Biologic versus nonbiologic mesh in ventral hernia repair: a systematic review and meta-analysis

Darehzereshki A, Goldfarb M, Zehetner J, Moazzez A, Lipham JC, Mason RJ, Katkhouda N

CRD summary
The authors concluded that use of biologic mesh resulted in fewer infectious wound complications but had similar recurrence rates compared to non-biologic mesh in patients who underwent ventral hernia repair. The authors' conclusion and recommendations for practice seem overly confident given that the review included highly variable studies with inherent methodological biases and unclear generalisability of the findings.

Authors' objectives
To compare the effectiveness of biologic versus non-biologic mesh in patients undergoing ventral hernia repair.

Searching
PubMed/MEDLINE and Cochrane CENTRAL databases and Google Scholar were searched for studies published in English between January 1990 and January 2012. Search terms were reported. Relevant articles and reference lists were screened for additional studies.

Study selection
Eligible studies were clinical trials, prospective or retrospective cohort studies and case control designs. Eligible participants underwent ventral hernia repair or abdominal wall reconstruction using biologic versus non-biologic mesh, or human-derived biologic mesh versus porcine-derived biologic mesh. Studies had to report at least one outcome (rates of hernia recurrence or wound complications) for both biologic and non-biologic mesh.

Studies were excluded if mesh was applied in a grossly contaminated field (defined in the paper); hernia repair was carried out primarily with sutures; both types of mesh were used; mesh was used with a distant autologous tissue flap; or where non-commercially available biologic grafts were applied.

Most included studies were retrospective designs and most used AlloDerm as the biologic mesh. Recurrence was defined as any reported repair failure. Wound complications could be infectious or non-infectious (defined in the paper).

It appeared than more than one reviewer selected studies for inclusion. Discrepancies were resolved by discussion and consensus.

Assessment of study quality
Study quality was assessed informally using a range of criteria for follow-up, mesh characteristics, completeness of outcome data, selective reporting and other methodological weaknesses related to heterogeneity.

It was unclear how many reviewers carried out the quality assessment.

Data extraction
Data were extracted to enable calculation of odds ratios and 95% confidence intervals.

It was unclear how many reviewers carried out data extraction.

Methods of synthesis
Pooled odds ratios were calculated in a random-effects meta-analysis (Mantel-Haenszel). Statistical heterogeneity was assessed using X² and I² statistics. Subgroup analyses were carried out for patients who received a mesh with or without a component separation technique and for those who received human-derived versus porcine-derived biologic mesh. Publication bias was investigated in funnel plots.

Results of the review
Twelve studies were included in the review. Eight studies (889 participants, range 27 to 545) compared biological versus non-biologic mesh. Four studies (235 participants, range four to 113) compared human versus porcine biologic mesh. All studies contained biases associated with retrospective designs. Follow-up was variably reported (up to 66 months).

In terms of hernia recurrence there was no statistically significant difference between biologic and non-biologic mesh (eight studies; $I^2=82\%$).

For infectious wound complications, a statistically significant difference in favour of biologic mesh was reported (OR 0.18, 95% CI 0.09 to 0.37; eight studies; no heterogeneity $I^2=0\%$) but only three studies had any events. There was no difference in non-infectious wound complications.

No statistically significant differences in hernia recurrence or wound complications were found when human-derived versus porcine-derived biologic mesh were compared (high heterogeneity reported).

Subgroup analysis did not reveal any statistically significant differences (high heterogeneity). The authors appeared to conclude that funnel plots showed evidence of possible publication bias.

**Authors’ conclusions**

Use of biologic mesh for ventral hernia repair resulted in fewer infectious wound complications but similar recurrence rates compared to non-biologic mesh.

**CRD commentary**

The review question was clear. Inclusion criteria were sufficiently defined. Relevant sources were searched to identify the included studies. Publication and language biases were possible so relevant studies might have been overlooked. The review process was reported sparsely; it was unclear whether attempts were made to minimise error and bias at the data extraction and quality assessment stages.

The authors acknowledged that the included study designs carry inherent biases and therefore limit the reliability of this review. The absence of participant characteristics and substantial variation on other aspects of the studies mean that generalisability of the findings is unclear. The authors’ conclusion and recommendations for practice seem overly confident given these limitations. Recommendations for research seem justified.

**Implications of the review for practice and research**

**Practice:** The authors stated that the review findings support application of biologic mesh for ventral hernia repair in high-risk patients or patients with a history of wound infection only when the significant additional cost of these materials can be justified and where synthetic mesh is not appropriate.

**Research:** The authors stated that a large randomised controlled trial may be required to evaluate the various available biologic mesh products and future cost-benefit analyses are needed.

**Funding**

Not stated.

**Bibliographic details**


**PubMedID**

24101015

**DOI**

10.1007/s00268-013-2232-1

**Original Paper URL**

Database of Abstracts of Reviews of Effects (DARE)

**Indexing Status**
Subject indexing assigned by NLM

**MeSH**
Bioprosthesis; Hernia, Ventral /surgery; Herniorrhaphy /methods; Humans; Prosthesis Design; Surgical Mesh

**AccessionNumber**
12013059848

**Date bibliographic record published**
31/10/2013

**Date abstract record published**
10/01/2014

**Record Status**
This is a systematic review that meets the criteria for inclusion on DARE.