



Does Mesh Weight in Laparoscopic Mesh Hernioplasty Have Real Clinical Benefits?

– A Comprehensive Review of Literature

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Abstract

Laparoscopic mesh hernioplasty has emerged as the standard approach for inguinal and ventral hernia repair due to reduced postoperative morbidity and faster recovery. Among the factors influencing surgical outcomes, mesh weight has gained considerable attention. Lightweight meshes were introduced to reduce foreign body reaction and improve patient comfort, whereas heavyweight meshes have traditionally been used for their durability and tensile strength. This review critically evaluates the available literature to determine whether mesh weight significantly affects postoperative pain, chronic discomfort, recurrence, and complications. Evidence suggests that lightweight meshes provide modest benefits in terms of patient comfort and reduced foreign body sensation, while long-term outcomes such as recurrence remain comparable. The clinical relevance of mesh weight alone appears limited, emphasizing the importance of mesh design and surgical technique.

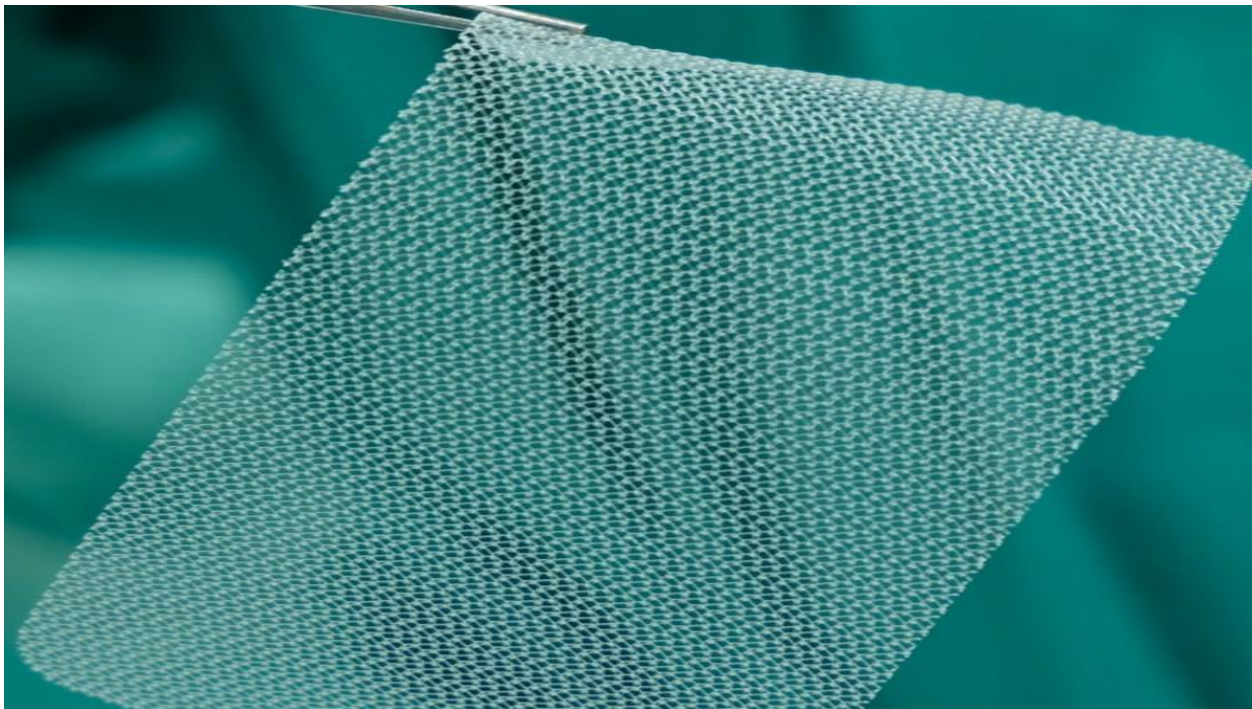
