NICE guidance

Selective dorsal rhizotomy for spasticity in cerebral palsy

Interventional procedures guidance
Published: 15 December 2010

www.nice.org.uk/guidance/ipg373

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.

This guidance replaces IPG195.

1 Guidance

1.1 Current evidence on selective dorsal rhizotomy for spasticity in cerebral palsy shows that there is a risk of serious but well-recognised complications. The evidence on efficacy is adequate. Therefore, this procedure may be used provided that normal arrangements are in place for clinical governance and audit.

1.2 During the consent process parents or carers should be informed that selective dorsal rhizotomy for spasticity in cerebral palsy is irreversible, and that patients may experience deterioration in walking ability or bladder function, and later complications including spinal deformity. They should understand that prolonged physiotherapy and aftercare will be required and that additional surgery may be necessary.

1.3 Patient selection and treatment should be carried out by a multidisciplinary team with specialist training and expertise in the care of spasticity in patients with cerebral palsy, and with access to the full range of treatment options. This team would normally include a physiotherapist, a paediatrician and surgeons, all with specific training and expertise.

1.4 NICE encourages further research into this procedure. Long-term outcomes are encouraged. Outcome measures should include: the incidence of neurological impairment and spinal deformity; the need for additional operations; and assessments of disability, social inclusion, and quality of life.

2 The procedure

2.1 Indications and current treatments

2.1.1 Cerebral palsy encompasses different brain disorders originating during fetal development, birth or early childhood. It is associated with abnormalities of movement, balance and posture, language and vision. Lower limb spasticity affects 80% of people with cerebral palsy. This can impair walking and sitting, and can cause discomfort, cramps and spasms.

2.1.2 Current treatments include oral muscle relaxant medication, orthotic devices, physiotherapy, and repeated intramuscular injections of botulinum toxin. Surgical procedures include tendonotomy, tendon lengthening, peripheral neurotomy, osteotomy, electrical stimulation of the muscles or dorsal spinal cord, and continuous intrathecal baclofen infusion.

2.2 Outline of the procedure

2.2.1 The aim of selective dorsal rhizotomy is to achieve a long-term reduction in sensory input to the sensory–motor reflex arcs responsible for increased muscle tone, by dividing some of the lumbar sensory nerve roots.

2.2.2 With the patient under general anaesthesia, a laminectomy of one or more vertebrae is performed to expose the dural sac, which is opened to display the spinal conus with or without the cauda equina. Intraoperative neurophysiological assessment is commonly used to identify the sensory nerve rootlets judged to be most responsible for the excess motor tone. Selected sensory rootlets are divided, preserving some sensory supply and the motor roots responsible for voluntary movements.

2.2.3 Intensive physiotherapy and aftercare is usually given for several months after the procedure. Patients who were previously able to walk may have to learn different walking skills.

2.3 Efficacy

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

2.3.1 A non-randomised comparative study of 142 patients treated by the procedure (n=71) or intrathecal baclofen pump (ITBP; n=71) reported improvements in Modified Ashworth Scale scores (measures muscle tone on a scale from 0 to 5; lower score indicates lower muscle tone) of -2.52 and -1.23 points respectively at 1-year follow-up ($p<0.0001$).

2.3.2 A non-randomised comparative study of 108 patients treated by the procedure plus physiotherapy or physiotherapy alone reported mean improvements in Gross Motor Function Measure (GMFM) score (higher score indicates better gross motor functioning) from baseline of 87 to 92 and 89 to 91 respectively at 20-month follow-up ($p<0.05$ for both groups from baseline).

2.3.3 The non-randomised comparative study of 142 patients treated by the procedure or ITBP reported that 94% and 96% of parents respectively were satisfied at 1-year follow-up (absolute figures not stated; $p=0.71$).

2.3.4 The Specialist Advisers listed key efficacy outcomes as reduction in lower limb spasticity, reduction in number of subsequent orthopaedic procedures, improved gross motor function, improved gait and walking, improved level of independence and quality of life.

2.4 Safety

2.4.1 Radiologically observed scoliosis was reported in 9% (5 out of 58) of patients who had laminectomy and 1% (2 out of 150) of patients who had laminoplasty in the case series of 208 patients at a mean follow-up of 4.2 years. The percentage of patients with scoliosis pre-operatively was not stated. Case series of 105, 98 and 30 patients reported scoliosis of 10° or more in 55% at 4.3 years, in 43% at 5.8 years, and scoliosis of less than 35° in 50% at 21.4 years respectively.

2.4.2 In a case series of 61 patients, 4 patients developed spondylolysis and grade 1 spondylolisthesis between 3 and 5 years after the procedure.

2.4.3 Urinary retention due to decreased bladder tone and hyporeflexia was reported in 10% (20 out of 208) of patients in the case series of 208 patients. This resolved spontaneously within 4 weeks in 18 patients but 2 patients had long term urinary incontinence because of atonic bladder.

2.4.4 The Specialist Advisers considered theoretical adverse events to include death, worsening motor function and/or paraplegia, wound infection, meningitis, cerebrospinal fluid leakage, dislocation of the hip(s), back pain, constipation, weakness, chronic pain, and late arachnoiditis and/or syringomyelia.

2.5 Other comments

2.5.1 The Committee noted that most of the evidence for this procedure relates to children aged 4 to 10 years. The Committee also noted that this procedure and patient selection for it are still evolving. Several commentators recommend limited laminectomy to reduce the risk of late spinal deformity, and others question the need for intraoperative neurophysiology.

3 Further information

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.

ISBN: 978-1-4731-6366-9

Endorsing organisation

This guidance has been endorsed by Healthcare Improvement Scotland.