The efficacy of peri-incisional local xylocaine injection on postoperative pain after caesarean section: Arandomized controlled trial

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Abstract: Objectives: To evaluate the efficacy of local anaesthetic infiltration (xylocaine) on the postoperative pain after caesarean section. **Patients and Methods:** A prospective randomized control trial was designed to assess the analgesic efficacy of 20 ml 1% xylocaine solution infiltration in the rectus sheath space and surgical wound compared to control group, in two groups of 75 women for each group. All included women underwent caesarean section under spinal anaesthesia: group I (control group) and group II (xylocaine group) . Postoperative pain scores using the visual analogue scale and the total amounts of pethidine used were assessed at 30 minutes, 2, 4, 6, 8, 12 and 24 hours postcaesarean section. **Results:** Xylocaine infiltration in the rectus sheath space and the subcutaneous tissue for caesarean delivery before wound closure leads to a reduction in the overall consumption of analgesics (70.44±30.44 mg pethidine for group II versus 120.544±25.44 mg for group I with $P < .05$), especially in the first 24 hrs, and also significantly increases the time interval until the first request for an analgesic (5.114±0.457 hours in group I versus 8.112 ±0.348 hours in group II). There was significant difference in the visual analogue scale in the two groups. It was lower in group II than group I in all time intervals. **Conclusions:** The local anaesthetic infiltration of xylocaine appears to be effective in reducing postoperative pain and pethidine use after caesarean delivery.
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1. Introduction:

Caesarean section is a common surgical operation and rates are increasing [1]. Postoperative pain is the greatest issue for women during and after caesarean section, as authenticated by a recent survey [2]. Pain relief and patient satisfaction are still insufficient in many cases. Postoperative pain may be severe, continue at least for 48 to 72 hours, and may also postpone patient ambulation, prolongation of hospitalization, recovery, increased lung collapse, vascular thrombosis and eventually patient dissatisfaction [3]. As a result of their valuable analgesic and anesthetic sparing criteria; opioids analgesic drugs are often taken during the postoperative period; nevertheless, they are associated with many drawbacks such as paralytic ileus, nausea, vomiting, pruritus, dizziness, urinary retention and respiratory depression. Moreover, these drugs need to be frequently injected either intravenous or intramuscular to control postoperative pain. Pain control using opioids based on patient requirement and demand and usually complete patients' satisfaction doesn't achieved [4].

Because of analgesic properties and lack of opioids induced side effects; local anesthetic drugs are increasingly targeted in the treatment of surgical pain. The strategy behind the use of pre-emptive anesthesia "local anesthetic taken during the operation to prevent or reduce pain afterwards" is to stop pain from the beginning by blocking the usual response of nervous system to pain. The data from previous studies suggest that the infiltration of local anesthesia into the wound during caesarean section seems to be effective in reducing postoperative narcotic requirements [5]. The aim of the current study was to evaluate the efficacy of local anesthetic infiltration (xylocaine) on the postoperative pain after caesarean section.

2. Patients and Methods

The current randomized controlled study was conducted at the Ain Shams University, Maternity Hospital and Bolak El-Dakror Public Hospital during the period from January 2013 to September 2013 after being approved by local ethical committee. A written informed consent was obtained from all women. Total of 150 women who underwent elective caesarean delivery under spinal anesthesia for various indications were included in the current study. All women were subjected to full history taking, general abdominal and pelvic examinations. Anaesthetic time, surgery time, incision length, ambulation time and hospital stay time.

Women were excluded if they had an emergency caesarean section, known or suspected sensitivity to local anesthesia and / or any medical disorders during pregnancy.Included women were assigned randomly into two groups: Group I (control group) and Group II (xylocaine group). Randomization was performed using random number allocation and sealed envelopes,

and each group consisted of 75 women. In all cases, a standard spinal anesthesia was used such that a sensory block up to T_6 level was established and no opioid drug was used during or before anaesthesia. A urinary catheter was inserted systematically before the caesarean section and was left in place for 24 hours. All caesarean sections were performed using pfannestiel incision.

At the time of closure of the anterior abdominal wall, women in group II had received infiltration with 20 milliliter (ml) of 1% xylocaine using 20 ml syringe:

1. 10 ml in the rectus sheath space, care was taken to avoid the inferior epigastric vessels as they ascend between the posterior layer of the rectus sheath and the rectus abdominis muscles. A needle was passed under direct vision into the space between the rectus abdominis muscle and the posterior layer of the rectus sheath towards the umbilical pole, after aspiration to exclude vascular injury. The rectus sheath space expanded with little resistance as the xylocaine was introduced. The procedure was repeated on the contra lateral side of the abdomen (Figure 1).
2. 10 ml subcutaneously on each of the upper and lower edges of the incision.

Women in group I received 20 ml of 0.9% saline in both sites as group B. The postoperative pain was evaluated at 30 minutes, 2, 4, 6, 8, 12 and 24 hours after operation by using the standard 10 cm visual analogue scale (VAS) (Figure 2) for pain scoring by the nurse that was explained to included women during the preoperative visit. Women had received opioids (pethidine) as a postoperative analgesia, on demand and when VAS was equal or more than four. Observation concerning opioid consumption was documented and the total dose of analgesic drug was calculated for each patient.

