Infiltrative methods and wound catheter infusions for perioperative analgesia - an underused technique

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Achieving and maintaining adequate analgesia after surgery remains a challenge for anaesthesiologists. Effective control of postoperative pain is important for patients undergoing surgery, and may aid recovery, reduce length of hospital stay and improve outcomes. Opioid analgesics, the mainstays of postoperative pain management, are associated with many adverse effects, especially respiratory depression, regardless of the route of administration or technique.

The development of new drug delivery methods offers multiple possibilities for the delivery of regional anaesthesia. Local anaesthetics can be administered to nearly every part of the body through a variety of techniques, including peripheral nerve block and neuraxial delivery.

While epidural analgesia or perineural catheters are very effective in controlling postoperative pain, these methods are expensive, labour-intensive, and associated with technical failures. A simple and effective alternative is the continuous infusion of local anaesthetics, directly into a postsurgical wound via an incisional catheter.

The usefulness of catheter techniques for controlling postoperative pain after ambulatory surgery was demonstrated in a 1998 feasibility study. This showed that a simple, patient-controlled system of local anaesthetic administration via a wound catheter connected to an elastomeric pump effectively reduced pain following a variety of surgical procedures (Rawal et al 1998). Catheter techniques have since proved effective for controlling postoperative pain, and have been extensively studied over the past decade. The technique has grown in popularity with both health professionals and patients, thanks to its simplicity, efficacy, good safety profile and widespread application in both ambulatory and inpatient surgery.

A meta-analysis of over 40 randomized, controlled trials (Liu et al 2006) has confirmed that catheter techniques are effective in a variety of surgical procedures (abdominal, cardiothoracic, gynaecological, orthopaedic, minor), and have many benefits, including reduction of pain at rest and during activity, opioid-sparing effects, increased patient satisfaction, and shortened length of hospital stay. The procedures are also associated with a low incidence of toxicity and side effects (Liu et al 2006), and can be used as a single technique or (preferably) as part of a multimodal analgesic approach. However, despite the abundance of supporting data, not all studies are positive, and the specific of the technique (type of catheter, catheter placements, flow rate, etc.) vary between studies.

In addition to the need for a standard procedure, many questions remain unanswered, such as which drug or combination of drugs is most effective, whether preoperative local anaesthetic administration reduces postoperative pain, whether wound healing is affected by the infusion of local anaesthetic, and whether there is a risk of wound infection.

Although verification is still in the early stages, a considerable body of evidence supports the use of catheter techniques in clinical practice, and the techniques appear to be effective and safe for patients across a wide spectrum of surgical procedures.

References
Letter to the editor

Wound catheters for post-operative pain management: overture or finale?

Sir,

In their editorial based on a meta-analysis on local anaesthetic wound infiltration Möiniche and Dahl conclude: “Do not waste any more time on clinical trials (or meta-analysis) of wound infiltration with local anaesthetics after in particular major surgical procedures – be it with or without catheters – the analgesic effect, if any is not clinically relevant” (1). Such a categorical statement in a scientific journal is simply invalid because it ignores results of another meta-analysis (2) and the evidence-based the recommendations from Australasia (3) and the PROSPECT collaborative group (4). Moreover, they contradict their own previous reviews on the topic. In a 2009 review of literature on the local anaesthetic infiltration for major abdominal and orthopaedic surgery, they repeatedly emphasized the need for further studies (5), NOT meta-analysis of existing studies.

The editorial accompanies a meta-analysis by Gupta et al (6) that has serious weaknesses. First, for unclear reasons orthopaedic patients were excluded although some of the best results are seen using LIA for major knee and hip surgery (7, 8). Secondly, importantly, studies with catheters not strictly in the surgical wound have also been excluded. Currently wound catheter infusion (WCI) technique also includes catheters placed through the incision in deeper layers/cavities e.g. subfascial, peritoneal, subacromial, intraosseous, intraarticular etc. Excluding these may make meta-analysis easier and scientifically more satisfying but does not reflect clinical reality. Möiniche and Dahl debate statistical considerations between qualitative and quantitative meta-analysis, but neither discuss nor evaluate the impact of these.

The editorial condemns wound infiltration analgesia as clinically irrelevant, in contrast to the published evidence. Liu et al. meta-analysed 44 RCTs concluding “The most notable feature was the consistent evidence of these benefits across a wide range of surgical procedures, location of wound catheters, and dosing regimens accompanied with low incidences of catheter-related complications. Both the efficacy and technical simplicity of this technique encourage its widespread clinical use” (2). WCI was recommended in the second (2005) and third (2010) editions of Australian and New Zealand College of Anaesthetists manual based on growing level 1 evidence (3). The evidence-based procedure-specific postoperative pain management group (PROSPECT) currently recommends wound infiltration for inguinal herniotomy, laparoscopic cholecystectomy, hysterectomy, open colon surgery, haemorroidectomy (4) and may include more procedures as its database is updated.

Well-controlled studies demonstrate that pre-peritoneal catheter placement is highly effective after open colectomy (9), subfascial placement is as effective as epidural technique after caesarean section (10), LIA with intraarticular placement is superior to epidural technique for lower limb arthroplasty (7) and to intrathecal morphine for knee replacement (8). Currently, LIA technique is used in 75% of all knee arthroplasties in Sweden (11). As another editorial in the same issue of the journal states “Further studies and work on LIA should be encouraged, also because there are very little data on LIA being inferior to even the most efficient alternative methods of systemic analgesia” (12).

Infiltrative techniques with and without catheters are simple and safe and effective for many but not all procedures. There is a definite need for head-to-head comparison with alternative analgesic techniques to identify the most cost-effective modality for different procedures. Thus, WCI is an overture, Möiniche and Dahl’s editorial is a finale without an overture!

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Conflict of interest
Narinder Rawal has served on advisory boards of Baxter, Pfizer and Merck and received speakers’ honoraria from Sintetica. Alain Borgeat has served on the advisory boards of Baxter, Pfizer and AstraZeneca. Nick Scott has received speakers’ honoraria from Biomet and BBraun.

References
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