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CORRESPONDENCE

Lower oxycodone dose prescription post caesarean section is associated with decreased inpatient opioid consumption

The provision of analgesia in a postoperative setting often requires the delicate balancing of adequate analgesia and a low incidence of adverse effects. This balance is particularly pronounced in the post caesarean section patient, in a situation where the mother is required to care for her baby, establish breastfeeding and mobilise early to reduce the risk of thromboembolism. Many factors affect the severity of postoperative pain, making individual tailoring challenging.[1]

Multimodal analgesia, including a combination of intrathecal or epidural opioids, paracetamol and non-steroidal anti-inflammatory drugs, is usually effective without further opioid administration. Oral opioids such as oxycodone provide effective analgesia[2] but have important dose-dependent adverse effects in this population. Transmission into breastmilk appears to be minimal,[3] but up to a 20% incidence of neonatal central nervous system depression has been reported even when less than 40 mg per day is used.[4] The development of persistent opioid use was reported in 0.36% of opioid-naïve women following caesarean section[5] and up to 66% of women report lethargy, 16% constipation and 14% nausea or vomiting.[4] For these reasons, oxycodone should only be prescribed on an as-required basis, using the lowest dose that provides adequate analgesia.[6]

An audit on oxycodone usage after caesarean section at our institution performed in 2016 found that the maximum dose used in the first 24 h was 20 mg. Our current default prescription is 2.5–5 mg two-hourly on pre-printed medication charts. Although this could provide up to 60 mg in a 24-h period, risks of adverse events are minimised by administering smaller individual doses. It was observed that many inpatient prescriptions for oxycodone were for higher doses, particularly after general anaesthesia (GA) which is associated with higher analgesic requirements.[7,8]

We conducted a retrospective audit to ascertain inpatient oxycodone usage in patients after caesarean section under GA. Ethics approval was obtained from the local human research ethics committee. We identified 83 patients between January 2015 and December 2017, two of whom were excluded due to concurrent chronic pain and opioid dependence. All patients received fentanyl patient-controlled intravenous analgesia for the first day postoperatively before switching to an oral multimodal regimen. Data were collected from a chart review for the oxycodone prescription and usage for the first three days following cessation of patient-controlled analgesia.

There were three oxycodone dose ranges prescribed: 2.5–5 mg two hourly (group 1), 5–10 mg two hourly (group 2) and 5–15 mg two hourly (group 3). Paracetamol was used in 98% of patients, diclofenac in 61% and tramadol was prescribed in 44% of patients. The mean oxycodone usage was significantly lower in group 1 compared to groups 2 and 3 ($P < 0.05$) (Table 1). Only two patients used more than 60 mg in 24 h (both from group 3), 60 mg being the maximum possible dose over 24 h in group 1. This suggests that 2.5–5 mg two-hourly should provide enough oxycodone to manage pain in the majority of post-GA patients.

Although this audit did not determine the level of patient satisfaction with different dosing regimens, no patient in group 1 or 2 used more than 50% of the maximum possible dose across 24 h. All patients were reviewed daily by medical staff (including at an acute pain round for the first two to three days or until analgesia was adequate) and anaesthetic staff were available to consult at all times. None of the patients required an increase of their initial oxycodone prescription. The results of this audit indicate that further study of oxycodone dosing schedules with respect to the quality of analgesia, patient satisfaction and the incidence of opioid adverse effects would be of value. Based on our information we believe that our current default oxycodone regimen should continue to be used, including in patients post-GA.

In conclusion, further research is required to confirm the association of lower opioid prescription with decreased consumption in patients following caesarean section under GA.

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Table 1 Postoperative oral oxycodone use

	Group 1 (n=40)		Group 2 (n=11)		Group 3 (n=30)	
Prescription	2.5–5 mg two hourly		5–10 mg two hourly		5–15 mg two hourly	
Maximum possible dose (mg) in 24 h	60 mg		120 mg		180 mg	
	Mean (mg/day)	Range (mg)	Mean (mg/day)	Range (mg)	Mean (mg/day)	Range (mg)
Day 1	11.8 (9.6 to 14)[a]	0 to 25	23.0 (16.1 to 29.1)[a]	2.5 to 40	21.9 (17.9 to 25.9)[a]	0 to 40
Day 2	8.1 (5.1 to 11.1)[a]	0 to 30	22.3 (11.8 to 32.8)[a]	0 to 50	19.7 (12.6 to 26.8)[a]	0 to 70
Day 3	3.4 (0 to 9.1)[a]	0 to 25	11.8 (3.4 to 20.2)[a]	0 to 40	8.7 (0 to 21.4)[a]	0 to 70
Overall	7.71 (6.16 to 9.26)[a]	0 to 30	19.0 (13.8 to 24.2)[a]	0 to 50	16.8 (13.4 to 20.2)[a]	0 to 165

[a]95% confidence interval.

