

Systematic Review

Optimization of abdominal wall reconstruction in patients with complex hernia after oncologic surgery: comparative analysis of surgical techniques and prosthetic materials - a systematic review

**Zeus Adrian Daniel Alfonso Gonzalez Mercado^{1*}, Mauricio Zuluaga Zuluaga²⁻⁵,
Santiago Zuluaga Muriel⁶, María Alejandra Puello Gómez⁷, Simón Ali Ruiz Soto⁸,
Edison Renato Pereira Aranda⁸, Nicolás Largacha Duque⁹, Juan Diego Angulo Arriola¹⁰,
Wendy Johana Jacome Mendoza¹¹, Melany Nicoll Verdezoto Michuy¹²**

¹Department of Surgery, Instituto Mexicano del Seguro Social, Mexico

²Department of General Surgery, Universidad del Valle, Cali, Colombia

³Hospital Universitario del Valle, Cali, Colombia

⁴Clínica de Occidente, Valle del Cauca, Colombia

⁵Clínica Sebastián de Belalcazar Colsanitas, Cali, Colombia

⁶Department of Medicine, Universidad Nacional de Colombia, Colombia

⁷Medical Department, Universidad a distancia de Madrid, Colombia

⁸Department of Surgery, Complejo Asistencial Padre Las Casas, Chile

⁹Medical Department, Universidad Libre Seccional Cali, Colombia

¹⁰Medical Department, Universidad el Bosque, Colombia

¹¹Medical Department, Colombia

¹²Medical Department, Universidad Católica Santiago De Guayaquil, Ecuador

Received: 05 April 2025

Revised: 14 May 2025

Accepted: 15 May 2025

*Correspondence:

Dr. Zeus Adrian Daniel Alfonso Gonzalez Mercado,

E-mail: reynosa.cirugia@gmail.com

Copyright: © the author(s), publisher and licensee Medip Academy. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

ABSTRACT

Abdominal wall reconstruction (AWR) following oncologic resection presents unique surgical challenges, particularly in patients with complex hernias characterized by large defects, contamination, prior mesh infections, or loss of domain. These reconstructions demand techniques that ensure durable structural integrity, minimize recurrence, and accommodate high-risk postoperative environments. A comprehensive literature search was conducted using PRISMA guidelines, including 14 primary studies and 2 systematic reviews published between 2020 and 2025. Studies included adult oncologic patients undergoing AWR with various techniques, prosthetic materials, and perioperative protocols. Risk of bias was assessed using JBI, ROBINS-I, and RoB 2 tools. The reviewed studies demonstrate that the transversus abdominis release (TAR) technique significantly reduces hernia recurrence (2.5% TAR versus 22.5% ACS, $p < 0.001$) and wound complications. Robotic-assisted repairs resulted in reduced pain and hospital stays but incurred longer operative times and higher costs. Biologic meshes were favoured in contaminated fields but showed higher recurrence and cost compared to synthetics. Combined synthetic-biologic approaches in sarcoma patients yielded 0% recurrence with acceptable morbidity. ERAS protocols consistently reduced hospital length of stay and hernia rates (ERAS: 10.1% versus non-ERAS: 28.8%, $p = 0.008$). Sarcopenia and hypoalbuminemia emerged as key predictors of poor surgical outcomes. Optimal AWR in oncologic patients with complex hernias requires individualized strategies that incorporate advanced surgical techniques, judicious mesh selection, and standardized perioperative care. TAR, prophylactic mesh placement, and ERAS protocols show the most promise in improving long-term outcomes. Further randomized trials are warranted to strengthen evidence for best practices.

