The American Journal of Surgery 238 (2024) 115950

Contents lists available at ScienceDirect

The American Journal of Surgery

journal homepage: www.americanjournalofsurgery.com

Original Research Article

Weighing the benefits: Exploring the differential effects of light-weight and heavy-weight polypropylene meshes in inguinal hernia repair in a retrospective cohort study

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ARTICLE INFO

Keywords:
Inguinal hernia repair
Quality of life
Polypropylene meshes
Lightweight
Heavyweight

ABSTRACT

Background: Inguinal hernia repair is a common surgical procedure, with more than 20 million cases yearly. Choice between mesh types varies in clinical practice. To compare light-weight polypropylene (LW-PP, 34–36 g/m2) and heavy-weight polypropylene (HW-PP, 95 g/m2) meshes.

Methods: Data from patients who underwent open inguinal hernia repair between 2020 and 2022. Selection criteria ensured homogeneity. Endpoints were to assess the impact of different mesh weights on overall health-related quality of life (HRQoL), using Short Form 36 (SF-36), and to monitor postoperative complications.

Results: Two hundred patients were included in both groups. Lateral and direct hernias occurred in 60.5 % and 39.5 %. According to EHS, 31.5 %, 22.3 % and 46.2 % were classified as size 1, 2, 3. Follow-up showed similar HRQoL at 30-days, with a favorable trend towards LW-PP mesh offering fewer limitations, better comfort, and improved general health after 12-months. No difference in postoperative paresthesia, wound hematoma, and interference with daily activities.

Conclusion: 1-year after surgery HRQoL evaluation highlights the non-inferiority of LW-PP. Mesh selection should be tailored, aiming at improving outcomes and postoperative comfort.

1. Introduction

Inguinal hernia repair stands as one of the most common surgical interventions worldwide, with more than 20 million of procedures performed annually.[1,2] The choice of the appropriate surgical approach is influenced by patient's condition, type of hernia, and surgeon's expertise, leading to considerable worldwide variation in practice. Therefore, various techniques are available for hernia repair, including mesh and non-mesh techniques. Throughout history, a range of materials have been used for hernia repair, from commonly used cotton and silk sutures to more modern options such as nylon, polyester, and polytetrafluoroethylene. However, these materials have had several disadvantages, such as susceptibility to sepsis, provocation of foreign body reactions, rigidity, and a reduction in tensile strength over time.[3,4] In 1959, F. Usher developed a knitted mesh in polyethylene, the forerunner of polypropylene. It showed better integration of collagen due to increased fibroblast activity, and improved strength of the whole system.[5] The use of polypropylene mesh has strongly reduced hernia recurrence rates and improved patient recovery, due to its exceptional stretch, which exceeds physiological stress by approximately five times.[6]

Nevertheless, a contentious debate has emerged within the surgical community regarding the ideal characteristics of polypropylene mesh, particularly its weight. Meshes are typically categorized as: heavy-weight, greater than 80 g/m2; medium-weight, between 50 and 80 g/m2; light-weight, between 35 and 50 g/m2; and ultra-lightweight, less than 35 g/m2.[6] A recent systematic review of 48 randomised controlled

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https://doi.org/10.1016/j.amjsurg.2024.115950
Received 12 May 2024; Received in revised form 17 August 2024; Accepted 3 September 2024

trials found that light-weight meshes ranged from 28 to 60 g/m2, while heavy from 72 to 116 g/m2, suggesting a simplified classification: light as ≤60 g/m2 and heavy as >70 g/m2.[7] While heavy-weight polypropylene (HW-PP) meshes initially gained favour due to their perceived mechanical stability and longevity, concerns about potential complications, including chronic pain and foreign body reactions, have led researchers and clinicians to investigate alternative options. Light-weight polypropylene meshes (LW-PP), composed of thinner filaments with large pores (generally larger than 1 mm), have been designed to offer a balance between tissue integration and reduced foreign body reaction. The presence of lower density material and a different pore size allows for reduced foreign body reaction, increased defect site compliance, and is emerging as a potential solution to the drawbacks associated with HW-PP meshes.[8]

Several reports evaluated clinical outcomes and postoperative complications comparing the use of LW-PP versus HW-PP meshes in open inguinal hernia repair, thereby providing valuable insight.[9–11] Although the type of mesh does not increase hernia recurrence rate,[12] the relationship between the use of LW-PP and the risk of developing chronic groin pain is still ambiguous.[13,14] Furthermore, few studies have focused on patient satisfaction and recovery of activity of daily living over months.