Introduction

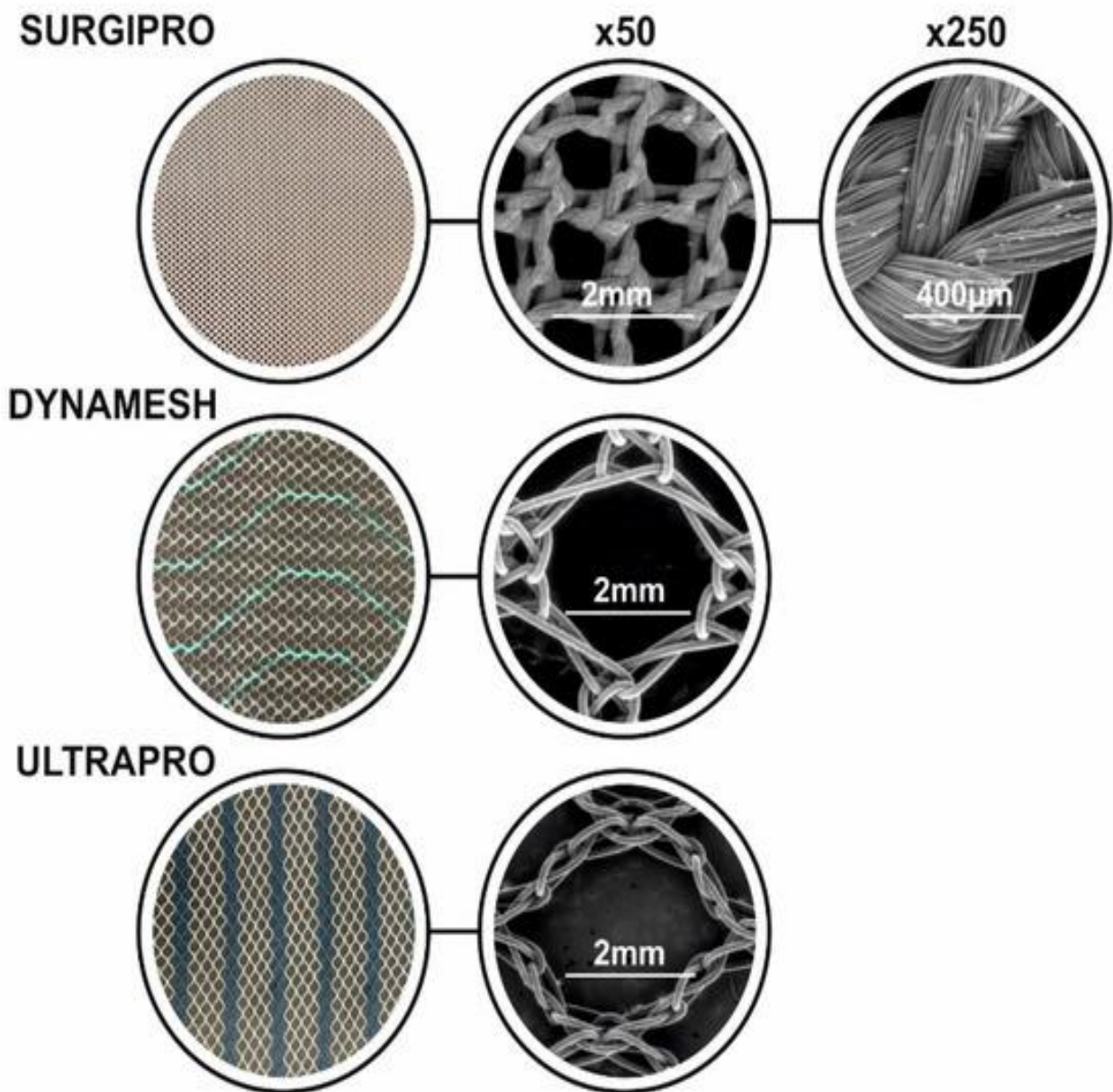
Hernia repair remains one of the most frequently performed surgical procedures globally, with inguinal hernia repairs accounting for a significant proportion of cases. The introduction of laparoscopic techniques such as totally extraperitoneal and transabdominal preperitoneal repair has significantly improved patient outcomes. These approaches reduce tissue trauma, postoperative pain, and hospital stay while maintaining low recurrence rates.

The use of prosthetic mesh has been central to these advancements. Traditional heavyweight meshes, composed primarily of dense polypropylene, provided excellent mechanical strength but were associated with increased foreign body reaction, fibrosis, and chronic discomfort. To address these issues, lightweight meshes with reduced material density and larger pore sizes were developed. These modifications aim to improve tissue integration and reduce inflammatory response.

Despite these advancements, the true clinical benefit of reducing mesh weight remains controversial. This review aims to evaluate whether mesh weight significantly influences surgical outcomes in laparoscopic hernioplasty.

