

Pengaruh pajanan sinar x image intensifier c-arm terhadap potensi osteogenik : perbandingan sel punca mesenkimal jaringan adiposa dan sel punca mesenkimal sumsum tulang = Clinical and radiological outcome of transforaminal lumbar interbody fusion using combination of hydroxyapatite and demineralized bone matrix compared with autograft on lumbar spondylosis cases

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Abstrak

ABSTRAK

Pendahuluan. Sel punca mesenkimal merupakan salah satu alternatif pengobatan yang menjanjikan, termasuk dibidang orthopedi. Sumsum tulang masih menjadi pilihan utama sumber sel punca mesenkimal, namun dikarenakan jumlah sel punca mesenkimal yang sedikit, prosedur pengambilan yang invasif dan nyeri, jaringan adiposa mulai digunakan sebagai alternatif dengan kemampuan yang sebanding. Tindakan minimal invasive pada implantasi sel punca pada kasus tulang belakang membutuhkan alat bantu image intensifier C-arm yang menyebabkan sel punca teradiasi sinar X. Penelitian ini bertujuan mengetahui efek pajanan sinar-x c-arm terhadap viabilitas dan potensi osteogenik sel punca mesenkimal dan membandingkan antar kelompok donor. Bahan dan Metode. Penelitian ini merupakan penelitian eksperimental yang dilaksanakan di UPT-TK Sel Punca RSCM januari 2016-februari 2017 . Sampel penelitian adalah sel punca mesenkimal jaringan adiposa dan sumsum tulang pasca kriopreservasi. Sel punca pasca thawing dan propagasi dilakukan pajanan sinar X C-arm dengan berbagai dosis yang dilakukan di Instalasi Bedah Pusat RSUPN Ciptomangunkusumo. Sel punca lalu dikultur dan dilakukan difenrensiasi osteogenik. Peneliti melakukan analisis viabilitas, waktu penggandaan populasi dan potensi osteogenik dengan pewarnaan alizarin red. Seluruh data dianalisis dengan SPSS 20. Hasil. Tidak terdapat perbedaan viabilitas sel punca mesenkimal jaringan adiposa dan sumsum tulang pre radiasi, pasca radiasi serta pasca radiasi dan kultur pada dosis radiasi yang sama $p>0,05$. Tidak terdapat perbedaan potensi osteogenik yang bermakna antara sel punca mesenkimal jaringan adiposa dan sumsum tulang $p>0,05$. Terdapat penurunan waktu penggandaan populasi sel punca mesenkimal jaringan adiposa pada dosis radiasi $> 5,94$ mSv. Kesimpulan. Viabilitas dan potensi osteogenik sel punca mesenkimal sumsum tulang dan jaringan adiposa tidak dipengaruhi oleh paparan sinar X hingga 15,30 mSv. Sel punca mesenkimal jaringan adiposa menunjukkan waktu penggandaan populasi yang lebih pendek pada dosis yang lebih besar. Sel punca mesenkimal jaringan adiposa dan sel punca mesenkimal sumsum tulang memiliki potensi osteogenik yang sebanding

ABSTRACT

Introduction. Mesencymal stem cells MSCs is a promising alternative treatment in medicine, including in orthopedic. Bone marrow is still the main source for MSCs. Because of relative less stem cell number, limited source, pain and invasive procedure to obtain the bone marrow, adipose tissue is also considered as a valuable source of MSCs with equal potency. Minimally invasive MSC injections in spine need image intensifier C arm as guidance that potentially influence the cell viability and osteogenic potency. The aim of this study is to evaluate the radiation effects from C arm on the viability and osteogenicity among two types

of MSCs. Material and Methods. This experimental study was held on Stem Cell Medical Technology Integrated Service Unit Cipto Mangunkusumo Hospital January 2016 February 2017 . Study samples were Adipose Tissue derived MSCs AT MSCs and Bone Marrow MSCs BM MSCs , which had undergone cryopreservation. After thawing and propagation process, we gave x ray radiation with a variety of doses to MSCs at the Operation Theater Cipto Mangunkusumo Hospital. After the radiation, MSCs was took back to the laboratory for culture and osteogenic differentiation. Author analyzed the viability, population doubling time, and osteogenic potential by alizarin red stain. All data were analyzed using SPSS 20. Results. There was no significant difference among MSCs groups in term of cell viability before radiation, after radiation, and after radiation and culture $p > 0.05$. There was also no significant difference of the osteogenic potential between the two MSCs groups $p > 0.05$. However, there was a reduction in population doubling time of AT MSCs radiated with more than 5.94mSv radiation dose. Conclusions. Viability and osteogenic potential of either AT MSCs or BM MSCs were not affected by x ray radiation up to 15.3 mSV. AT MSCs showed a shorter population doubling time when given larger radiation dose. AT MSCs and BM MSCs had equal osteogenic potency.