The present paper attempts to advance the debate on inguinal hernia repair by challenging the status of the conventional method as the optimal solution for groin problems and its position as the gold standard in the field. Our aim is to conduct a comprehensive evaluation of the advantages and drawbacks associated with both LW-PP and HW-PP polypropylene meshes, and to determine their impact on postoperative comfort and overall patient health-related quality of life (HRQoL).[15]

2. Material and methods

2.1. Study design

We design a retrospective cohort study aimed to assess the HRQoL and 1-year outcomes of patients who underwent open inguinal hernia repair using HW-PP meshes (Fig. 1A) compared to LW-PP meshes (Fig. 1B). The study cohort included adult patients who underwent inguinal hernia repair at our Institution, Azienda Ospedaliera Universitaria Senese (Siena, Italy) within June 2020 and November 2022.

The results of this study were reported as established by the Strengthening the reporting of observational studies in epidemiology (STROBE) statement for cohort studies.[16]

2.2. Patient selection

To ensure population homogeneity, subjects with a body-mass index (BMI) below 18.5 or above 29.9 were excluded from the study. Patients

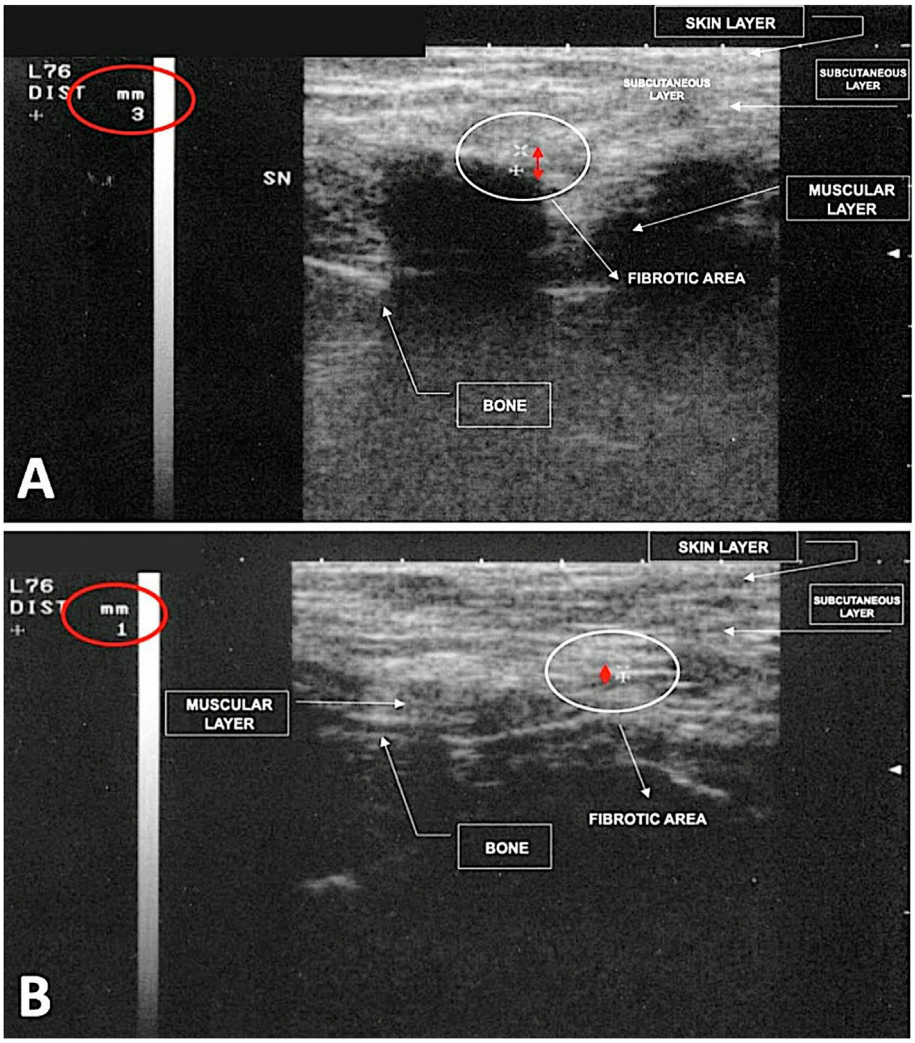

Fig. 1. In (A) the normal ultrasound appearance of HW-PP 12 months after surgery. Note the 3 mm thickness of the mesh and the acoustic shadow produced by the intense fibrotic reaction. In (B) the normal appearance of the LW-PP 12 months after surgery. The reduced thickness of the fibrotic area (1 mm) allows the structures beneath the mesh to be visualized. No mispositioning was detected.

with internal oblique hernia or recurrent hernias were also excluded. Furthermore, patients who underwent urgent surgery upon arrival at the emergency room or had undergone previous abdominal surgery in the past 3 years, recent pregnancy, hospitalization, or sepsis were excluded.

