

Platelet Rich Fibrin Augmented Versus Non-Augmented Glycerolized Bovine Pericardium and Polypropylene Mesh for Repairing of Large Abdominal Wall Defects

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Abstract:

This study aimed to evaluate the use of glycerolized bovine pericardium (GBP) compared to polypropylene mesh (PPM) in repairing of large abdominal wall defects in animal model, and to investigate the role of platelet rich fibrin (PRF) in promoting this repair. Fresh bovine pericardium collected from local abattoir were processed and preserved in 99.5% glycerol. PRF matrix was harvested from fresh autologous blood (10 ml) after centrifugation. Full-thickness, mid-ventral abdominal wall defects (6 × 10 cm) were surgically created in 36 healthy goats (9 goats/group) and were repaired with an equal size of GBP, PPM, GBP-PRF, or PPM-PRF. Qualitative and gray scale quantitative ultrasonography were adopted at day 1, 1, 2, 3, 4, 8 and 12 weeks post-implantation. Three goats per group were slaughtered at 4, 8 and 12 weeks post-implantation for further gross, histopathological and tensiometric (tensile strength, load at failure and strain %) evaluations. Ultrasonography revealed significant ($P < 0.05$) improvement of implant gray scale, low subcutaneous edema and reduction of skin implant distance in PRF-augmented groups. Besides, a substantial improvement of connective tissue covering, implant incorporation, new blood vessels formation, and reduction of the inflammatory cells infiltrations were observed. Tensiometric parameters were improved in GBP-PRF group compared to the other groups. In conclusion, the obtained results not only proved the superiority of GBP over PPM, but also the advantage of PRF-augmented over non-augmented implants in treatment of large abdominal wall defects. Ultrasonographic analysis provided a satisfactory tool to evaluate the healing process of the abdominal wall defects.

Keywords: Platelet Rich Fibrin, Glycerolized Bovine Pericardium, Polypropylene mesh, Hernioplasty, Hernia.