

Postoperative pain management following caesarean section in University of Ilorin Teaching Hospital (UIIH), Ilorin, Nigeria.

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Summary

Objective: To assess the common methods of analgesia used in our hospital following caesarean section, their effectiveness and patient satisfaction.

Design: A prospective descriptive study.

Settings: The study was conducted at the University of Ilorin Teaching Hospital (UIIH), Ilorin, Nigeria over a period of 18 months (February 1999 – July 2000).

Methodology: We studied prospectively the methods used for postoperative analgesia in 88 consecutive patients who had elective caesarean section under general anaesthesia. Pain assessment was carried out by direct questioning method using a 4-point verbal rating scale of none, mild, moderate and severe, in the recovery room, and on the mornings of days 1 and 2 postoperatively. Patients' satisfaction of pain relief was assessed on day 2 on a 2-point scale of satisfactory or unsatisfactory. The postoperative drug sheets and medication charts were also reviewed and analysed.

Results: Surgeon-prescribed, nurse-administered intermittent intramuscular administration of analgesics was the method used for postoperative pain control in all the patients. Pentazocine was prescribed in 86.4% of patient while the remaining 13.6% had Tramadol. Most of the patients (95%) experienced some degree of pain in the immediate postoperative period. The first 24 hours postoperatively was particularly painful for the patients with 79.6% and 54.6% reporting moderate to severe pain in the recovery room and on day 1 respectively. However, despite the high incidence of pain most of the patients (85.2%) still expressed satisfaction with the level of pain relief.

Conclusion: Pain remains a significant problem following surgical operations in our environment.

Keywords: Postoperative, Analgesia, Caesarean section, Effectiveness, Patient satisfaction.

Résumé

La prise en charge de la douleur postopératoire à la suite de la césarienne

Objectif: Evaluer les méthodes les plus communes d'analgésie utilisées dans notre hôpital la suite de la césarienne, leur efficacité et le contentement du patient.

Plan: Une étude descriptive en perspective.

Cadre: L'étude a été effectuée au centre hospitalo universitaire d'Ilorin, Nigeria pendant une période de 18 mois (du février 1999 au juillet 2000).

Méthodologie: Nous avons étudié prospectivement les méthodes

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utilisées pour l'analgésie postopératoire chez 88 patientes consécutivement atteintes de la césarienne de confort sous l'anesthésie générale. Evaluation de la douleur a été effectuée à travers une méthode interrogatrice directe tout en utilisant un 4 point échelle de classement verbal composant: aucun, doux, moyen et sévère, dans la salle de réveil et les matins des journées 1 et 2 postopératoires. Le contentement des patients en ce qui concerne le soulagement de la douleur était évalué pendant la deuxième journée à travers une deux point échelle de la satisfaction ou sans satisfaction. Les feuilles de la drogue postopératoire et les feuilles de la médication ont été également passées en revue et analysées.

Resultat: Selon l'ordonnance d'un chirurgien, une infirmière a effectué la méthode d'une administration intramusculaire intermittente des analgésiques pour le contrôle de la douleur postopératoire chez tous les patients. La pentazocine était prescrit chez 86,4% des patients tandis que les autres 13,6% avaient le Tramadol. La plupart des patients soit 95% ont eu quelque degré d'expérience de la douleur dans la période immédiate postopératoire. Le premier 24 heures postopératoire était particulièrement douloureuses pour des patients avec 79,6% et 54,6% signalant une douleur modérée à la sévère dans la salle de réveil et le premier jour respectivement. Toutefois, en dépit de l'incidence élevée de la douleur la plupart des patients soit 85,2% avait encore exprimé la satisfaction avec le niveau de soulagement.

Conclusion: La douleur demeure un problème important suite à des opérations chirurgicales dans notre milieu

Introduction

Several studies have enumerated the undesirable consequences of inadequately treated postoperative pain¹⁻³. These include both physiological and psychological consequences resulting in increased catabolic response, increased morbidity and prolonged hospital stay^{2,3}. It is not known to what extent the present techniques of postoperative analgesia have succeeded in alleviating the pain of caesarean section in our patients in this environment. Several studies have shown that despite the recent advances in the knowledge of pathophysiology of pain and improvement in analgesic drugs and techniques, there appears to be little improvement in postoperative pain management in several years in developing countries^{4,5}.

The aim of this study was to assess the common methods of analgesia used in our hospital following caesarean section, their effectiveness and patient satisfaction.