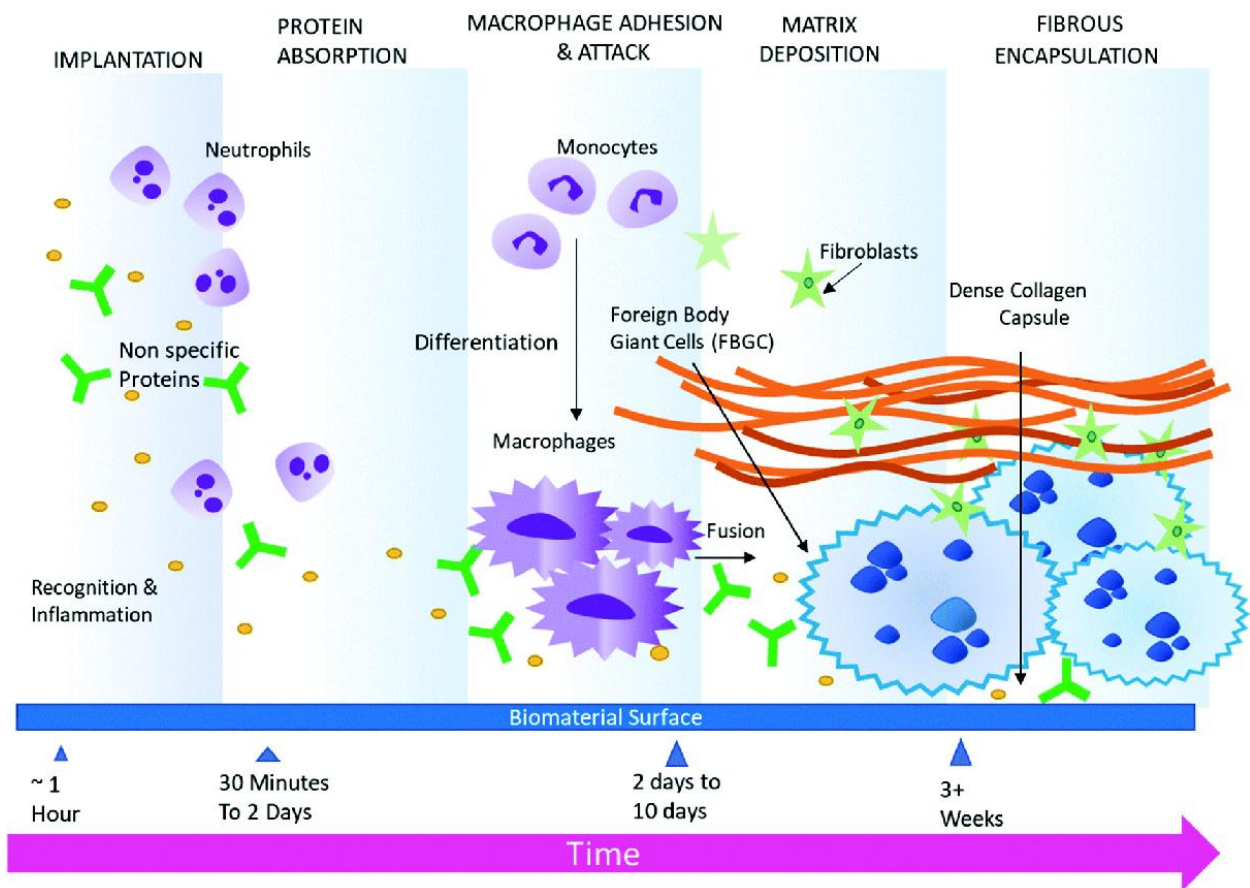
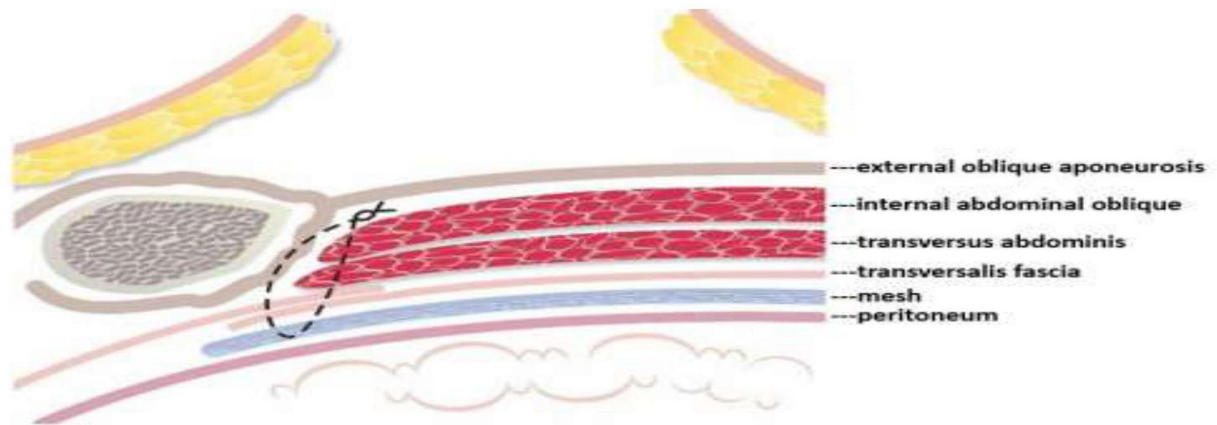
Mesh Structure and Classification

