Original Article

Observational study to assess the effectiveness of postoperative pain management of patients undergoing elective cesarean section

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Abstract

Background: The study was designed to assess the strategy, effectiveness, and safety of postoperative pain management in patients undergoing elective cesarean section in the obstetric unit of our hospital.

Materials and Methods: Patients having elective cesarean section from December 2008 to May 2009 were included in this observational study. We recorded patient's demographics, postoperative pain orders, and analgesia regime on the day of surgery. Anesthesia team, which included one of the investigators, assessed the overall pain since the time of surgery by visual analogue scale (VAS) and also recorded any complications since the time of surgery and patients' satisfaction with the pain management.

Results: A total of 263 patients were reviewed during the study period. Postoperative analgesia regime was started by the obstetric team in 81% of patients and in rest by the anesthesia team. The common modality of pain management was intravenous opioid infusion (94%) and coanalgesia was used in 99% of patients. The analysis of pain at rest by VAS was between 1 and 3 in 89.7%, 4 and 6 in 9.5%, and 7 and 10 in 0.8% of patients. The VAS on movement was 1–3 in 60.1%, 4–6 in 33.1%, and 7–10 in 6.8% of patients. Patients' opinion regarding postoperative pain management was satisfactory in 91.6% of patients and unsatisfactory in 8.4% of patients. Overall, 9% of patients had minor complications, which responded well to treatment.

Conclusion: The regime for postoperative pain management was mostly started and followed by the obstetric team at the hospital. Although the postoperative pain management was adequate in terms of patients' safety, it was not effective according to the goal set by Joint Commission on Accreditation of uniformly low pain score of not more than 3 out of 10 both at rest and with movement.

Key words: Cesarean section, postoperative pain assessment, visual analogue scale

Introduction

With the dramatic rise in the rate of cesarean deliveries in the last two decades,[1] postoperative pain management of these patients has become a major medical and nursing challenge. Although advances have been made in the understanding of pathophysiology of postoperative pain and development of new analgesics and delivery techniques, many patients still suffer from moderate to severe postoperative pain.[2] Results from a recent United States national survey suggest that a patient has 50–70% chance of experiencing moderate to severe pain after surgery.[3] Many studies have attributed the cause of this problem to the lack of knowledge and poor attitude of both health personnel and patients toward pain and also due to the lack of a dedicated pain management service.[4]

Cesarean delivery patients have even more compelling reasons to achieve optimal postoperative pain relief, as they present with unique challenges; such as, a higher risk for thromboembolic events, which may also be precipitated by immobility from inadequate pain control or excessive sedation associated with the use of opioids. Moreover, these women want to be alert and energetic enough to care for, interact with, and breastfeed their newborn.[5]

Assessing pain using visual analogue scale (VAS) in the postoperative period is essential to improve pain management. Regular audits are mandatory for the continuous development

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of patient care[6] and improvement in pain management service. The aim of our study was to observe the pain management strategy used in our hospital for elective cesarean section patients. In our observations, we reviewed broad areas of outcome, such as effectiveness, safety, and tolerability. Effectiveness was inferred from visual pain scores and satisfaction. Safety and tolerability were assessed by the occurrence of side effects.

Materials and Methods

After approval of the University Ethics Committee, all patients scheduled for elective cesarean section from December 2008 to May 2009 were reviewed after taking verbal consent for participation in this observational study. Emergency cesarean section patients were excluded from this study. All patients were reviewed by one of the investigator.

On the day of surgery, data entered in the predesigned proforma included patients' names, hospital number, technique of anesthesia used, postoperative pain orders, and specialty of the physician prescribing the postoperative analgesia. Anesthesia team followed the patients on the first postoperative day, and data regarding the type of postoperative analgesia, co-analgesia used (NSAIDs or paracetamol in either oral or suppository form); team managing the postoperative pain, assessment of pain severity, complications and patient satisfaction with the pain management were noted. In our study, we used a VAS of 0–10. The overall VAS score, since the time of surgery, was recorded. VAS of 0–3 as graded as mild, VAS of 4–6 as moderate, and VAS of 7–10 as severe pain.