Materials and methods

All patients who had elective caesarean section under general anaesthesia over a period of 18 months (February 1999 to July 2000) were enrolled into the study. The aim of the study was explained to the patients and informed consent obtained. Criteria for exclusion included patient's refusal, language barrier

or inability to cooperate with assessment. A questionnaire was designed to record hospital number, age, indication for surgery, type of anesthesia and duration of surgery. The questionnaires were administered to the patients by direct questioning methods.

A standard anaesthetic technique with rapid sequence induction was used for all the patients. Following preoxygenation for 3–5 minutes, anaesthesia was induced with thiopentone 5–6mg/kg and tracheal intubation was facilitated using suxamethonium 100mg. Anaesthesia was maintained with 50% nitrous oxide in oxygen supplemented with 0.5–1% halothane until delivery of the baby, and thereafter 66% nitrous oxide in oxygen with 0.5% halothane. Pancuronium 6mg was used to maintain muscle paralysis and ventilation was controlled manually. Analgesia was supplemented after the delivery of the baby with intravenous pentazocine 20mg. Uterine contraction after the delivery of the baby was augmented with intravenous pitocin 10 units bolus and 50 units added to a litre of the perioperative infusion. At the end of the operation, the residual muscle paralysis was reversed with 2.5mg neostigmine and 1.2mg atropine. All anaesthetic agents were discontinued and 100% oxygen administered for 5–10 minutes. Tracheal extubation was carried out with the patient fully awake and breathing spontaneously, and patient was then transferred to the recovery room.

Pain assessment was carried out using a 4-point verbal rating score of no pain, mild pain, moderate pain and severe pain, after full recovery from anaesthesia in the recovery room and, on the mornings of days 1 and 2 in the ward. In addition, patient's satisfaction of analgesic therapy was assessed in the ward on day 2, using a 2-point rating score of satisfactory or unsatisfactory. They were also asked to identify factors, which they felt aggravated their pains. The postoperative treatment sheets of the patients were reviewed and analysed for type of analgesic prescribed by the surgeon, doses and frequency of administration, and the nurses notes were examined for compliance with frequency of analgesic administration.

The results are presented as numbers, means and percentages in the form of tables.

Results

A total of 98 patients had general anaesthesia for elective caesarean section within the study period. Out of this, 10 patients were excluded from the study for various reasons such as language barrier in 3 patients, and absence of both investigators in the immediate postoperative period in 4 patients. Three patients did not cooperate for assessment postoperatively. The remaining 88 patients fulfilled the criteria for the study. The age distribution of the patients is shown in Table 1. The age ranged

Table 1 Age distribution of 88 patients who had elective caesarean section

Age (years)	No. of patients	Percentage
16 – 20	2	2.3
21 – 25	5	5.7
26 – 30	18	20.5
31 – 35	31	35.2
36 – 40	28	31.8
41 – 45	4	4.5
Total	88	100

Table 2 Indications for surgery in 88 patients who had elective caesarean section at UIITH, Ilorin (February 2000 – July 2001).

Indications	No. of patients	Percentage
Previous caesarean section	30	34.1
Abnormal lie	12	13.6
Placental previa	9	10.2
Severe PET + prematurity	6	6.8
Postdatism	5	5.7
Elderly primigravida	4	4.6
Multiple gestation	4	4.6
Previous infertility	3	3.4
Bad obstetric history	3	3.4
Diabetes mellitus	2	2.3
Oligohydramnios	2	2.3
Intra-uterine growth retardation	2	2.3
Pregnancy + Fibroid	2	2.3
Short stature + CPD	3	3.4
Sickle cell disease + previous stillbirth	1	1.1
Total	88	100

Table 3 Prescribed drug dosages and frequency of administration

Drug	Dosage	Frequency	No of patient	%
Pentazocine (n= 76, 86.4%)	30mg	4 hourly	3	3.4
	50mg	6 hourly	6	6.8
	60mg	6 hourly	44	50
	60mg	8 hourly	6	6.8
	60mg	p.r.n	17	19.3
Tramadol: (N=12,13.6%)	100mg	6 hourly	3	3.4
	100mg	8 hourly	9	10.2

between 16 and 42 years (mean 32.72 ± 8.40). The various indications for caesarean section are shown in Table 2. The main indications were previous caesarean section (34.1%) and abnormal lies (13.69%). Anaesthesia and surgery were uneventful in all the patients. Surgery duration time ranged between 42 minutes and 95 minutes with a mean of 54.35 ± 40.71.