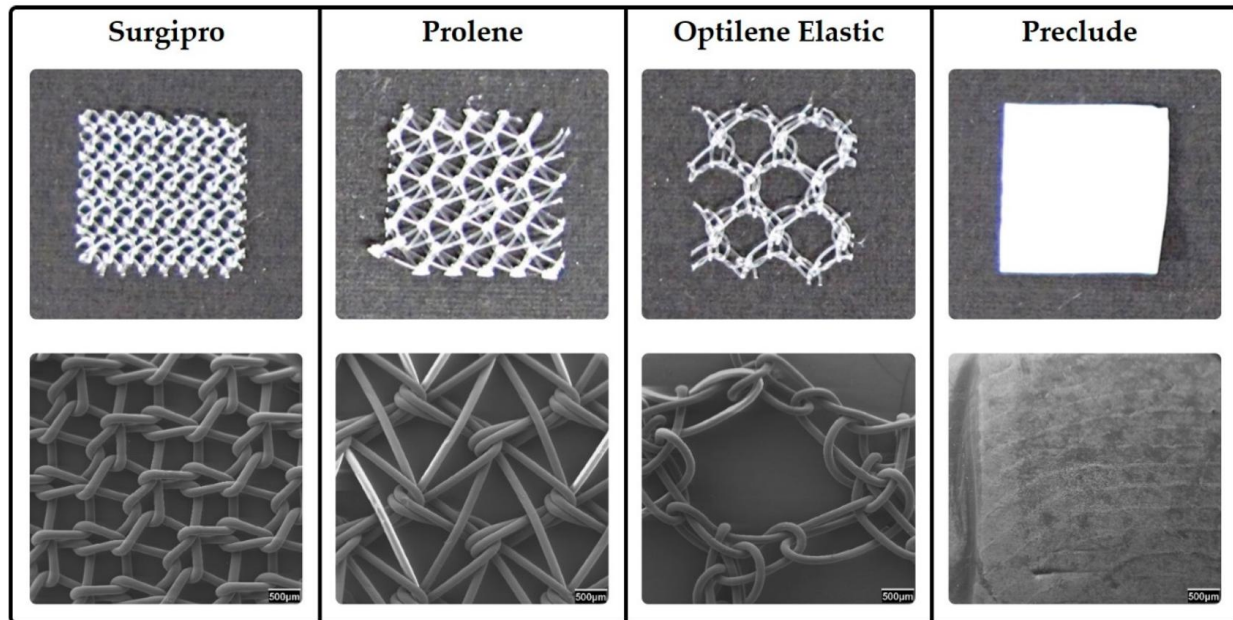




Mesh materials used in hernia repair can be broadly classified based on weight, pore size, and filament structure. Heavyweight meshes typically contain more than 80 g/m² of material and have smaller pore sizes, resulting in a dense structure. Lightweight meshes contain less than 50 g/m² and are characterized by larger pores and reduced filament density, allowing greater flexibility and improved biocompatibility.

