# Self-adhesive mesh in open inguinal hernia repair, how does it compare to conventional suture fixation?

Ali W & Nugud O

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# Introduction

Lichtenstein tension-free mesh repair has been the standard practice in open inguinal hernia repair for many years. The procedure involves suture fixation of the mesh via an anterior approach to the inguinal canal. It is hypothesised that this invasive fixation contributes to the development chronic postoperative inguinal pain (CPIP), a condition which can cause significant morbidity.

A sound repair should restore the groin anatomy whilst minimising recurrence and not adversely affecting the patient quality of life. Considering the large number of these operations performed each year, reducing complications such as chronic postoperative pain will have a significant impact on healthcare resources.

The introduction of anatomical self-adhesive meshes such as Parietx ProGrip<sup>TM</sup> addresses this concern in theory by obviating the need for mesh fixation. This mesh is a macro porous polyester mesh that utilizes polylactic acid micro grips (PLA) to aid placement within 60 seconds<sup>1</sup> without the need for additional fixation. The manufacturer does suggest, however, that additional fixation is left to the discretion of the operating surgeon.

We conducted a review of the literature to evaluate the reported outcomes of using this mesh in open inguinal hernia repair.

#### Methods

We conducted a PUBMED/MEDLINE search using the search words "Self-adhesive mesh", "Lichtenstein repair", "Open inguinal hernia repair" and "Self-gripping mesh" .We looked primarily at the outcomes of postoperative pain and recurrence. The result highlighted five well-structured meta-analyses and several RCTs and retrospective reviews.

#### Results

In a retrospective review of 211 patients who underwent open inguinal hernia repair with self-adhesive mesh, Tarchi P et al reported a recurrence rate of 0.5% at 1 year and 2.4% at 2 years. They incidence of chronic pain was less than 3%. There were no cases of seroma, testicular complications or mesh infection at 1, 2 and 3-year follow-up. The report highlighted the shorter operative duration with no effect on recurrence rates

as a point in favour of self-adhesive mesh. The authors acknowledged the limitation of the study design and the need for randomised trials to address the issue.<sup>8</sup> A few other small non-randomised trials draw similar conlusions.9

A randomised blinded trial from the Danish Multicentre DANGRIP Study Group allocated 163 vs 171 patients to selfadhesive and suture fixation respectively. There were no significant differences between the groups in postoperative complications (33.7 versus 40.4 %; P = 0.215), rate of recurrent hernia within 1 year (1.2 % in both groups) or quality of life. The 12 month prevalence of moderate or severe symptoms was 17.4 and 20.2% respectively (P = 0.573).

The study concluded that the avoidance of suture fixation using a self-gripping mesh was not accompanied by a reduction in chronic symptoms after inguinal hernia repair. 5

The FinnMesh trial is a randomised multicentre trial from Finland that Compared glue fixation, self-gripping mesh, and suture fixation of mesh. 625 patients were randomised to cyanoacrylate glue (Histoacryl, n = 216), self-gripping mesh (Parietex ProGrip, n = 202), or conventional non absorbable sutures (Prolene 2-0, n = 207) There was no significant differences postoperatively in pain response or need for analgesics between the study groups at 1 year follow up. The mean operative duration was lower in the self-adhesive mesh group.6

The HIPPO trial is a randomised double-blinded trial of 165 patients. The reported hernia recurrence rate after 24 months was 2.4% for the ProGrip mesh and 1.8% for the sutured mesh (P = 0.213).

The incidence of CPIP was 7.3% at 3 months declining to 4.6% at 24 months and did not differ between both groups. <sup>7</sup> The mean duration of surgery was significant shorter with the ProGrip mesh (44 vs 53 minutes, P < 0.001).

In a systematic review of 7 studies comparing self-gripping versus sutured mesh for inguinal hernia repair totalling 1353 patients, Zhang C et al found no difference in recurrence (risk difference -0.02 [95% confidence interval -0.07 to 0.03], P = 0.40) or chronic pain (risk difference -0.00 [95% confidence interval -0.01 to 0.01], P = 0.57).<sup>2</sup> This review found no difference in wound infection, hematoma, and seroma

formation. Self-adhesive mesh was again associated with a shorter mean operative duration. In its conclusion, the authors surmised that both mesh types are comparable in outcome but further long term analysis might be needed.