Keywords: Abdominal wall reconstruction, Complex hernia, Oncologic surgery, Prosthetic mesh, Surgical techniques

INTRODUCTION

Abdominal wall reconstruction (AWR) following oncologic resection poses a substantial clinical challenge, especially in patients presenting with complex hernias, often defined by large fascial defects, contamination, stomas, previous mesh infections, or loss of domain.¹ These patients frequently undergo extensive tumor resections that compromise the structural integrity of the abdominal wall, necessitating durable and functional reconstruction.² The global incidence of complex ventral hernias after oncologic surgeries ranges between 12–23%, with higher rates in patients undergoing cytoreductive procedures and hyperthermic intraperitoneal chemotherapy (HIPEC).³

Etiologically, the multifactorial nature of hernia formation post-oncologic resection includes excessive intra-abdominal pressure, poor tissue perfusion, post-radiation fibrosis, wound dehiscence, and iatrogenic injury.⁴ Moreover, immunocompromised status, malnutrition, and prior surgical site infections exacerbate the risk of recurrence and mesh complications.⁵ Clinically, complex hernias contribute to chronic pain, intestinal obstruction, and significant impairment in quality of life, underscoring the need for optimized reconstructive strategies.⁶

Modern AWR strategies aim to restore anatomical and functional continuity while minimizing recurrence and prosthetic-related complications. The advent of component separation techniques (CST), biologic and biosynthetic meshes, and prehabilitation protocols has altered reconstructive paradigms.⁷ However, comparative outcomes of synthetic versus biologic prostheses in contaminated fields remain controversial. Biologic meshes, though favoured in high-risk patients, are associated with higher recurrence rates and cost, while synthetic meshes demonstrate superior durability but raise concerns about infection and extrusion.⁸ The significance of optimizing AWR in this patient subset is emphasized by the growing oncologic survivor population and the economic burden of hernia recurrence, estimated to cost healthcare systems billions annually.⁹ A critical appraisal of surgical approaches and material selection is thus warranted to inform evidence-based decision-making and improve long-term outcomes.¹⁰

Objectives

This systematic review evaluates and compares current surgical techniques and prosthetic materials used in AWR among patients with complex hernias post-oncologic surgery, emphasizing outcomes such as recurrence, infection, complications, and length of hospital stay.

METHODS

We followed a systematic strategy to evaluate applicable studies regarding abdominal wall reconstruction for patients at high risk or with oncologic conditions so our

research methodology adhered to preferred reporting items for systematic reviews and meta-analyses (PRISMA) principles through a pre-established evaluation framework that focused on ensuring both study credibility and experimental robustness alongside methodological clarity.

Search strategy

A structured search of PubMed, Embase, and Scopus was conducted for articles published between January 2020 and April 2025. The search combined MeSH terms and free-text strings related to hernia repair, oncologic surgery, and surgical techniques.

Table 1: Search strategy.

Search domain	Keywords/MeSH terms
Population	"Abdominal wall hernia", "ventral hernia", "incisional hernia", "oncologic surgery"
Intervention	"Component separation", "transversus abdominis release", "TAR", "anterior component separation", "mesh repair", "biologic mesh", "synthetic mesh", "mesh-free repair"
Technique	"Robotic surgery", "laparoscopic hernia repair", "open hernia repair", "enhanced recovery after surgery", "ERAS protocol"
Outcomes	"Hernia recurrence", "postoperative complications", "surgical site infection", "length of stay"
Study design	"Case report", "cohort study", "randomized controlled trial", "systematic review", "meta-analysis"

Boolean operators (AND/OR) and filters for human studies, English language, and adult subjects were applied. References of included papers were manually screened for additional eligible studies.

Table 2: Inclusion and exclusion criteria.

Inclusion criteria	Exclusion criteria
Adults (>18 years) undergoing abdominal wall reconstruction	Pediatric studies
Oncologic or high-risk surgical cohorts	Studies not reporting surgical outcomes
Comparative studies, RCTs, cohort studies, case reports, systematic reviews	Editorials, commentaries, conference abstracts
Full-text availability in English	Non-English publications
Reporting outcomes such as recurrence, infection, LOS, or complication rates	Lacking primary or extractable outcome data

Risk of bias assessment

Each included study underwent rigorous bias evaluation using design-appropriate tools - observational and case report studies: JBI critical appraisal checklists, non-randomized interventional studies: ROBINS-I, and randomized trials: RoB 2.

Each domain (e.g., confounding, outcome assessment, attrition) was independently scored by two reviewers. Inconsistencies were resolved by consensus. Studies were classified as low, moderate, or high risk of bias based on cumulative domain-level judgments. Missing data, heterogeneity in CT follow-up, and unclear exposure assessment were critically weighted in risk grading. Studies with high-risk bias in core domains (e.g., confounding or outcome measurement) were included for completeness but were caveated in interpretation.

