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A Novel Method to Decrease Shoulder Tip Pain during Cesarean Section

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Authors' contributions

This work was carried out in collaboration among all authors. Author MAM designed the study, performed the statistical analysi and wrote the protocol, wrote the first draft of the manuscript. Author EID wrote the first draft of the manuscript and 'managed the analyses of the study. Author WAM managed the literature searches & shared in designing of the study. All authors read and approved the final manuscript.

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ABSTRACT

Objective: To investigate the efficacy of the placement of two towels around uterus before delivery of fetes upon the incidence of intraoperative shoulder tip pain (STP) during cesarean section.
Methods: Two hundred and sixty parturient were scheduled to undergo elective cesarean section under spinal anesthesia were randomized to do packing around the uterus before uterine incision or placebo (control group). The primary outcome was the incidence of intraoperative shoulder pain. Secondary outcomes were operative time, amount of intraoperative blood loss, incidence of hypotension, and the Need of post-opertive morphine.
Results: Shoulder tip pain was recorded only in 7 cases (5.4%) in towel placement group compared to 25 cases (19.2%) in placebo group (P value, 0.001). The need of post-operative morphine was statistically significant lower in Towel placement group (33.8%) compared to (47.7%) in control group (P value, 0.023).
Conclusion: Packing around the uterus just before uterine incision decreases the incidence and severity of intraoperative shoulder pain in patients undergoing cesarean section.

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Keywords: Cesarean section; shoulder tip pain; packing around uterus.

1. INTRODUCTION

Cesarean section had become the most common surgery among women all over the world [1]. Spinal anaesthesia has recently become the preferred anaesthesia for cesarean section [2]. The advantages of regional anaesthesia include an awake mother at delivery, minimal side effect of the new born and minimise or avoidance of the risks (aspiration, difficult intubation etc...) of general anaesthesia [3].

Recent studies found that shoulder pain is common during and after cesarean section [4]. There are few studies investigated this problem in patients undergoing cesarean delivery. In one study it was reported that the incidence of shoulder tip pain (STP) after cesarean section is significant [5].

The reason for this pain is postulated to be due to sub-diaphragmatic clot, subdiaphragmatic air trapping, or because of peritoneal irritation resulting from them [6].

1.1 Aim

This study aimed to investigate the effect of the placement of two towels around uterus before delivery of fetes upon the incidence of intraoperative shoulder tip pain (STP) during cesarean section.

2. PATIENTS AND METHODS

This prospective observational study was conducted in Sohag university hospital, department of obstetrics and gynaecology. The patients included in the study were women aged more than 18 years and presented with an indication for an elective cesarean section at ≥ 37 weeks of gestation.

Women with complicated or multiple pregnancy, emergency CS, cardio-pulmonary diseases and patients who felt pain during CS due to any other cause rather than shoulder pain like patchy or incomplete block necessitating more analgesia were excluded from the study.

Patients with suspected abnormal placentation, previous vertical uterine incision, a history of >1 cesarean section, a history of major abdominal surgery were excluded.

All women were randomized blindly into two groups based on a closed envelop method. There was no premedication given to the patients. Intravenous line was installed to all patients then 500 cc lactated ringer solution was infused. Pulse rate, blood pressure, SpO_2 of each parturient and fetal heart rate were recorded before spinal anaesthesia. Both groups were received spinal anaesthesia given in the sitting position from the midline approach, intervertebral space L3-L4 or L4-L5, with a spinal needle size 25-27 gauge, using 10-15 mg 0.5% hyperbaric bupivacaine plus 200 µg morphine intra-thecally.

Group A (Control group. N= 130): They received spinal anaesthesia then caesraen section was done while the patients were lying flat without head elevation.

Group B (Study group N= 130): They received spinal anaesthesia then a caesraen section was done with putting two large towels around the uterus while the patients were lying flat without head elevation. Towels were removed after the uterine incision had been closed with good haemostasis.

The desired level of sensory block was T4-T6. If hypotension or bradycardia occurred intravenous ephedrine 5 mg incremental doses or atropine sulphate 0.5 mg was administered respectively. Surgeries were done by lower segment cesarean section performed in all the cases with low transverse skin incision, and uterus was repaired in two layer with no 1.0-vicryl sutures. Visceral peritoneum was not repaired. Parietal peritoneum, rectus sheath and skin were repaired as usual. All patients were given a single use of antibiotic prophylaxis (cefotaxime, 1g). postoperative pain was treated with intravenous morphine 2 mg given incremental doses.

The primary outcome was the incidence of intraoperative shoulder pain. Secondary outcomes were operative time, amount of intraoperative blood loss, incidence of hypotension, and Need of post-opertive morphine.

The demographic data, body mass index, operation time, preoperative and postoperative hemoglobin values, the time of passing flatus were recorded. To facilitate the double-blinding

method, Thus, the patients and the observer were blinded to groups.