Safety and tolerability were assessed by the occurrence of side effects. The common complications specifically looked for were nausea, vomiting, drowsiness, headache, backache, pruritus, sedation, respiratory depression, urinary retention, muscle weakness, and inability to walk.

The data were entered and analyzed in SPSS (version 14). Frequencies of type of anesthesia, patient satisfaction, complications, and visual pain score at rest and at movement, any co-analgesia used and post operative pain orders and ordering physicians are generated, component bar chart for severity of pain at different position was made, and 95% confidence interval for the patient satisfaction was also computed.

Results

Two hundred and sixty three patients had an elective cesarean section during the 6 months study period. One hundred and eleven patients (42%) received general anesthesia while 152 patients (57%) received spinal anesthesia for elective cesarean section. The postoperative analgesia regime was started by the obstetric team in 81% of patients and in rest by the anesthesia team. The follow-up of these patients for the pain management was done by obstetric team in 94% and rest by the acute pain management service (APMS).

Continuous intravenous opioid infusion was the commonest modality of postoperative pain management used in our hospital for patients undergoing elective cesarean section. It was used in 94% (n = 248) of patients. The dose of opioid infusion for the next 24 h was adjusted by the obstetrician, at the rate of 10 mg/h for pethidine and tramadol and 1 mg/h for morphine. Postoperatively, these patients were followed up by the obstetric team, which included management of inadequate pain relief. The distribution of narcotic agent used in intravenous infusion is shown in Table 1. Patient-controlled intravenous analgesia (PCIA) was the choice in 6% (n = 15) of patients. All patients received pethidine in the PCIA form and settings were made by anesthetist as per our routine departmental protocol for PCIA, which is background infusion of 10 mg/kg of body weight, bolus of 0.15 mg/kg of body weight, and lock out interval of 10 min. All patients on PCIA were followed up by the acute pain service (AMPS) for 24 h. Coanalgesia was prescribed in 99% (n = 261) of patients on regular interval. Table 2 shows the different agents used as a part of multimodal analgesia.

Analysis of overall pain score since the time of surgery showed mild pain (VAS 0–3) in 89.7%, moderate pain (VAS 4–6) in 9.5%, and severe pain (VAS 7–10) in 0.8% of patients at rest. On movement, pain score was mild in 60.1%, moderate in 33.1%, and severe in 6.8% of patients [Figure 1]. Patients' opinion regarding their pain management was satisfactory for 91.6% (n = 241; 95% C.I.: 88.3%, 95.0%), while 8.4%

Table 1: Percentage of patients receiving different types of opioid as intravenous infusion (n = 248)

Type of opioid agents used in IV infusion	Number of patients (%)
Pethidine	185 (74.6)
Tramadol	58 (23.4)
Morphine	5 (2.0)

Table 2: Percentages of patients receiving different types of co-analgesia medications (n = 262)

Co analgesia used	No of patients (%)
Dicofenac sodium (100 mg suppository twice a day)	196 (74.8)
Tablet Paracetamol (1 g three times a day per oral)	12 (4.6)
Both (tablet and suppository in the above mentioned dose and frequency)	54 (20.6)

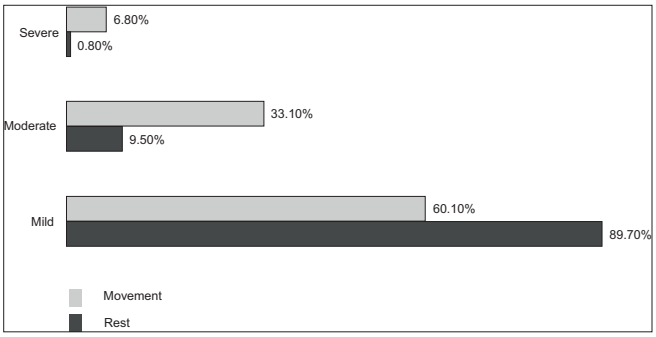

Figure 1: Percentage of patients having mild, moderate, and severe pain scores at rest and movement

