Biosynthetic Versus Synthetic Mesh in Oncologic Ventral Hernia Repair

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Background

- Ventral hernia repair in oncologic patients is challenging due to poor tissue quality, immunosuppression, malnutrition, and prior operations.
- Synthetic and biologic meshes offer advantages and disadvantages, including strength and resistance to contamination
- Biosynthetic mesh material, such as that composed of poly-4-hydroxybutyrate (P4HB), represents an alternative to standard allo- and xenograft implants, and are designed to combine synthetic materials' durability with biologics' biocompatibility
- There is a lack of comparative studies directly evaluating outcomes of biosynthetic vs. synthetic meshes in cancer patients

Objectives

Compare hernia recurrence and surgical risk factors in oncologic patients undergoing hernia repair with either biosynthetic or synthetic mesh reinforcement following prior abdominal or pelvic oncologic resection

Methods

Study population:

Patients > ≥ 18 years of age

Retrospective review, 2010-2023

Inclusion:

Prior history of abdominal or pelvic oncologic resection, which was complicated by hernia development and subsequently underwent repair with either biosynthetic or synthetic mesh

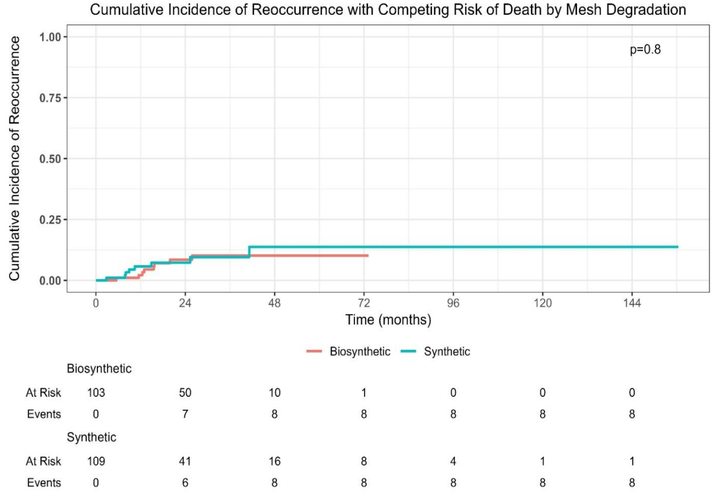
Results

Table 1. Operative Details

Characteristic	Biosynthetic, N=103	Synthetic , N=109	p-value
ASA Class			0.5
II	6 (5.8%)	9 (8.3%)	
III	79 (77%)	86 (79%)	
IV	18 (17%)	14 (13%)	
Concomitant Urologic Procedure	8 (7.8%)	4 (3.7%)	0.2
Concomitant Gynecologic Procedure	14 (14%)	5 (4.6%)	**0.022**
Concomitant Large Bowel Procedure	16 (16%)	6 (5.5%)	0.017
Concomitant Small Bowel Procedure	7 (6.8%)	2 (1.8%)	0.094
Wound Class			**0.011**
Clean (I)	49 (48%)	75 (69%)	
Clean/Contaminated (II)	45 (44%)	29 (27%)	
Contaminated (III)	8 (7.8%)	4 (3.7%)	
Dirty/Infected (IV)	1 (1.0%)	1 (0.9%)	
Wound Class (Clean vs. Contaminated)			**0.002**
I	49 (48%)	75 (69%)	
II-IV	54 (52%)	34 (31%)	
Unilateral External Oblique Release	13 (13%)	15 (14%)	0.8
Bilateral External Oblique Release	71 (69%)	46 (42%)	**<0.001**
Unilateral Tranvsere Rectus Abdominus Release	0 (0%)	6 (5.5%)	**0.029**
Bilateral Tranvsere Rectus Abdominus Release	1 (1.0%)	8 (7.3%)	**0.036**
Depth of Mesh Placement			0.068
Onlay	22 (21%)	24 (22%)	
Retrorectus	70 (68%)	61 (56%)	
Underlay	11 (11%)	24 (22%)	
History of Ostomy	9 (8.7%)	5 (4.6%)	0.2
Ostomy at Time of Surgery	22 (21%)	9 (8.3%)	**0.007**

Table 2. Univariable Fine-Gray Competing Risk Regression Models for Reoccurrence with competing risk of death

Characteristic	N	Event, N	HR[1]	95% CI[1]	p-value
Age at Surgery	212	16	1.01	0.96, 1.05	0.8
Body Mass Index	**212**	**16**	**1.08**	**1.02, 1.14**	**0.005**
Smoking Status					
Never Smoker	173	13	—	—	
Former Smoker	28	2	0.84	0.21, 3.37	0.8
Unknown Smoker Status	11	1	1.05	0.15, 7.55	>0.9
Radiation History	**212**	**16**	**3.14**	**1.13, 8.71**	**0.028**
Chemotherapy	212	16	0.77	0.29, 2.04	0.6
Prior Hernia Repair	212	16	1.53	0.54, 4.34	0.4
Mesh Degradation					
Biosynthetic	103	8	—	—	
Synthetic	109	8	1.17	0.45, 3.03	0.8
Wound Class,					
I	124	2	—	—	
II-IV	**88**	**14**	**8.23**	**1.89, 35.8**	**0.005**
Unilateral External Oblique	**212**	**16**	**4.26**	**1.49, 12.2**	**0.007**
Bilateral External Oblique	**212**	**16**	**0.24**	**0.08, 0.75**	**0.014**
Depth of Mesh Placement					
Onlay	46	9	—	—	
Retrorectus	**131**	**2**	**0.09**	**0.02, 0.41**	**0.002**
Underlay	35	5	0.81	0.27, 2.47	0.7
Ostomy at Time of Surgery	212	16	2.24	0.80, 6.27	0.12



Conclusion

- Biosynthetic & synthetic mesh are both effective options for ventral hernia repair in oncologic patients
- Retrorectus mesh placement and bilateral component separation are critical in reducing hernia recurrence risk in oncologic hernia repair
- Radiation increases the risk of hernia recurrence following repair

References

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