Pandanaboyana S published a meta-analysis of 5 RCTs and 1170 patients, that also found no significant difference in recurrence or chronic pain. Wound infection was lower in the self-gripping mesh group compared to sutured mesh but this was not statistically significant (risk ratio (RR) 0.57, 95% confidence interval 0.30-1.06, P = 0.08). The duration of operation was significantly shorter with self-gripping mesh compared to sutured mesh with a mean difference of -5.48 min [-9.31, -1.64] Z = 2.80 (P = 0.005).<sup>3</sup>

In another meta-analysis, Li J et al included 5 RCTs and 2 prospective comparative studies and 1353 patients. Statistically, there was no difference in the incidence of chronic pain [odds ratio = 0.74, 95% confidence interval (CI) (0.51-1.08)]. There was no statistical difference in the incidence of acute postoperative pain [odds ratio = 1.32, 95% CI (0.68-2.55)], hematoma or seroma [odds ratio = 0.89, 95% CI (0.56-1.41)], wound infection [risk difference = -0.01, 95% CI (-0.02 to 0.01)], and recurrence [risk difference = 0.00, 95% CI (-0.01 to 0.01)]. The self-gripping mesh group was associated with a shorter operating time (1-9 minutes).<sup>10</sup>

In Ismail A et al's meta-analysis of 12 randomized controlled trials and 5 cohort studies, 3722 patients were included in the final analysis. The two groups, using self-gripping mesh or sutured mesh fixation, did not differ significantly in terms of recurrence rate (odds ratio = 0.66, 95% confidence interval 0.18-2.44; P = 0.54) or postoperative chronic groin pain (odds ratio = 0.75, 95% confidence interval 0.54-1.05; P = 0.09). The operative time was less in the self-gripping mesh group (mean difference = -7.85, 95% confidence interval -9.94 to -5.76; P < .0001). There were comparable risks between self-gripping mesh and sutured mesh fixation groups in terms of postoperative infection (odds ratio = 0.81, 95% confidence interval 0.53-1.23; P = 0.32), postoperative hematoma (odds ratio = 0.97, 95% confidence interval 0.7-1.36; P = 0.9), and urinary retention (odds ratio = 0.66, 95% confidence interval 0.18-2.44; P =0.54).11

A more recent meta-analysis including 10 RCTs and 2541 patients also draws similar conclusions, with no significant difference in the incidence of chronic pain (odds ratio = 0.93; 95% confidence interval, 0.74-1.18), recurrence (odds ratio = 1.34; 95% confidence interval, 0.82-2.19), or foreign body sensation (odds ratio = 0.82; 95% confidence interval, 0.65-1.03).<sup>4</sup> The mean operating time was significantly shorter (odds ratio = -7.58; 95% confidence interval, -9.58 to -5.58) in the self-gripping mesh group which is consistent with the reported literature.

#### Discussion

Open inguinal hernia repair is a routinely performed operation and chronic postoperative inguinal pain is a significant cause of morbidity that can impact negatively on patients' quality of life. Eliminating the need for suture fixation seems theoretically a step in the right direction.

The published literature, however, seems to arrive at similar conclusions. Whilst using self-adhesive mesh results in a shorter operative duration and seemingly does not affect the outcome negatively otherwise, there is no evidence that it reduces postoperative chronic pain and therefore should not be advocated on this merit. A shortened operative time coupled with a non-inferior outcome does seem like a more reasonable evidence-based argument for its proponents.

The decision of which mesh fixation technique to use can be left to the discretion of the operating surgeon. Further longterm follow up data is required to arrive at more definitive conclusions as the mean follow up duration in the reviewed studies ranged from 4 months to 3 years. The cost implications involved in the choice of mesh used should also be taken into account in future studies.

## Competing Interests None declared

Author Details

WADAH ALI, MBBS MRCS(Glas) CABHS, General Surgery Registrar, Health Education, England North East. O NUGUD, Consultant General and Laparoscopic Surgeon, England. CORRESPONDENCE: waddahabdelazim@hotmail.com Email: waddahabdelazim@hotmail.com

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