

Available online at [www.sciencedirect.com](http://www.sciencedirect.com)

ScienceDirect

journal homepage: [www.JournalofSurgicalResearch.com](http://www.JournalofSurgicalResearch.com)

# Mesh reinforcement for the prevention of incisional hernia formation: a systematic review and meta-analysis of randomized controlled trials

Xi-Chen Wang, MM,<sup>a,b</sup> Dan Zhang, MM,<sup>a,b</sup> Zeng-Xi Yang, MM,<sup>a,b</sup>  
Jian-Xin Gan, MM,<sup>a,b</sup> and Lan-Ning Yin, MM, PhD<sup>a,b,\*</sup>

<sup>a</sup>Department of General Surgery, Lanzhou University Second Hospital, Lanzhou, Gansu Province, China

<sup>b</sup>Key Laboratory of Digestive System Tumors of Gansu Province, Lanzhou, Gansu Province, China

## ARTICLE INFO

### Article history:

Received 6 July 2016

Received in revised form

4 September 2016

Accepted 27 September 2016

Available online 4 October 2016

### Keywords:

Surgical mesh

Incisional hernia

Meta-analysis

Randomized controlled trials

## ABSTRACT

**Background:** European Hernia Society guidelines suggested that the evidence of mesh augmentation for the prevention of incisional hernia (IH) was weak. In addition, previous systematic reviews seldom focused on quality of life and cost-effectiveness related to mesh placement. Therefore, an updated meta-analysis was performed to clarify quality of life, cost-effectiveness, the safety, and effectiveness of mesh reinforcement in preventing the incidence of IH.

**Methods:** Embase, Pubmed, and the Cochrane library were searched from the inception to May 2016 without language limitation for randomized controlled trials (RCTs) which explored mesh reinforcement for the prevention of IH in patients undergoing abdominal surgeries.

**Results:** Twelve RCTs totaling 1661 patients (958 in mesh, 703 in nonmesh) were included in our study. Compared with nonmesh, mesh reinforcement can effectively decrease the incidence of IH (relative risk: 0.19; 95% CI: 0.09-0.42). Besides, mesh placement was associated with improved quality of life, a higher rate of seroma (relative risk: 1.64; 95% CI: 1.13-2.37), and longer operating time (mean difference: 17.62; 95% CI: 1.44-33.80). No difference can be found between both groups in postoperative overall morbidity, systemic postoperative morbidity, wound-related morbidity, surgical site infection, hematoma, wound disruption, postoperative mortality, and length of hospital stay.

**Conclusions:** Prophylactic mesh reinforcement may be effective and safe to prevent the formation of IH after abdominal surgery, without impairing quality of life. Thus, preventive mesh should be routinely recommended in high-risk patients.

© 2016 Elsevier Inc. All rights reserved.

## Introduction

Nearly 14.5% incisional hernia (IH) happened in patients who are undergoing abdominal operation 1-y postoperatively,<sup>1,2</sup>

especially in open bariatric surgery and abdominal aortic aneurysm surgery,<sup>3,4</sup> which was usually associated with increased readmission rate and hospital cost,<sup>5</sup> diminished quality of life,<sup>6</sup> and extended economic burden.<sup>7</sup> If the rate of

The Chief Editor for the article was X-C.W. Department of General Surgery, Lanzhou University Second Hospital, Lanzhou, 730030, Gansu Province, China. Tel: +8613919881448; E-mail address: [wangxichen182@163.com](mailto:wangxichen182@163.com).

\* Corresponding author. Department of General Surgery, Lanzhou University Second Hospital, Lanzhou 730030, Gansu Province, China. Tel.: +8613909465749; fax: +860931891222.

E-mail address: [yinlanning@163.com](mailto:yinlanning@163.com) (L.-N. Yin).

0022-4804/\$ – see front matter © 2016 Elsevier Inc. All rights reserved.

<http://dx.doi.org/10.1016/j.jss.2016.09.055>

IH can be decrease to 5% after abdominal surgery in France, a total of 4 million Euros have been saved in 2011.<sup>7</sup> Generally, complicated and multifactorial risk factors can promote the formation of IH after abdominal surgery, which involving midline incision, body mass index (BMI)  $\geq 25$  kg/m<sup>2</sup>, advanced age, chronic obstructive pulmonary disease, and incisional surgical-site infection, and so on.<sup>8,9</sup> Sequentially, patients with these perioperative high-risk factors were associated with increased incidence of IH.

