Pengaruh pemberian conditioned medium sel punca mesenkimal asal tali pusat manusia terhadap regenerasi saraf perifer tikus yang mengalami cedera = Effects of giving conditioned medium of human umbilical cord mesenchymal stem cell towards the regeneration of peripheral nerve of injured rats

Ria Margiana, author

Abstrak

Latar belakang: Cedera saraf perifer merupakan komplikasi trauma ekstremitas pada 3-10 pasien yang menyebabkan kelainan fungsi normal saraf. Terapi sel punca mesenkimal MSC telah banyak dikembangkan untuk regenerasi sel dan jaringan. Conditioned medium CM yang berasal dari tali pusat MSC-TP manusia dalam regenerasi saraf perifer belum banyak diketahui. Penelitian ini bertujuan untuk membandingkan perbaikan fungsi dan struktur saraf perifer.
Metode: Penelitian ini merupakan penelitian eksperimental menggunakan 36 ekor tikus putih Rattus norvegicus berumur 2-3 bulan dengan berat badan berkisar 250-300 g. Penelitian dilakukan di laboratorium RSCM-FKUI dan Pusat Penelitian dan Pengembangan selama 3 tahun. Hewan coba dibagi menjadi 3 kelompok, yaitu kelompok kontrol atau sham SH , terapi standar ST , dan perlakuan conditioned medium MSC-TP CM . Penelitian dibagi menjadi dua jangka waktu, yaitu jangka pendek 7 hari pasca operasi HPO dan jangka panjang 70 HPO . Pemeriksaan yang dilakukan adalah analisis berjalan, elektrofisiologi dan imunohistokimia.
Hasil: Hasil pemeriksaan fungsi motorik SFI, TFI, PFI, Q1-Q4 dan TOA , kelompok CM menunjukkan kesembuhan yang lebih cepat dibanding kelompok ST. Hasil gambaran elektrofisiologi, kelompok CM memiliki kecepatan konduksi saraf NCV lebih baik dibandingkan kelompok ST. Berdasarkan gambaran histologis, pewarnaan HE menunjukkan jumlah sel saraf yang lebih banyak pada kelompok CM dibanding kelompok ST pada hari ke-7 HPO dan 70 HPO. Pewarnaan TB menunjukkan diameter selubung mielin yang lebih tebal pada kelompok CM dibandingkan kelompok ST pada hari ke-7 HPO dan 70 HPO. Marker CD34 menunjukkan jumlah pembuluh darah memiliki hasil pada kelompok CM yang mendekati kelompok SH pada hari ke-7 HPO dan 70 HPO. Marker S100 menunjukkan persentase yang lebih banyak pada kelompok CM dibanding kelompok ST pada hari ke-7 HPO dan 70 HPO.
Kesimpulan: CM MSC-TP mampu memberikan pengaruh terhadap perbaikan struktur dan fungsi saraf perifer pascacedera saraf pada kelompok CM hari ke-7 HPO.
<hr />
Background Peripheral nerve injury is a complication of extremities trauma in 3 10 of patients causing the dysfunction of nerve. Mesenchymal stem cell conditioned medium MSC CM is used as therapy to regenerate cells and tissues. However, the ability of human umbilical cord derived mesenchymal stem cell conditioned medium HU MSC CM in regenerating peripheral nerves has not been known. This research aimed to compare the functional and structural repairs of peripheral nerve.
Method This study is an experimental research using 36 rats of Sprague Dawley Rattus norvegicus strain aged 2 3 months with body weight ranging from 250 to 300 grams. The research was conducted in various laboratories at RSCM FKUI and the Center for Health Research and Development for three years. The

experimental animals were divided into 3 groups, namely the control group SH , the standard therapy treatment group ST , and the conditioned medium treatment group CM . The research was divided into two stages consisting of a short term research of 7 days of post surgery PS and a long term research 70 PS . The examinations performed were in the form of motor function for the walking analysis, electrophysiology, and immunohistochemistry.
Result Based on the examination of motor function SFI, TFI, PFI, Q1 Q4, and TOA , the CM group showed faster recovery compared to the ST group. Based on the electrophysiological images, the CM group was able to have a better nerve conduction velocity NCV compared to the ST group. Based on the histological images, HE staining showed a higher amount of all nerve cells in the CM group compared to the amount in the ST group on the 7th day of PS and 70th day of PS. TB staining showed a thicker myelin sheath diameter in the CM group than that in the ST group on the 7th day of PS and 70th day of PS. CD34 marker showed that the number of blood vessels of the CM group was close to that of the SH group on the 7th day of PS and 70th day of PS. S100 marker had a higher percentage in the CM group compared to the ST group on the 7th day of PS and 70th day of PS.
Conclusion HU MSC CM is able to affect the functional and structural repairs of the peripheral nerve after nerve injury in the CM group on the 7th day of PS.