

INTISARI

EKSPRESI bFGF PADA PROSES KESEMBUHAN FRAKTUR OS FEMUR TIKUS PUTIH SETELAH PEMBERIAN EKSTRAK MEDIA PENUMBUH SEL PUNCA MESENKEIMAL ASAL TALI PUSAT MANUSIA SECARA INJEKSI DAN TOPIKAL

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Ekstrak Media Penumbuh Sel Punca Mesenkimal (EMPSPM) mengandung *growth factor* dan sitokin. Proses kesembuhan fraktur membutuhkan substansi biologis salah satunya adalah *Basic Fibroblast Growth Factor* (bFGF). Penelitian ini bertujuan untuk melihat efek pemberian EMPSPM secara injeksi dan topikal terhadap proses kesembuhan fraktur pada tikus (*Rattus norvegicus*) serta imunolokalisasi bFGF pada tiap fase kesembuhan fraktur. Fraktur os femur dexter pada 54 ekor tikus dibuat dengan operasi sesuai prosedur dalam kondisi steril. Setelah pembuatan fraktur, tikus dibagi menjadi 2 kelompok yaitu kelompok injeksi NaCl fisiologis 0,1 ml/kg BB IM sebagai kontrol dan kelompok perlakuan injeksi EMPSPM 0,1 ml/kg BB IM dan krim EMPSPM 10 %, satu kali pada hari ke-1, 2, 3, 7, 14, 21, 28, 35, dan 60 pasca operasi. Koleksi foto mikrograf dan sampel os femur dexter dilakukan, sampel tulang kemudian difiksasi dalam larutan *Bouin*. Pembuatan preparat histologi dilakukan dengan metode parafin, blok jaringan dipotong dengan ketebalan 5 μ m, kemudian dilakukan pewarnaan *Hematoksilin-eosin*, *Mallory anniline blue*, dan pewarnaan imunohistokimia dengan antibodi primer *rabbit anti-bFGF* dan kit *Starr Trek Universal*. Hasil foto radiograf dan pewarnaan jaringan kemudian dianalisis secara deskriptif dan kuantitatif. Pembentukan *soft callus* diikuti pembentukan *hard callus* terjadi lebih cepat pada kelompok injeksi EMPSPM 0,1 ml/kg BB IM dan krim EMPSPM 10 % dibanding kelompok kontrol. Pertumbuhan *soft callus* yang kemudian menjadi *hard callus* lebih cepat pada kelompok injeksi EMPSPM 0,1 ml/kg BB IM dan krim EMPSPM 10 % dibanding kelompok kontrol. Imunoreaktivitas bFGF terdeteksi pada sel radang, kondrosit, osteosit, fibrosit, osteoblas, dan osteoklas. Terdapat perbedaan yang signifikan pada sel imunoreaktif bFGF pada hari ke-1, 2, 7, 14, 21, 28, 35, dan 60 pasca operasi pada kelompok kontrol dengan kelompok injeksi EMPSPM 0,1 ml/kg BB IM dan krim EMPSPM 10 %. Injeksi EMPSPM 0,1 ml/kg BB IM dan krim EMPSPM 10 % pada kasus fraktur os femur tikus mampu mempercepat kesembuhan fraktur melalui peningkatan pertumbuhan kalus. *Basic Fibroblast Growth Factor* terdeteksi pada seluruh fase kesembuhan fraktur ditandai dengan intensitas yang kuat pada kelompok injeksi EMPSPM 0,1 ml/kg BB IM dan krim EMPSPM 10 % dibanding kontrol.

Kata kunci: bFGF, EMPSPM, Fraktur, Krim dan Injeksi, Kalus, Imunohistokimia,

ABSTRACT

bFGF EXPRESSION IN FRACTURE OS FEMUR HEALING RATS INDUCED BY CREAM AND INJECTION OF HUMAN UMBILICAL MESENCHYMAL STEM CELL CONDITIONED MEDIUM

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Mesenchymal Stem Cell Conditioned Medium (MSC-CM) contain growth factors and cytokines. The fracture healing process requires biologic substances, such as Basic Fibroblast Growth Factor- β (bFGF). The aim of this study are to determine the effect of MSC-CM which was gifted topically and injection simultaneously of the fracture healing process in rats (*Rattus norvegicus*) and also immunolocalization of bFGF in each fracture healing phase. The fracture of dexter femur in 54 rats were made surgically under sterile condition. After the fracture were formed, the rats were divided into two groups, i.e. control group that were injected intramuscularly with physiological NaCl 0.1 ml / kg body weight and treatment group that were injected intramuscularly with MSCGME 0.1 ml / kg body weight and smeared topically in 1st, 2nd, 3rd, 7th, 14th, 21st, 28th, 35th, and 60th day post-surgery. Micrograph photo collection of samples were performed, bone samples then were fixed in Bouin's solution. The histology preparations was carried out using paraffin method and the tissue blocks were cut with 5 μ m thickness. The piece of tissue blocks then were stained using Hematoxylin-eosin staining, Mallory aniline blue, and immunohistochemical staining with rabbit primary antibody anti-bFGF and Universal Starr Trek kits. The radiographic photograph and tissue staining then were analyzed descriptively and quantitatively. The formation of soft callus which followed by hard callus formation was faster in the treatment group than control group. The growth of soft callus which then became hard callus was also faster in the treatment group than control group. The immunoreactivity of bFGF was detected in inflammatory cells, chondrocytes, osteocytes, fibrocytes, osteoblast, and osteoclast. There were significant differences in bFGF immunoreactive cells on days 1, 2, 7, 14, 21, 18, 35, and 60 post-surgery between control and treatment group. The simultaneously administration between intramuscularly injection of MSC-CM 0.1 ml / kg body weight and cream topical of 10% MSC-CM in rats femoral fracture was able to accelerate the fracture healing through improvement callus growth. The bFGF was detected in all phase of fracture healing which were stronger characterized in treatment group than control group.

Keyword: bFGF, MSC-CM, Fracture, Cream and Injection , Callus, Immunohistochemical.