Užití biologických materiálů k náhradě tkání v plastické chirurgii

Abstrakt v angličtině

Background: Biological meshes are biomaterials consisted of extracellular matrix and used in surgery particularly for hernia treatment or thoracic wall reconstruction. They are capable of vascularization, that decreases risk of infection, expecially when used in contaminated fields. This study compared the strength of incorporation and biocompatibility of two porcine-derived grafts (cross-linked and non-cross-linked) in a rat hernia model. In addition, we hypothesized that combination of extracellular matrices with autologous mesenchymal stem cells used for hernia repair would result in increased vascularization and increased strength of incorporation.

Methods: Standardized 2 x 4 cm fascial defect was created in 42 Wistar rats and repaired with a cross-linked or a non-cross-linked graft either enriched or non-enriched with stem cells. The rats were sacrificed 3, 6 and 12 months later. The strength of incorporation, vascularization, cellular invasion, foreign body reaction and capsule formation were evaluated.

Results: Comparison of stem cell enriched and non-enriched groups showed no significant differences in the capsule thickness, foreign body reaction, cellularization or vascularization. In the non-cross-linked extracellular matrix, the strength of incorporation was significantly higher in the stem cell group than in the acellular group. In comparison of non-stem cell enriched grafts, the average level of cellularization and vascularization was significantly higher in the non-cross-linked grafts than in the cross-linked grafts at 6 months. 3 months after implantation non-cross-linked grafts showed significantly higher strength of incorporation; at 6 and 12 months was the difference insignificant.

Conclusion: The results of our study suggest that non-cross-linked grafts are more biocompatible and allow a more rapid and higher degree of cellular penetration and vascularization, resulting in stronger attachment to the tissues. Seeding of biological meshes with stem cells does not significantly contribute to their increased vascularization. In cross-linked materials it does not ensure increased strength of incorporation, in contrast to non-cross-linked materials where the difference is significant.