2.3. Data collection

Relevant data were retrospectively extracted from the electronic medical records of the included patients. Demographic information, such as age and sex, along with preoperative characteristics including hernia site, symptoms, and comorbidities (cardiovascular disease, asthma or chronic obstructive pulmonary disease, obstructive sleep apnea syndrome, cancer, diabetes, chronic kidney disease, constipation, smoking) were recorded.

Surgical details, the type of mesh used (LW-PP or HW-PP) as well as hernia size (according to EHS inguino-femoral classification[2,17]), and length of surgery were documented. Patients received LW-PP weighing 34–36 g/m2 or HW-PP weighing 95 g/m2. Postoperative outcomes, including complications, length of hospital stay, recurrence and HRQoL measures, were also collected.

2.4. Health-related quality of life assessment

To assess the impact of hernia repair, this study employed a cross-sectional design, utilizing the Short Form 36 (SF-36) questionnaire to evaluate Health-Related Quality of Life (HRQoL). The SF-36 is a widely utilized generic measure covering multiple domains of physical and mental health. It comprises eight scaled scores, evaluating aspects such as physical functioning, role limitations, bodily pain, general health, vitality, social functioning, role limitations due to emotional problems, and mental health. Scores, ranging from 0 to 100, represent weighted sums of questions in each section.[18]

Patients completed the questionnaire at various time points, including preoperatively and postoperatively at 1 year during outpatient follow-up visits.

2.5. Follow-up

Patients were routinely scheduled for follow-up appointments at the surgical outpatient clinic one month after the surgery, and subsequently one year later. Patients lost to follow-up were excluded from the final cohort.

The standard follow-up protocol entailed a thorough assessment of patients' medical history and a physical examination. If a doubt of hernia recurrence persisted, an ultrasound was performed (Fig. 1).

2.6. Surgical procedure

All surgeries were performed by the same senior surgeon (N.C.). All surgeries were performed on a day-case basis under local anaesthesia. The choice and administration of anesthetics (mepivacaine, lidocaine, and ropivacaine) were determined independently of the investigators.

The surgical technique (modified Lichtenstein hernia repair) included preparation of the aponeurosis of the external oblique muscle, followed by its opening to access the hernia site. The spermatic cord was isolated (Fig. 2A), and the elements of the funiculus were separated from the hernia sac, which was neither opened nor reduced in size (Fig. 2B). For direct hernias ("medial" in the EHS classification system), it was held below the level of the internal oblique and transverse muscles using anatomical forceps. Forward layer begins medially, leaving a sufficient end to tie the returning suture. For indirect hernias ("lateral"), the hernia sac was reduced in size (Fig. 2C). The transversalis fascia was prepared and flattened with 0 polypropylene suture behind the spermatic cord (Fig. 2D).

After completion the sutures, a polypropylene mesh was placed on the reconstructed floor of the inguinal canal, secured to the prepubic fibrous tissue with a single stitch (Fig. 2E), and the aponeurosis of the external oblique muscle was closed (Fig. 2F). Finally, the abdominal wall was