References

1. Gadsden J, Hart S, Santos AC. Post-cesarean delivery analgesia. *Anesth Analg* 2005;**101**(Suppl):S62–9.
2. Davis KM, Esposito MA, Meyer BA. Oral analgesia compared with intravenous patient-controlled analgesia for pain after cesarean delivery: a randomized controlled trial. *Am J Obstet Gynecol* 2006;**194**:967–71.
3. Seaton S, Reeves M, McLean S. Oxycodone as a component of multimodal analgesia for lactating mothers after caesarean section: relationships between maternal plasma, breast milk and neonatal plasma levels. *Aust N Z J Obstet Gynaecol* 2007;**47**:181–5.
4. Lam J, Kelly L, Ciszkowski C, et al. Central nervous system depression of neonates breastfed by mothers receiving oxycodone for postpartum analgesia. *J Pediatr* 2012;**160**. 33–37.e2.
5. Bateman BT, Cole NM, Maeda A, et al. Patterns of opioid prescription and use after cesarean delivery. *Obstet Gynecol* 2017;**130**:29–35.
6. van den Anker JN. Is it safe to use opioids for obstetric pain while breastfeeding? *J Pediatr* 2012;**160**:4–6.
7. Saracoglu KT, Saracoglu A, Umuroglu T, Eti Z. Neuraxial block versus general anaesthesia for cesarean section: post-operative pain scores and analgesic requirements. *J Pak Med Assoc* 2012;**62**:441.
8. Kessous R, Weintraub AY, Wiznitzer A, et al. Spinal versus general anesthesia in cesarean sections: the effects on postoperative pain perception. *Arch Gynecol Obstet* 2012;**286**:75–9.

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Dexmedetomidine nebulization: an answer to post-dural puncture headache?

Headache following spinal anaesthesia is very occasionally excruciating in nature and often difficult to treat. Various treatment options include well-maintained hydration, maintaining the supine posture, caffeine, other poorly evidenced pharmacological therapies and epidural blood patch. We report the apparently successful use of a novel method, namely the nebulization of dexmedetomidine in five patients suffering from post-dural puncture headache (PDPH).

Dexmedetomidine is a highly selective, centrally acting α_2-adrenergic agonist with analgesic and anxiolytic effects. It has been used via the intranasal and inhalational routes for various purposes including premedication, sedation and postoperative analgesia.[1–4] The premedicant use of nebulised dexmedetomidine in paediatric patients having bone marrow biopsies and outpatient dental procedures is associated with more satisfactory sedation, shorter recovery time, and less postoperative agitation.[3,4] Kumar et al. have reported on its use as an additive to lidocaine for nebulization of the airway prior to awake fiberoptic bronchoscopy.[5]

Because of its desirable properties and various modes of administration, we have used dexmedetomidine nebulization in patients suffering from PDPH post caesarean section who were not responding to conservative treatment. All these patients received ultrasonic nebulization of dexmedetomidine (1 μg/kg diluted in 4 mL saline) twice daily for three days. There was considerable improvement in pain scores in all the patients, with complete relief by the third day. Adverse effects such as hypotension, bradycardia and sedation were not observed. The effect of intranasal dexmedetomidine in reducing pain postoperatively has been attributed to lower circulating levels of inflammatory mediators.[1] Perineural dexmedetomidine has increased the analgesic effect of local anesthetic due to blockade of the hyperpolarization-activated cation (I_h) current.[6] Hence, the action of dexmedetomidine could be both local and systemic.

The bioavailability of dexmedetomidine through the transnasal route is 65% and through the buccal mucosa 82%.[2] Nebulization of dexmedetomidine might be of