NICE guidance

Ultrasound-guided regional nerve block

Interventional procedures guidance
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Your responsibility

This guidance represents the view of NICE, arrived at after careful consideration of the evidence available. When exercising their judgement, healthcare professionals are expected to take this guidance fully into account, and specifically any special arrangements relating to the introduction of new interventional procedures. The guidance does not override the individual responsibility of healthcare professionals to make decisions appropriate to the circumstances of the individual patient, in consultation with the patient and/or guardian or carer.

All problems (adverse events) related to a medicine or medical device used for treatment or in a procedure should be reported to the Medicines and Healthcare products Regulatory Agency using the Yellow Card Scheme.

Commissioners and/or providers have a responsibility to implement the guidance, in their local context, in light of their duties to have due regard to the need to eliminate unlawful discrimination, advance equality of opportunity, and foster good relations. Nothing in this guidance should be interpreted in a way that would be inconsistent with compliance with

those duties. Providers should ensure that governance structures are in place to review, authorise and monitor the introduction of new devices and procedures.

Commissioners and providers have a responsibility to promote an environmentally sustainable health and care system and should assess and reduce the environmental impact of implementing NICE recommendations wherever possible.

1 Guidance

1.1 Current evidence on the safety and efficacy of ultrasound-guided regional nerve block appears adequate to support the use of this procedure provided that normal arrangements are in place for clinical governance, consent and audit.

1.2 Clinicians wishing to perform this procedure should be experienced in the administration of regional nerve blocks and trained in ultrasound guidance techniques.

2 The procedure

2.1 Indications and current treatments

2.1.1 Regional nerve block is used for anaesthesia and/or analgesia during or after surgery, and also in the management of chronic pain. It may be used as an adjunct to general anaesthesia.

2.1.2 It is delivered with a needle in close proximity to the target nerve. Anatomical landmarks, the detection of a 'click' when fascia is breached, and nerve stimulation can all be used to guide the needle tip insertion.

2.2 Outline of the procedure

2.2.1 Ultrasound imaging is used to visualise the target nerve and to guide accurate needle tip placement adjacent to the nerve. Ultrasound imaging allows

visualisation of neurovascular as well as musculoskeletal structures, and of superficial tissues. It also allows visualisation of the injected anaesthetic solution: the needle tip can be repositioned if the spread of the solution is not satisfactory.

2.3 Efficacy

Sections 2.3 and 2.4 describe efficacy and safety outcomes which were available in the published literature and which the Committee considered as part of the evidence about this procedure. For more detailed information on the evidence, see the overview.

2.3.1 Success of the regional nerve block technique was defined differently across the studies identified, in terms of sensory and motor function, making comparison of outcomes difficult.

2.3.2 A randomised controlled trial (RCT) of 188 patients reported that nerve block was more often successful with ultrasound guidance (83%, p=0.01) or with combined ultrasound and nerve stimulation guidance (81%, p=0.03) than with nerve stimulation guidance alone (63%; absolute numbers not reported).

2.3.3 A second RCT of 60 patients having regional nerve block and spinal anaesthesia reported nerve block failure in 5% (1 out of 20) of patients following ultrasound-guided regional nerve block for hip surgery compared with 10% (2 out of 20) of patients receiving the same volume of anaesthetic with nerve stimulation guidance (level of significance not reported).

2.3.4 A third RCT of 40 patients reported that nerve block was significantly more successful with ultrasound guidance than with anatomical landmark guidance (p=0.003), and that the onset of block was significantly faster (p=0.011; absolute numbers not reported). This study reported conversion to general anaesthesia in 5% (1 out of 20) of patients in the ultrasound-guided group and 10% (2 out of 20) of patients in the landmark-guided group.

2.3.5 A fourth RCT of 100 patients having ilioinguinal and iliohypogastric nerve blocks reported that a significantly lower mean volume of anaesthetic (0.19 ml/kg) was required to produce an effective block when using ultrasound guidance than when using anatomical landmark guidance with fascial click (0.3 ml/kg;

p<0.0001). In this study, a smaller proportion of patients required postoperative analgesic in the ultrasound-guided group (6%) than in the anatomical landmark group (40%; p<0.0001; absolute numbers not reported).

2.3.6 A non-comparative trial of 248 patients treated with peripheral nerve blocks at different sites reported nerve block failure in 2% (3 out of 124) of patients treated with combined ultrasound and nerve stimulation-guided block compared with 6% (8 out of 124) of patients treated with nerve stimulation-guided block alone (not statistically significant, p=0.334).

2.3.7 In two case series of 1,146 and 520 patients a successful block was recorded in 99% (1,138 out of 1,146, upper limb or hand surgery) and 94% of patients (absolute numbers and location of block not reported in the series of 520 patients).

2.3.8 The Specialist Advisers considered key efficacy outcomes to include success of the blocks, volume of anaesthetic required, speed of onset of analgesia, pain score and number of needle passes.

2.4 Safety

2.4.1 The RCT of 188 patients reported transient paraesthesia (up to 5 days) in 20% (13 out of 64) of patients treated with ultrasound-guided block, 21% (13 out of 62) of patients who received nerve stimulation-guided block and 15% (9 out of 62) of patients who received combined ultrasound-guided and nerve stimulation-guided block (level of significance not reported). In the RCT of 40 patients, the incidence of paraesthesia was significantly higher in the landmark-guided group than in the ultrasound-guided group (p=0.012; absolute numbers not reported).

2.4.2 A case series of 620 patients treated with ultrasound-guided catheter insertion reported nerve injury in fewer than 1% (2 out of 620) of patients. In one patient the resulting weakness and sensory loss had resolved spontaneously at 6-week follow-up. The other patient was reported to have developed symptoms consistent with complex regional pain syndrome, with burning pain in the foot and allodynia. These symptoms reportedly resolved 2 weeks later, following three sympathetic blocks of the lower extremity.

2.4.3 The RCT of 60 patients reported vascular puncture causing haematoma in 0% (0 out of 20) of the 20 patients treated with ultrasound-guided nerve block and in 10% (4 out of 40) of patients following nerve stimulation-guided block (level of significance not reported).

2.4.4 The RCT of 40 patients reported arterial puncture in 0% (0 out of 20) of the 20 patients treated with ultrasound-guided block, and 15% (3 out of 20) of patients treated with anatomical landmark-guided block (not statistically significant).

2.4.5 The Specialist Advisers considered anecdotal adverse events to include organ damage, pneumothorax, nerve damage, intravascular injection, bleeding, systemic toxicity and intraneural injection.

2.5 Other comments

2.5.1 The Committee noted that the procedure requires the use of ultrasound equipment of adequate image quality.

3 Further information

3.1 NICE has published interventional procedures guidance on ultrasound-guided catheterisation of the epidural space.

Sources of evidence

The evidence considered by the Interventional Procedures Advisory Committee is described in the overview.

Information for patients

NICE has produced information for the public on this procedure. It explains the nature of the procedure and the guidance issued by NICE, and has been written with patient consent in mind.

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Endorsing organisation

This guidance has been endorsed by Healthcare Improvement Scotland.