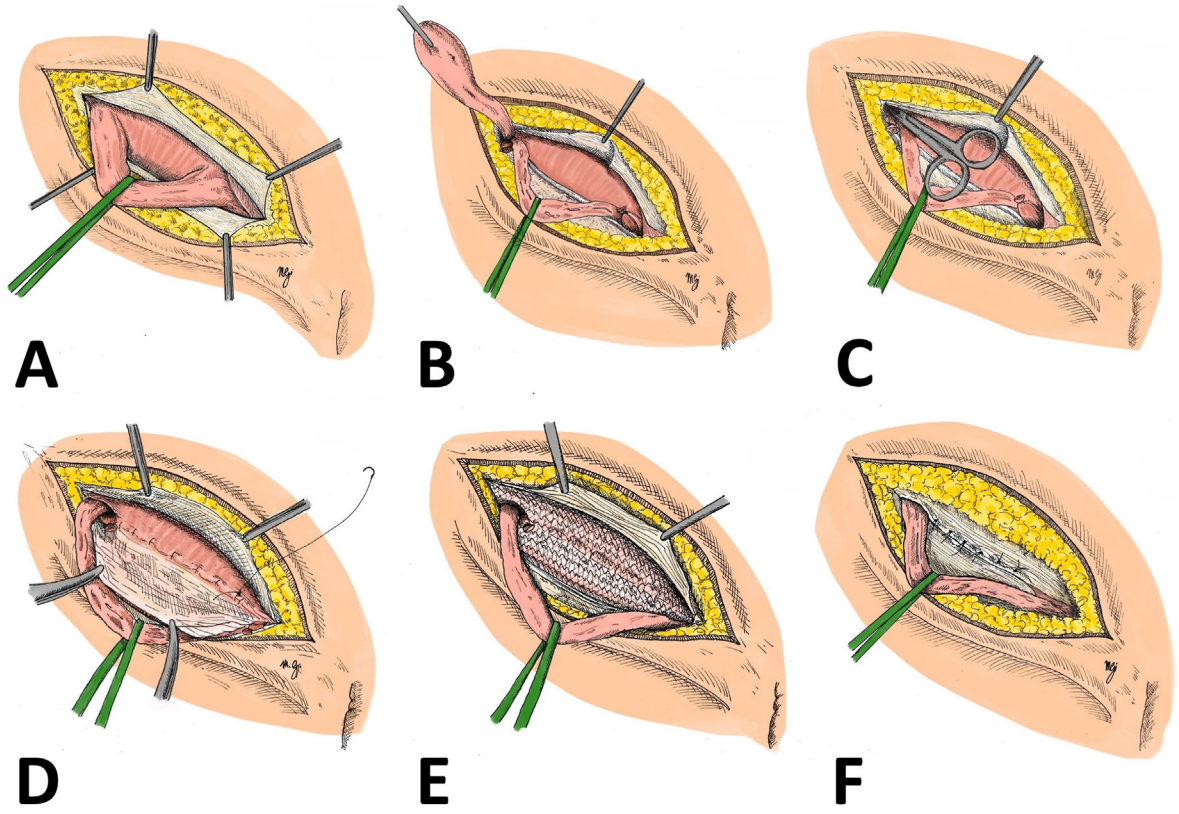

Fig. 2. Open inguinal hernia repair technique.

closed in layers. Notably, no plugs were used in any of the procedures. Fig. 3 shows counterparts intraoperative frames.

2.7. Endpoints

Primary endpoint was to assess the impact of inguinal hernia repair on patients' quality of life and to monitoring its modification after time (delta ratio). Secondary endpoints were post-operative complications and daily life disturbances.

2.8. Statistical analysis

Descriptive statistics, including means, standard deviations, frequencies, and percentages, were used to summarize the demographic and clinical characteristics of the study population. Continuous variables were analyzed using t-tests or Mann-Whitney U tests, depending on the data distribution. Categorical variables were compared using chi-square tests or Fisher's exact tests as appropriate. Statistical significance was set at $p < 0.05$.

Ethical approval

This study was conducted in accordance with the principles outlined in the Declaration of Helsinki. Patient confidentiality and data protection were ensured throughout the study by anonymizing patient information and using secure electronic databases. We obtained the Institutional Review Board approval, whereas ethical was waived due to the retrospective nature of the study.

3. Results

A total of 368 patients underwent open inguinal hernia repair in the enrollment period, whereas 168 were lost to 1-year follow-up. A final cohort of 200 patients fulfilled the inclusion criteria, including 100 patients for each of the prostheses implanted (172 males and 28 females). The age of the participants ranged from 21 to 93 years (66 ± 14), with no statistically significant differences between the two groups. In detail, 55 % were right inguinal hernias, while 45 % were left inguinal hernias. Patients were symptomatic in about 60 % of cases. There were no significant differences also in BMI, American Society of Anesthesiologists (ASA) physical status grade and comorbidities. About 9 % of the population had a history of previous cancer, while 15 % had a history of contralateral inguinal hernia surgery (Table 1 – Patients and hernia characteristics).

In terms of specific hernia characteristics, 60 cases involved "pantaloon hernias", and in 20 cases, the transversalis fascia was completely frayed from the pubic tubercle to the internal inguinal ring. Hernia size was identified according to the EHS groin hernia classification. No bowel resection was performed, and the mean operative length was 50 min in LW-PP group and 52 min in HW-PP group (Table 2 – Intra-operative data).

Evaluation of intraoperative parameters revealed that the HW-PP presented no difficulty in positioning. On the other hand, after the first 10 cases, the LW-PP mesh was found to be better suited to the patient's anatomical shape. No intraoperative complications were encountered during the placement of either type of mesh.

