Effect of distraction arthroplasty on osteoarthritic goat models of the articular cartilage

Rizky N. H. Putro, author

Abstrak

Latar belakang: Osteoartritis (OA) adalah kelainan sendi lutut degeneratif tersering, jumlah pasien OA semakin bertambah dengan bertambahnya harapan hidup. Artroplasti distraksi adalah sebuah alternatif yang relatif lebih tidak invasif untuk tatalaksana OA dengan menghilangkan stres mekanis dan mempertahankan tekanan intermiten cairan sendi, sehingga menghentikan siklus kerusakan pada OA. Penelitian ini bertujuan mempelajari perubahan anatomi dan histopatologi setelah artroplasti distraksi pada model hewan osteoartritis.

Metode: Penelitian dilakukan pada 32 lutut kambing (16 kambing) yang terlebih dahulu diinduksi secara mekanis menjadi OA dengan menisektomi lateral. Selama masa penelitian, 6 kambing mati. Artroplasti distraksi dilaksanakan menggunakan fiksasi eksterna pada 10 lutut selama 4 minggu, dan 10 lutut kontralateral dibiarkan, kemudian diperiksa secara anatomis dan histopatologis untuk diperbandingkan mengunakan staging International Cartilage Repair Society (ICRS) dan skoring Osteoarthritis Research Society International (OARSI). Perbedaan anatomis dan histopatologis diuji kemaknaannya menggunakan uji Wilcoxon.

Hasil: Terdapat perburukan secara anatomi dan histopatologi pada lutut yang diberikan perlakuan. Nilai median perbandingan secara makroskopis dengan staging ICRS berbeda bermakna (1,5 vs 2,5; $p < 0,002$). Perbandingan secara histopatologi dengan skoring OARSI berbeda bermakna (6 vs 10; $p < 0,002$).

Kesimpulan: Arthroplasti distraksi pada model OA kambing dalam penelitian ini, tidak memberikan perbaikan, melainkan memperburuk OA. Penelitian lebih lanjut diperlukan untuk memberikan dasar biologis yang kuat dari artroplasti distraksi sebagai terapi alternatif untuk OA.
<hr><i>Background: Osteoarthritis (OA) is the most common knee degenerative disease, the number of OA patients increases along with the increase of life expectancy. Distraction arthroplasty is a less invasive alternatif for OA management by releaving mechanical stress while maintaining intermitten joint fluid pressure changes, thus halting the OA destructive cycle and inducing repair. This study aims to evaluate the anatomical and histopathological changes after distraction arthroplasty on osteoarthritic animal models.

Methods: The study was performed on 32 goat stiffle joint (16 goats) with mechanically induced OA by lateral meniscectomy. During the study 6 goats were decreased. Distraction arthroplasty was performed using external fixation on 10 knees for 4 weeks, and the contralateral knees left untreated. The knees were anatomically and histopathologically examined using International Cartilage Repair Society (ICRS) staging and Osteoarthritis Research Society International (OARSI) scoring. The differences of the anatomical and histopathological changes are tested for significance using the Wilcoxon test.

Results: There was anatomical and histopathological worsening of the OA on treated knees. The anatomical difference assessed using ICRS stage gave median values of 1.5 and 2.5 respectively ($p < 0.002$). The histopathological difference assessed using OARSI scoring was significant (6 vs 10; $p < 0.002$).

Conclusion: Distraction arthroplasty in OA goat models in this study, worsens the OA instead of inducing repair. Further studies are required to find out a convincing biological basis of distraction arthroplasty as an alternative treatment for OA.</i>