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# Post-operative pain after caesarean section

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## SHORT REPORT

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## BACKGROUND

Inadequate pain relief after caesarean section is a topic of international concern. At Oslo University Hospital, Ullevål, patients receive bupivacaine infiltration local anaesthesia as well as oral paracetamol, ibuprofen and oxycodone for pain management during the first 24 hours post-surgery. The aim of this study was to survey pain after acute and elective caesarean sections in our department.

## MATERIAL AND METHOD

The study included 50 patients who had undergone acute or elective caesarean section. Pain intensity on an 11-point numerical scale, pain duration, degree of mobilisation, and use of analgesia on postoperative day one were obtained from

patient interviews and medical records.

## RESULTS

Inadequate pain relief was defined as an average pain intensity of  $\geq 4$  and was reported by 34 patients (68 %). Total opioid consumption on postoperative day one exceeded 40 mg oral oxycodone equivalents in 28 patients. Of these, seven patients received more than 60 mg oral oxycodone equivalents.

## INTERPRETATION

A large proportion of patients had high pain intensity and opioid requirement in the first 24 hours after caesarean section.

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### Main findings

Thirty-four out of 50 patients had an average pain score of  $> 3$  during the first 24 hours after caesarean section.

Multimodal prophylaxis with bupivacaine (infiltration), paracetamol, ibuprofen and oxycodone was inadequate in these patients.

Almost all patients received additional opioid pain management on request.

There is a need for both better prophylaxis and more personalised pain relief.

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Postoperative pain after caesarean section may be underreported and poorly managed [\(1\)](#). In a cross-sectional study of postoperative pain in 215 Norwegian hospital patients in 2011, successful pain management was defined as average pain over the last 24 hours of  $\leq 3$  on the Numeric Rating Scale (NRS, 0–10). This was not achieved in 38 % of patients [\(2\)](#).

The maternity ward at Oslo University Hospital, Ullevål has been using a multimodal regimen with 40 ml bupivacaine 2.5 mg/ml infiltration plus oral paracetamol 1 g  $\times$  4, ibuprofen 400 mg  $\times$  4 and oxycodone prolonged release 10 mg  $\times$  2 to prevent pain after caesarean section. We wished to determine whether this provided adequate pain relief, defined as average pain over the first 24 postoperative hours of  $\leq 3$  on the NRS scale.

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## Method

The study was conducted in the Division of Gynaecology and Obstetrics, Oslo University Hospital, Ullevål. As a quality assurance study, it was not submitted to the Regional Committee for Medical and Health Research Ethics. The study was approved by the Data Protection Officer at Oslo University Hospital and was registered at ClinicalTrials.gov (no. NCT03730246).

On days and times chosen at random during the period December 2017–September 2018, all patients who had undergone a caesarean section in the previous 24–48 hours were assessed for inclusion. Written informed consent was obtained if the patient was present in the department and was able to communicate well in Norwegian.

Data were obtained within 24 hours of the caesarean section being completed, partly from a brief, structured interview conducted in the maternity ward by the first author and partly from information in the medical records.

The interview consisted of 16 questions. For postoperative pain, patients were asked to indicate their average and worst pain using NRS scores from 0 to 10 (0 = no pain, 10 = worst pain imaginable). They were also asked about complications and any adverse effects, time from surgery to being able to eat and drink, and degree of mobilisation after 24 hours on a scale of 0–4 (0 = in bed the whole time, 4 = normal activity).

Demographic data and information about post-operative medications were obtained from the patient medical records. The total opioid dose was converted into the total dose in oral oxycodone equivalents.

The patient data collected were de-identified prior to being registered in a database and analysed using IBM SPSS Statistics 25 for Windows.

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## Results

We planned to include 50 patients in the study. Out of 93 potential patients spread across 26 randomly selected surgery days, 60 patients were invited to participate. The remaining 33 were unable to communicate in Norwegian or were not present in the department. Of the 60 women invited to participate, two declined, while another eight were unable to take part because they were not present at the time of the interview.

Patient demographic data are shown in Table 1.