In terms of postoperative outcomes, no significant differences in healing time were observed between the two mesh types. The hospitalization period was generally brief, and only one patient requiring an additional overnight stay.

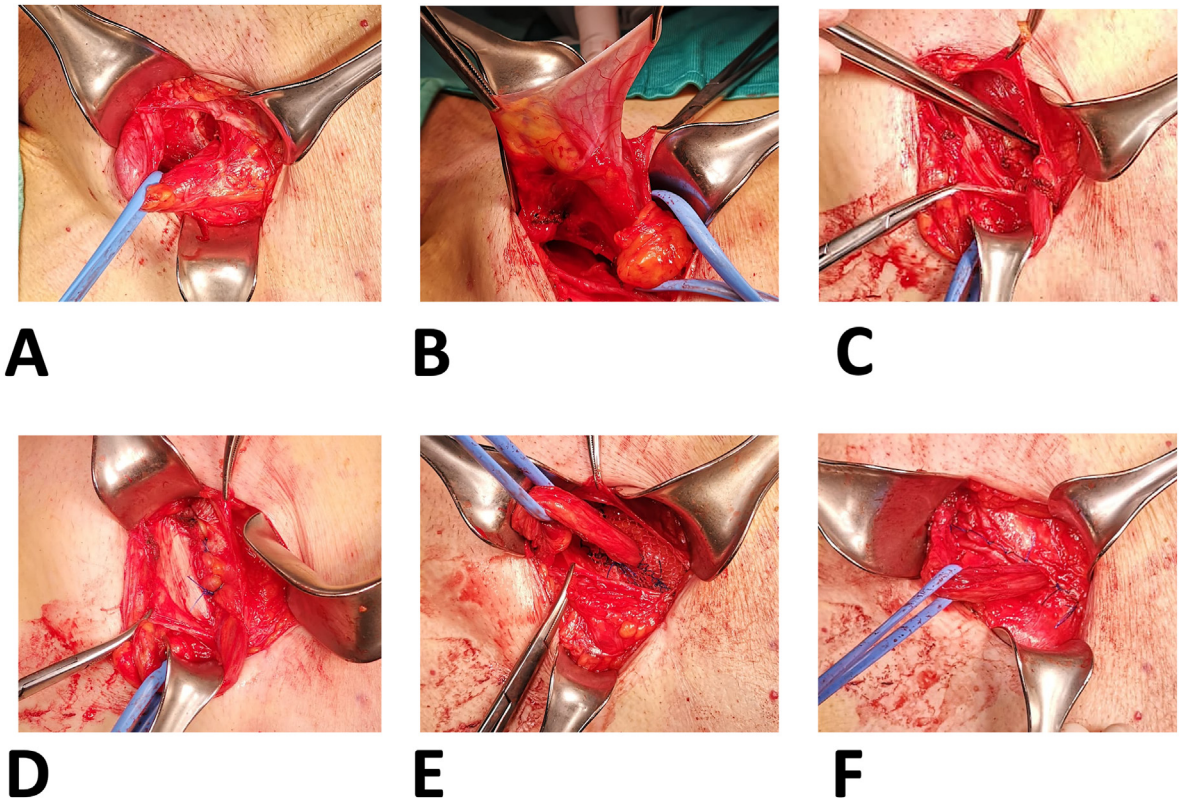

Fig. 3. Open Inguinal Hernia Repair intraoperative frames. A) The spermatic cord is lifted; a retractor is used to keep them away from the operative field. B) The cremaster muscle is divided and removed; indirect hernia sac is dissected. C) Sac and its contents are reduced in size. D) The transversalis fascia is reinforced to create a flat surface for the mesh placement. E) A polypropylene mesh is positioned over the defect in a tension-free manner, with a single stitch at the prepubic fibrous tissue and the two tails of the slit crossed around the spermatic cord and fixed together. F) The external oblique aponeurosis is closed, covering the mesh completely.

Table 1
Patients and hernia characteristics.

