Assessment of alternative tissue approximation techniques for laparoscopy.

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Abstract:

Objective: To investigate the feasibility and results of applying alternative techniques of tissue approximation for experimental urothelial re-anastomosis in an open and laparoscopic setting. Materials and methods: The study was carried out in two phases; in phase 1, an open porcine ureteric re-anastomosis was performed using gelatin/resorcin/formaldehyde (GRF) glue, fibrin glue or potassium-titanyl-phosphate laser tissue-welding with a fluorescein-doped human albumin solder. The anastomoses were assessed both immediately, by leak pressure, and by the operating time, upper tract urodynamic studies and light and scanning electron microscopy, 6 weeks after surgery. In phase 2, the best technique from phase 1 was compared with sutured controls for porcine retroperitoneoscopic dismembered pyeloplasty, using the same assessment criteria. Results: In phase 1, GRF glue produced adhesion which was insufficiently flexible to withstand rotation of the anastomosis and this technique was therefore abandoned. Fibrin-glued anastomoses withstood leak pressures equal to those from laser-welding (P=0.91) and gave similar changes in maximum pressure with a Whitaker test at 6 weeks (P=0.30), but were superior in requiring a shorter operating time (P=0.02) and in their electron and light microscopic appearances. In phase 2, fibrin glue gave similar changes in maximum pressure with a Whitaker test to those from polyglactin 910 sutures (P=0.51) but withstood higher leak pressures (P=0.01), had a shorter operating time (P=0.01) and had superior electron and light microscopic appearances. Conclusion: Fibrin glue produced effective experimental laparoscopic pelvi-ureteric anastomoses within less operating time than did sutured controls. Such anastomoses withstood supra- physiological pressures, with no evidence of

functional obstruction and with a more favourable histological result after 6 weeks. Laparoscopic evaluation of this modality in a clinical setting is now justified.