Systematic review

Meta-analysis of negative pressure wound therapy of closed groin incisions in arterial surgery

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Background: **Surgical-site infection (SSI) after groin incisions for arterial surgery is common and may lead to amputation or death. Incisional negative pressure wound therapy (NPWT) dressings have been suggested to reduce SSIs. The aim of this systematic review with meta-analysis was to assess the effects of incisional NPWT on the incidence of SSI in closed groin incisions after arterial surgery.**

Methods: **A study protocol for this systematic review of RCTs was published in Prospero (CRD42018090298) *a priori*, with predefined search, inclusion and exclusion criteria. The records generated by the systematic research were screened for relevance by title and abstract and in full text by two of the authors independently. The selected articles were rated for bias according to the Cochrane risk-of-bias tool.**

Results: **Among 1567 records generated by the search, seven RCTs were identified, including 1049 incisions. Meta-analysis showed a reduction in SSI with incisional NPWT (odds ratio (OR) 0·35, 95 per cent c.i. 0·24 to 0·50; $P < 0·001$). The heterogeneity between the included studies was low ($I^2 = 0$ per cent). The quality of evidence was graded as moderate. Two studies had multiple domains in the Cochrane risk-of-bias tool rated as high risk of bias. A subgroup meta-analysis of three studies of lower limb revascularization procedures only (363 incisions) demonstrated a similar reduction in SSI (OR 0·37, 0·22 to 0·63; $P < 0·001$; $I^2 = 0$ per cent).**

Conclusion: **Incisional NPWT after groin incisions for arterial surgery reduced the incidence of SSI compared with standard wound dressings. The risk of bias highlighted the need for a high-quality RCT with cost-effectiveness analysis.**

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Introduction

Surgical-site infection (SSI) is the most frequent type of nosocomial infection among surgical patients[1]. SSIs significantly increase duration of hospital stay, ICU admission, long-term surgical-site complication rate, patient suffering, antibiotic use, costs and mortality[2]. The risk of SSI varies according to the type of surgery[3]. Patients undergoing arterial surgery with a groin incision have a risk of up to 30 per cent of developing an SSI[4–6] (*Fig. 1*).

In recent years, single-use negative pressure wound therapy (NPWT) dressings have been developed for sutured incisions to decrease rates of surgical complications. The two leading commercially available products are the PICO™ system (Smith & Nephew, Hull, UK) and the Prevena™ Incision Management System (KCI Medical, San Antonio, Texas, USA), which both deliver continuous negative pressure for 7 days. The effects of incisional NPWT on the wound are multifaceted, with several positive effects identified. It decreases the wound surface area[7] and lateral tension[8] by contracting the wound edges. It reduces postsurgical inflammation, tissue oedema and exudate[9,10]. It also creates a sealed wound environment for 7 days, inhibiting postsurgical contamination. This seems particularly beneficial after arterial surgery where the commonly used groin incision is often infected with intestinal flora, most likely spread through direct contamination[11].

There are several reports of studies with incisional NPWT. An RCT[12] demonstrated a significant reduction in SSIs with incisional NPWT of sutured wounds after

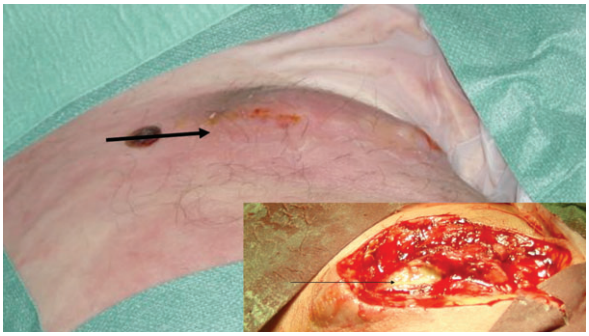

Fig. 1 Surgical-site infection in the right groin after arterial surgery. Typical clinical signs of a surgical-site infection (thick arrow). An abscess (thin arrow) visible underneath the subcutaneous layer after incision has an ASEPSIS score of more than 40 points, which is interpreted as a severe wound infection

open fractures. Three meta-analyses[13–15] from a broad spectrum of surgical specialties investigating incisional NPWT compared with standard dressing showed significant reductions in SSIs, all with reservation about the high level of heterogeneity between the included studies. A WHO guideline[16] published in 2016 recommends the use of incisional NPWT for the prevention of SSIs in high-risk incisions. However, the same guideline states that the overall quality of evidence is low and that few analyses comparing incisions for different types of surgical procedure have been done.

There is no current evidence-based guideline on the use of incisional NPWT to reduce the risk of SSI specifically after arterial surgery via groin incisions. This systematic review aimed to identify, appraise and emphasize the current scientific evidence which may lead to a new guideline or focus future research. The objective was therefore to assess the effects of prophylactic incisional NPWT on closed groin incisions after arterial surgery.