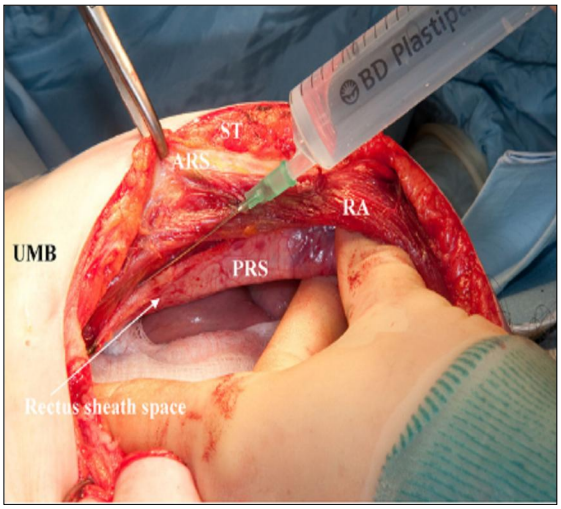

Figure 1: Technique of local anesthetic injection in the rectus sheath space.

ST: Subcutaneous tissue; ARS: Anterior rectus sheath; RA: rectus abdominis; PRS: Posterior rectus sheath.

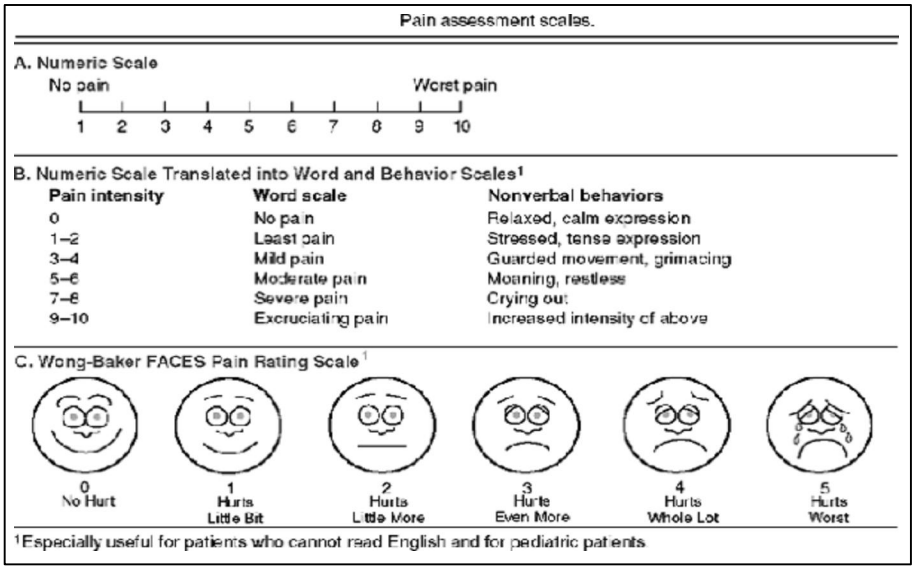

Figure 2: Pain assessment scales *[15]*

3. Results

There was no significant difference in women demographics between the 2 groups with respect to maternal age, body mass index (BMI), gestational age (Table-1) parity and number of previous caesarean sections. There was no significant difference between both groups regarding surgery time and incision length, however, the ambulation time was significantly decreased in xylocaine group when compared to control group (Table-1).

Table 1. Comparison between Group 1 and Group 2 as regards the studied parameters

Studied parameters	Studied groups		P value[¥]
	Group 1 (control) (n=75)	Group 2 (xylocaine) (n=75)	
Maternal age (years)	23.8±3.8	26.8±3.4	0.92
Body mass index on admission (kg/m2)	30.1±5.1	29.9±4.9	0.72
Gestational age (weeks)	38.6 ±1.1	38. 5±1.1	0.38
Surgery time (minutes)	56.25±13	57.3±9.5	0.57
Incision length (cm)	10.5± 0.71	10.44± 0.70	0.60
Ambulation time(hours)	8.46±0.63	5.8±0.72	<0.001[¶]
Mean time interval for the first analgesic request (hours)	5.11± 0.45	8.11± 0.34	<0.001[¶]
The mean total dose of pethidine used(mg)	120.5± 25	70.5± 25	<0.001[¶]

no., number; [¥]: Analysis using student t-test Data are presented as mean ± standard deviation as appropriate.
[¶] indicates statistical significance.

The mean VAS for pain was 2.57 versus 1.6 at 2 hours, 6.01 versus. 3.71 at 4 hrs, 4.13 versus. 5.77 at 6 hours, 5.87 versus 6.41 at 8 hours, 4.24 versus 5.09 at 12 hrs, 4.18 versus. 3.98 at 24 hours for Group I and Group II respectively. The pain scores were lower in the Group II than Group I in all time intervals which was a statistically significant (Table-2).

Table 2: Comparison between the visual analogue scales in both groups.