Risk of bias evaluation

Across the included studies, risk of bias varied depending on design, methodology, and assessment tool.

Observational studies assessed with the JBI checklist mainly exhibited moderate risk, primarily due to retrospective designs, incomplete follow-up, partial adjustment for confounders, and limited outcome standardization. Studies such as those by Clark et al and Varsos et al showed high risk in confounding and outcome reliability, while others like Kobayashi et al attempted multivariate analysis but still faced interpretation and follow-up limitations. For non-randomized intervention studies, both ROBINS-I assessments (Deerenberg and Goda) identified moderate overall risk, mostly from intervention heterogeneity and potential residual confounding. Randomized trials (RoB 2) by Lombardo and HART Collaborative showed generally low to moderate risk, with well-conducted randomization and blinding of outcome assessors, but lacked blinding in surgical teams, increasing the chance of performance bias. Silva et al's case report met all JBI criteria, indicating low risk. The systematic review by Anoldo et al, despite mostly sound methodology, had a moderate risk due to missing information on appraisal criteria and lack of publication bias assessment. Overall, while some studies maintained methodological rigor, the majority displayed moderate risk of bias, necessitating cautious interpretation of outcomes.

Table 3: Risk of bias evaluation using JBI checklists.

Author (year)	Tool type	D1: inclusion criteria	D2: exposure measurement	D3: outcome assessment	D4: confounding addressed	D5: follow-up completeness	D6: statistical analysis	Overall risk of bias
Anoldo et al, 2024 ¹¹	JBI – systematic reviews	Yes	Yes (sources adequate)	No (appraisal criteria unclear)	Partially (bias methods partially described)	Yes	Yes	Moderate
Clark et al, 2020 ¹²	JBI – observational	Yes	No (heterogeneous CT)	Partially	No	Not specified	No (qualitative only)	High
Silva et al, 2023 ¹³	JBI – case reports	Yes	Yes	Yes	N/A	Yes	N/A	Low
Lode et al, 2020 ¹⁵	JBI – observational	Yes	Partially (retrospective)	Yes	Partially	Not stated	Yes	Moderate
Fernández et al, 2024 ¹⁸	JBI – observational	Yes	Yes (standardized)	Yes	Partially	Yes (38 months)	Yes	Moderate
Varsos et al, 2024 ¹⁹	JBI – observational	Yes	Yes	Partially (CT for 72 %)	No	No (72.7% had imaging)	Yes	Moderate
Míguez Medina et al, 2025 ²¹	JBI – observational	Yes	Partially	Yes	Partially	No (22 patients excluded)	Yes	Moderate
Kobayashi et al, 2023 ²²	JBI – observational	Yes	Partially (non-radiologist CT)	Yes	Partially	No (44 patients missing CT)	Yes	Moderate

Table 4: Risk of bias evaluation using ROBINS-I and RoB 2 (merged table for non-randomized and RCTs).

Author (year)	Tool type	Confounding	Selection bias	Intervention classification	Deviations from intended interventions	Missing data	Outcome measurement	Reporting bias	Overall risk of bias
Deerenberg et al, 2022 ¹⁴	ROBINS-I	Moderate	Low	Low	Moderate	Moderate	Moderate	Moderate	Moderate
Goda et al, 2022 ²⁰	ROBINS-I	Moderate	Low	Low	Low	Low	Low	Low	Low to moderate
Lombardo et al, 2022 ¹⁶	RoB 2	Low	Low	Low	Some concerns (no blinding)	Low	Some concerns	Low	Low to moderate
HART Collaborative, 2022 ¹⁷	RoB 2	Some concerns (surgeon variability)	Low	Low	Some concerns (performance bias)	Low (16.3% attrition)			

Table 5: Study characteristics.

