

Management of Pain after Caesarean Section and the Maternal Implications

Salam Hadid, R.N. PhD^{1*}, Esther Perez, R.N. B.A.², Farida Morani R.N. M.A.³, Cathrine Bibar, R.N. M.A.⁴, Prof. Jacob Bornstein, MD⁵, Maya Wolf, MD⁶

¹Coordinator of acute pain treatment, Galilee Medical Center - Nahariya, Israel

²Nurse in charge of a maternity ward, Galilee Medical Center - Nahariya, Israel

³Nurse in charge of an infant ward, Galilee Medical Center - Nahariya, Israel

⁴Nurse in a maternity ward, Galilee Medical Center- Nahariya, Israel

⁵Chairmen, Department of Obstetrics & Gynecology, Galilee Medical Center - Nahariya, Israel. Associate Dean, Bar-Ilan University Faculty of Medicine

⁶Director of a high-risk pregnancy ward, Galilee Medical Center- Nahariya, Israel

*Corresponding author

Dr. Salam Hadid, Coordinator of acute pain treatment, Galilee Medical Center - Nahariya, Israel, Miilya, P.O. Box 446, Galilee, Zip Code - 2514000, Israel; Cell No: +972544979016; E-mail: salamh@gmc.gov.il

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Abstract

Objective: Post-caesarean pain management affects both the mother and the newborn. Administration of intravenous acetaminophen is an accepted pain control treatment option. The aim of the study is to examine the effectiveness of IV Acetaminophen every 8 hours for the first 24 hours post-op in post-caesarean patients.

Design: A prospective quantitative research study

Setting: At the maternity ward

Participants: 102 women after cesarean section

Intervention: All women treated according to a pain protocol of intravenous Acetaminophen. Pain was recorded with the Visual Analog Scale (VAS), and then patients were questioned 48 post-op about the pain experienced and its influence on functioning ability.

Findings: The medication reduced pain level by 2-4 points on the VAS. Mean maximum pain reported in the first 24 hours was VAS=5.61, in the next 24 hours 4.54. However, mean maximum pain remembered by the patients was VAS=7.99 in the first 24 hours and 7.07 in the next 24 hours. Most women maintained that the medication helped to reduce their pain but that the pain hindered their ability to perform tasks such as moving and leaving the bed, caring for the newborn and breastfeeding.

Key Conclusions: There is disparity between level of pain reported by women in 'real time' and that recalled in self-report 48 hours post-op. Despite pain alleviation by medication, functioning was still problematic. In addition to pain evaluation, function analysis is also necessary

Implications for Practice: Pain evaluation is insufficient; evaluation and intervention of maternal function is also necessary.

Keywords: Caesarean Section, Pain, Maternity Nursing

Introduction

Caesarean section is considered one of the most common surgeries in women of childbearing age and for various reasons its incidence is on the rise [1,2]. Caesarean section, like any surgical intervention, is associated with post-operative surgical incision pain as well as discomfort associated with uterine contractions [3].

Puerperal Pain is defined as a negative emotional experience that accompanies women during and after childbirth [4]. The experience of pain after caesarean section may affect both the mother and the

baby; it affects the mother in terms of the process of recovery, as it prolongs the time period that it takes her to get up of bed, relative to vaginal delivery; it prolongs hospitalization and affects her mobility. It may also lead to the development of postoperative complications, such as atelectasis, deep vein thrombosis (DVT), or constipation. Pain can negatively affect the quality of the mother-infant relationship and the former's ability to care for and breastfeed the baby [1,3]. While prevention and treatment of pain is one of the basic human rights [5], and it is commonly accepted that the treatment of pain after caesarean section is important, data were insufficient to determine whether any regimen (drug, dose, duration) was better than another [6].

The most effective treatment for pain relief after caesarean section should ensure pain relief with minimal maternal and infant side effects [7]. The medications used for pain control after caesarean section belongs to different groups such as opioids and NSAIDs. Each medication has side effects, and some may affect the newborn through breast milk.

Opiates are effective in treating acute and chronic pain and are one of the therapeutic approaches to relief pain after caesarean section. However, treatment with opioid drugs involves side effects that affect the mother, such as nausea, vomiting, blurring, and constipation, and some affect the infant through breast feeding [8]. Additional treatment alternatives for caesarean pain treatment are NSAIDs and Acetaminophen. NSAIDs are able to prevent inflammation signs and symptoms, and have analgetic effect, especially when pain has correlation with inflammation. NSAIDs are effective in controlling post-operative pain but have side effect as NSAIDs medications [9]. Treatment with Acetaminophen by intravenous injection every 6-8 hours is one of the recommended treatment options for pain relief after emergency caesarean section or elective caesarean section [1,10,11]. Acetaminophen is a pain reliever which does not have the side effects associated with opioid drugs, and it affects the central and peripheral pain trajectories, as well as blocking n-methyl-d-aspartate receptors and cox2 receptors [12].