Mesh reinforcement as the golden standard of hernia repair, can significantly reduce the recurrence of abdominal hernia, involving inguinal hernia,<sup>10</sup> parastomal hernia,<sup>11</sup> and IH.<sup>6,12</sup> Moreover, recent clinical trials also indicated that prophylactic mesh reinforcement significantly decreased the occurrence of parastomal hernia in patients undergoing colostomy.<sup>13,14</sup> Understandably, mesh reinforcement seemed to be a promising method to prevent the formation of IH after laparotomy, which was verified by previous systematic reviews and meta-analyses.<sup>15–17</sup> However, these studies included low-quality clinical trials with small sample size and potential selection bias and confounding bias, which may be difficult to reach enough credible conclusions. Hence, European Hernia Society guidelines suggested that the quality of evidence of mesh augmentation for the prevention of IH was weak, and further high-quality evidence was essential.<sup>18</sup>

Chronic incision pain was a hardly neglected symptom after abdominal surgery and weakened quality of life. Interestingly, published studies suggested that along with a lower recurrence rate, mesh repair for IH was associated with reduced chronic pain, and improved quality of life.<sup>19,20</sup> However, whether prophylactic mesh reinforcement also had similar influence on chronic incision pain and quality of life after abdominal operation was ill-defined. More important, published systematic reviews seldom evaluated these easily neglected but vitally important aspects.

Therefore, an updated meta-analysis of randomized controlled trials (RCTs) was undertaken to systematically assess the safety and effectiveness of mesh reinforcement in preventing the incidence of IH, particularly including relevant data on chronic incision pain, quality of life, and cost-effectiveness.

## Methods

The present study was consistently performed according to the Cochrane Handbook for Systematic Reviews of Interventions and Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines.<sup>21,22</sup> Three reviewers separately conducted literature retrieval, data extraction, quality assessment, and statistical analysis, with controversy and inconsistency resolved by discussion and consensus.

### Search strategy and inclusion criteria

PubMed, Embase, and the Cochrane library were systematically searched from the inception to May 2016 without language limitation. We merely included RCTs focused on mesh reinforcement for the prevention of IH in patients undergoing abdominal surgery. We eliminated studies which explored the effectiveness of mesh reinforcement in patients undergoing

primary abdominal hernia repair. The primary outcomes were the incidence of IH, chronic incision pain, quality of life, and cost-effectiveness, with operating time, length of hospital stay, morbidity related to wound, and mortality making up the secondary outcomes. In the present study, the incidence of IH was defined as a protrusion in the abdominal wound post-operatively with the longest duration whether it was detected by physical examination or imageological examination. Actually, it was difficult to distinguish IH from parastomal hernia, which usually appeared near stoma. Accordingly, we also excluded patients undergoing mesh reinforcement in stoma sites. Detailed inclusion and exclusion criteria were present in [Table 1](#).

To retrieve as more studies meeting predefined inclusion criteria as possible, we generated enlarged search strategy, that is, “hernia\*(Title/Abstract) AND ‘Mesh’ (Title/Abstract) AND random\*(Title/Abstract).” In addition, the references of relevant reviews, published meta-analyses, and included studies were carefully checked for any possible inclusion.

### Data extraction and quality assessment

Data were extracted in the form of PICOS, and all the relevant information was entered into a predesigned extraction table. Detailed PICOS was as follows.

Patients (P): country and clinical setting, number of randomization, demographic characteristics, BMI (kg/m<sup>2</sup>), concomitant diseases, type of surgery, and incision, and so on.

Intervention (I): type, size, and location of mesh, surgical process of mesh location, and so on.

Compare (C): the surgical process of conventional abdominal wound closure and so on.

Outcomes (O): the definition of outcomes of interest, diagnosis of IH, outcomes data of interest, and so on.

Study design (S): the detail of randomization, blinding, allocation concealment, intention-to-treat analysis, and so on.

We used the Cochrane Collaboration’s tools to assessing the quality of included studies, that is, random sequence generation; allocation concealment; blinding of patients, personnel, outcome assessors; incomplete outcome data; selective reporting.<sup>23</sup> Individual trial with six elements of low risk of bias was regarded as low risk of bias, if not, unclear or high risk of bias.

### Statistical analysis

Data were analyzed on the basis of an “intention-to-treat” principle. Relative risks (RRs) and mean differences (MDs) with 95% confidence intervals (CIs) were used to estimate overall pooled effect. More conservatively, random effects model was used to calculate overall effect size when considering the inherent difference among the include studies. The statistic heterogeneity across the included studies was evaluated by  $I^2$  statistic and  $I^2 < 50\%$  was deemed as accepted heterogeneity.<sup>24</sup> If  $I^2 > 50\%$ , we would perform post-hoc subgroup analyses to investigate the potential source of heterogeneity, according to sample size (<100 versus >100), risk of bias (low versus unclear or high), mean age (<60 versus >60), mean BMI (<40 versus >40), location of mesh (intraperitoneal versus

Download English Version:

<https://daneshyari.com/en/article/5734307>

Download Persian Version:

<https://daneshyari.com/article/5734307>

[Daneshyari.com](https://daneshyari.com)