Author (s)	Year	Study design	Population characteristics	Sample size/ range	Duration/ follow-up	Intervention	Methodology
Anoldo et al ¹¹	2024	Systematic review	Adults with inguinal or ventral hernias	23 studies	Varied across studies	Laparoscopic versus robotic hernia repair	PRISMA-guided, English-only
Clark et al ¹²	2020	Systematic review	Adults undergoing abdominal wall hernia repair	4 studies	Up to 1 year	Body composition analysis	PRISMA-compliant literature review
Silva et al ¹³	2023	Case report	62-year-old female post-oncology surgery	Single patient	5 months	Mesh-free transposition with Arista powder	Hernia sac suturing with relaxing incisions
Deerenberg et al ¹⁴	2022	Systematic review and guideline	Adults undergoing abdominal surgery	39 studies	Up to 2+ years	Surgical techniques, mesh, closure methods	Grade/sign criteria, meta-analyses
Lode et al ¹⁵	2020	Systematic review and meta-analysis	Adults undergoing abdominal wall reconstruction	947 across 5 studies	Not reported	ERAS protocols	Retrospective cohorts, PRISMA/MOOSE compliant
Lombardo et al ¹⁶	2022	Network meta-analysis of RCTs	Adults post-distal gastrectomy for gastric cancer	10 RCTs, 1456 patients	12-month follow-up	5 reconstruction techniques	Pooled RR, WMD, credible intervals
HART Collaborative ¹⁷	2022	Pragmatic multicenter RCT	Colorectal cancer, midline incision	802 patients	1–2 years	Hughes vs. standard closure	Randomized, ITT, blinded
Fernández et al ¹⁸	2024	Retrospective case series	Abdominal wall sarcoma patients	19 (10M, 9F)	Mean 38 months (4–78)	Combined synthetic + biological mesh	Tumor resection + mesh repair

Continued.

Author (s)	Year	Study design	Population characteristics	Sample size/ range	Duration/ follow-up	Intervention	Methodology
Varsos et al¹⁹	2024	Retrospective case-series	Upper GI cancer patients	44	12 months	Onlay synthetic mesh augmentation	Retrospective review, CT follow-up
Goda et al²⁰	2022	Prospective comparative study	Large ventral abdominal hernia (≥ 10 cm)	80 (40 ACS, 40 TAR)	12 months	TAR versus ACS	Sequential allocation, CT follow-up
Míguez Medina et al²¹	2025	Retrospective cohort study	Advanced ovarian cancer, post-cytoreduction	156	Up to 3 years	ERAS versus non-ERAS	CT-confirmed diagnosis, multivariate regression
Kobayashi et al²²		Retrospective study	Those who were diagnosed with incisional hernia and who underwent LC for colorectal cancer	47 cases	1 year	Postoperative CT surveillance used to detect incisional hernias after colectomy	Retrospective CT review of patients post-laparoscopic colectomy for cancer.

Table 6: Results and quantitative data.

Author(s)	Primary outcome(s)	Secondary outcome(s)	Quantitative data	Main findings/key takeaways	Limitations / biases
Anoldo et al¹¹	Hospital stay, pain, recurrence; robotic=less pain	Cost, operative time; robotic=longer time, higher costs	No unified pooled data	Robotic has less pain, shorter stays, but costs more	Heterogeneity; English-only; cost bias
Clark et al¹²	Sarcopenia and recurrence risk (2 studies)	LOS, ileus, SSI, readmission	None pooled	Sarcopenia linked to worse outcomes	Outdated definitions; heterogeneity
Silva et al¹³	No recurrence or surgical complications	Hepatic function worsened then resolved	Hernia: 12×10 cm; CT on day 6	Mesh-free feasible in high-risk case	Single case; no comparator; short follow-up
Deerenberg et al¹⁴	Hernia reduction (RR 0.35, 95% CI 0.21–0.57)	SSI: 5.0% versus 11.4%, $p<0.001$	Hernia: 4.3% (lap) versus 10.1% (open), $p<0.001$	Non-midline and prophylactic mesh reduce hernia	Low evidence quality; heterogeneity
Lode et al¹⁵	LOS reduced by 0.89 days ($p=0.03$)	No difference in readmission, SSI/SSO ($p>0.5$)	LOS: -0.89 (CI -1.70 to -0.07), $p=0.03$; ORs for SSI and readm. >1.0 , $p>0.5$	ERAS lowers LOS without $\uparrow$ complications	Retrospective, heterogeneous, limited follow-up
Lombardo et al¹⁶	Remnant gastritis reduced in RY (RR=0.56, CrI 0.35–0.76)	No mortality or complication difference	RR=0.56; CI 0.35–0.76; no p-value	RY lowers remnant gastritis versus BI	Trend-only; lacks long-term data
HART Collaborative¹⁷	1-year hernia: 14.8% versus 17.1% (OR 0.84, $p=0.402$)	2-year: 28.7% versus 31.8% (OR 0.86, $p=0.429$); SSI higher in Hughes ($p=0.011$)	Closure time: 20 versus 11 min, $p<0.001$	No hernia rate difference; Hughes=more SSI	Surgeon variance; few emergencies
Fernández et al¹⁸	Complications in 31.5% (6/19)	0% hernia recurrence; LOS 15.3 days	Defect: 262.8 cm ² (150–600)	Low recurrence; manageable complications	Retrospective; small size; no control group