In addition, use of Acetaminophen as a treatment for pain in patients who also receive opioids reduces the consumption of opioids. Its efficacy is particularly beneficial if administered over a 48-hour continuum, which results in a constant level of the drug in the blood, as opposed to a method in which drug levels change [7]. Acetaminophen administration prior to surgery can also result in a reduction in reported pain two hours postoperatively and a reduction in the amount of opiates patients consume after surgery [13].

Most studies on this topic have examined the intensity of pain reported after caesarean section as a method of examining efficacy of treatment. Few studies relate to its effects on daily activities and on the bonding between mother and infant and the maternal ability to provide care. In this study, we examined the extent to which treatment for pain management after caesarean section, including Perfalgan (Acetaminophen), administered intravenously every 8 hours for the first 24 hours after caesarean section, affected healing and recovery. We further checked both the frequency of use of additional analgesics during a pain outbreak, and the well-being of the mother and her ability to breastfeed and care for her infant. The overall purpose of the study was to examine the efficacy of pain management in women after caesarean section in the maternity ward.

Method

In this prospective cohort study, women undergoing caesarean section in a tertiary medical center over the period February 2016 to May-2016 were treated according to a pain protocol of intravenous Acetaminophen. Maternal pain sensation and consumption of additional analgesics and quality of daily functioning and care of the infant were examined.

The treatment included Perfalgan (Acetaminophen) administered intravenously for pain relief every 8 hours for the first 24 hours after surgery. The women were interviewed using a short form of the Brief Pain Inventory (BPIsf) structured questionnaire, on the experience of pain and its effect over 48 hours after caesarean section. In addition,

data were collected from medical records related to management of pain in terms of type and dosage of drug administered, documented pain levels, and demographic and obstetric details. Follow-up included pain assessment based on the VAS scale when the mother was admitted to the maternity ward, a routine estimate once per shift and in accordance with the patient's complaints of pain, and once again within an hour of therapeutic intervention. In cases of pain onset (pain reported above 4 on the VAS scale), one of the following was given: Optalgin P.O. (Dipyrone, Metamizole), Voltaren I.M. or Ibuprofen P.O... Approval was granted by the Helsinki Committee of the Galilee Medical Center.

Instrument

The instrument was a structured questionnaire, composed of several parts. The first was the BPIsf, which presented eight questions that examined pain levels at different points of time during hospitalization, as reported by the patients and measured on the VAS scale. Four questions dealt with the lowest and highest pain levels felt over 24 hours (Cronbach's alpha = 0.77), and the other questions dealt with the extent of analgesic effect on pain reduction (Cronbach's alpha = 0.76). A further 11 questions examined the disruptive effect of pain on daily activity including breast feeding and infant care for the first two days, on an eleven-point scale where 0 = not disruptive at all, and 10 = completely disruptive (Cronbach's alpha was 0.75 for the first day and 0.85 for the second).

Inclusion criteria consist of: age over 18 and elective or emergency caesarean section. Women who were hospitalized after the surgery in the intensive care unit or refused to participate were not included. Statistical analyses were carried out using SPSS version 20, and included analysis of the effect of demographic data on the results. Results were considered significant where $p < 0.05$.

Results

Of the 102 women undergoing cesarean section birth, 49% had an elective cesarean section and 51% had emergency cesarean section, their age range 19 - 45 years ($M = 30.3$ years). The demographic data is presented in table 1.

Table 1: Description of the study population: N = 102

Variable				
Marital status	94% married		6% single or separated	
Religious affiliation	32% Jewish	23% Muslim	15% Christian	22% Druse
Religious persuasion	60% secular		22.5% observant	18.5% religious

In most cases, the birth was a second birth ($m = 2.27$, $SD = 1.35$), the mean gestational age at birth was 38.3 weeks of gestation ($SD = 1.87$). The intensity of the pain reported by the mothers when they left the recovery room was 2.93 on the VAS scale ($SD = 1.31$). The intensity of pain reported during the 48 hours after caesarean section was at a moderate level or less as shown in Figure 1.

