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Title: COMPARATIVE STUDY OF HEALING RESPONSES TO VARIOUS MATERIALS SUBJECTED TO EPISODIC STRESSES IN THE RABBIT PELVIS

Aims of Study:

Several materials are currently used to construct urethral slings. The goal of this study was to analyze the inflammatory and healing responses to 5 sling materials, and the possible effect of episodic stress on these responses.

Methods:

Materials included a high porosity silicone coated polyester mesh (SPM), a high porosity polypropylene mesh (PPM), a low porosity gelatin coated Dacron™ weave (GDW), human fascia graft (HFG) and human dermal graft (HDG) with 4 paired samples (4 stressed and 4 non-stressed) evaluated for each material. 120 samples were implanted on the inner aspect of the abdominal wall in the pelvis of 30 New Zealand white rabbits. Stress was created by attachment of the implant to Cooper's ligament under tension. Animals were sacrificed at 2, 4 and 15 week intervals and submitted for histological analysis.

Results:

Inflammation within and around the high porosity materials (SPM and PPM) resolved and nearly complete incorporation by newly deposited collagen and neovasculature was achieved by 4 weeks. Inflammation and a chronic foreign body reaction persisted in the low porosity material (GDW) after 15 weeks, and collagen deposition was primarily limited to an encapsulation layer. Both tissue grafts were nearly completely resorbed with no evidence of collagen deposition about the implants.

Conclusions:

High porosity materials (SPM and PPM) demonstrated a rapid resolution of inflammation and incorporation by surrounding tissues. The woven Dacron (GDW) with very low porosity elicits a profound foreign body reaction with inflammation remaining at 15 weeks. The nearly complete resorption of HFG and HDG by 15 weeks and absence of newly deposited collagen raise some question as to the long term efficacy of using a donor graft material for slings. No difference in response was noted in the stressed vs. non-stressed samples of all materials. Synthetic materials with a large porosity appear to be better suited for use in constructing slings.

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