(n = 22) of patients were not satisfied. Out of 22 patients not satisfied with postoperative pain management, 12 (50%) had severe pain on movement, while 1 had severe pain at rest. Upon further look at the VAS scores for these patients, we found 1 patient with VAS of 10, 4 with VAS of 8, and 7 with VAS of 7 at movement. The patient who had VAS of 10 at movement was the only one with severe pain (VAS 8) at rest. The remaining 10 patients not satisfied with their pain management had mild to moderate pain at rest and movement. None of the patients, who were dissatisfied with their pain management, reported any complications. Of the 241 patients satisfied with their pain management, seven (2.9%) rated their VAS as severe at movement. None had pain at rest.

Of the 19 patients who reported severe pain on movement (with one patient at rest), 16 were given pethidine infusion, 2 tramadol infusion, and 1 was given PCIA. The only two patients who did not have co-analgesia were included in the group of patients complaining of severe pain: One was on PCIA and one on pethidine infusion. The patient on PCIA was managed by the anesthesia pain service. She received rescue analgesia as pethidine 10 mg IV boluses with a maximum of 30 mg in 30 min and her VAS after 30 min was 3.

Nine percent of patients (n = 24) complained of different complications. Backache was present in 0.8% (n = 2), headache in 1.5% (n = 4), nausea and vomiting in 2.3% (n = 6), and sedation in 0.4 %(n = 1) of patients. 4.2% of patients reported miscellaneous complications. None of the complications were severe and responded well to the treatment and did not lead to any delay or readmission after discharge.

Discussion

High-quality pain relief is important after cesarean section to promote early recovery and optimize mothers' ability to care for their newborns. Surveys[7] have shown that parturient consider pain during and after cesarean section as their most important concern. Despite advances in postoperative pain management, postoperative pain relief and satisfaction are still inadequate in some patients because of individual variability and limitation from side effects of analgesic drugs or techniques.[2]

Historically, surgeons have prescribed postoperative pain medications when writing general postoperative orders. Marks and Sachar[8] noted that 73% of postoperative patients experienced distressing pain due to inadequate doses of analgesics prescribed at infrequent intervals by the physicians. Loper *et al.*[9] have demonstrated an inadequate knowledge of health care providers regarding analgesics leading to ineffective pain control. In our study, we observed that in the majority of cases, postoperative orders were prescribed and followed up by the obstetrics team.

One way to meet the demands of managing postoperative pain is the introduction of an anesthesiology-based acute pain service.[10] There is no "gold standard" for post-cesarean pain management. There are number of options, the choice of which is at least partly determined by drug availability, regional and individual preferences, resource limitation, and financial considerations.[11] The issue of cost and availability of the drugs are the main barriers to effective pain control in developing countries.

Regional anesthesia provides anesthetists with an effective and convenient route of opioid administration and in many developed countries, it is employed as a method of postoperative pain management after cesarean sections.[12] The administration of epidural and intrathecal opioids is a popular means of augmenting intraoperative anesthesia and optimizing postoperative analgesia.[13] In our part of the world, the only preservative free narcotic available for intrathecal and epidural route is fentanyl, which is routinely used in our unit for cesarean sections performed under spinal anesthesia. While intrathecal fentanyl is widely given due to its intraoperative analgesic effect, unless used in high doses (e.g., fentanyl 40–60 μg), the effects are too short lived to be adequate for postoperative pain relief and they do not alter 24 h opioid consumption.[14] In contrast, the lower lipid solubility of morphine delays the onset of action and prolongs its duration, hence making it suitable for postoperative pain management.

In developing countries, surgeon prescribed, nurse administered intermittent intramuscular administration of analgesics is the method used for postoperative pain management.[15] In our unit, an intravenous opioid infusion supplemented with anti-inflammatory analgesics is the most common type of postoperative management regime used. Pethidine was the drug of choice and used in a fixed dose of 10 mg/h, irrespective of the weight and individual demand of the patient.