Continued.

Author(s)	Primary outcome(s)	Secondary outcome(s)	Quantitative data	Main findings/key takeaways	Limitations / biases
Varsos et al¹⁹	0% hernia recurrence versus historical	3 seromas, 2 mesh removals	Albumin: 4.1 (2.9–4.8) mg/dl	Mesh effective, minor complications	Retrospective; small sample; selection bias
Goda et al²⁰	Recurrence: TAR 2.5% versus ACS 22.5%, $p<0.001$	Wound complications: TAR 22.5% versus ACS 65%, $p<0.05$	Time: TAR 226±51.9 min versus ACS 215.4±52.4, NS	TAR reduces recurrence and wound issues	Non-randomized; single center; short follow-up
Míguez Medina et al²¹	Hernia rate: 19.2% (overall); ERAS: 10.1% versus 28.8%, $p=0.008$	Symptomatic hernias: 10%; dehiscence: 34.4% (non-ERAS) versus 15.0%, $p=0.026$	Smoking RR: 10.84 (CI 2.76–42.64); ERAS RR: 0.22 (CI 0.08–0.61)	ERAS reduces hernias; smoking ↑ risk	Retrospective; possible technique bias
Kobayashi et al²²	Hernia incidence with CT surveillance	Risk factor analysis: SSI, female sex, BMI	Not specified	Risk factors for incisional hernia identified	Limited generalizability; no intervention tested

RESULTS

The studies collectively highlight that optimization of abdominal wall reconstruction in complex hernia cases post-oncologic surgery relies on appropriate surgical techniques, tailored use of prosthetic materials, and enhanced recovery protocols. Robotic approaches were shown to reduce postoperative pain and hospital stay, though with increased costs and operative time. Enhanced recovery after surgery (ERAS) protocols consistently decreased length of stay and hernia incidence (10.1% with ERAS versus 28.8% without, $p=0.008$), indicating significant postoperative benefit. Prophylactic mesh placement and non-midline incisions reduced hernia formation risk (RR 0.35, CI 0.21–0.57), while the TAR technique significantly outperformed ACS in recurrence rates (2.5% versus 22.5%, $p<0.001$) and wound complications. Combined synthetic-biologic meshes in oncologic sarcoma patients showed 0% recurrence with acceptable complication rates. Sarcopenia emerged as a risk factor for poor outcomes, emphasizing the need for preoperative nutritional assessment. Although some techniques like mesh-free repair were feasible in high-risk patients, results were case-specific. Overall, tailored technique selection favouring TAR, prophylactic mesh, and ERAS implementation along with patient risk stratification, optimizes outcomes by minimizing recurrence, complications, and recovery time. Limitations across studies include retrospective designs, heterogeneous populations, and lack of long-term follow-up, but the cumulative data support specific, evidence-based optimization strategies.

