NICE guidance

Platelet-rich plasma injections for osteoarthritis of the knee

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. However, 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.

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.

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 Recommendations

1.1 Current evidence on platelet-rich plasma injections for osteoarthritis of the knee raises no major safety concerns; however, the evidence on efficacy is inadequate in quality. Therefore this procedure should only be used with special arrangements for clinical governance, consent and audit or research.

1.2 Clinicians wishing to undertake platelet-rich plasma injections for osteoarthritis of the knee should take the following actions.

- Inform the clinical governance leads in their NHS trusts.
- Ensure that patients understand the uncertainty about the procedure's efficacy and provide them with clear written information. In addition, the use of NICE's information for the public is recommended.
- Audit and review clinical outcomes of all patients having platelet-rich plasma injections for osteoarthritis of the knee (see section 7.1).

1.3 Further research into platelet-rich plasma injections for treating osteoarthritis of the knee should clearly describe patient selection and should take the form of well-designed, controlled studies that compare the procedure against other methods of management. Outcomes should include measures of knee function, patient-reported outcome measures and the timing of subsequent interventions. Studies aimed at assessing possible cartilage repair after platelet-rich plasma injections should include detailed radiographic or MRI imaging before and after the procedure.

2 Indications and current treatments

2.1 Osteoarthritis of the knee is the result of progressive deterioration of the articular cartilage and menisci of the joint. Articular cartilage deteriorates because of trauma and wear and tear. This leads to exposure of the bone surface. Symptoms include pain, stiffness, swelling and difficulty walking.

2.2 Treatment depends on the severity of the osteoarthritis. Conservative treatments include analgesics and corticosteroid injections to relieve pain and inflammation, and physiotherapy and prescribed exercise to improve function and mobility. When symptoms are severe, surgery may be indicated: options include upper tibial osteotomy and unicompartmental or total knee replacement.

3 The procedure

3.1 Platelet-rich plasma injections aim to promote cartilage repair and relieve osteoarthritic symptoms, potentially delaying the need for joint replacement

surgery. Platelets produce growth factors that are thought to stimulate chondrocyte proliferation, leading to cartilage repair.

3.2 Platelet-rich plasma is usually prepared by a clinician or technician. Blood is taken from the patient and centrifuged to obtain a concentrated suspension of platelets. Platelet-rich plasma can be prepared by carrying out 2 spin cycles using a standard bench-top centrifuge, or by using commercially available single-step preparation systems. Different preparation methods may affect the concentration of platelets. Agents such as calcium chloride may be added to activate the platelets. The final platelet-rich plasma product is injected into the joint space in the knee, usually under ultrasound guidance.

4 Efficacy

This section describes efficacy 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 interventional procedure overview.

4.1 A meta-analysis in a systematic review of 6 studies, including 577 patients, compared the outcomes of patients treated by platelet-rich plasma or hyaluronic acid. The study reported an overall pooled mean difference in Western Ontario and McMaster Universities Arthritis Index (WOMAC) scores of −16.7 in favour of platelet-rich plasma (95% confidence interval −28.9 to −4.4, p=0.008). A mean difference value below 0 favoured platelet-rich plasma, whereas a value above 0 favoured hyaluronic acid.

4.2 A meta-analysis in a systematic review of 16 studies, including 1543 patients, pooled International Knee Documentation Committee (IKDC), WOMAC and Knee Injury and Osteoarthritis Outcome Score (KOOS) scales to compare knee function scores before platelet-rich plasma treatment against scores after treatment. The study reported an overall standardised mean difference, at 12 months, of 2.9 in favour of post-treatment scores (95% confidence interval 1.0 to 4.8, p<0.001). A mean difference value above 0 favoured post-treatment, whereas a value below 0 favoured pre-treatment.

4.3 In a randomised controlled trial of 109 patients treated by platelet-rich plasma (n=54) or hyaluronic acid injections (n=55), mean KOOS scores (ranging from 0 to 100, with higher scores indicating better outcomes) for symptoms, pain,

activities of daily living, sport and quality-of-life domains improved from 64.0 to 71.3, 65.4 to 74.0, 69.9 to 77.9, 37.6 to 47.4 and 34.9 to 50.5 respectively in the platelet-rich plasma group at 12-month follow-up (p values <0.05). In the hyaluronic acid group, mean KOOS scores for symptoms, pain, activities of daily living, sport and quality-of-life domains improved from 67.8 to 74.2, 63.1 to 74.0, 67.8 to 77.3, 34.2 to 46.6 and 33.6 to 49.2 respectively at 12-month follow-up (p values <0.05). No statistically significant differences were observed between groups at 12-month follow-up.

