.

5. CONCLUSION

Rehabilitation programs aim to improve the functional outcomes of postoperative patients and reduce postoperative morbidity, primarily through better management of physiology and the organization of perioperative care. A common denominator of these programs is a reduction in the length of hospital stay and convalescence, which is a major economic consideration. The implementation of this enhanced recovery after cesarean (ERAS) protocol at the Dalal Jamm National Hospital Center has allowed us to reduce the length of hospital stays for our patients, as demonstrated. The study also shows the important role of TAP-Block in managing post-cesarean pain. However, this study has some limitations, notably the small sample size but also the lack of comparison with previous data.

Conflicts of Interest: The authors declare no conflicts of interest.

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