International Journal of Obstetric Anesthesia (2018) **34**, 21–27
0959-289X/$ - see front matter © 2018 Published by Elsevier Ltd.
https://doi.org/10.1016/j.ijoa.2018.01.009

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ORIGINAL ARTICLE

# Incidence and risk factors for chronic pain after elective caesarean delivery under spinal anaesthesia in a Chinese cohort: a prospective study

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**ABSTRACT**
**Background:** China has one of the highest rates of caesarean delivery in the world. The aim of this study was to investigate the incidence and risk factors for chronic pain after caesarean delivery in a Chinese cohort.
**Methods:** Patients undergoing elective caesarean delivery with a Pfannenstiel incision under spinal anaesthesia were recruited prospectively at a Chinese tertiary women's hospital. The State Trait Anxiety Inventory was measured before surgery. Postoperative analgesia was provided by intravenous patient-controlled analgesia for 48 hours. Postoperative acute pain scores and analgesic consumption were assessed. After 3, 6 and 12 months, patients were interviewed by telephone regarding whether pain was present, and if present, the intensity, frequency, location and impact of the pain.
**Results:** In total 786 patients completed this study. The incidence of pain at 3, 6 and 12 months was 12.2%, 3.8% and 0.8% respectively. Of patients with pain at 3 months, most patients experienced pain daily (43.7%) or with intervals of a day or more between pain (41.7%), with intensity overall described as mild to moderate. The most common sites of pain were the incision or nearby (56.3%), and the low back (36.4%). Risk factors for pain at 3 months included previous caesarean delivery and higher analgesic consumption at 24 h and 48 h postoperatively.
**Conclusion:** Chronic pain after elective caesarean delivery under spinal anaesthesia occurs infrequently, especially in the long-term, in a Chinese population. Patients with a previous caesarean delivery and higher analgesic use were at increased risk.


***Keywords***: Pain; Chronic; Delivery; Caesarean; Risk factors

## Introduction

Chronic post-surgical pain (CPSP) is a significant clinical problem and the incidence ranges between 4% and 50%, depending on the surgical procedure.[1] Although the reported incidence of CPSP after caesarean delivery, which varies from 1% to 18%,[2,3] appears less than that after other general surgeries, considering the increase in caesarean rates in recent years and the negative impact of chronic pain on a mother, the development of CPSP after caesarean delivery deserves more attention. A caesarean rate of 42% in China[4] means that even a very low incidence of CPSP has the potential to be a major health issue. To date there is little information about CPSP after caesarean delivery among Chinese populations.

Identification of the potential risk factors for developing CPSP is important because its treatment is difficult, making its prevention all the more important.[1] Possible risk factors include poorly-controlled acute pain, general anaesthesia and previous pain.[2,3] Psychological factors such as anxiety and depression have been suggested to influence the development of CPSP after some types of surgery,[5] but the role of anxiety in CPSP after caesarean delivery has not been well studied.

We performed a prospective, single-centre study to assess pain at three, 6 and 12 months after surgery in a cohort of Chinese pregnant women who underwent elective caesarean delivery under spinal anaesthesia. We also attempted to elucidate the association between patient demographics, clinical and psychological factors in the development of CPSP after caesarean delivery.

Accepted January 2018
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## Methods

This study was approved by the local ethics committee (Jiaxing Maternity and Children Health Care Hospital, China, Reference number: 20151204) and registered with the Chinese Clinical Trial Registry (http://www.chictr.org.cn/index.aspx) under the number ChiCTR-OOC-16008260. After obtaining their written informed consent, we recruited patients of American Society of Anesthesiologists (ASA) physical status I or II, who were scheduled for elective caesarean delivery with a Pfannenstiel incision and under spinal anaesthesia. All delivered at our institution, a Chinese tertiary women's hospital, between 1 May 2016 and 31 August 2016. In 2016, our hospital had 17 263 births, of which 37.2 % were by caesarean delivery. The most common indications for surgery were previous caesarean delivery, fetal distress, and prolonged or obstructed labour. The exclusion criteria were contraindications to spinal anaesthesia, pre-existing pain (such as migraine or menstrual pain) before pregnancy or pain during pregnancy (such as back pain or pelvic girdle pain), chronic disease, pregnancy-induced medical conditions that were not well-controlled, previous caesarean delivery with a vertical skin incision, and a history of drug dependence or a major psychiatric disorder.