Biological Response to Mesh





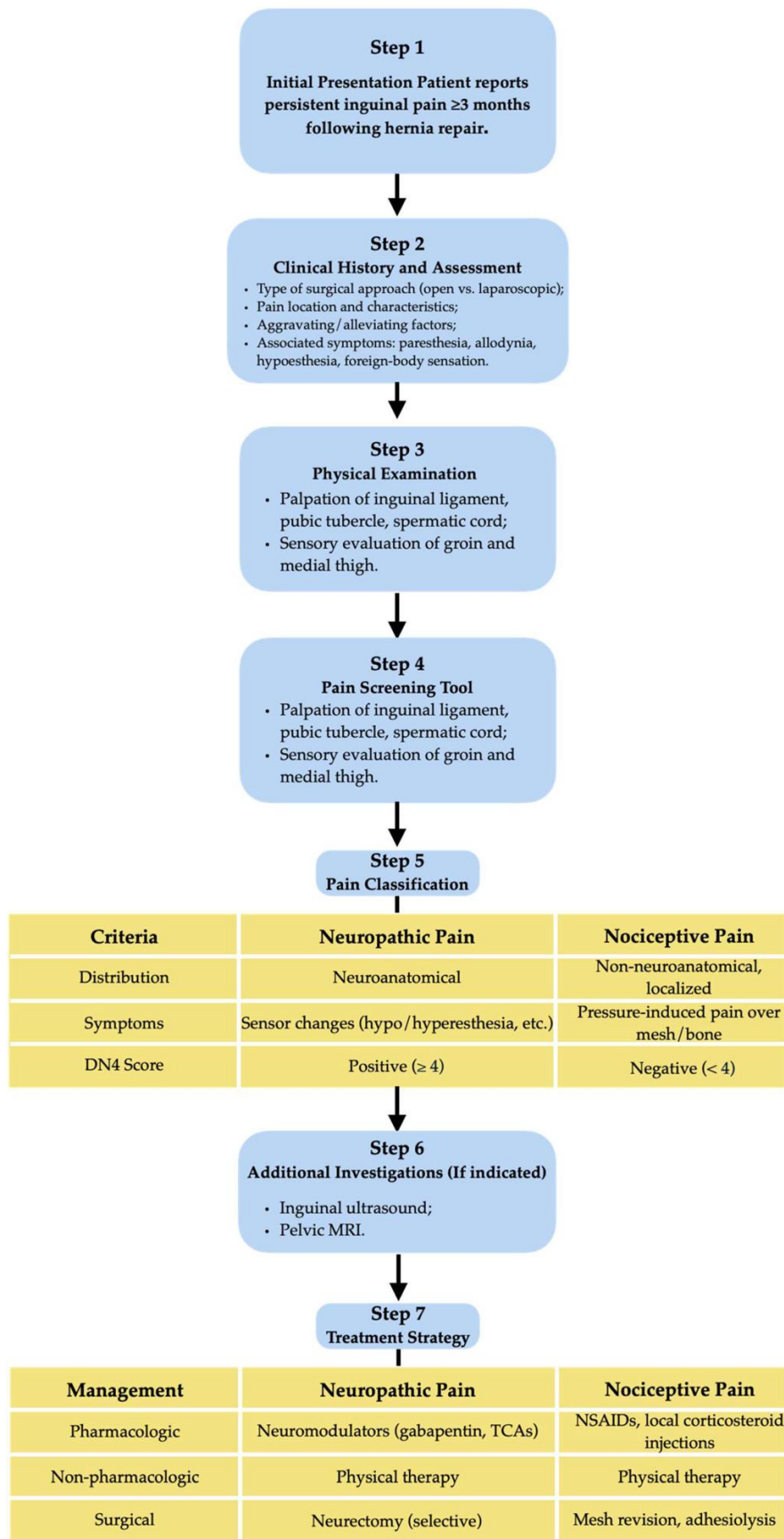
The implantation of mesh initiates a complex inflammatory response involving macrophage activation, fibroblast proliferation, and collagen deposition. Heavyweight meshes induce a stronger inflammatory reaction due to the greater amount of foreign material, leading to dense fibrosis and scar plate formation. This can result in reduced abdominal wall compliance and chronic pain.

Lightweight meshes, by contrast, minimize the foreign body response, promoting a more physiological healing process. The larger pore size facilitates better vascularization and collagen remodeling, leading to improved flexibility and reduced stiffness.

