distractions such as noise and reduced task performance.[2,3] Up to 11% of patients experience an adverse event when in hospital and half are potentially preventable.[1] Noise pollution has been shown to be a contributing factor to anaesthesia-related complications.[3] Labour wards, especially, are locations where impaired performance of complex procedures can adversely affect patients. This pilot study is the first to look at disturbances outside the operating theatre and serves as a baseline for further investigation. It is important for anaesthetists to create a "sterile cockpit" environment during a procedure and to be aware that environmental factors may negatively impact their performance. Human factors play an important role in preventing mistakes and situational awareness is a key non-technical skill that can be compromised if you are distracted. The reality is that the labour ward environment is dynamic and on many occasions it may be necessary to interrupt procedures. Nevertheless, a responsibility exists to minimise these disturbances so as to provide the highest quality care for each patient.

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Ultrasound-guided pulsed radiofrequency to the ilio-inguinal/iliohypogastric nerves to manage chronic pain after caesarean delivery in a breast-feeding woman

Caesarean delivery is a very common operation worldwide. The procedure leads to a significant incidence of chronic and persistent pain.[1] In labouring women the most common nerve injuries are those of the femoral cutaneous and femoral nerve respectively.[2] After major pelvic surgery obturator and ilio-inguinal/iliohypogastric (II/IH) nerve injury is the most common postoperative neuropathy.[3] The incidence of these latter neuropathies after gynecological surgery or a Pfannenstiel incision has been reported to be 3–7%.[4,5] The development of neuropathy may depend on many factors such as the surgical procedure and approach, the duration of surgery and patient positioning. Nerve injury may be due to the incision extending to the lateral corner of the rectus abdominis muscle, suturing of the nerve during the closure of the fascia or compression by a wound retractor or subsequent scar tissue.[6]

The World Health Organization (WHO) and UNICEF recommend that women breastfeed for the first six months after delivery. Mothers may avoid the use of medications due to potential detrimental effects on the baby caused by limited neonatal metabolism. We report a case of chronic inguinal pain that developed after caesarean delivery in a breastfeeding patient who refused to receive medical treatment and that was successfully treated with ultrasound (US)-guided II/IH nerve pulsed radiofrequency (PRF). This appears to be the first published case describing the successful application of PRF in a breastfeeding patient with a chronic neuropathy.

A 31-year-old female patient who had undergone emergency caesarean delivery under general anaesthesia three weeks previously presented to our pain clinic with pain on the left side of the incision site, which radiated the left groin. She was a breastfeeding and refused medication and hospitalisation. Initially a diagnostic block was used. With the patient supine, a linear US probe was placed on the left lower abdomen in transverse plane just above the anterior superior iliac spine. The fascia of external oblique (EO), internal oblique (IO), and transversus abdominis (TA) muscles were identified, and the II/IH nerves identified between IO and TA fascia. Using an in-plane approach from lateral to medial, a 100 mm sonovisible needle was inserted. After a negative aspiration test and 2 mL saline bolus, a total of 20 mL 0.25% bupivacaine was injected. After 30 minutes the patient's pain had improved (visual analogue scale (VAS) scores fell from nine to two). The patient reattended the next day. Her pain had returned and by eight hours after the procedure her pain score was nine. Pulsed radiofrequency was performed using the same technique as previously described. A NeuroTherm® 10 cm radiofrequency needle with 5 mm active tip was inserted (Fig. 1) and PRF with two six-minute treatments at 42 °C were applied (NeuroTherm® NT 1100 radiofrequency device). One week later her VAS score was two and was two to three at the first-, third- and sixth-month follow-ups. No additional analgesic drugs were used.