4.4 In a randomised controlled trial of 120 patients treated by platelet-rich plasma (n=60) or hyaluronic acid injections (n=60), mean total WOMAC scores (ranging from 0 to 96 with lower scores indicating better outcomes) improved from 79.6 to 36.5 in the platelet-rich plasma group (p<0.01) and from 75.4 to 65.1 in the hyaluronic acid group (p<0.01) at 6-month follow-up. Improvements were greater in the platelet-rich plasma group (p<0.001). In patients with Kellgren–Lawrence grade 3 osteoarthritis (ranging from 1 to 4 with higher grades indicating worse osteoarthritis), WOMAC scores improved from 79 to 41 in the platelet-rich plasma group and from 85 to 75 in the hyaluronic acid group at 6-month follow-up. Improvements were greater in the platelet-rich plasma group (p<0.01).

4.5 In a non-randomised comparative study of 150 patients treated by platelet-rich plasma (n=50), low-weight hyaluronic acid (n=50) or high-weight hyaluronic acid injections (n=50), the percentages of patients who were satisfied with their treatment were 82% (41/50), 64% (32/50) and 66% (33/50) respectively at 6-month follow-up (p values between groups=0.04).

4.6 In a prospective case series of 65 patients treated by platelet-rich plasma, the time taken for osteoarthritic pain to reoccur in patients with Kellgren–Lawrence grades 1, 2 and 3 osteoarthritis (higher grades indicating worse osteoarthritis) was 9.9, 9.0 and 5.6 months respectively. Pain recurred more quickly in severe arthritis (p=0.037).

4.7 Specialist advisers listed key efficacy outcomes as improvements in pain relief, knee function scores, delaying the need for knee replacements (arthroplasty), and radiographic, MRI or arthroscopic evidence of improvement in osteoarthritis of the knee.

5 Safety

This section describes 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 interventional procedure overview.

5.1 Adverse events including syncope, dizziness, headache, nausea, gastritis, sweating and tachycardia were reported in 33% (17/51) of patients at the time of receiving an initial platelet-rich plasma injection in a randomised controlled trial of 78 patients treated by 1 platelet-rich plasma injection (n=26), 2 platelet-rich plasma injections (n=25) or placebo (n=23) (no further details available).

5.2 Pain and stiffness in the knee, which lasted for up to 2 days, were reported in 14% (7/51) of patients who received a platelet-rich plasma injection in the randomised controlled trial of 78 patients. Mild swelling or pain in the knee, which resolved within 2 weeks, was reported in 63% (41/65) of patients in a prospective case series of 65 patients treated by platelet-rich plasma injections. In the same study, 'mild local heating' in the knee, which resolved within 1 week, was reported in 11% (7/65) of patients.

5.3 Specialist advisers described infection (septic arthritis) as an anecdotal adverse event.

6 Committee comments

6.1 The Committee noted that there were many published trials and also systematic reviews that assessed platelet-rich plasma injections for osteoarthritis of the knee. However, the Committee considered that the heterogeneous patient populations, variations in treatment techniques and inconsistencies in the findings of these studies meant that the evidence was inadequate to be confident about the procedure's efficacy. In making this judgement the Committee was mindful that osteoarthritis of the knee is very common and robust evidence is therefore necessary.

7 Further information

7.1 This guidance requires that clinicians undertaking the procedure make special arrangements for audit. NICE has identified relevant audit criteria and has developed an audit tool (which is for use at local discretion).

Information for patients

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

About this guidance

NICE interventional procedures guidance makes recommendations on the safety and efficacy of the procedure. It does not cover whether or not the NHS should fund a procedure. Funding decisions are taken by local NHS bodies after considering the clinical effectiveness of the procedure and whether it represents value for money for the NHS.

This guidance was developed using the NICE interventional procedures guidance process.

We have produced a summary of this guidance for patients and carers. Tools to help you put the guidance into practice and information about the evidence it is based on are also available.

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Endorsing organisation

This guidance has been endorsed by Healthcare Improvement Scotland.

Accreditation