	LW-PP (n = 100)	HW-PP (n = 100)	p
Age (year ± SD)	67 ± 13	65 ± 16	0.33
Sex assigned at birth (M/F)	91/9	87/13	0.36
BMI (Kg/m2)	24.26	24.57	0.18
ASA I	49	44	0.71
ASA II	35	38	
ASA III	16	18	
Cardiovascular disease	9	10	0.81
Cancer history	8	11	0.47
COPD	7	8	0.79
Smoking	22	20	0.73
OSAS	2	3	0.65
Diabetes mellitus	12	15	0.53
Chronic kidney disease	5	3	0.47
Constipation	3	4	0.70
Previous controlateral hernia surgery	13	17	0.43
Site of hernia			0.57
- Left	47	43	
- Right	53	57	
Size of inguinal hernia			
- Limited to inguinal region	61	65	0.56
- Limited to scrotum	29	25	0.52
- Extend to mid-thigh	9	10	0.81
- Extend to knee or beyond	1	0	0.31
Symptomatic hernia	63	56	0.31
- Heaviness	29	26	0.63
- Discomfort	23	21	0.73
- Pain	11	9	0.64

*COPD: Chronic obstructive pulmonary disease; OSAS: Obstructive Sleep Apnea Syndrome.

Table 2
Intra-operative data.

	LW-PP (n = 100)	HW-PP (n = 100)	p
Hernia size acc. to EHS			0.65
– 1	32	31	
– 2	35	32	
– 3	33	37	
Kind of hernia			0.66
- Lateral	62	59	
- Medial	38	41	
Operative Skin-to-skin time (min)	50,3	52,6	0.28

* EHS: European Hernia Society.

After suture removal (approximately in the 10th postoperative day), patient discomfort was assessed using a self-administered Visual Analogue Pain Scale (VApS)[19] with median scores of 3 for LW-PP and 4 for HW-PP. No cases of superficial surgical site infection were detected during wound evaluation, although seroma formation was observed in 6 cases for both mesh types. On the contrary, slight hemorrhagic suffusion occurred in 7 cases with LW-PP and 10 cases with HW-PP. No cases of orchioepididymitis, hydrocele, or urinary complications were reported. However, 10 peri-incisional paresthesia was observed with HW-PP and 9 cases with LW-PP.

Postoperative pain was managed with common medications, and patients typically resumed daily activities, including returning to work, within seven days. Sleep disturbances, defined as any disruptions in a patient's normal sleep patterns (insomnia, non-restorative sleep, delayed sleep onset or fragmented sleep), were evaluated during the first ten days after surgery, with 4 cases experiencing disturbances in the HW-PP group and 1 case in the LW-PP group. Impairment of daily living, which typically includes physical limitations such as reduced mobility, fatigue and pain that interfere with routine activities such as walking, working, driving and housework, occurred in 10 cases with HW-PP and 4 cases with LW-PP (Table 3 – Postoperative course).

Table 3
Post-operative course.

	LW-PP (n = 100)	HW-PP (n = 100)	p
Post-operative length of stay >1 (POD)	0	1	0.32
10-days Patient discomfort score (VApS)	3	4	0.70
10-days Perincisional paresthesia	9	10	0.81
10-days Wound seroma	6	6	1
10-days Wound hematoma	7	10	0.45
10-days Daily life disturbances	4	10	0.09
10-days Sleep disturbances	1	4	0.17
90-days Occurrence of hernia	0	2	0.15

* POD: Post-operative day; VApS: Visual Analogue Pain Scale.

The SF-36 questionnaire, assessing Health-Related Quality of Life (HRQoL), comprised 36 items across eight different health domains. At the 30-day follow-up, patients with LW-PP mesh reported a higher level of well-being compared to those with HW-PP meshes. Specifically, within 30 days postoperatively, patients who received the HW-PP reported discomfort in 35 % of cases, primarily in the form of a foreign body sensation in the inguinal canal. This discomfort was accentuated in certain postures or movements. Another 10 % of patients complained of burning along the inguinal ligament.

Interestingly, no statistically significant differences were observed in any of the eight domains of the SF-36 health survey. Median follow-up was 1 year (range 11–14 months). Thus, the 1-year follow-up with the SF-36 questionnaire revealed no significant differences in outcomes between the two types of mesh, although there is a positive trend that LW-PP mesh provides fewer functional limitations, greater social and emotional well-being, reduced discomfort, and better overall health (Table 4 — Follow-up SF-36 details).

No cases of hernia relapse were reported among the operated patients, although we report two cases of fermoral hernia appeared after three months in patients with heavy meshes. In addition, no mispositioning was found on US examination.

4. Discussion

The use of mesh in hernia repair surgery has become a common practice, with polypropylene mesh being the predominant choice due to its excellent stretch and tensile strength. Despite the widespread use of HW-PP meshes, a significant proportion of patients (up to 25 %) continue to experience postoperative discomfort or interference with daily activities, even for several months.[20,21] These studies suggest that LW-PP meshes, consisting of a lower density material, may have potential advantages over HW-PP, offering increased patient comfort and reducing the postoperative complication rates. A randomized clinical trial, on a similar cohort of patients underwent unilateral primary inguinal hernia via the Lichtenstein technique, confirmed that fewer patients in the LW-PP mesh group reported numbness around the groin or along the thigh after surgery, whereas with no differences in terms of chronic pain

Table 4
Follow-up SF-36.