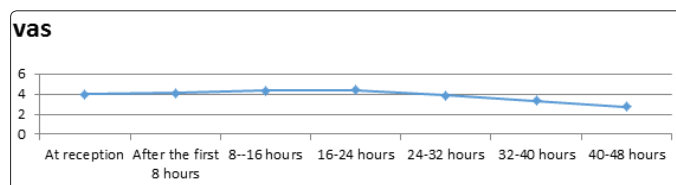


Figure 1: Average reported pain intensity during the 48 hours after surgery

In general, pain levels decreased with time, lower levels reported on the second day than on the first. In addition, the maximum pain level reported in the first day averaged 5.61 (SD = 1.45) and on the second day 4.54 (SD = 1.64).

For the treatment of intrusive pain, the patients consumed additional analgesics. Figure 2 shows the percentage of consumption of additional analgesics during the first 48 hours after surgery. Add-on analgesia in the first day of treatment was based mostly on Optalgin (Dipyrone, Metamizole) and in the second 24 hours was based on Ibuprofen. For most of that day, less than half of the women needed an analgesic agent other than Acetaminophen.

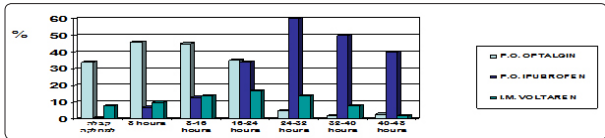


Figure 2: Consumption of additional analgesics during the 48 hours after surgery

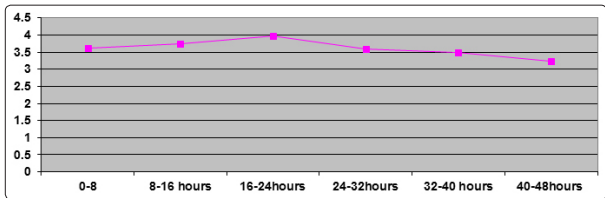


Figure 3: Rate of pain reduction before and after analgesic administration
(y-axis: Levels of pain intensity)
(x-axis: Hours after surgery)
 $p < .001$ for all points in time.

Over each of the two days, for each burst of pain, the additional analgesic that was given significantly reduced pain by 3-4 points on the VAS scale. With regard to pain recalled at the time of the questionnaire (48 hours after caesarean section), 97% of the women reported feeling some level of pain in the postoperative period.

The mean highest pain level recalled for the first day was 7.99 on the VAS scale (SD = 2.39), similar to that of the second day (M = 7.07, SD = 2.44). Lowest mean pain level recalled for the first (M = 3.70, SD = 3.10), and second days (M = 3.56, SD = 2.70) was also similar. The mean recalled pain experience or total pain from the surgery to the interview stage that the women recalled for the first day was 6 (SD = 1.60). This is contrary to levels of pain reported at postoperative real time intervals (see Figure 1).

78.4% of the women reported that in the first 24 hours they experienced moderate or severe pain (M = 3.81, SD = 0.65) and 70.6% reported similar pain for the second day (M = 3.61, SD = 0.73). The mean reported pain during the interview (48 hours after surgery) was 2.38 (SD = 2.19). The presence of pain had an effect on the daily activities of the mothers as shown in Figure 4.

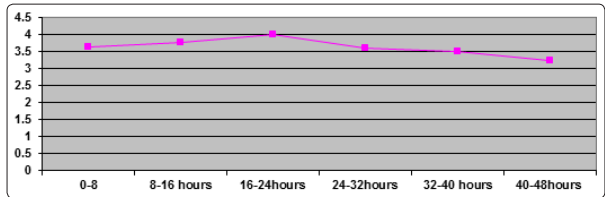


Figure 4: Rate of pain reduction before and after analgesic administration

(y-axis: Levels of pain intensity)
(x-axis: Hours after surgery)
 $p < .001$ for all points in time.
All differences were significant at the .001 level except for the effect on mood.

The effect of pain was observed for all activities. The most significant effect was on the physical ability of the mother to move in bed, get out of bed, take a shower, and go to the bathroom. It also affected the mother's ability to breastfeed and care for the baby. While there was a significant effect of pain on daily activity, there was an improvement from the first to the second days. In addition, the women reported that all analgesics treatment helped them (M = 8.22, SD = 1.40). 92% of the mothers reported that the treatment helped them to a great or very great extent on the first day; a similar percentage (89%) noted this for the second day.

