Mesh fixation in laparoscopic incisional hernia repair: Glue fixation provides attachment strength similar to absorbable tacks but differs substantially in different meshes.

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Publication Date: 2011

Abstract:

Background Laparoscopic ventral hernia repair has gained popularity among minimally invasive surgeons. However, mesh fixation remains a matter of discussion. This study was designed to compare noninvasive fibrin-glue attachment with tack fixation of meshes developed primarily for intra-abdominal use. It was hypothesized that particular mesh structures would substantially influence detachment force. Study Design For initial evaluation, specimens of laminated polypropylene/polydioxanone meshes were anchored to porcine abdominal walls by either helical titanium tacks or absorbable tacks in vitro. A universal tensile-testing machine was used to measure tangential detachment forces (TF). For subsequent experiments of glue fixation, polypropylene/polydioxanone mesh and 4 additional meshes with diverse particular mesh structure, ie, polyvinylidene fluoride/polypropylene mesh, a titanium-coated polypropylene mesh, a polyester mesh bonded with a resorbable collagen, and a macroporous condensed PTFE mesh were evaluated. Results TF tests revealed that fibrin-glue attachment was not substantially different from that achieved with absorbable tacks (median TF 7.8 Newton [N], range 1.3 to 15.8 N), but only when certain open porous meshes (polyvinylidene fluoride/polypropylene mesh: median 6.2 N, range 3.4 to 10.3 N; titanium-coated polypropylene mesh: median 5.2 N, range 2.1 to 11.7 N) were used. Meshes coated by an anti-adhesive barrier (polypropylene/polydioxanone mesh: median 3.1 N, range 1.7 to 5.8 N; polyester mesh bonded with a resorbable collagen: median 1.3 N, range 0.5 to 1.9 N), or the condensed PTFE mesh (median 3.1 N, range 2.1 to 7.0 N) provided a significantly

lower TF ($p < 0.01$). Conclusions Fibrin glue appears to be an appealing noninvasive option for mesh fixation in laparoscopic ventral hernia repair, but only if appropriate meshes are used. Glue can also serve as an adjunct to mechanical fixation to reduce the number of invasive tacks.