DISCUSSION

The optimization of AWR in oncologic patients with complex hernias remains a multifaceted challenge due to patient comorbidities, prior surgeries, and increased risk

for complications. Recent literature provides insights into surgical techniques, prosthetic materials, and perioperative strategies that influence outcomes. Robotic approaches, as analyzed by Anoldo et al, appear to offer significant clinical advantages such as reduced postoperative pain and shorter hospital stays compared to laparoscopic repair.¹¹ However, these benefits are offset by longer operative times and higher associated costs. Additionally, while some studies within the review suggested lower recurrence and reoperation rates with robotic procedures, the heterogeneity of data and absence of pooled statistics limit the generalizability of findings. Thus, robotic AWR may be best reserved for institutions with appropriate resources and skilled surgical teams. Patient-specific risk factors, such as sarcopenia, also critically affect outcomes. Clark et al highlighted that sarcopenia is associated with increased recurrence and prolonged hospitalization.¹² However, inconsistent definitions and imaging protocols prevented statistical synthesis. This underscores the need for standardized criteria for sarcopenia assessment to better guide risk stratification and prehabilitation strategies. Innovative approaches for high-risk patients have shown promise. Silva et al reported a successful case using mesh-free hernia sac transposition with hemostatic agents in a hepatopathic oncologic patient, achieving favourable outcomes without recurrence over five months.¹³ While encouraging, this technique lacks long-term data and broader validation. Guideline updates by Deerenberg et al support laparoscopic repair and prophylactic mesh placement to reduce hernia and surgical site infection (SSI) rates.¹⁴ Techniques such as small-bite suturing with slowly absorbable material have demonstrated improved midline closure integrity. These findings advocate for technique standardization, although applicability in emergency or oncologic scenarios requires further study. ERAS protocols play a crucial role in postoperative outcomes. Lode et al and Míguez Medina et al both found ERAS significantly reduced hospital stay and hernia rates, especially in gynecologic oncology

populations.^{15,21} The protective effect of ERAS, coupled with modifiable risk factor management like smoking cessation, should be integrated into standard AWR care pathways. Prosthetic choice remains pivotal. Dual-mesh reconstruction, as evaluated by Fernández et al offered durability without hernia recurrence in sarcoma patients, though complication risks necessitate cautious patient selection.¹⁸ Similarly, Varsos et al demonstrated that prophylactic synthetic mesh significantly reduced hernia rates in upper GI cancer patients, with minimal adverse events, reinforcing its utility in high-risk oncologic closures.¹⁹ Among reconstructive techniques, Goda et al identified transversus abdominis release (TAR) as superior to anterior component separation (ACS), reporting lower recurrence and complication rates.²⁰ These findings support the preferential use of TAR for large, complex defects. Kobayashi et al highlighted both early detection of incisional hernias by CT surveillance and identified SSI along with female sex and elevated BMI as the main risk factors. Postoperative surveillance and specific prevention strategies must be implemented due to the need for proper monitoring.

AWR for patients who had complex hernias after oncologic surgery presents itself as a complex challenge because it demands appropriate surgical techniques matched with the right materials. Component separation techniques (CST) have emerged as central procedures for managing big defects among oncologic patients whose tissue planes suffered damage. Research demonstrated that component separation technique lowers fascial stress during closure while decreasing the risk of hernia return which proves its essential value in advanced reconstructive procedures.²¹⁻²³

Material choice significantly influences outcomes. The research by Najm et al shows that biologic meshes should be preferred for contaminated or irradiated areas because they integrate better with tissue and decrease infection rates although they cost more.²⁴ According to Saiding et al medical researchers studied drug-eluting and biodegradable meshes as potential options in hernia repair but more time is necessary to validate their effectiveness.²⁵ Advanced material technology shows early indications for a better future of reconstructive healthcare because it reduces patient complications from infections and mesh rejection. Continuous progress exists in the development of fixation techniques for hernia mesh repair. Research conducted by Ali et al indicated that adhesive mesh fixation combined to suture mesh resulted in diminished operation durations yet produced equivalent continued recurrence of hernias.²⁶ The particular tissue condition of oncologic patients might necessitate specific analysis because their tissue integrity differs from that of other patients. The combination of CST with mesh reinforcement has demonstrated excellent potential for surgical site outcome prevention according to Nockolds et al.²⁷ Robotic and laparoscopic surgical techniques have become the new method for addressing less severe defects yet they still maintain their position as second options to

traditional approaches due to their ability to minimize postoperative complications.²⁸ Personalization stands as the basis for selecting the optimal strategy. The treatment protocol requires adaptation for patients with prior radiation therapy and immunocompromised status and poor tissue quality because it must unify mechanical stability with biological tissue adhesion.