Postoperative analgesia

Intramuscular analgesics of different types were prescribed for all the patients in the first 48 hours by the surgeons. Pentazocine was prescribed for 76 patients (86.4%), while the re-

Table 4 Time interval between end of surgery and first dose of an analgesics

Time after surgery	No. of patient	Percentage
30 minutes	11	2.5
31 – 60 minutes	55	62.5
61 – 90 minutes	22	25.0
Total	88	100

Patients' satisfaction

Overall, 75 patients (85.2%) expressed satisfaction with the level of pain control.

Table 5 Number of patients who received analgesic at the frequency prescribed by the surgeons within the first 24 hours

Frequency	No of patients	Percentage
4 hourly (n=3)	1	33.3
6 hourly (n = 53)	37	62.8
8 hourly (n = 15)	13	86.7
p.r.n (n = 17)	Only 5 received up to 3 doses within 24 hours	29.4

Table 6 Distribution of pain score following elective caesarean section to UITH (February 2000 – July 2001)

Pain	Recovery room	Day 1	Day 2
No pain	5 (5.7%)	3 (3.4%)	5 (5.7%)
Mild pain	13 (14.8%)	37 (42.0%)	61 (69.3%)
Moderate pain	32 (36.4%)	37 (42.0%)	19 (21.6%)
Severe pain	38 (43.2%)	11 (12.5%)	3 (3.4%)

maining 12 patients (13.6%) had Tramadol. The doses and frequency of administration varied, depending on the prescribing surgeon (Table 3), and the time for commencement of analgesic medication was not specified. Table 4 shows the interval between end of surgery and the first dose of postoperative analgesic. Only 11 patients (12.5%) received the first dose of postoperative analgesic within the first 30 minutes after the surgery (usually in the recovery room). The remaining 77 patients (87.5%) received the first dose of postoperative analgesic medication at various periods ranging from 30 – 90 minutes after the surgery. Table 5 shows the prescribed frequency of analgesic and the nurses' compliance rate. Of the 17 patients whose analgesic prescription was based on as required (p.r.n) dosing regimen, only 5(29.4%) received up to 3 doses within the first 24 hours after the surgery. Most of those who did not receive the first dose of analgesic medication within 1 hour postoperatively were in the p.r.n dosing regimen. Nurses' compliance was best with 8 hourly prescription (86.7%) followed by 6 hourly prescription (69.8%).

Pain score

Table 6 shows the distribution of pain score in the recovery room and in the first two postoperative days of assessment in the ward. Moderate and severe pain was reported by 32 patients (36.4%) and 38 patients (43.2%) respectively in the recovery room. These magnitude of pain persisted till the second assessment 24 hours postoperatively in 48 patients (54.6%). Although as expected, pain score continued to decline with each passing day after the surgery, up to 22 patients (25.0%) still reported moderate (21.6%) to severe (3.4%) pain on the second postoperative day. Factors associated with worsening of pain included coughing, turning in bed and ambulating.

Discussion

Postoperative pain is an acute traumatic pain resulting from surgical tissue injury⁶. Although usually self-limiting and amenable to treatment, it remains the most common and probably, the most distressing and frequently undertreated sequelae of major surgical operations. Several studies have enumerated the enormous benefits associated with adequate post operative pain relief^{5,7}. These include reduced post-operative morbidity, early mobilization, and decreased length of hospitalisation. It also enhances the comfort and well-being of the patients. Unfortunately, despite considerable advances in the management of pain in recent years, studies have shown an unacceptable high incidence of significant pain after surgery in our environment^{4,5,8}.

Most (95%) of the patients in our study experienced some degree of pain in the immediate postoperative period. The incidence of moderate to severe pain (79.6%) was particularly high compared to previous reports in this environment. Soyannwo, in Ibadan, reported an incidence of 46% for this magnitude of pain in the immediate postoperative period in a series comprising a wide range of surgical procedures⁵. An earlier report in the same environment had found the overall incidence of moderate to severe postoperative pain in Nigerians to be about 68%, which is comparable to the findings of other reports in Africa⁴.

The high incidence of moderate to severe pain in the recovery room in our study is no doubt a reflection of an inadequacy of residual analgesic effect of the anaesthetic procedure. This is not surprising as it is a recognised fact that analgesia may be, and is often inadequate at least prior to the delivery of the baby, when general anaesthesia is used for caesarean delivery. Unlike in other surgical procedures where opioids are commonly used, as part of a balanced anaesthetic technique to supplement the analgesic effect of nitrous oxide, opioids are usually avoided in caesarean section until the baby is delivered. This is necessary to prevent opioid-induced neonatal respiratory depression.

However, it also deprives the mother the pre-emptive analgesic benefits of an opioid administered once the baby is delivered, as was done in our patients, this may not provide residual analgesic effect comparable to preincisional administration of opioid⁸. Furthermore, the need to ensure prompt recovery and prevent postoperative drug induced maternal respiratory depression often precludes the use of an adequate analgesic dose. The end result is a patient waking up from anaesthesia with an inadequate residual analgesia, as seen in our series.