In the literature search, we came across some studies using continuous intravenous infusion for postoperative pain management. Church[16] described a regular controlled infusion of pethidine at a rate of 0.3 mg/kg/h. Stepleton *et al.*[17] assessed another regimen for the intravenous infusion of pethidine. They gave a loading dose of 1 mg/min for 45 min followed by 0.53 mg/min for 28 min. A maintenance infusion of 0.4 mg/min was used for the remainder of the 32 h study period. Rutter *et al.*[18] assessed morphine requirement immediately after surgery and used each patient's individual requirement as a guideline for comparing intravenous infusion, scheduled intramuscular injection, and intramuscular injection on patient request.

These studies demonstrate a common theme. Despite the use of a continuous opioid infusion (either as a fixed dose or a dose based on weight), these investigators could not identity an ideal dose that would provide adequate analgesia. Opioid requirements may be minimal during periods of inactivity but dose requirements increase during periods of heightened activity.[19]

Patient-controlled intravenous opioids are popular after cesarean delivery because of convenience, safety, and consistently high patient satisfaction.[11] In our hospital, we have limited availability of PCIA pumps and cesarean section patients are on a low priority list for PCIA.

During the study period, 99% of patients received co-analgesia, with 75% of patients in the form of diclofenac suppository. The addition of paracetamol and non-steroidal anti-inflammatory drugs (NSAIDs) potentiates the opioid effects, decreases its consumption, and reduces the side effects when systemic and neuraxial opioids are administered for post-cesarean delivery analgesia.[20] The anti-inflammatory and antipyretic properties of NSAIDs may reduce visceral pain originating from the uterus, complementing the somatic wound pain relief from the opioids. NSAIDs must be used with caution because of the potential problems with bleeding, platelet dysfunction, and renal insufficiency, although practice varies widely in this regard.[5]

We reviewed broad areas of outcome such as effectiveness, safety, and tolerability. Effectiveness was inferred from pain scores and satisfaction. Satisfaction was assessed by simply asking if the patients were satisfied or not satisfied with the pain management. Safety and tolerability were assessed by occurrence of side effects. The incidence of respiratory depression, excessive sedation, hypotension, muscle weakness, and inability to walk was used to assess the safety and the occurrence of other side effects, such as nausea, vomiting, headache, backache, and itching, were used to assess the tolerability of postoperative pain management regime.

Dolin *et al.* [2] examined after examining the evidence from published data concerning the incidence of moderate to severe pain after major surgery, states that at the end of 24 h, patient gives an overall assessment. The aim of our observational study was also to see the overall assessment to see the effectiveness of our pain management strategy.

None of the patient experienced respiratory depression, a drop in saturation or any incidence of hypotension, which is indicative of the fact that our postoperative management was safe. 9% of our patients, who reported complications such as nausea, vomiting, headache, and backaches, were treated with anti-emetics and analgesics and did not require additional treatment, investigations, or further hospitalization.

We observed few limitations in our study. The study patient population was same in our study, but the pain perception may vary among different individuals for the same procedure. The educational and socioeconomic status may also have its influence on the pain perception. This data are lacking from our study. We did not include the technique of anesthesia and intraoperative analgesia used in our analysis, which we plan to do in our future studies. Since the aim of our study was to see the overall effectiveness of our pain management strategy, we recorded the overall VAS on the first post operative day. Lastly, we did not use any scale for measuring satisfaction score of patients.

In conclusion, our postoperative pain management was adequate in terms of patients' safety but it was not effective according to the goal set by Joint Commission on Accreditation of uniformly low pain score of not more than 3 out of 10 both at rest and with movement. In order to meet International Standards of Pain Management, an ideal post-cesarean analgesic regimen requires proper utilization of resources to formulate a method which is cost effective, simple to implement, and has minimal impact on staff workload. We recommend expanding the services of acute pain service to develop nurse based; anesthesiologist supervised acute pain service in cooperation with surgeons. This also needs upgrading the role of ward nurses by providing them with proper training to assess pain intensity, administer analgesics, monitor efficacy and adverse events, and be able to participate in collecting data for audits.

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