Platelet-rich fibrin versus albumin in surgical wound repair: a randomized trial with paired design.

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Abstract:

OBJECTIVE: To study the effects of autologous platelet-rich fibrin (PRF) versus human albumin on incisional wound breaking strength and subcutaneous collagen deposition in patients undergoing laparoscopic cholecystectomy in a randomized trial.

SUMMARY BACKGROUND DATA: Platelet peptidic growth factors may stimulate collagen synthesis and tissue repair.

METHODS: One expanded polytetrafluoroethylene (ePTFE) tube was inserted subcutaneously from the edge of each of the two 10-mm trocar incisions in 51 patients. Treatment with PRF prepared from the patient's own blood or human albumin was randomized to respective wound site by concealed allocation. On postoperative day 10, breaking strength of the incisional wounds as well as the collagen concentration, type I procollagen mRNA, type III procollagen mRNA, matrix metalloproteinase-1 mRNA, and fibroblast density in the ePTFE tubes were determined. All analyses were assessor-blinded. The trial was registered in the Current Controlled Trials Registry (ISRCTN34481461).

RESULTS: Local PRF had no significant effect on incisional wound-breaking strength. In the ePTFE tubes, PRF treatment decreased collagen concentration by 24% (P=0.046) and type I procollagen mRNA level by 29% (P=0.003), but had no significant impact on type III procollagen mRNA, matrix

metalloproteinase-1 mRNA or fibroblast infiltration. The profibrotic transforming growth factor-beta1 level increased (P<0.0001) 2-fold with PRF. Collagen concentration in albumin-treated ePTFE tubes correlated with breaking strength of the skin incisions (rs=0.48, P=0.03).

CONCLUSIONS: PRF did not improve wound strength significantly compared with albumin but suppressed subcutaneous collagen synthesis and deposition during early repair of surgical wounds in humans. Furthermore, deposition of reparative collagen in the subcutaneous ePTFE tube model partly predicted the breaking strength of an incisional skin wound.