CONCLUSION

A comprehensive approach based on evidence and specific to patient risk characterization and surgical circumstances defines the treatment of complex hernias following oncologic surgery in the abdominal wall. Both TAR and prophylactic mesh placement along with ERAS protocols establish themselves as proven methods for lowering hernia recurrence and complications when combined. Biologic meshes work well in contaminated fields but synthetic options provide the best durability in suitable cases. Robotic procedures enhance postoperative patient results yet they demand higher expenditures. Patients who have sarcopenia or malnutrition before surgery show major effects on postoperative results thus such conditions should define strategies for improvement. Ongoing comparative research about reconstructive algorithms must continue because it helps both improve long-term functional and oncologic results in this population with high risk.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: Not required

REFERENCES

1. Boutros C, Somasundar P, Espat NJ. Early results on biomaterials as adjuvant to abdominal wall closure following cytoreduction and HIPEC. *World J Surg Oncol.* 2010;8(72).
2. Ngaage LM, Hammad AY, Kumar AS, Vandevender D, Holihan JL, Kao LS, et al. Outcomes of complex abdominal wall reconstruction at the time of CRS and HIPEC. *Surg Oncol.* 2019;30:113-9.
3. Shi H, Wang R, Dong W, Yang D, Song H, Gu Y. Synthetic Versus Biological Mesh in Ventral Hernia Repair and Abdominal Wall Reconstruction: A Systematic Review and Recommendations from Evidence-Based Medicine. *World J Surg.* 2023;47(10):2416-24.
4. Frountzas M, Tzivanakis E, Nikolaou C, Tzovaras G, Gkouziouta A, Kalles V, et al. Synthetic vs. biologic mesh for AWR in contaminated surgical fields: Meta-analysis. *Hernia.* 2024;29(1):43.
5. Núñez MF, Ortega-Deballon P, Gómez F, Álvarez A, Jover J, Pérez I, et al. Morbidity of abdominal wall resection and reconstruction post CRS/HIPEC. *Ann Surg Oncol.* 2015;22(2):621-7.
6. Bueno-Lledó J, Torregrosa A, Carbonell-Tatay F, Planells M, Pastor PG, García-Botello S, et al. Prophylactic use of negative pressure wound therapy

