NATIONAL INSTITUTE FOR HEALTH AND CARE EXCELLENCE

Health Technology Appraisal

Autologous chondrocyte implantation with chondrosphere for treating articular cartilage defects

Final scope

Remit/appraisal objective

To appraise the clinical and cost effectiveness of chondrosphere within its marketing authorisation for treating articular cartilage defects.

Background

Articular cartilage is hyaline cartilage on the joint surfaces of the bone. Articular cartilage defects can be caused by injury (often sports related), or arthritis, or it can occur spontaneously. Cartilage damage may also arise because of instability or abnormal unbalanced pressures in the joint. Damage of the articular cartilage does not heal on its own and can cause symptoms such as pain, swelling, locking and giving way of the joint. In addition, damage to the cartilage and surrounding tissues can cause osteoarthritis and lead to a need for partial or total joint replacement surgery in later life. Cartilage damage can be described by size (area) and graded by depth. Commonly used scoring systems include the international cartilage repair society (ICRS) grading system, and the Outerbridge system.

There are no reliable estimates of the prevalence of symptomatic articular cartilage defects, although it is estimated that around 10,000 people need treatment for cartilage damage every year in the UK.

The aim of treatment is to relieve symptoms such as locking, swelling, and instability, and to improve general mobility. Treatment options include debridement (removal of damaged cartilage), re-establishing the articular surface (microfracture, mosaicplasty and autologous chondrocyte implantation), osteotomy, and joint replacement. Osteotomy and joint replacement are options reserved for larger lesions and those where cartilage repair has failed.

In autologous chondrocyte implantation, healthy chondrocytes are harvested arthroscopically from the affected joint. The cells are cultured in a laboratory and then implanted into the damaged areas of the cartilage. The method for delivering the cells to the damaged area has evolved over time. The number of people with symptomatic cartilage defects suitable for autologous chondrocyte implantation is estimated to be between 200 and 500 people each year in the UK.[1]

NICE technology appraisal 89 does not recommend autologous chondrocyte implantation for the treatment of articular cartilage defects of the knee except

in the context of ongoing or new clinical studies. NICE interventional procedure guidance recommends mosaicplasty (IPG162) and microstructural scaffold insertion without autologous cell implantation for repairing symptomatic chondral knee defects (IPG560) be used with special arrangements for clinical governance, consent and audit or research.

The technology

Chondrosphere (Co.don) is a technique in which the cartilage is developed in vitro. Cultured chondrocytes are seeded into agarose to form stable chondrocyte aggregates (spheroids). These spheroids, or 'microtissues' are induced to form cartilage-like tissue and are grown in vitro for 8 to 10 weeks. The resultant 'chondrospheres' are then transplanted into the defect.

Chondrosphere does not currently have a marketing authorisation in the UK for people with articular cartilage defects. It has been studied in trials in adults with cartilage defects of knee joints.

Intervention(s)	Chondrosphere
Population(s)	People with articular cartilage defects
Comparators	As appropriate for lesion size: • Microfracture (marrow stimulation) • Autologous chondrocyte implantation (subject to ongoing NICE appraisal) • Knee debridement • Mosaicplasty • Best supportive care (non-operative intervention)
Outcomes	The outcome measures to be considered include: • pain • joint function including long-term function • rates of retreatment • activity levels • avoidance of osteoarthritis including joint replacement • adverse effects of treatment • health-related quality of life.

Economic analysis	The reference case stipulates that the cost effectiveness of treatments should be expressed in terms of incremental cost per quality-adjusted life year. The reference case stipulates that the time horizon for estimating clinical and cost effectiveness should be sufficiently long to reflect any differences in costs or outcomes between the technologies being compared. Costs will be considered from an NHS and Personal Social Services perspective.
Other considerations	Guidance will only be issued in accordance with the marketing authorisation. Where the wording of the therapeutic indication does not include specific treatment combinations, guidance will be issued only in the context of the evidence that has underpinned the marketing authorisation granted by the regulator. If the evidence allows consideration will be given to subgroups stratified by duration of symptoms, size and site of lesion, previous exposure to surgical treatment, and for cartilage defects secondary to malalignment.
Related NICE recommendations and NICE Pathways	Related Technology Appraisals: The use of autologous chondrocyte implantation for repairing symptomatic articular cartilage defects of the knee (including a review of TA89). NICE technology appraisals guidance (ID686). Publication expected: September 2017. Autologous chondrocyte implantation (ACI) for the treatment of cartilage injury (review of Technology Appraisal 16) (2005). NICE technology appraisals guidance 89. Under review. Related Interventional Procedures: Microstructural scaffold (patch) insertion without autologous cell implantation for repairing symptomatic chondral knee defects (2016). NICE interventional procedures guidance 560. Mosaicplasty for knee cartilage defects (2006). NICE interventional procedures guidance 162. Related NICE Pathways: Musculoskeletal conditions (2017) NICE pathway http://pathways.nice.org.uk/
Related National	NHS England, Manual for Prescribed Specialised

Policy	Services 2016/17 (published 2016): Chapter 13. https://www.england.nhs.uk/commissioning/wp-content/uploads/sites/12/2016/06/pss-manual-may16.pdf

References

1. NIHR Horizon Scanning Centre (2014) Spheroids of human autologous matrix-associated chondrocytes (chondrosphere) for articular cartilage defects. Birmingham: NIHR Horizon Scanning Centre.