	LW-PP (n = 100)		HW-PP (n = 100)	
	30-days	12-months	30-days	12-months
Physical functioning	85 %	100 %	75 %	90 %
Role Physical	90 %	100 %	75 %	75 %
Bodily Pain	70 %	90 %	65 %	77.5 %
General Health	80 %	90 %	75 %	75 %
Vitality	75 %	80 %	65 %	65 %
Social Functioning	65 %	75 %	60 %	75 %
Role Emotional	90 %	100 %	90 %	100 %
Mental Health	85 %	92 %	75 %	80 %
Reported Health	70 %	75 %	70 %	75 %

incidence and recurrence rate.[22] In our study, 1-year HRQoL evaluation, using a reliable and easy-to-use questionnaire, highlights the non-inferiority of LW-PP. These findings appear to be consistent with the 6-month results reported by the SUPERMESH study group in 2018.[23] It is also coherent with the biologic-functional role of the prosthesis as a scaffold for the development of fibrosis necessary for the containment and long-term resolution of hernia disease.

Previous results call for a critical evaluation of LW-PP product, requiring a thorough analysis of its features, technical difficulties, and the implications of its preference. Two main strengths of our study are that variability was reduced by having the same main surgeon using the same technique, and that the type of mesh was usually blinded to the patient and their reported symptoms were not influenced by the surgeon's choice. Our intra-operative evaluation revealed that LW-PP meshes have some practical advantages. They are easier to handle and more transparent, allowing better visualization of the underlying tissues. The LW-PP mesh also conforms better to the roundness of the tissue and offers less resistance to cutting. These characteristics support the notion that they may provide better anatomical integration and reduce the risk of postoperative complications, such as a lower incidence of seroma formation and peri-incisional paresthesia. However, it is crucial to note that early post-operative course did not show significant differences between the two groups, apart from a greater number of patients who underwent HW-PP mesh placement experiencing generic daily life disturbances or sleep disturbances, further supporting their potential benefits in terms of patient comfort. According to Smedberg et al. the placement of either mesh does not affect short-term complications, with comparable rates of postoperative pain, as well as the occurrence of wound hematoma and seroma.[24] Compared with recent literature, our cohort has a higher rate of seroma than wound hematoma.

At mid-term follow-up, the self-administered scale, assessing post-operative comfort, strongly indicated higher scores for patients with LW-PP meshes compared to those with HW-PP meshes. These results suggest that LW-PP meshes may contribute to a better overall patient experience, potentially leading to improved postoperative recovery and well-being. Interestingly, patients who received HW-PP mesh placed rarely achieved full satisfaction in the physical and mental health domains examined one year after surgery, although baseline scores were similar in both groups. On the other hand, the same domains are more likely to improve in patients who have placed a LW-PP mesh, with complete satisfaction in physical functioning, role physical as well as role emotional. Indeed, this finding is consistent with previous literature and with the biologic-functional role of the prosthesis as a scaffold for the development of the fibrosis necessary for the containment and long-term resolution of hernia disease.[25] Consequently, smaller filament spacing, and pores increase the risk of bridging by scar tissue, which takes several months to develop.

A recent meta-analysis reported no statistically significant difference in recurrence between the two types of mesh, contradicting the notion that there is a higher incidence of recurrence due to the smaller amount of material in the LW-PP mesh.[26] An important role in influencing recurrence is played by mesh shrinkage. The percentage of mesh shrinkage is highly variable, depending on the material, structure, geometry, and direction of the mesh.[27] Jerabek et al. describe how the implantation of a polypropylene mesh with a pore size of 3 mm is associated with a significant reduction in shrinkage compared to a mesh with a pore size of 1 mm and a mesh with a pore size of 0.5 mm.[28] Meanwhile, Silvestre et al. concluded that shrinkage was significantly higher for HW-PP, although the difference was not large.[29] In our sample case, two cases of femoral hernia and no recurrence were recorded. It's essential to interpret this result with caution. First, we hypothesize that the placement of a HW-PP resulted in an upward detraction of tissue, leading to the formation of a new area of weakness below the Poupart's ligament. Second, the relatively small sample size and the limited follow-up period could affect our results. We strongly emphasize the need for further research with larger cohorts and longer follow-up periods to gain a more comprehensive understanding of the surgical outcomes associated with each mesh type. Other contributing factors to the absence of hernia relapse could be that all procedures were performed by a high-volume surgeon,[30] as well as the preference of the modified Lichtenstein hernia repair.