Visual Analogue Scale	Group I					Group II					Mean rank		Mann-Whitney Test	
	Range			Median	Inter-quartile Range	Range			Median	Inter-quartile Range	Group I	Group II	Z	P-value
After 30 min	0	-	0	0	0	0	-	0	0	0	75.50	75.50	0.00	1.00
After 2 hrs	1	-	3	1	1	0	-	1	0	0	110.24	40.76	-10.55	0.00
After 4 hrs	2	-	8	5	2	1	-	3	1	1	112.43	38.57	-10.62	0.00
After 6 hrs	1	-	7	3	1	2	-	5	3	1	65.57	85.43	-2.94	0.00
After 8 hrs	2	-	8	5	3	1	-	7	4	2	83.13	67.87	-2.20	0.03
After 12 hrs	1	-	7	2	1	1	-	6	2	1	77.73	73.27	-0.65	0.51
After 24 hrs	1	-	6	3	1	1	-	3	2	1	100.17	50.83	-7.40	0.00

The mean rank of pethidine was 106.00 mg versus.45.00 mg at 4 hours and 81.00mg versus70.00 at 24 hours, respectively, which showed a significant difference P<0.05 (table-3). The total dose of pethidine consumed in Group I was higher than Group II, it was 120.544±25.44 mg versus 70.44±30.44mg, respectively, which was also significant P<0.05 as shown in table-1.

Table 3: Comparison between the doses of pethidine used in both groups in all time intervals.

Visual Analogue Scale	Group I					Group II					Mean rank		Mann-Whitney Test	
	Range			Median	Inter-quartile Range	Range			Median	Inter-quartile Range	Group I	Group II	Z	P-value
After 30 min	0	-	0	0	0	0	-	0	0	0	75.50	75.50	0.00	1.00
After 2 hrs	0	-	0	0	0	0	-	0	0	0	75.50	75.50	0.00	1.00
After 4 hrs	0	-	50	50	0	0	-	0	0	0	106.00	45.00	-10.11	<0.001*
After 6 hrs	0	-	50	0	0	0	-	50	0	50	71.00	80.00	-1.70	0.09
After 8 hrs	0	-	50	50	50	0	-	50	50	50	77.50	73.50	-0.72	0.47
After 12 hrs	0	-	50	0	0	0	-	50	0	0	76.50	74.50	-0.40	0.69
After 24 hrs	0	-	50	0	0	0	-	0	0	0	81.00	70.00	-3.43	<0.003*

4. Discussion

Also our study showed that xylocaine infiltration in the rectus sheath space and subcutaneous tissue significantly decreased the pain scores postoperatively. The mean VAS was decreased at the all-time intervals and the amount of postoperative opioids consumption was also significantly decreased and thus decreasing the possible side effects with the increasing amount of opioids consumed.

There is little published evidence that rectus sheath block provides effective post-operative analgesia in abdominal surgery; However in Crosbie study, the surgical rectus sheath block appeared to provide effective post-operative analgesia for women undergoing major gynecological surgery and that women who received the surgical rectus sheath block went home significantly earlier than those who received the usual subcutaneous local anesthetics into the wound. The above conclusion may pave the way for achieving early post-operative mobilization and provide a useful alternative method for established regional anesthetic techniques [6]

Also a recent Cochrane review also found just three eligible randomized controlled trials (RCTS) to

include in its analysis. Only one of these authenticated a reduction in postoperative morphine requirements in women receiving rectus sheath blocks. The studies were small and heterogeneous in terms of the way of block localization, the duration of the block, 'single shot' versus continuous infusion and the type, concentration and amount of local anesthetic used [7].

In two of these studies, the anesthetist gave the rectus sheath block at the beginning of induction of anesthesia [8] or at the end of the operation, using loss of resistance to guide the way of needle insertion [9]. In the third study, catheters were put bilaterally in the rectus sheath space to allow intermittent post-operative infusions of local anesthetic [10]. Fouldi et al, compared pre-incisional , post-incisional and combined pre- and post-incisional local wound infiltrations with lidocaine in elective caesarean section". They concluded that, mixed group had a significantly lower pain scores, time of breast feeding, number of analgesic demand and duration of analgesia were significantly lower in 'mixed' group than those in pre- and post-incisional groups, respectively [11].

Ejlersen et al, authenticated that pre-incisional infiltration of the surgical wound with lidocaine for providing postoperative analgesia is a more effective method than post-incisional infiltration [12].

Kessous et al. revealed that Pre-emptive analgesia with local infiltration using lidocaine does not add beneficial in decreasing post caesarean pain scores and narcotic requirements [13].

Women who had undergone caesarean section were adequately pain free to breast feed their babies with early return to normal activities, which is an adventurous effect [14] and was also demonstrated in the current study. This suggests that local infiltration with xylocaineis is a simple, safe and effective procedure of reducing post-operative pain. This technique could be considered as fundamental part of the analgesic procedure in women planned for caesarean section. It aims to give ideal pain relief with minimal drawbacks, without interfering with the mother child bond, allowing breast feeding and optimizing postoperative rehabilitation. Our study has shown no surgical postoperative complication related to this technique.

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