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**Table 1**

Demographic data for 50 patients following elective or acute caesarean section

|  | <b>Number (%)</b> |
|--|-------------------|
| Elective caesarean section                             | 27 (54)           |
| Vaginal delivery attempted prior to caesarean section  | 20 (40)           |
| Epidural analgesia prior to peri-operative anaesthesia | 17 (34)           |
| Primipara  | 29 (58)           |
| Previous caesarean section                             | 14 (28)           |

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The caesarean section was performed under spinal anaesthesia in 40 patients (with hyperbaric bupivacaine 10–15 mg + sufentanil 5–10 µg), epidural anaesthesia in six patients, all of whom had an indwelling epidural catheter from an attempted vaginal delivery, and under general anaesthesia in three patients, in two of whom the indication for caesarean section was acute fetal distress. Standard pain prophylaxis was provided to 47 patients. Three patients did not receive standard pain prophylaxis because one or more of the medications were contraindicated. Two received postoperative epidural analgesia. Additional fast-acting oxycodone was routinely prescribed on an as-needed basis to 49 patients. The median amount of oxycodone administered on an as-needed basis over the first 24 hours was 25 mg in addition to the fixed dose of oxycodone.

The median average pain intensity on postoperative day one was 4, while the median worst pain intensity was 7 (Table 2). In 34 patients, self-reported average pain intensity was  $\geq 4$ , and seven patients reported a pain intensity of  $\geq 7$ .

**Table 2**

Postoperative medication and pain in 50 patients following elective or acute caesarean section

|   | Number (%) | Average | SD  | Median | Range |
|---|------------|---------|-----|--------|-------|
| Total oxycodone (mg)  |            | 47      | 17  | 45     | 0–97  |
| As-needed oxycodone (mg)  | 49 (98)    | 26      | 15  | 25     | 5–68  |
| Postoperative opioids   | 49 (98)    |         |     |        |       |
| Postoperative antiemetics   | 6 (12)     |         |     |        |       |
| Average pain (NRS)  |            | 4.4     | 2.0 | 4      | 1–9   |
| 1–3   | 16 (32)    |         |     |        |       |
| 4–6   | 27 (54)    |         |     |        |       |
| 7–9   | 7 (14)     |         |     |        |       |
| Percentage of first 24 hours in pain (%)                                |            | 60      | 29  | 60     | 5–100 |
| Percentage of first 24 hours in moderate/severe pain, i.e. $\geq 4$ (%) |            | 29      | 25  | 20     | 0–100 |

On a scale of 0–4, the median degree of postoperative mobilisation after 24 hours was 1. Six patients experienced nausea, three of whom received antiemetic medication. In 15 patients, pruritus was recorded as an adverse effect.

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## Discussion

In this study of a mixed clinical patient population, we found inadequate pain relief in 34 of 50 patients (68 %) after caesarean section, despite the fact that 47 of the patients had received standard multimodal pain prophylaxis.

In 49 patients, extra opioids were administered on an as-needed basis. This can be interpreted as indicating that patients were not opposed in principle to receiving additional opioid pain relief, as could be hypothesised out of concern over implications for breastfeeding or bonding with the newborn.

Spinal opioids may contribute to nausea and in particular to pruritus [\(3, 4\)](#), which was the most common adverse effect in our dataset.

Seventy per cent of patients reported a low degree of mobilisation on postoperative day one. This may be due to inadequate pain relief, but other possible explanations include fatigue and a desire for rest, or possibly wound guarding or a fear of activity-related pain [\(5\)](#).

One limitation of the study is that 40 % of the patients who were considered for inclusion were excluded because they spoke another language or because they were not in the department. It is possible that the latter group may have had greater mobility and less pain than the patients who were included, which may have led to our results overestimating the proportion of patients with inadequate pain relief. Furthermore, a dataset comprising 50 patients must be considered small.

There are also drawbacks associated with use of the NRS scale to assess the quality of pain relief. Patients may have differing impressions of what a given score should mean [\(1, 6\)](#).

The results led us to conclude that pain relief after acute and elective caesarean sections was inadequate. As a result of the study, the department in question increased the standard dosage of ibuprofen to 600 mg × 4. In addition, peri-operative dexamethasone 16 mg intravenously was added to the multimodal regimen; this has been shown to provide enhanced nausea and pain prophylaxis [\(7\)](#). Use of post-operative epidural pain relief was also increased in patients with an indwelling epidural catheter from an attempted vaginal delivery.

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*The article has been peer-reviewed.*

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