The women age, level of education, number of deliveries before, undergoing a cesarean section before, had no effect on any of the areas (recalled pain level, real time pain levels, and daily activity). On the other hand, differences were observed according to the cultural affiliation of the mothers, but were not significant, possibly because of the size of the sample. Jewish and Druze mothers reported real time higher levels of pain than Muslim and Christian women. Druze women did not recall high pain levels. No significant differences were observed for culturally different groups on the effect of pain on daily activity, mood and infant care and breastfeeding.

A comparison was also made between patients who underwent caesarean section for either emergency or elective reasons. A significant difference between maximum pain levels was reported for the first day, as well as for recalled pain levels in the first day second days.

Table 2: maximum pain levels reported in the first day and recalled first and second day pain levels in emergency versus elective cesarean section

		N	Mean	SD	P 2-sided 1-sided	Wilcoxon W	Z	P 2-sided 1-sided
What was your maximum pain over the first 24 hours?	1= Emergency	50	5.8600	1.59092				
	2= Elective	49	5.3673	1.28604	.040	2165.5	-2.05	0.04 0.02
	Total	99	5.6162	1.46181	.020			
How intense was the pain over the first 24 hours?	1= Emergency	51	7.49	2.679			-2.07	
	2= Elective	50	8.54	1.951	.2312		0.04 0.02	
	Total	101	8.01	2.394	.019			
How intense was the pain over the second 24 hours?	1= Emergency	51	6.47	2.641	.009			
	2= Elective	50	7.78	1.930	.004	2221	-2.61	0.009 0.004
	Total	101	7.12	2.397				
	Total	101	2.39	2.204				

Women who had undergone an emergency caesarean section reported higher pain levels for the first day. In contrast, women who had undergone elective surgery recalled higher pain levels for the first and second days. There were no significant differences for the effect

of pain on the areas of activity between patients after elective surgery and emergency surgery.

Discussion

In our study, pain relief via intravenous Acetaminophen was found to be effective in women after elective caesarean section. The effectiveness of analgesic therapy was assessed by examining its effect on reported pain, consumption of additional analgesics, and daily activity, infant care, and breast feeding. The average level of pain reported by women in real time was at a moderate level on the first day with a reduction in pain as time progressed. When the women experienced outbreaks of pain they were treated with other analgesic medications. The average pain levels of 4 out of 10 also included the pain outbreaks that were treated with other analgesics (in accordance with guidelines) which reduced pain levels by about 3-4 points on the VAS scale. The mean number of additional doses consumed beyond the fixed dose of Acetaminophen was between half a dose to a dose with a downward trend observed in second-day analgesic consumption. Other studies have similarly reported effective results with post-caesarean around the clock Acetaminophen at a maximum dose of 3 grams per day, resulting in reduced opiate use. Effective treatment with Acetaminophen has also been reported in combination with NSAIDS [7,14].

The claim of effectiveness was documented by the mothers themselves when 90 % reported that the treatment helped them to a large or very large extent in the first day. A similar percentage - 88% of mothers reported this for the second day. That is, despite women reporting pain at moderate levels, they report that the treatment did help significantly and relieved their pain. Similar findings were presented in a study that examined the experience of pain in 60 women after caesarean section. While the reported pain levels were moderate to severe, the women reported that they were very satisfied with the pain treatment [15]. Kalstrom et.al report similar findings [3].

Mothers, who experienced bursts of pain, treated with other drugs - on average, half a full dose. The drugs used were Optalgin (Dipyrone, Metamizole) which was used more on the first day, Ibuprofen which was used more on the second day, and Voltaren which was used in a limited way on both days. A multimodal approach, i.e. the use of a combination of drugs, has been described and recommended. Valantine, Carvelho, Kazo and Riley reported that a cohort of 240 women received one dose of NSAIDS (Ibuprofen) in addition to an Opioid or Acetaminophen administered as regular treatment following caesarean section [7].

They also found that regular use of Acetaminophen around the clock, plus an optional Opioid dose during a pain outbreak, was found to be an effective treatment that reduced both the use of opiates and their side effects [7]. The results of this study were also consistent with a study by Darvish, Ardistani, Shali and Tajik of 102 women after caesarean section which showed that an analgesic together with Acetaminophen was more effective than the analgesic alone, and this did not lead to increased complications [14]. In addition, the combination of Acetaminophen and Ibuprofen was found to be a more effective postoperative pain therapy than administering any drug on its own [16].

