Biomechanical analyses of mesh fixation in TAPP and TEP hernia repair.

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Abstract:

BACKGROUND: Reliable laparoscopic fixation of meshes prior to their fibrous incorporation is intended to minimize recurrences following transabdominal preperitoneal hernia repair (TAPP) and totally extraperitoneal repair (TEP) repair of inguinal hernias. However, suture-, tack- and staple-based fixation systems are associated with postoperative chronic inguinal pain. Initial fixation with fibrin sealant offers an atraumatic alternative, but there is little data demonstrating directly whether fibrin-based mesh adhesion provides adequate biomechanical stability for repair of inguinal hernia by TAPP and TEP.

METHODS: Using a newly developed, standardized simulation model for abdominal wall hernias, sublay repairs were performed with six different types of commercially available hernia mesh. The biomechanical stability achieved, and the protection afforded by the mesh-hernia overlap, were compared for three different techniques: nonfixation, point-by-point suture fixation, and fibrin sealant fixation.

RESULTS: Mesh dislocation from the repaired hernia defect was consistently seen with nonfixation. This was reliably prevented with all six mesh types when fixed using either sutures or fibrin sealant. The highest stress resistance across the whole abdominal wall was found following superficial fixation with fibrin sealant across the mesh types. There was a highly statistically significant improvement in fixation stability with fibrin sealant versus fixation using eight single sutures (p =

0.008), as assessed by the range of achievable peak pressure stress up to 200 mmHg.

CONCLUSIONS: To ensure long-term freedom from recurrence, intraoperative mesh-hernia overlap must be retained. This can be achieved with fibrin sealant up to the incorporation of the mesh - without trauma and with biomechanical stability.