- in abdominal wall surgery. *Surgery*. 2023;174(2):498-506.
7. Parikh R, Shah S, Dhurandhar V, Alzahrani N, Fisher OM, Arrowaili A, et al. An analysis of the morbidity associated with abdominal wall resection and reconstruction after cytoreductive surgery and hyperthermic intraperitoneal chemotherapy (CRS/HIPEC). *Eur J Surg Oncol*. 2019;45(3):394-9.
 8. Chapman SJ, Patel RK, Ho A, Sinha R, Winslet MC, Windsor AC, et al. Stage of innovation of biologic mesh for contaminated closure. *BJS Open*. 2018;2(6):371-9.
 9. Lambrecht JR. Anterior abdominal wall hernia in adults: Clinical studies on treatment and prevention. University of Oslo Dissertation. 2016. Available at: <https://www.duo.uio.no/handle/10852/51871>. Accessed on 15 March 2025.
 10. Struller F, Horvath P, Solass W, Horvath M, Königsrainer A, Reymond MA. Abdominal wall morbidity post CRS and HIPEC. *Scand J Surg*. 2017;106(2):146-52.
 11. Anoldo P, Manigrasso M, D'Amore A, Musella M, De Palma GD, Milone M. Abdominal Wall Hernias—State of the Art of Laparoscopic versus Robotic Surgery. *J Pers Med*. 2024;14(100).
 12. Clark ST, Malietzis G, Grove TN, Jenkins JT, Windsor ACJ, Kontovounisios C, Warren OJ. The emerging role of sarcopenia as a prognostic indicator in patients undergoing abdominal wall hernia repairs: a systematic review of the literature. *Hernia*. 2020;24:1361-70.
 13. Silva TS, Martins MR, Batista TL, Martins ED, Fernandes MH, Hinrichsen EA. Case report: Abdominal wall reconstruction in a high-risk patient with incisional hernia and complications from oncological treatment. *J Abdom Wall Surg*. 2023;2:11767.
 14. Deerenberg EB, Henriksen NA, Antoniou GA, Antoniou SA, Bramer WM, Fischer JP, et al. Updated guideline for closure of abdominal wall incisions from the European and American Hernia Societies. *Br J Surg*. 2022;109(12):1239-50.
 15. Lode L, Oma E, Henriksen NA, Jensen KK. Enhanced recovery after abdominal wall reconstruction: a systematic review and meta-analysis. *Surg Endosc*. 2020;35(2):514-23.
 16. Lombardo F, Aiolfi A, Bona D, Brachet Contul R, Asti E, Bonavina L. Techniques for reconstruction after distal gastrectomy for cancer: Updated network meta-analysis of randomized controlled trials. *Langenbecks Arch Surg*. 2022;407(1):75-86.
 17. HART Collaborative. Incisional hernia following colorectal cancer surgery according to suture technique: Hughes Abdominal Repair Randomized Trial (HART). *Br J Surg*. 2022;109(10):943-50.
 18. Fernández JA, Alconchel F, Frutos MD, Gil E, Gómez-Valles P, Gómez B, et al. Combined use of composite mesh and acellular dermal matrix graft for abdominal wall repair following tumour resection. *World J Surg Oncol*. 2024;22(1):226.
 19. Varsos P, Seretis F, Theodorou A, Pachos N, Kitsou E, Saliaris K, et al. Prophylactic mesh augmentation of midline closure in patients undergoing resection for upper gastrointestinal cancer reduces the rate of incisional hernia: Results of a case-series study. *J Abdom Wall Surg*. 2024;3:13533.
 20. Goda MH, Abdelrahim HS, Elmaleh HM, Amer AF, Fadl EMA. Transversus abdominis release versus anterior component separation in ventral abdominal hernia: A prospective comparative study. *Surg Gastroenterol Oncol*. 2022;27(3).
 21. Míguez Medina M, Luzarraga A, Catalán S, Acosta Ú, Hernández-Fleury A, Bebia V, et al. Incisional hernia in cytoreductive surgery for advanced-stage ovarian cancer: A single-center retrospective study. *Cancers*. 2025;17(3):418.
 22. Kobayashi T, Miki H, Yamamoto N, Hori S, Hatta M, Hashimoto Y, et al. Retrospective study of an incisional hernia after laparoscopic colectomy for colorectal cancer. *BMC Surg*. 2023;23(1):314.
 23. Hhansa I, Janis JE. Modern reconstructive techniques for abdominal wall defects after oncologic resection. *J Surg Oncol*. 2015;111(5):587-98.
 24. Najm A, Niculescu AG, Gaspar BS, Grumezescu AM. A review of abdominal meshes for hernia repair—current status and emerging solutions. *Materials*. 2023;16(22):7124.
 25. Saiding Q, Chen Y, Wang J, Pereira CL, Sarmento B. Abdominal wall hernia repair: from prosthetic meshes to smart materials. *Mater Today Bio*. 2023;21:100702.
 26. Ali M, Mena J, Azir E, Ahmed R. Suturing versus adhesion for mesh fixation in ventral hernia repair and abdominal wall reconstruction: a systematic review and network meta-analysis. *Cureus*. 2024;16(2):e51324.
 27. Nockolds CL, Hodde JP, Rooney PS. Abdominal wall reconstruction with component separation and mesh reinforcement in complex hernia repair. *BMC Surg*. 2014;14:25.
 28. Anoldo P, Manigrasso M, D'Amore A, Musella M, De Palma GD, Milone M. Abdominal Wall Hernias-State of the Art of Laparoscopic versus Robotic Surgery. *J Pers Med*. 2024;14(1):100.

Cite this article as: Mercado ZADAG, Zuluaga MZ, Muriel SZ, Gómez MAP, Soto SAR, Aranda ERP, et al. Optimization of abdominal wall reconstruction in patients with complex hernia after oncologic surgery: comparative analysis of surgical techniques and prosthetic materials - a systematic review. *Int J Res Med Sci* 2025;13:2545-52.