Clinical Outcomes

Postoperative Pain and Chronic Discomfort



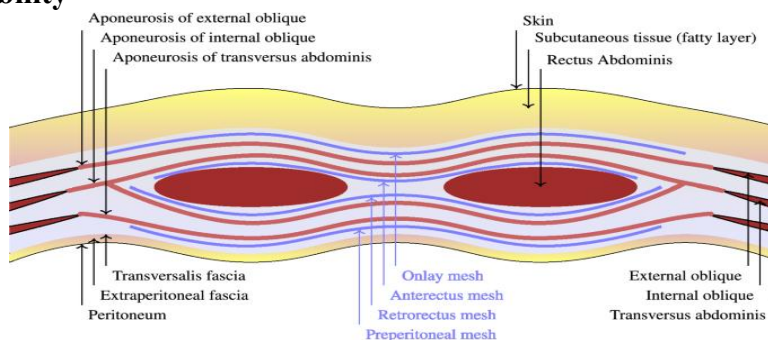


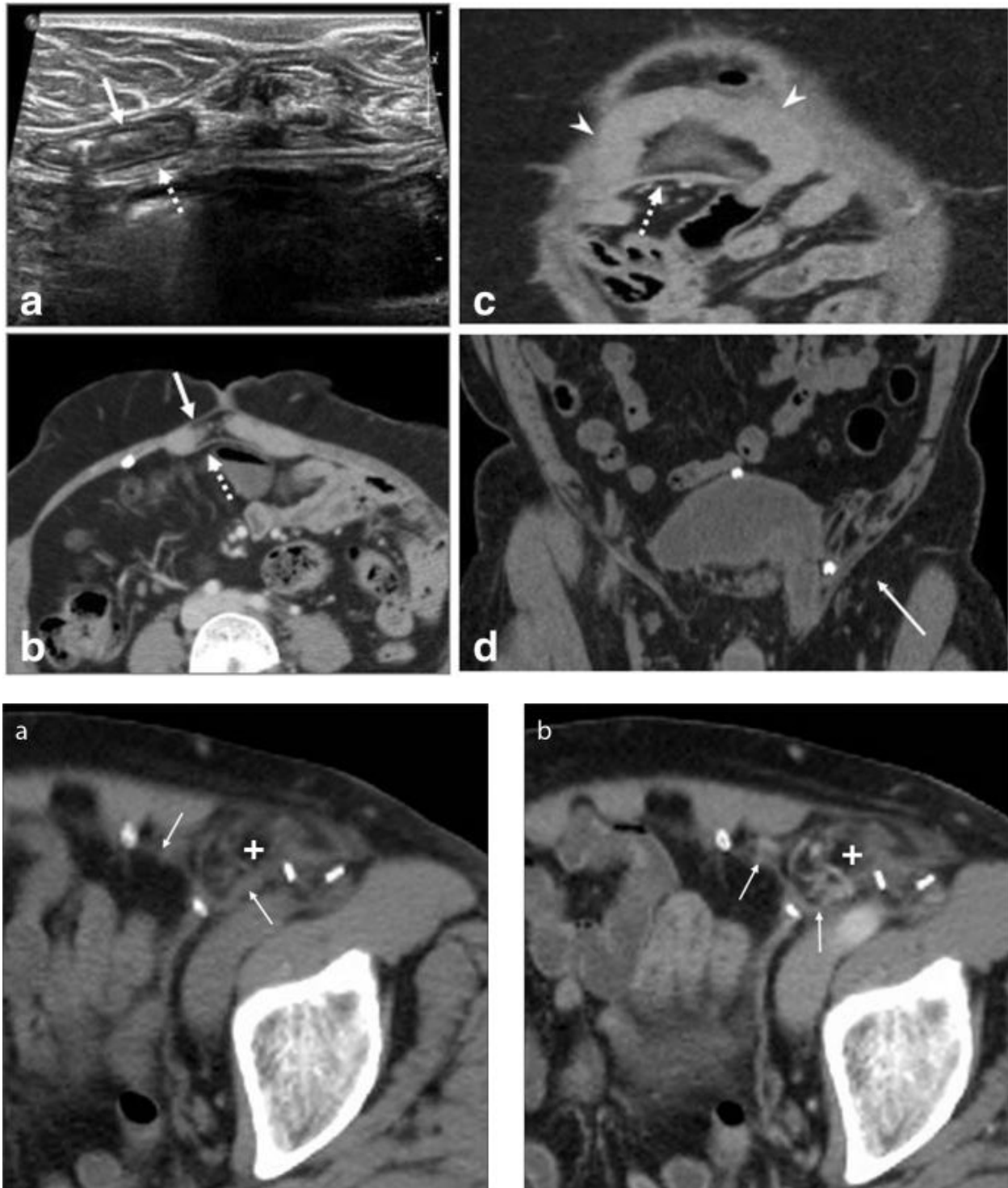


Several randomized controlled trials have demonstrated that lightweight meshes are associated with reduced early postoperative pain. This benefit is attributed to decreased inflammatory response and improved flexibility of the mesh. Chronic pain, which significantly affects patient quality of life, has also been reported to be lower in patients receiving lightweight meshes, although the difference is often modest and may diminish over time.

