Epidural analgesia is effective in managing acute pain, but failure is relatively common. Nurse administered top-ups of diamorphine can improve the efficacy of epidural

Administering ‘top-ups’ of epidural analgesia

In this article...

- Benefits of epidural analgesia
- Reasons why epidural analgesia fail
- Nurse-administered diamorphine top-up can improve efficacy

Keywords: Pain management/Epidural/ Analgesia/Drug administration

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Abstract

Repeated annual audit cycles revealed an unacceptable failure rate of 38%-46% in epidural analgesia for surgical patients in our organisation. Reasons for failure included unilateral block, missed segments and catheter migration. In spite of interventions to remedy the situation, the success rate could not be improved. The aim of the initiative outlined in this article was to improve the efficacy of epidural analgesia and to reduce the failure rate. We found that following the appropriate training and assessment, nurse-administered diamorphine top-ups are a safe and effective way to improve the efficacy of epidural analgesia and can be integrated into acute pain team practice.

5 key points

1. Epidural analgesia is one of the most effective forms of analgesia for pain associated with surgery and trauma.
2. There is a lack of clarity around reasons for success and failure.
3. Diamorphine can safely be administered by acute pain nurses via the epidural route as a bolus top-up dose.
4. Nursing staff with specific training and skills must be present on every shift and have 24-hour access to senior anaesthetic advice.
5. Regular audit of epidural analgesia including efficacy, patient satisfaction, complication rate and compliance with protocols can identify problems.

Anatomy
Epidural analgesia involves the delivery of drugs either through a single injection or the placement of a catheter into the epidural space.

The epidural space is the “potential” space between the dura mater (a membrane covering the brain and spinal cord) and the vertebral wall. It is described as “potential” because the space contains fat, lymphatics and small blood vessels.

The epidural space is outside the dural sac, which surrounds the spinal cord and nerve roots and is filled with cerebrospinal fluid. It extends from the foramen magnum in the cervical region to the sacrum. Traditionally it was thought that this was one continuous space but more recently it has been suggested that it includes crevices and layers in the fat that may impede or restrict flow of analgesic solution (Bauer et al, 2012).

It is important that epidural catheters are sited at the appropriate segmental level in relation to the surgical incision. For abdominal procedures and chest trauma, an epidural catheter is best placed in the thoracic region so that the relevant dermatomes (a dermatome is an area of skin supplied by a nerve) are covered with the infusion. For lower-limb procedures, a lumbar catheter is appropriate.

Best practice
The best-practice guidelines in the management of epidural analgesia in hospital settings are clearly laid out in a comprehensive document published by the Faculty of Pain Medicine of the Royal College of Anaesthetists (2010) in association with other royal colleges.

Epidural analgesia is not without risk or...
Complications are relatively uncommon but can be significant. It is important that informed patient consent is obtained and a full discussion includes the risks and benefits. The Royal College of Anaesthetists has produced a comprehensive patient information leaflet (2008).

All education programmes should include detailed information about complications – some are frequent and others are less common. Box 2 highlights the most important as suggested in best-practice guidelines (Faculty of Pain Medicine of the Royal College of Anaesthetists, 2010).

Failed epidural analgesia is more frequent than generally recognised. Among the reasons for an inadequate epidural block are incorrect primary placement, secondary migration of the catheter after correct placement, suboptimal fixation of the catheter and suboptimal dosing of local anaesthetic drugs. There remains a lack of clarity on definitions and outcomes for success and failure. It has also been reported that active management of inadequate epidural analgesia, including a new block, resulted in an almost complete success rate (Pan et al, 2004).

One of the recommendations of the Royal College of Anaesthetists’ best-practice guidelines is that regular audits of the efficacy of epidural analgesia should be carried out. In our trust this is done annually. Repeated audit cycles show a 38-46% failure rate in adequate epidural analgesia provision for surgical patients.

Annual audits
Historically, the acute pain team in our trust has audited epidural analgesia annually. Audits were carried out until data from 50 patients from varying specialties, excluding obstetrics had been obtained.

In our institution epidurals are used for upper- and lower-gastrointestinal, thoracic, urological and vascular cases, and emergency patients. The literature includes detailed information about complications – some are frequent and others are less common. Box 2 highlights the most important as suggested in best-practice guidelines (Faculty of Pain Medicine of the Royal College of Anaesthetists, 2010).

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Some patients also benefited from a significant improvement in pain relief in the postoperative phase by having a top-up dose of diamorphine via the epidural catheter administered by the anaesthetist. Diamorphine is a very lipid-soluble drug and penetrates the central nervous system rapidly. It has been found to be effective when administered by intermittent bolus injection or by infusion (McLeod et al, 2005).

We looked at developing the administration of epidural diamorphine 2-3mg bolus top-up doses as an initiative that could be adopted by the acute pain team. The aim was to provide a quicker response time with a solution that had been tried and found to be effective in several patients.

Working group
A working group was established to devise a strategy for the initiative, with anaesthetic and acute pain team representation. A guideline and training package was developed and approved in 2012; formal education was delivered by the acute pain anaesthetic lead and practice was supervised to assess competence in the practical technique. This competency was developed solely for use by nurses working on the acute pain team.

As part of the initiative nurse-administered diamorphine top-up doses would be administered to patients following assessment of the patient and consultation with either the consultant anaesthetist responsible for the patient or the on-call consultant anaesthetist.

Follow-up audit
Another audit of epidural analgesia was carried out in 2013, after implementation of the initiative. This time we used a database inquiry method and reviewed all epidural infusions carried out in 2013. Data was collected prospectively and extracted from the acute pain database using the MedICUs acute pain software “Managing Pain Efficiently”. It was the first time we had looked at epidurals over a 12-month period using this software instead of paper forms.

During 2013 346 epidurals were performed. The results of the audit showed 87 patients had diamorphine epidural bolus top-ups for inadequate analgesia at least once during epidural infusion.

The success rate of all epidurals during this period was found to be 81%; this is a significant improvement compared with previous audits, which showed a 38-46% failure rate. The 19% failure rate was due to catheter migration, persistent hypotension or inappropriate catheter placement.

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Side-effects related to the use of epidural diamorphine were minimal. A small increase in the incidence of pruritus was managed with either chlorpheniramine or a 40mcg bolus dose of naloxone. There was no increase in nausea and vomiting.

Conclusion
The audit carried out after the introduction of the new nursing initiative revealed a significant improvement in the efficacy of epidural analgesia.

The management of inadequate epidural analgesia is now addressed in a timely manner and the use of 2-3mg diamorphine as a bolus top-up has been found to be associated with few side-effects. There have been no adverse events associated with this change in practice.

This has been found to be a simple and safe initiative that has had a significant benefit in the success of epidural analgesia in our trust. Database inquiry will be continued to ensure safety, success and benefits are ongoing.

References
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