2.1 Statistical Analysis

Statistical differences between two groups in discrete and continuous variables were tested using Chi-square and Student's t-test, respectively. A p-value of <0.05 was considered significant. SPSS 16.0 (SPSS Inc, IL, and USA) was used to analyse the data.

3. RESULTS

A total of 318 cases undergoing an elective cesarean section were assessed for eligibility to participate; 58 of them were excluded. 260 cases were included into 2 equal groups. 130 cases towels were placed before opening of uterus and another 130 cases no interventions were done. Both groups were comparable as regard Age, weight gestational age and amniotic fluid index as shown in Table 1.

Shoulder tip pain was recorded only in 7 cases (5.4%) in towel placement group compared to 25 cases (19.2%) in placebo group (P value, 0.001). The need of post-operative morphine was statistically significant lower in Towel placement group (33.8%) compared to (47.7%) in control group. There was no statistically significant difference between groups as regard incidence of hypotension (51.5% versus 45.4% in control group), operative time (51.23 ± 5.7 min. versus 50.81±6.3 min in control group) nor estimated blood loss (788±141 ml versus 806±129 in control group) as shown in Table 2.

4. DISCUSSION

Cesarean section (CS) is the most common abdominal surgery among women worldwide [7]. Spinal anesthesia is most commonly used anesthesia technique in patients scheduled for CS. There are very well known complications of spinal anesthesia used during CS [6]. But few studies highlighted the shoulder tip pain as one of the most annoying problems during CS.

Shoulder pain is one of the intraoperative complications of CS, is usually neglected in clinical work and research even though it is very distressing to patients and is a very common happening. Shoulder pain is common in CS performed under spinal anaesthesia and it commonly needs a rapid intervention due to its severity.

This sharp type of pain noticed intra-operatively during CS is usually experienced in the shoulder area, and was described by the patients to originate from deep inside the shoulder. They also at times complain it to originate this from the right side of chest [8].

The pain is found to go down to the upper arm and in the neck on right side sometimes. This pain at times leads muscle spasm. The exact mechanism of pain is still unknown, but it is postulated to be due to sub-diaphragmatic clot, sub-diaphragmatic amniotic fluid, or sub-diaphragmatic air trapping [9].

In this study, we tried to demonstrate the effect of a new technique by putting two packs around the uterus to decrease the incidence of shoulder pain during CS.

Our study showed that the prevalence of STP during CS under the conventional flat position without head elevation was 19.2%, which is significantly decreased through putting two large packs around the uterus to 7% possibly due to decrease the leakage of blood & amniotic fluid upwards which cause peritoneal and diaphragmatic irritation.

Table 1. Patients characteristics in both groups

	Towel placement group (No 130)	control group (No 130)	P value
Age (years)	25.43± 3.6	26.08±3.3	0.26*
Weight (kg)	78.27 ±7.9	76.88± 8.4	0.18*
Gestational age (weak)	38.6 ± 0.8	38.2 ±0.9	0.48*
Amniotic fluid index (AFI), cm	7.34± 1.4	7.68± 1.7	0.32*

**Using independent sample T test*

Table 2. Operative data in both groups

	Towel placement group (No 130)	control group (No 130)	P value
Shoulder tip pain	7 (5.4%)	25 (19.2%)	0.001#
Hypotension	67 (51.5%)	59 (45.4%)	0.32#
Need of post-opertive morphine	44 (33.8%)	62 (47.7%)	0.023#
Operative time (min)	51.23 ± 5.7	50.81±6.3	0.41*
Estimated blood loss (ml)	788± 141	806± 129	0.45*

 # Using Chi Square test; Using independent sample T test*

Similar results were obtained by Abbas M et al [10], however they used pre-operative ketorolac (30 mg) as prohpylaxis for shoulder tip pain. Their option has a disadvantage of exposing the fetus to non steroidal anti- inflammatory drugs (NSAID), also uterine relaxing effect of NSAID may contribute to increase blood loss.

Regarding the use of analgesia due to STP, in the present study we used morphine by incremental doses until pain became mild or subsided, we found a statistically significant decrease in morphine dose in the study group than the control one demonstrating the preventive effect of our new method to decrease STP during CS.

5. CONCLUSION

Our study showed that the prevalence of intraoperative shoulder pain in patients undergoing cesarean section under spinal anesthesia was 19%, which is a high percentage and is being neglected till now. Packing around the uterus provides an excellent method to decrease shoulder pain during CS Further studies should be done regarding other methods and analgesics to decrease STP during CS.

6. LIMITATION OF THE STUDY

We did not investigate the impact of STP on postoperative recovery. A study assessing how much STP interfering with patient's performance after cesarean section could answer this question.

CONSENT AND ETHICAL APPROVAL

The trial protocol was approved by the institutional ethical committee, and written informed consent was obtained from all patients.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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