Despite the high incidence of pain in the immediate postoperative period in our study, very few of our patients (12.5%) received analgesia in the recovery room (within 30 minutes postoperatively). This represents a serious flaw in postoperative pain management in our center. The usual reluctance of our recovery room nurses to give analgesic, especially opioids, which they believe would induce prolonged drowsiness and make the patient unsuitable for discharge early, probably accounted for this. The few patients who received analgesic in the recovery room were given the drug either by or at the insistence of an anaesthetist who was also immediately available in the recovery room to supervise the patient.

Like in most parts of the world, opioids are the mainstay of postoperative pain control in our center. However, the potent opioids like morphine and pethidine, which have been found useful and effective for pain control following major surgical procedures¹¹ were not used in our series. This is due to non-availability of these drugs following major governmental restrictions on the use of narcotics prior to and including, the period of the study. The drug (pentazocine) used in most of our patients

(86.4%) is a relatively weak opioid with agonist/antagonist properties¹². This drug can therefore not be expected, as demonstrated in this study, to provide effective analgesia following a major surgical procedure like caesarean section. Even tramadol used in a few of the patients, does not have enough analgesic efficacy to provide effective analgesia following a surgical procedure of this magnitude¹³.

Opioids can be given by a variety of routes, utilising different modes of delivery. However, the traditional method of surgeon prescribed, nurses administered intermittent intramuscular opioid remains the practice in our center. Although the method has been widely criticised in recent time on the basis that it leads frequently to inadequate pain relief^{14,15}, it continues to enjoy unrivaled patronage in developing countries. This is because of its convenience, familiarity, relative safety and low cost, which makes it a suitable alternative especially in a country like Nigeria with depressed economy and poor health financing.

Despite the recognised drawbacks of intramuscular opioids, it is believed that effective analgesia can be provided with adequate dose and frequency of administration that is based on a good understanding of the pharmacokinetics of the chosen drug¹¹. In this regard, dosing regimen whose timing of drug administration is based on patient's request (pre re nata or p.r.n) is ineffective and no longer encouraged¹⁰. Few patients (19.3%) whose analgesic prescriptions were based on p.r.n dosing regimen in our series received less doses than the fixed interval dosing regimen in the first 24 hours of postoperative admission (Table 5). It is also from this same group that most patients did not receive the first dose of their postoperative analgesic within the first hour. However, other common reasons while patients are often not commenced on the postoperative analgesic early on arrival in the ward are non-availability of the prescribed drug immediately or if the few available nurses in the ward are busy attending to other patients.

Fixed interval dosing regimen is an improved method of intramuscular opioid administration, which is expected to guarantee improved analgesia. Unlike the p.r.n dosing, it compels the nursing staff to interact with the patient at a prescribed regular interval for the purpose of pain relief. However, despite the use of fixed interval dosing regimen for most of the patients (80.7%) in our series, postoperative analgesia remained grossly inadequate, especially in the first 24 hours. This is in conformity with previous reports^{4,5}. Three things may account for this: studies have shown that administration of analgesic by simple intermittent depot injections, as used in our patients, without an initial front loading can not guarantee effective analgesia¹¹. Infact it is estimated that because of the wide interindividual differences in the pharmacokinetics and pharmacodynamics of opioids, it may take up to 24 hours to achieve an adequate blood analgesic concentration that would provide effective analgesia in most patients, using simple intermittent intramuscular depot opioid administration¹⁶. However, an initial loading dose of analgesic would ensure a rapid attainment of adequate blood concentration (minimum effective analgesic concentration) to gain control of pain, which may then be maintained with regular intermittent depot administration. Secondly, the dosing interval in our patients varied depending on the prescribing surgeon, and in most cases the drugs were grossly underprescribed. For instance the dosing interval of 6–8 hourly used for pentazocine in 63.6% of the patients was too far away from the dosing interval of 4 hours on a dose of 60mg, which other authors have found effective^{12,15}. The third factor is the infrequent administration of the prescribed analgesic by the

nursing staff. Even at the extended dosing interval, fewer doses were administered than prescribed in some of the patients (Table 5). It is therefore not surprising that a significant number of our patients (54.6%) continued to experience moderate to severe pain throughout the first 24 hours postoperatively. This persisted for an upward of 48 hours in about 25% of the patients.

