

EXECUTIVE SUMMARY

MAJOR COMPLICATIONS OF CENTRAL NEURAXIAL BLOCKS: THE 3RD NATIONAL AUDIT PROJECT OF THE ROYAL COLLEGE OF ANAESTHETISTS

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WHY?

Central neuraxial blocks (CNB) are a group of anaesthetic techniques which include epidurals, spinals and combined spinal epidurals (CSE). All are invasive techniques involving injection of pain relieving drugs into the vertebral (spinal) canal and requiring a needle to be placed close to the central nervous system. CNB has the potential to provide patients with optimal pain relief, but can also lead to patient harm.

Use of CNB for surgery may mean that general anaesthesia and its complications are avoided. Alternatively, CNB may be used in addition to general anaesthesia and as a method of providing high quality prolonged pain relief after surgery. The techniques are also used widely in the management of acute and chronic pain states, particularly in obstetrics both during labour and for delivery.

The number of CNB performed in the United Kingdom (UK) was previously unknown. It is recognised that major complications may occur as a consequence of CNB and these include damage to the nervous system, important infections and even death. The frequency with which CNB leads to harm to the patient was not known either.

WHAT?

The 3rd National Audit Project of the Royal College of Anaesthetists was designed to answer the questions:

- ◆ What types of CNB are used in the UK, and how often?
- ◆ How often do major complications, leading to permanent harm, occur in association with CNB?
- ◆ What happens to the patients experiencing these complications?

Phase one of the project used a novel process to identify the number of CNB performed in the UK's National Health Service during a defined period. These data were then used to estimate the number of such procedures performed annually.

Phase two sought to identify all cases of major complications of CNB occurring in the same population as in phase one.

Each reported case was reviewed by an expert panel and this analysis enabled calculation of the incidence of complications leading to permanent patient harm after CNB.

The methodology was designed to ensure that those being notified of cases (at the Royal College of Anaesthetists) and those receiving detailed reports of cases (at the National Confidential Acute Pain Critical Incident Audit) were unable to access the other's data thereby preserving patient, hospital and clinician anonymity.

WHO?

The project required collaboration of anaesthetists throughout the UK and was supported by many specialist organisations whose members might be in a position to identify and report complications after CNB. These groups included members of acute pain teams, neurologists, radiologists, spinal and neurosurgeons.

CAVEATS

The project invited reports of all the major complications of CNB to ensure maximum reporting. However, the primary aim of the project was to identify the incidence of permanent harm due to CNB. Therefore the report does not provide information on the incidence of minor complications or major complications without permanent harm.

RESULTS

The response of the profession to this project has been unprecedented with every invited UK NHS hospital agreeing to contribute and then later returning data.

Clinical uncertainty in the reported cases, particularly regarding final clinical outcome, means that it is appropriate to report results with the incidence of permanent harm interpreted both pessimistically and optimistically.

- ◆ The census phase produced a denominator of a little over 700,000 CNB. Of these, 46% were spinals and 41% epidurals, and 45% were performed for obstetric indications and 44% perioperative.

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- ◆ Eighty-four major complications were reported in the year of data collection, with 52 meeting all of the audit inclusion criteria. With the data interpreted 'pessimistically' there were 30 permanent injuries, and 'optimistically' 14.
- ◆ The incidence of permanent injury due to CNB (expressed per 100,000 cases) was 'pessimistically' 4.2 (95% confidence interval 2.9–6.1) and 'optimistically' 2.0 (1.1–3.3). These are equivalent to 1 in 24,000 and 1 in 54,000, respectively.
- ◆ 'Pessimistically' there were 13 deaths or paraplegias, 'optimistically' five. The incidence of paraplegia or death was 'pessimistically' 1.8 per 100,000 (1.0–3.1) or 1 in 50,000 and 'optimistically' 0.7 (0–1.6) or 1 in 140,000.
- ◆ In the 30 patients with permanent harm (judged 'pessimistically') 60% occurred after epidural block, 23% after spinal anaesthesia and 13% after CSE. More than 80% of these patients had a CNB placed for perioperative analgesia.
- ◆ Two-thirds of injuries judged initially as severe resolved fully.

INTERPRETATION OF RESULTS

The results indicate that the incidence of the complications of CNB in the UK is considerably lower than some previous reports (based on much smaller surveys) have suggested. This is very reassuring for clinicians and patients.

The review panel identified many circumstances where care of patients was timely and of high quality. However, as is inevitable in a report examining cases in which patients experienced harm, there were instances of sub-optimal and even occasionally poor management. The report emphasises some of these in the hope lessons can be learnt.

The reported cases encompass almost all of the major complications of CNB previously reported and no new ones. The failures of recommended practice were identified and are commented on below and in individual chapters.

SUMMARY

- 1 This project achieved widespread awareness within the specialty. There was a universal response to the census phase and attempts at validation did not identify cases which had not been notified to or identified by the project. This suggests that the project has achieved its goals. As such the estimates of incidence are likely to be robust, certainly as robust as is achievable.
- 2 The incidence of permanent harm following CNB in this series, in all groups considered, is lower than reported in some smaller studies and this is reassuring. The incidence of permanent harm based on an optimistic

interpretation of the reported cases reported is approximately half that if all cases are judged pessimistically.

- 3 Two-thirds of patients with complications reported to the project made a full recovery. However patients with vertebral canal haematoma and spinal cord ischaemia had a poor prognosis, with most patients being left with significant disability after these complications.
- 4 Most complications leading to harm occurred following CNB performed in the perioperative setting. The incidence of complications in children, and after CNB for chronic pain or obstetric indications seems to be extremely low.
- 5 The majority of complications after perioperative CNB occurred after epidurals. Perioperative epidurals represent approximately 1 in 7 of all CNB, but accounted for more than half of complications leading to harm. The data do not clarify whether this is because perioperative epidurals are intrinsically unsafe or because these patients have particularly high risk.
- 6 Considering the relatively small number of combined spinal epidurals performed (<6% of all CNB) the number of associated reports of harm (>13%) is concerning
- 7 Failure to follow published recommendations is a recurring issue in some of the reported complications.
- 8 Several reported cases illustrate that failure to identify and understand the relevance of inappropriately weak legs (including unilateral weakness) after CNB or during continuous postoperative CNB can lead to avoidable harm.
- 9 Organisational deficiencies contributed to delays in diagnosis and intervention in several cases and led to avoidable harm. Delays included failure to monitor, poor understanding of abnormal findings (by nurses and doctors), poor interdepartmental referral processes, scanning equipment which was routinely unavailable out of hours or broken, and lack of availability of beds in tertiary referral centres for patients requiring specialised emergency surgery.
- 10 A care bundle for CNB might usefully be developed. On the basis of this report its most useful application would be in the management of perioperative epidurals. Such a care bundle might usefully include aspects such as balancing risk/benefit before insertion, optimal choice of the vertebral level for CNB, use of a full aseptic technique, management of difficult procedures, patient monitoring and daily assessment of the risk/benefit of continued use. If such a care bundle were to be developed audit of its implementation would be appropriate.