

Effect of preservation methods on the performance of bovine pericardium graft in a rat model.

ABSTRACT

This study investigates the effect of preservation methods on the performance of bovine parietal pericardium grafts in a rat model. Mid-ventral full thickness abdominal wall defects of 3x2.5 cm in size were created in 90 male Sprague-Dawley rats (300-400 g), which were divided into three groups of 30 rats each. The abdominal defects of group one and two were repaired with lyophilized and glycerolized bovine pericardium grafts, while the defects of group three were repaired with expanded polytetrafluoroethylene (ePTFE) Mycro Mesh as a positive control. Another group of 30 rats underwent sham operation and was used for comparison as negative control. Each group of rats (n=30) was divided into five subgroups (n=6) and killed at 1, 3, 6, 9 and 18 weeks post-surgery for gross and morphological evaluations. The rats tolerated the surgical procedure well with a total mortality of 0.05%. No serious post-operative clinical complications or signs of rejection were encountered. Adhesions between the grafts and the underlying visceral organs observed in the study were mostly results of post-surgical complications. Glycerol preservation delayed degradation and replacement of the grafts, whereas lyophilization caused early resorption and replacement of the grafts. The glycerolized grafts were replaced with thick dense fibrous tissue, and the lyophilized grafts were replaced with thin loose fibrous tissue. The healing characteristic of the bovine pericardium grafts was similar to those of the sham-operated group, and quite different from those of the ePTFE Mycro Mesh. The outcome of the present study confirmed the superiority of glycerolized bovine pericardium grafts over its lyophilized counter part.

Keyword: Animal models; Glycerol; Grafts; Heart; Heart diseases; Heart transplant; Pericardium; Preservation.