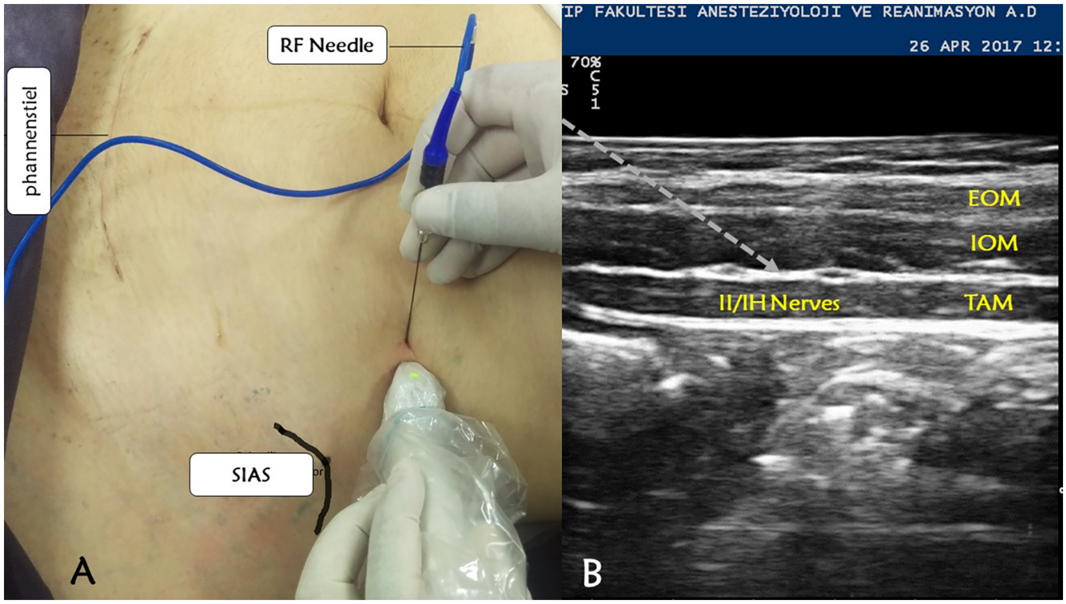

Fig. 1 A. Needle and transducer position for II/IH nerve PRF, B. Sonographic anatomy of the II/IH nerves. II/IH: Ilioinguinal/ Iliohypogastric, PRF: Pulsed radiofrequency. RF: radiofrequency. ASIS: anterior superior iliac spine. EOM: External oblique muscle, IOM: Internal oblique muscle, TAM: Transversus abdominis muscle. The grey arrow indicates the needle.

The incidence of chronic postsurgical pain (CPSP) varies between 5% and 85% and is more common after amputation, inguinal hernia, mastectomy and thoracotomy, at which the risk of neuropathic pain is higher. The incidence of CPSP after caesarean delivery has been reported to be 6–55%, with 5–10% having severe pain.[7] During caesarean delivery, II/IH neural trauma can be avoided by performing a short transverse incision 3 cm above the symphysis pubis and between the borders of the rectus muscle. If it is necessary to enlarge the incision, it should be angled cephalad, rather than continuing in a straight line.[8]

For the treatment of CPSP pharmacotherapy, peripheral nerve blocks, PRF, transcutaneous electrical nerve stimulation, peripheral nerve area stimulation, spinal cord stimulation, surgical repair with mesh, neurectomy and cryoablation have been used.[6] Radiofrequency treatment is a more recent neuromodulatory option that has been used for cervical-lumbar facet syndrome, sacroiliac problems, trigeminal neuralgia, peripheral nerves of abdomen, inguinal region or lower extremity neuropathies, and has been designed to provide the benefit of conventional radiofrequency with a reduction in side effects.[9]

There is only one published report in a breastfeeding mother in which an infusion catheter was inserted after a diagnostic II/IH nerve block.[4] The patient was hospitalized for three days during the local anesthetic infusion. In our case, the patient underwent PRF and was discharged on the same day so that the mother's desire to breastfeed was not impeded.

Although several pharmacological and non-pharmacological treatments for CPSP exist, there is no definitive treatment. We preferred to use PRF since it does not require medication or hospitalisation, can be readily applied under US guidance and has a low complication rate. In the treatment of CPSP, US-guided PRF can be an alternative treatment method for breastfeeding mothers.

Ethical statement

The authors declare that they have no conflict of interest to the publication of this article.

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Re: 'A study of factors influencing surgical cesarean delivery times in an academic tertiary center'

We read with interest the article by Gonzales Fiol et al.[1] published online in the journal in January 2018. The authors conducted a retrospective review of caesarean deliveries over a 12-month period to determine caesarean delivery times and identify factors influencing operative time and preference for a particular anaesthetic method. Although the authors examined the influence of several pertinent variables on operative time, we consider that premature conclusions were drawn that were not supported by the data.

Firstly, when undertaking a linear regression analysis, a key assumption is the normal distribution of the residuals (the distance of the predicted value from the measured value). Given the skewed distribution of operative time and the low coefficient of determination (R^2), we suspect the residuals of the data were not normally distributed, thus violating this condition. The authors did not report the assessment of this assumption.

Secondly, as identified by the authors, the variables studied account for a small part (18%) of the variation in caesarean delivery operative time. In presenting a predictive model in the form of the decision tool in Fig. 2, the authors infer clinical utility. However, a coefficient of determination (R^2) of only 0.18 suggests the predictive model is a poor fit and does not predict operative time accurately. Furthermore, the statistical model has not undergone an assessment of its predictive power. The convention when preparing and assessing a predictive statistical model is to undertake an analysis on a split data set.[2,3] Firstly, a "training" subset of data is used to formulate the model and then its performance is validated on a "testing" subset of data. If this had been undertaken, the authors could have demonstrated the model's ability to accurately identify cases of greater than 90 minutes duration, accompanied by the sensitivity and specificity. This would have evidenced the true utility and transferability of this model into clinical practice.

We believe this paper does not validate the predictive model proposed and suggest it is an inadequate tool to influence clinical decisions such as anaesthetic technique.

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Dosing an unintentional intrathecal catheter with programmed intermittent epidural bolus settings may not produce hypotension

Maintenance of epidural analgesia by programmed intermittent epidural boluses (PIEB) delivers identical volumes and doses of epidural medication at scheduled intervals, and demonstrates more extensive epidural spread than continuous infusion.[1] There is limited information on how an unrecognized intrathecal catheter might present during PIEB settings,[2] especially if the catheter was placed as part of a combined spinal-epidu-