NICE guidance

Low-intensity pulsed ultrasound to promote healing of fresh fractures at low risk of non-healing

Interventional procedures guidance
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www.nice.org.uk/guidance/ipg621

This guidance replaces IPG374.

1 Recommendations

1.1 The evidence for low-intensity pulsed ultrasound to promote healing of fresh fractures at low risk of non-healing raises no major safety concerns. However, current evidence does not show efficacy. Therefore, this procedure should not be used for this indication. Find out why NICE recommends not to use some procedures on the NICE interventional procedures guidance page.

2 The condition, current treatments and

procedure

The condition

2.1 Fractures are a common result of trauma, and are usually described as either closed (skin over the fracture site is intact) or open (involves an open wound). They may vary in complexity from a single break (transverse or oblique) to comminuted, in which the bone has broken into several pieces.

Current treatments

2.2 Fractures usually heal within a few weeks after treatment by closed or open reduction, and immobilisation using a cast or internal fixation. Sometimes, healing may be delayed or not happen at all (non-union). There is no agreed precise definition of a fracture non-union but, typically, it is considered to be when bony union has failed 6 to 9 months after the fracture. Risk factors for non-union of fractures include: systemic medical conditions (for example, diabetes, malnutrition, osteoporosis); smoking; use of non-steroidal anti-inflammatory drugs; local factors such as infection; vascular problems; magnitude of injury (for example, fracture location and gap, traumatic fractures); advanced age; and other iatrogenic factors. Treatment of non-union may need complex and prolonged management with implications for the patient's quality of life and functional capacity.

The procedure

2.3 The aim of low-intensity pulsed ultrasound is to reduce fracture healing time and avoid non-union by delivering micro-mechanical stress to the bone to stimulate bone healing.

2.4 An ultrasound probe is positioned on the skin over the fracture and patients self-administer low-intensity pulsed ultrasound daily, usually for 20 minutes. If a patient's limb is immobilised in a cast, a hole is cut into the cast for the ultrasound probe. The probe delivers acoustic radiation

and coupling gel is used on the skin to aid conduction of the ultrasound signal. An operating frequency of 1.5 MHz, pulse width of 200 microseconds, repetition rate of 1 kHz, and a temporal average power of 30 milliwatts/cm^2 is typically used. The exact treatment protocol and duration of treatment may vary.

2.5 Progress towards fracture healing is usually assessed radiographically. Treatment duration ranges from a few weeks to several months.

3 Committee considerations

The evidence

3.1 To inform the committee, NICE did a rapid review of the published literature on the efficacy and safety of this procedure. This comprised a comprehensive literature search and detailed review of the evidence from 6 sources, which was discussed by the committee. The evidence included 4 systematic reviews, 1 randomised controlled trial and 1 cohort study and is presented in table 2 of the interventional procedures overview. Other relevant literature is in the appendix of the overview.

3.2 The specialist advisers and the committee considered the key efficacy outcomes to be: fracture healing or union, functional outcomes and quality of life.

3.3 The specialist advisers and the committee considered the key safety outcome to be: need for subsequent reoperation.

3.4 Three commentaries from patients who had experience of this procedure were received, which were discussed by the committee.

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Endorsing organisation

This guidance has been endorsed by Healthcare Improvement Scotland.

Accreditation