Intravenous pain relief via Acetaminophen, whether as preemptive preoperative or postoperative treatment, was effective in women after

elective caesarean section. The same study found that Acetaminophen administered prior to surgery reduced the consumption of opioids during and after surgery and lengthened the intervals between requests for analgesics [1]. A meta-analysis showed that Acetaminophen as prophylaxis prior to surgery resulted in a reduction in reported pain two hours after surgery, as well as a reduction in the amount of opiates patients consumed after surgery and prolongation of the period until an additional dose of analgesia was required, together with reduced complaints of nausea and vomiting [13]. Another meta-analysis showed that a single dose of Acetaminophen resulted in reduced reported post-operative pain during both rest and movement and reduced reports of nausea and vomiting [11]. The efficacy of the treatment was noted both in reports of pain in real time and in recollections of pain several days after the painful event.

One of the central and surprising post-hoc analysis results of this study is the difference between the level of pain recollected and the level of pain reported in real time. Mothers who participated in the study reported moderate or low pain levels in real time, but when asked about the experience, reported higher pain levels, and this difference was significant. Similar findings have been reported in other studies, for example, Chin, Vincent & Wilkie found that women who report a low level of pain on a VAS scale cannot make inferential judgments about the pain experience and its impact on their daily activities and their ability to care for the baby [15]. Other studies have reported similar results [15,17]. It is possible that the difference between the pain level described in real time and the level of pain recollected is also dependent on other factors related to pain, such as level of functioning.

Examination of the effect of pain on the level of functioning in daily activities and on the ability of a mother to take care of her infant showed that the presence of pain affected most of the activities, but that the effect decreased on the second day compared to the first. The most powerful effect was on the activities that required physical effort, such as moving in bed, getting out of bed, coughing, going to the bathroom, and taking a shower [15,18]. The importance of mobility for reducing postoperative complications such as thromboembolism and the resulting reduction of pain is well attested [19,20].

In addition, and in accordance with reports from midwives, the presence of pain impaired the ability to breastfeed. Similarly, in a study of 60 women who had undergone caesarean section, over 80% of the patients reported that the presence of pain had impaired their ability to breastfeed and care for the baby [3]. At times however there may not be a direct impairment of the ability to breastfeed due to pain but there may be a limitation in ability to move and change position during the first few days after surgery, which can interfere with the breastfeeding position, and this may last several weeks to two months after birth [15].

Sleep and rest are important in reducing post-operative pain but may be impaired when pain is present. Women after a caesarean birth sleep less hours than women after normal birth [21]. In general, sleep and rest are eroded after giving birth because of the need to care for the baby, and pain aggravates the effect. According to the present study, women rated pain's interference with sleep as 6.5 out of 10. Similar findings have been reported by Chin, Vincent & Wilkie [15]. On the other hand, sleep can help reduce pain. Raising awareness among nursing staff and family members about the importance of

sleep and reducing pain to encourage sleep, can benefit mothers. Maintaining a quiet atmosphere and administering painkillers can be very rewarding in this regard.

An additional parameter that can affect the degree of reporting of pain and its level is cultural relevance. In the present study, differences were found between the reported and the recollected pain levels by ethnic group, but this difference was not significant. This is in contrast to other studies that found that cultural affiliation affects the perception and reported levels of pain [22].

We found that women who underwent emergency caesarean section reported higher pain levels on the first day. These women expected a normal birth but were beset by anxieties about the anticipated experience of pain [23]. These researchers note that the trait of anxiety is more likely to be associated with the level of anticipated pain than the actual levels of pain experienced, and that anxiety levels associated with an emergency caesarean section may have an effect on reported pain levels [23,24]. Levels of anxiety were not examined in the present study [25,26].

Conclusions

The level of pain reported in real time and in recollection is significantly different. Despite the women's reports that the pain treatment was of great help to them, and despite the moderate or reported levels of pain reported in real time, the recollection was of higher pain levels. The presence of pain interfered with the ability to perform daily activities involving mobility and the care of the baby. The presence of pain interfered with women's ability to breastfeed and takes care of the baby.

Recommendations

Raising staff awareness as to the difference between pain levels reported in real time and when recollected, and the impact of pain on daily activity, mainly related to mobility, can increase staff involvement. We suggest that during interventions related to the care of the infant and the improvement of nursing skills, the impact of pain on these areas should be considered and the relation between them should be taken into consideration, both by staff and nursing counselors.

With regard to the relationship between pain and sleep and rest, it is important to improve both staff awareness and that of the mother's family about the importance of sleep, about ways to reduce the negative impact of pain on sleep and about taking steps that could ensure beneficial rest time. Studied with larger number of participants over a longer period to examine the effect of various intervention programs on the relationship between assessment, intervention, pain experience, daily activities, sleep and rest, and infant care are warranted. Studies should differentiate emergency and elective caesarean section.

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