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NHS
National Institute for Health and Clinical Excellence

Mini-incision surgery for total knee replacement

This document replaces previous guidance on mini-incision surgery for total knee replacement (interventional procedure guidance 117).

1 Guidance

1.1 Current evidence on the safety and efficacy of mini-incision surgery for total knee replacement is adequate to support the use of this procedure provided that normal arrangements are in place for clinical governance, consent and audit.

1.2 Mini-incision surgery for total knee replacement should only be carried out by surgeons with specific training in the procedure.

1.3 Surgeons should submit details on all patients undergoing mini-incision surgery for total knee replacement to the National Joint Registry (www.njrcentre.org.uk).

2 The procedure

2.1 Indications and current treatments

2.1.1 The most common indication for a total knee replacement is symptomatic degenerative arthritis (osteoarthritis) of the knee joint.

2.1.2 Conservative treatments for arthritis include medications for pain and inflammation, and physical therapies. Corticosteroids may be injected into the knee joint to relieve inflammation. If these therapies are insufficient, a partial or total knee replacement may be necessary.

2.2 Outline of the procedure

2.2.1 The aim of mini-incision surgery is to improve both cosmesis and recovery time by reducing the length of incision and minimising damage to tendons and muscles. The procedure is carried out with the patient under general anaesthesia or spinal/epidural block. Specially designed instruments enable the surgeon to work through a small incision and avoid eversion of the patella or dislocation of the knee joint. The same types of joint prostheses are used in mini-incision procedures as in standard knee replacement. Computer-guided navigation may be used to improve placement of the prostheses.

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, available at www.nice.org.uk/IP247aoverview

2.3 Efficacy

2.3.1 A randomised controlled trial (RCT) of 108 patients treated by computer-assisted mini-incision (n = 52) or conventional knee replacement (n = 56) reported that 34 patients from each group were pain free at 6-month follow-up (denominator not stated) ($p = 0.15$).

2.3.2 A non-randomised controlled trial of 200 knees reported that mean pain score (using a 10-point visual analogue scale; high score indicates worse pain) was significantly better in the mini-incision group (3.2 points) than in the conventional surgery group (3.8 points) at 1-year follow-up ($p < 0.01$).

2.3.3 The RCT of 108 patients treated by mini-incision or conventional knee replacement reported no difference in mean Knee Society knee scores

Interventional procedure guidance 345

Interventional procedures guidance makes recommendations on the safety and efficacy of a procedure. The guidance does not cover whether or not the NHS should fund a procedure. Decisions about funding are taken by local NHS bodies (primary care trusts and hospital trusts) after considering the clinical effectiveness of the procedure and whether it represents value for money for the NHS.

Interventional procedures guidance is for healthcare professionals and people using the NHS in England, Wales, Scotland and Northern Ireland. This guidance is endorsed by NHS QIS for implementation by NHSScotland.

NHS Quality Improvement Scotland

(on a scale from 0 to 100; high score indicates less pain and better functional mobility) of 84 points and 85 points respectively at 6-month follow-up ($p = 0.06$).

2.3.4 In a case series of 237 patients undergoing revision surgery for reasons other than infection (not otherwise described) the mean time to revision surgery was significantly shorter in patients initially treated by mini-incision surgery than in patients treated by a standard approach (15.4 months and 79.2 months respectively) ($p < 0.0001$).

2.3.5 A non-randomised controlled study of 747 knees reported that achievable flexion was significantly greater in knees treated by mini-incision surgery (124°) than following conventional surgery (113°) at 24-week follow-up ($p < 0.001$).

2.3.6 The Specialist Advisers listed key efficacy outcomes as recovery time, functional long-term outcome and implant survival at 10 years.

2.4 Safety

2.4.1 Deep wound infection requiring 2-stage revision surgery and haemarthrosis requiring evacuation were reported in less than 1% (2/725 and 1/725 respectively) of knees treated by mini-incision surgery in a non-randomised controlled study of 732 knees (mean 25-month follow-up). Deep infection requiring 2-stage reimplantation was reported in less than 1% (2/335) of patients in a case series of 335 patients at a median 2-year follow-up.

2.4.2 Tibial component failure (requiring revision) was reported in less than 1% (2/725) of knees treated by mini-incision surgery in the non-randomised controlled trial of 732 knees (more than 12-month follow-up).

2.4.3 Periprosthetic femur fracture after a fall was reported in 1 of 725 knees treated by mini-incision surgery at 2-week follow-up in the non-randomised controlled trial of 732 knees.

2.4.4 Patella tendon rupture (requiring surgical repair) was reported in 1 of 725 knees treated by mini-incision surgery in the non-randomised controlled trial of 732 knees (timing of event not stated).

2.4.5 In a non-randomised controlled study of 137 knees, patella tendon shortening of greater than 5% occurred in significantly more knees treated by conventional surgery (37% [21/57]) than knees treated by mini-incision surgery (12% [9/74]) at 2-year follow-up ($p = 0.001$).

2.4.6 The non-randomised controlled study of 747 knees reported that 'patella clunk' occurred significantly more frequently following mini-incision surgery (6% [17/275] of knees) than following conventional surgery using the same type of prosthesis (less than 1% [1/222] of knees) at 1-year follow-up ($p < 0.001$).

2.4.7 In the non-randomised controlled study of 137 knees, secondary manipulations for reduced range of movement at 6 weeks were reported in 3% (2/68) of patients treated by mini-incision surgery and 7% (4/61) of patients treated by conventional surgery (significance not stated).

2.4.8 The Specialist Advisers listed anecdotal or published adverse events as increased operative time and malpositioning of the implant. They considered theoretical adverse events to include inadequate removal of bone cement from the back of the knee which may lead to early failure.

2.5 Other comments

2.5.1 The Committee noted that there is no generally accepted definition of a 'mini-incision' approach to knee replacement.

2.5.2 The Committee recognised that although concerns have been expressed about an increased revision rate after mini-incision surgery for total knee replacement, this may reflect the learning curve of a new procedure. The 2009 annual report of the Swedish Knee Arthroplasty Register stated that there was no increase in the revision rate of the procedure compared with standard arthrotomy at up to 8-year follow-up.

3 Further information

3.1 For related NICE guidance see www.nice.org.uk

Information for patients

NICE has produced information on this procedure for patients and carers ('Understanding NICE guidance'). It explains the nature of the procedure and the guidance issued by NICE, and has been written with patient consent in mind. See www.nice.org.uk/guidance/IPG345/publicinfo

Ordering printed copies
Contact NICE publications (phone 0845 003 7783 or email publications@nice.org.uk) and quote reference number N2180 for this guidance or N2181 for the 'Understanding NICE guidance'.

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