No premedication was given. Patient characteristics (age, weight and height) and obstetric history (gestational age, parity, previous surgeries including caesarean delivery) were collected preoperatively. On arrival in the preoperative room approximately one hour before surgery, patients were asked to complete the State Trait Anxiety Inventory (STAI). The STAI measures state anxiety (SAI), a temporary condition experienced in a specific situation, and the Trait Anxiety Inventory (TAI) a general tendency to perceive situations with anxiety: each of them are part of a 20-item self-reported inventory. These psychometric measures are widely used and show high reliability and validity.[6]

After entering the operating room, routine monitoring (electrocardiogram [ECG], pulse oximetry [$SpO_2$], and non-invasive blood pressure) was performed. A standardised combined spinal-epidural anaesthetic was performed at the L3–4 interspace, with the patient in the left lateral decubitus position. After free flow of clear cerebrospinal fluid had been obtained, 2 mL of hyperbaric 0.5% bupivacaine (10 mg) was injected intrathecally. As no preservative-free opioids were then available in China, intrathecal opioids were not used. Surgery began when sensory block to pinprick in the midline extended to T5. If the sensory level did not reach T5 after 20 minutes or if the patient complained of pain intraoperatively, epidural supplements of 2% lidocaine were administered in 5 mL increments. The need for, and the dose of, epidural supplementation was documented. If epidural dosing failed after a maximum of 20 mL, general anaesthesia was offered to the patient, and the patient was excluded from the study.

Surgery was performed via a Pfannenstiel incision by an experienced obstetrician using a standardised protocol. The incision was extended through the skin, subcutaneous fat, rectus sheath, muscle layers and peritoneum. The uterus was approached in the transverse direction. After delivery, the uterus was exteriorised for repair in all cases. The uterine wound, peritoneum and fascia were closed in one or two layers of continuous absorbable suture. The skin was closed with disposable skin staples that were removed on day five or six. The duration of surgery, use of forceps for fetal extraction if needed, and intraoperative complications were recorded. Patients who had complications such as haemorrhage and required additional surgical procedures were also excluded from the study.

Postoperative pain relief was provided with intravenous patient-controlled analgesia (PCA) using sufentanil 1 μg/mL and tramadol 5 mg/mL (background infusion 2 mL/h, bolus 2 mL, lockout 10 min) for 48 hours. We did not use non-steroidal anti-inflammatory drugs (NSAIDs) for post-caesarean analgesia, as is the normal practice at our institution. Patients were visited at four, 12, 24 and 48 h postoperatively. The acute postoperative pain intensity at rest and on movement (coughing and leg raising) was quantified with a 10-cm visual analogue scale (VAS) pain score (0 representing no pain and 10 representing the worst imaginable pain). Data concerning PCA analgesic consumption, relevant side effects and other complications, such as wound infection, were recorded at each assessment.

Three months after surgery, patients were contacted by telephone, by one of the authors, to assess the presence of pain using a previously proposed questionnaire.[7–10] Chronic pain was defined as any new-onset pain after surgery persisting for more than three months at rest and/or during normal physical activities. Complaints of numbness or decreased sensation at the incision were not considered chronic pain. If pain was present, patients were asked to grade its intensity. Pain was considered mild if the VAS score was 1–3, moderate if 4–6, and severe if 7–10. Patients were also asked about the pain frequency, location, impact on their daily activities, sleep, mood and child care; and whether they had consulted a doctor for its treatment. Patients reporting pain at three months were further followed up at six months, and similarly, those reporting pain at six months were followed up at 12 months; repeating the same questionnaire.

The results were expressed as mean ± SD, median [range] and number (%) as appropriate. To compare factors between patients with and without CPSP, continuous variables were compared with the independent samples $t$ test or Mann–Whitney $U$ test after testing for normal distribution by Kolmogorov–Smirnov test,