ABSTRAK

POTENSI *ALLOGENEIC PLATELET-RICH PLASMA* SEBAGAI TERAPI REGENERATIF PADA HEWAN MODEL OSTEOARTHRITIS

Hillary Yusan Chang
20/459036/KH/10660

Osteoarthritis (OA) merupakan penyakit sendi yang paling umum terjadi di negara maju dan menyebabkan kesulitan dalam menjalankan aktivitas fisik. Prevalensi terjadinya OA pada hewan dilaporkan cukup tinggi pada beberapa spesies misalnya anjing dan kuda. Penanganan penyakit OA hingga saat ini masih terbatas untuk mengatasi gejala dalam jangka pendek atau prosedur operasi penggantian sendi. Metode pengobatan dan terapi pendukung lain oleh karena itu diperlukan. *Platelet-rich plasma* (PRP) adalah produk turunan dari *whole blood* yang diperoleh melalui serangkaian proses sentrifugasi. Kandungan PRP berupa *growth factor* dilaporkan dapat berperan dalam regenerasi jaringan sehingga diduga potensial digunakan sebagai terapi OA. Penelitian ini bertujuan untuk menganalisis potensi *allogeneic* PRP sebagai terapi regeneratif pengobatan osteoarthritis pada hewan model berdasarkan gambaran histologi sendi lutut. Penelitian dilakukan pada 5 kelompok tikus Wistar jantan yang terdiri dari kelompok kontrol sehat (N), kontrol OA (OA), kelompok terinduksi OA dengan pemberian *allogeneic PRP* secara intraartikular 0,2 ml/200 g BB (A); 0,4 ml/200 g BB (B); dan 0,6 ml/200 g BB (C). Sampel sendi lutut ekstremitas kaudal diambil pada hari ke-10, hari ke-17, dan hari ke-24. Sendi lutut tersebut kemudian diproses menjadi preparat histologi dengan pewarnaan *hematoxylin & eosin*, *safranin-O/fast green*, dan imunohistokimia dengan antibodi interleukin-6 (IL-6). Data yang diperoleh dianalisis secara deskriptif kualitatif dan skoring berdasarkan standar penilaian *Osteoarthritis Research Society International* (OARSI). Hasil penelitian menunjukan bahwa pemberian *allogeneic PRP* pada hewan model OA, berdasarkan gambaran histologis yang teramati, mampu mendukung perbaikan permukaan kartilago, terdapat adanya indikasi peningkatan proteoglikan, dan berkurangnya kondrosit positif terhadap IL-6. Kesimpulan dari penelitian ini adalah *allogeneic* PRP berpotensi digunakan sebagai terapi pendukung pada hewan model OA. Penelitian lebih lanjut diperlukan untuk mengungkap lebih dalam mekanisme dan efek lebih lanjut terapi PRP pada kasus OA.

Kata kunci: Femorotibial, OARSI, Osteoarthritis, PRP, Histologi

ABSTRACT

THE POTENTIAL OF *ALLOGENEIC PLATELET-RICH PLASMA* AS A REGENERATIVE THERAPY IN ANIMAL MODELS OF OSTEOARTHRITIS

Hillary Yusan Chang
20/459036/KH/10660

Osteoarthritis (OA) is the most common joint disease in developed countries and causes difficulty in carrying out physical activities. The prevalence of OA in animals is reported to be quite high in several species, for example dogs and horses. Treatment for OA is currently limited to treating symptoms in the short term or joint replacement surgical procedures. Other methods of treatment and supportive therapy are therefore necessary. Platelet-rich plasma (PRP) is a product derived from whole blood obtained through a series of centrifugation processes. The content of PRP in the form of growth factors is reported to play a role in tissue regeneration, so it is thought to have the potential to be used as an OA therapy. This study aims to analyze the potential of allogeneic PRP as a regenerative therapy for the treatment of osteoarthritis in animal models based on the histology of the knee joint. The research was conducted on 5 groups of male Wistar rats consisting of a healthy control group (N), OA control (OA), OA induced group by intra-articular administration of allogeneic PRP 0.2 ml/200 g BW (A); 0.4 ml/200 g BW (B); and 0.6 ml/200 g BW (C). Caudal extremity knee joint samples were taken on the 10^{th} day, 17^{th} day, and 24^{th} day. The knee joint was then processed into a histology preparation with hematoxylin & eosin, safranin-O/fast green staining, and immunohistochemistry with interleukin-6 (IL-6) antibodies. The data obtained was analyzed descriptively qualitatively and scored based on the Osteoarthritis Research Society International (OARSI) assessment standards. The results of the study showed that administration of allogeneic PRP to animal models of OA, based on the observed histological features, was able to support cartilage surface repair, there were indications of increased proteoglycans, and a reduction in chondrocytes positive for IL-6. The conclusion of this study is that allogeneic PRP has the potential to be used as supportive therapy in animal models of OA. Further research is needed to reveal further mechanisms and effects of PRP therapy in OA cases.

Keywords: Femorotibial, OARSI, Osteoarthritis, PRP, Histology