More recently, the Hernias, Pathway and Planetary Outcomes for Inguinal Hernia Surgery Project (HIPPO) has been run in a prospective way by the NIHR Unit on Global Surgery. Main goals are to investigate technical variations and surgical outcomes of inguinal hernia surgery, with a focus on the impact of waiting times and environmentally sustainable measures adopted by surgical teams. Preliminary results from this study show a lack of access to mesh in low- and middle-income countries and limited use of minimally invasive approach across all income groups, with only a quarter of patients operated on using minimally invasive techniques.[31]

Our study has several limitations. First, its nature of retrospective single-center single-surgeon study introduces the possibility of selection bias and incomplete data. Secondly, the limited sample size may require validation in a larger cohort. As is increasingly recognized in the scientific community, preoperative planning is becoming crucial for the successful outcome of surgery and the reduction of complications of any kind. It is therefore crucial to consider individual patient features, such as age, comorbidities, and frailty status, as well as hernia characteristics, when selecting the appropriate mesh type.[32] Customizing mesh selection based on patient-specific factors may help to optimize outcomes and minimize postoperative complications.[33,34] Thirdly, as the study investigated the open inguinal hernia repair, the results may not be directly applicable to other types of hernias or surgical techniques, such as laparoscopic or robotic hernia repair surgery. Two recent meta-analyses described a significant superiority of HW-PP mesh in terms of hernia recurrence after laparo-endoscopic surgery, although with equivalent outcomes for postoperative pain, seroma, foreign body sensation, surgical site infection, and numbness. Minimally invasive approaches are gaining popularity and may present unique considerations.[35]

Further studies with larger sample sizes and longer follow-up could better explore the potential impact of mesh selection on outcomes and assess the incidence of hernia recurrence. Monitoring patients over an extended period will provide a more comprehensive understanding of the durability and efficacy of lightweight mesh in hernia repair.

Moreover, to place these results in the context of inguinal hernia surgery, it is necessary to consider both technical and economic aspects. From a technical perspective, ongoing trials are exploring the effectiveness of the Desarda technique,[36] which proposes a mesh-free approach with a recurrence rate comparable to the Lichtenstein technique.[37,38] In addition, technological advances are introducing not only meshes of different weights and materials but also anatomically shaped meshes (3D meshes) and meshes with different fixation technologies (self-anchoring or adhesive).

It is conceivable that in the future a different approach to the current “one-size-fits-all” approach will be adopted in many centers. This would involve defining tailored treatments based on the characteristics of both the hernia and the patient. From a pharmaco-economic point of view, it is important to remember that in the era of Health Spending Reviews, the opinions of administrative authorities play an increasingly significant role in the selection of devices for clinical practice.

5. Conclusion

In conclusion, our study provides valuable insights into the impact of mesh selection on patient outcomes in inguinal hernia repair surgery. LW-PP mesh placement showed comforting data regarding both patient outcomes and complications, although without a clear superiority over HW-PP meshes. Mesh selection should be individualized, taking into account patient-specific factors and considering alternative mesh materials, ultimately improving the quality of life for patients undergoing hernia repair.

COI/disclosures

The authors have no conflict of interests to disclose.

Funding sources

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

CRediT authorship contribution statement

Natale Calomino: Project administration, Conceptualization. **Gianmario Edoardo Poto:** Writing – review & editing, Writing – original draft. **Ludovico Carbone:** Writing – review & editing, Methodology. **Giorgio Micheletti:** Validation, Investigation. **Mattheus Gjoka:** Visualization, Formal analysis. **Gennaro Giovine:** Software, Resources. **Benito Sepe:** Software, Data curation. **Giulio Bagnacci:** Visualization, Data curation. **Stefania Angela Piccioni:** Formal analysis, Conceptualization. **Roberto Cuomo:** Project administration, Methodology. **Gian Luigi Adani:** Supervision, Resources. **Daniele Marrelli:** Supervision, Project administration, Conceptualization.

Acknowledgments

None.

Abbreviations

HW-PP	heavyweight polypropylene mesh
LW-PP	lightweight polypropylene mesh
HRQoL	health-related quality of life
EHS	European Hernia Society
SF-36	Short Form 36 questionnaire
VApS	Visual Analogue Pain Scale

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.amjsurg.2024.115950.

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