Previous authors have consistently implicated underprescription of opioids and infrequent administration by the surgeons and nurses respectively as a common cause of inadequate analgesia in the postoperative period^{14,16}. It continues to be a problem due to lack of adequate knowledge, regarding the effective dose ranges and duration of action of the different opioids¹⁴. Another reason may be the obviously exaggerated fear of side effects like sedation, respiratory depression and addiction in postoperative patients¹⁴. This probably accounted for the improved nurses compliance observed in our series with increasing duration of frequency of administration.

It is customary in our center to encourage our patients to mobilise within 24 hours following caesarean section. Although our study focused mainly on pain assessment at rest, most of our patients observed that their pains were aggravated by simple maneuvers like turning in bed, coughing and sitting out of bed within the period covered by the study (48 hours). This again is a reflection of the inadequacy of postoperative pain control in these patients. Adequate analgesia should allow patients to mobilise early to prevent the occurrence of deep vein thrombosis, and to cough and clear secretions to prevent pulmonary complications.

The inadequacy associated with the conventional intramuscular opioid analgesia was recognised several decades ago. This fuelled the search for an expansion in the use of other routes of opioids administration for postoperative analgesia. Such routes include intravenous, subcutaneous, sublingual, transbuccal spinal and epidural. However, opioid preparations for sublingual and transbuccal, administration are not available in Nigeria. Although continuous administration of opioid either by intravenous or subcutaneous routes removes the fear of repeated injections and have been found to provide better analgesia by maintaining a stable analgesic concentration¹¹, the problems of adequate monitoring and supervision preclude their safe use in our postsurgical wards.

The introduction and increased use, within the last decades, of patient controlled analgesic (PA) with opioids administered intravenously or via epidural route, and epidural local anaesthetic or opioid-local anaesthetic mixtures, have considerably revolutionized the management of postoperative pain. These techniques have been found superior to other methods of analgesia for postoperative pain control¹⁷. The epidural techniques utilizing local anaesthetic agents, would particularly be suitable following caesarean section because of the need to ensure a pain free and alert mother who is able to interact with her baby early. This early interaction promotes early maternal infant bonding, which is believed to be vital to infant future development¹⁸.

Several studies, including ours, have shown that the most common cause of failure of postoperative analgesic therapy is inappropriate use of analgesic drugs and techniques^{4,5}. This is a consequence of underestimation of patient's pain and inadequate knowledge of opioid pharmacology¹⁵. The routine use of bedside pain charts for better pain assessment as widely advocated is worth adopting¹⁴.

Furthermore since it is now a common knowledge that safe and optimal pain relief cannot be achieved by any single drug or method⁷, the concept of multimodal (balanced) analgesia should be embraced to enhance the quality of postoperative

analgesia. For instance intramuscular opioids may be combined with other less expensive methods like peripheral nerve blocks, local anaesthetic wound infiltration or nonsteroidal anti-inflammatory drug.

Despite the high incidence of moderate to severe pain in the post-operative period, especially within the first 24 hours, majority of our patients expressed satisfaction with the post-operative pain management. This is not surprising as several studies in the past have found similar disparity between patients satisfaction and pain relief^{5,20,21}. The disparity has been attributed to patient factors such as age; preoperative health status, race, culture, psychological state and expectation; and the level of care and affection received from the care givers^{5,20}. Most patients have accepted pain as an unavoidable consequences of surgery²². They can therefore be said to have, from outset, a very low expectation concerning pain relief, which enhances their coping ability. Consequently they feel satisfied and grateful for any measure taken to alleviate their pain. This had led some authors to conclude that patient satisfaction is an imprecise measure for assessing the effectiveness of postoperative pain management²⁰.

The verbal rating scale (VRS) used for pain assessment in our study is a simple method which had been used to assess the degree of postoperative analgesia by other authors in our environment^{4,5,23}. It is simple enough to be understood by our patients and can easily be translated into Yoruba which is the most common language spoken by the majority of our patients population.

As expected, the incidence and intensity of pain in our patients declined with each passing day. This is the natural course of an acute post surgical pain. Although where regular interval dosing of analgesic has been religiously complied with, even with intramuscular technique used in our series, it is expected that blood analgesic concentrations should gradually build up with time resulting in gradual attainment of adequate blood level and improved analgesia¹⁶.

In conclusion, pain remains a significant problem following surgical operation in our environment. Effective analgesia for most patients with postoperative pain remains elusive. Surgeons and nurses still control postoperative pain management with little or no input from the anaesthetists. Adequate interprofessional collaboration involving the surgeons, anaesthetists and nurses should be encouraged, and the concept of multimodal (balanced) analgesia should be embraced to ensure effective postoperative pain control.

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