

Biologic Versus Synthetic Mesh For Chest Wall Reconstruction: A Systematic Literature Review

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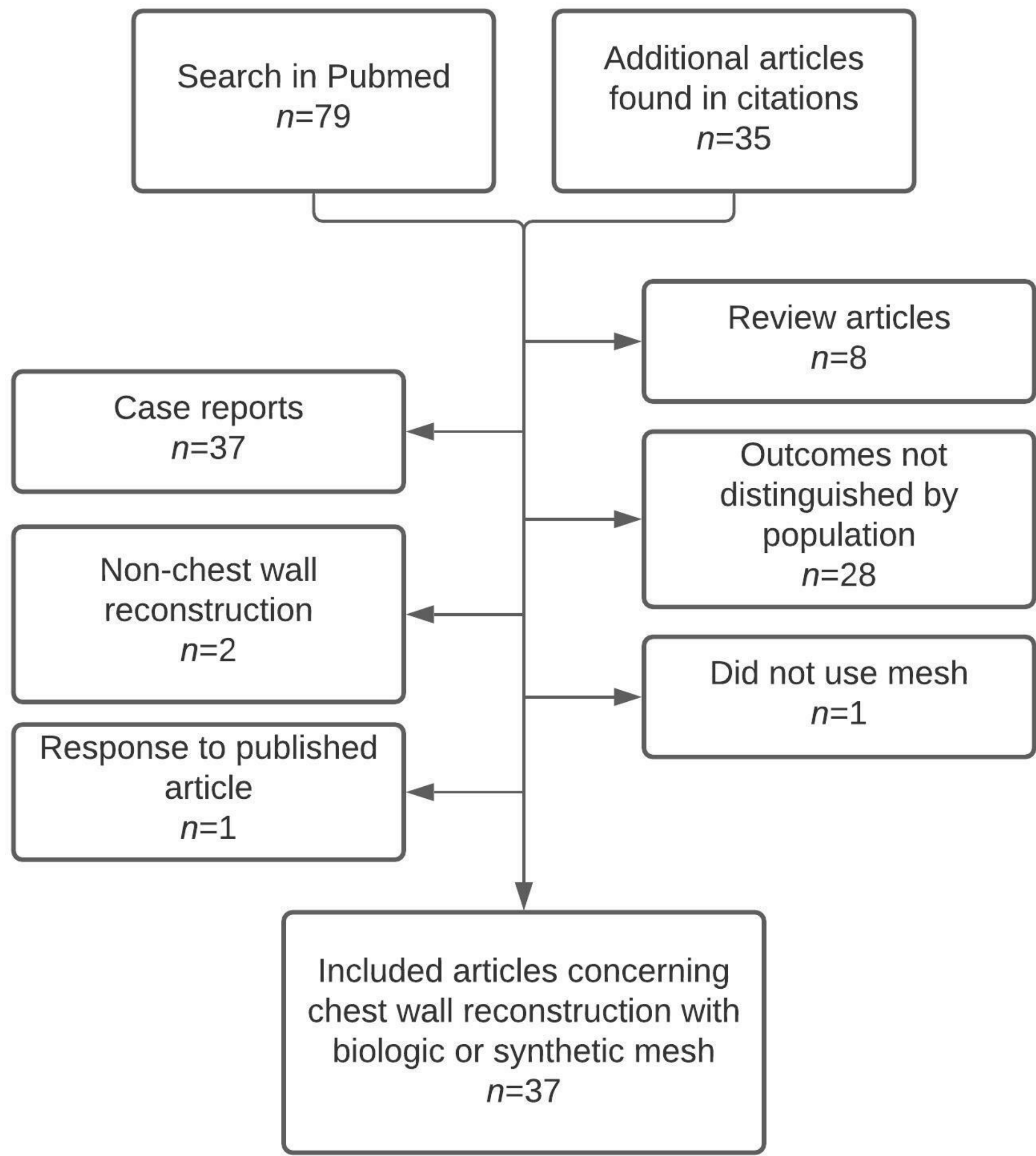


Introduction

- Few studies have compared the use of biologic materials to traditional synthetic materials for chest wall reconstruction
- It remains unknown whether synthetic or biologic materials have superior clinical outcomes
- In the first systematic review of its kind, we analyze 37 published articles totaling 838 patients to determine differences in clinical outcomes and complication rates in biologic versus synthetic mesh chest wall reconstruction

Methods

- A systematic review was conducted according to PRISMA guidelines
- A PubMed database search was performed
- Only studies investigating the use of either synthetic mesh or biologic mesh for the reconstruction of full-thickness chest wall defects were included
- Case reports, literature reviews, non-English studies, studies in non-human subjects, and studies without stratification of outcomes were excluded



Results

- 37 studies met inclusion criteria
- 838 total study participants were pooled into 2 groups:
 - Biologic mesh (287)
 - Synthetic mesh (551)

Table 1: Surgical site complication rates by type of mesh implanted

Group	Seroma <i>n</i> (%)	Hematoma <i>n</i> (%)	Dehiscence <i>n</i> (%)	Infection <i>n</i> (%)	Reoperation <i>n</i> (%)	Explantation <i>n</i> (%)
Biologic	7 (2.4) *	7 (2.4)	5 (1.7)	21 (7.3)	9 (3.1) *	2 (0.7) **
Synthetic	31 (5.6)	11 (2.0)	12 (2.2)	56 (10.2)	43 (7.8)	30 (5.4)
p-value:	0.041	0.670	0.682	0.197	0.011	0.001

Table 2: Respiratory complication rates by type of mesh implanted

Group	Respiratory failure <i>n</i> (%)	Atelectasis <i>n</i> (%)	Pleural effusion <i>n</i> (%)	Pneumonia <i>n</i> (%)	Persistent Air Leak <i>n</i> (%)	Paradoxical movement <i>n</i> (%)
Biologic	3 (1.0)	0 (0.0) *	3 (1.0)	5 (1.7)	3 (1.0)	0 (0.0) *
Synthetic	8 (1.4)	12 (2.2)	3 (0.5)	16 (2.9)	4 (0.7)	13 (2.4)
p-value:	0.632	0.013	0.412	0.319	0.626	0.009

Table 3: Overall complication rates by type of mesh implanted

Group	Surgical Site Complications <i>n</i> (%)	Respiratory Complications <i>n</i> (%)	Any Complication <i>n</i> (%)
Biologic	48 (16.7) *	15 (5.2) *	63 (22.0) **
Synthetic	147 (26.7)	58 (10.5)	205 (37.2)
p-value:	0.005	0.014	0.0002

*p < 0.05
**p < 0.005

Results (cont.)

- Biologic group exhibited lower rates of:
 - Seroma
 - Reoperation
 - Explantation
 - Atelectasis
 - Paradoxical chest wall movement
 - Surgical site complications
 - Respiratory complications
 - Total complications

Discussion

- This study demonstrates significant benefit in clinical outcomes with the use of biologic mesh in chest wall reconstruction
- Lower rates of surgical site complications in the biologic group support improved wound healing, resistance to infection, and decreased likelihood of explantation or reoperation in biologic meshes
- Respiratory outcomes were also improved in the biologic group, despite the theoretical advantage of the longer-lasting structural support provided by synthetic materials
- As a systematic review, this study is limited by the variability of its sources, sacrificing granularity of detail and homogeneity for increased sample size

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