Foreign body sensation is consistently reported to be lower with lightweight meshes. Patients frequently describe reduced stiffness and improved comfort during daily activities, which is considered one of the most significant advantages of these meshes.

Recurrence and Durability





Recurrence remains the most critical parameter in hernia repair. Current evidence indicates that there is no significant difference in recurrence rates between lightweight and heavyweight meshes in laparoscopic hernioplasty. Advances in mesh design and improved surgical techniques have addressed earlier concerns regarding the durability of lightweight meshes.

Comparative Analysis Table

Parameter	Heavyweight Mesh	Lightweight Mesh	Clinical Significance
Postoperative Pain	Higher	Lower	Moderate benefit
Chronic Pain	Slightly higher	Slightly lower	Limited benefit
Foreign Body Sensation	Common	Less frequent	Significant benefit
Recurrence Rate	Comparable	Comparable	No difference
Complications	Similar	Similar	No major impact

Discussion

The rationale behind lightweight mesh design is to reduce the amount of foreign material implanted in the body while maintaining adequate mechanical strength. Although this approach successfully reduces inflammatory response and improves patient comfort, its impact on long-term outcomes remains limited.

One of the key observations from the literature is that mesh weight alone does not determine surgical success. Factors such as pore size, mesh elasticity, fixation technique, and surgeon expertise play a more critical role. Additionally, laparoscopic techniques inherently minimize tissue trauma, which may explain why the difference between lightweight and heavyweight meshes is less pronounced compared to open repair.

Patient-specific factors must also be considered. In individuals with large hernia defects or increased intra-abdominal pressure, the mechanical strength of the mesh becomes more important than its weight. Conversely, in younger or more active patients, lightweight meshes may offer improved comfort and quality of life.

Conclusion

Mesh weight in laparoscopic hernioplasty has a measurable but limited impact on clinical outcomes. Lightweight meshes provide benefits in terms of reduced postoperative discomfort and foreign body sensation; however, they do not significantly influence recurrence rates or major complications. Therefore, mesh selection should not be based solely on weight but should consider overall design, patient characteristics, and surgical expertise.

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References

1. Klinge U, Klosterhalfen B. Modified mesh for hernia repair that is adapted to the physiology of the abdominal wall. *Hernia*. 2012;16(1):1–7.
2. Bringman S, Wollert S, Österberg J, et al. Three-year results of a randomized clinical trial of lightweight or standard polypropylene mesh in Lichtenstein repair of inguinal hernia. *Ann Surg*. 2006;244(2):212–9.
3. O'Dwyer PJ, Kingsnorth AN, Molloy RG, et al. Randomized clinical trial assessing impact of lightweight or heavyweight mesh on chronic pain after inguinal hernia repair. *Ann Surg*. 2005;242(3):350–6.
4. Sajid MS, Leaver C, Baig MK, et al. Systematic review and meta-analysis of the use of lightweight versus heavyweight mesh in open inguinal hernia repair. *Surg Endosc*. 2013;27(8):2640–8.
5. Weyhe D, Schmitz I, Belyaev O, et al. Experimental comparison of monofile light and heavy polypropylene meshes: less weight does not mean less biological response. *Br J Surg*. 2007;94(7):879–85.
6. EU Hernia Trialists Collaboration. Repair of groin hernia with synthetic mesh: meta-analysis of randomized controlled trials. *Lancet*. 2002;360(9340):861–8.
7. Bittner R, Arregui ME, Bisgaard T, et al. Guidelines for laparoscopic treatment of inguinal hernia. *Surg Endosc*. 2011;25(9):2773–843.
8. Kingsnorth AN, Leblanc KA. Hernias: inguinal and incisional. *Lancet*. 2003;362(9395):1561–71.
9. Stoppa R. The treatment of complicated groin and incisional hernias. *World J Surg*. 1989;13(5):545–54.
10. Junge K, Klinge U, Rosch R, et al. Influence of mesh materials on the integrity of the abdominal wall. *Eur J Surg*. 2002;168(4):209–13.