Methods

Protocol and inclusion criteria

This systematic review was conducted in accordance with the Cochrane Handbook for Systematic Reviews[17] and included RCTs only. A study protocol, including search methods with defined search criteria, inclusion and exclusion criteria, instructions for data extraction and methods for data synthesis and analysis, was established and published in Prospero (CRD42018090298). Study participants were adults (aged at least 18 years) who had received incisional NPWT after elective arterial surgery via a groin incision. The NPWT devices included in this study were the PICO™ system and the Prevena™ Incision Management System; the comparison treatments were all types of non-NPWT dressing.

Outcome measures

The primary outcome measured in this review was incidence of SSIs after incisional NPWT compared with standard dressing. All types of grading systems for defining a SSI were included: the ASEPSIS (Additional treatment, Serous discharge, Erythema, Purulent exudate, Separation of the deep tissues, Isolation of bacteria, and duration of inpatient Stay) score[18], the Szilagyi classification system[19], clinical grading according to the US Centers for Disease Control and Prevention (CDC) guidelines[20] and modified grading systems. All cases of SSI were included, irrespective of time of occurrence.

Secondary outcomes measured were the incidence of seroma formation, wound dehiscence, cutaneous scar formation and intolerance to the NPWT device. The secondary outcomes were diagnosed and evaluated clinically. All adverse reactions to the NPWT device were assessed, including allergic skin reactions, mechanical skin damage, skin blisters or other adverse reactions.

Search methods

A search strategy was devised in consultation with a faculty librarian (*Appendix S1*, supporting information). The following electronic databases were searched: Cochrane Library, MEDLINE (PubMed), Embase, Cumulative Index to Nursing and Allied Health Literature (CINAHL) (EBSCO), ClinicalTrials.gov and WHO International Clinical Trials Registry Platform (ICTRP). There was no restriction to publication year, languages or settings other than the aforementioned. Both published and unpublished materials were used, including materials from conferences and ongoing trials.

The databases were searched systematically for potentially relevant records. The retrieved records were then uploaded in the official Cochrane software Covidence (Veritas Health Innovation, Melbourne, Victoria, Australia) where duplicates were excluded. In Covidence, titles and abstracts were screened for relevance independently by two of the study authors. Full-text copies of the selected studies were reviewed independently for potential inclusion by two review authors. Disagreements about eligibility were settled by consensus, both after screening and following full-text review.

Risk-of-bias assessment and data extraction

The included studies were assessed using the Cochrane risk-of-bias tool[17]. If the risk was high or unclear, the

authors of the study were contacted for clarification. Evaluations of bias were conducted in Review Manager 5.3 (RevMan; The Nordic Cochrane Centre, Copenhagen, Denmark) by two of the review authors, independently. Disagreements were settled by consensus. For studies with connections to the review authors, the grading was undertaken by two independent adjudicators, one with experience of risk-of-bias assessments and one with experience of NPWT.

Data were extracted and pooled for meta-analysis in RevMan. A subgroup analysis was conducted excluding patients who had endovascular aneurysm repair (EVAR). A *post hoc* sensitivity analysis was performed, comparing peer-reviewed with non-peer-reviewed studies.

Each outcome was evaluated according to the GRADE system, where evidence is rated as high, moderate, low or very low. The GRADE assessment was conducted using GRADEpro GDT software (Evidence Prime Incorporation, McMaster University; https://gradepro.org).

Statistical analysis

Statistical analyses were conducted in RevMan. Dichotomous outcomes were assessed, with calculation of odds ratios (ORs) with 95 per cent confidence intervals. The significance level was set at $P < 0{\cdot}050$.

Owing to differences in study design in the event of bilateral incisions, the allocated treatment for each incision was accounted for, irrespective of number of patients; the unit of analysis was the individual incision.

The included studies were assessed for heterogeneity. Variations in participants, interventions, outcome and study design were documented. Statistical heterogeneity among the outcome data was evaluated using the I^2 test[21,22]. I^2 was calculated using a random-effects model in the analysis of all included studies as well as in the sensitivity analysis; a fixed-effect model was used for the subgroup analysis. The I^2 value was interpreted according to the Cochrane guidelines[17].

Results

Search results and exclusion process

A systematic database search was conducted according to the predefined search templates, accounting for reports published up to 1 September 2018; full search terms and results can be found in *Appendix S2* (supporting information). It resulted in 1003 records, of which 43 were reviewed in full text after title and abstract screening for relevance (*Fig. 2*). Of these, seven studies (from 13 records) were considered to have met the inclusion criteria: Kwon *et al.*[24,25], Gombert *et al.*[26,27], Hasselmann *et al.*[28–30], Engelhardt *et al.*[31], Lee *et al.*[32,33], Pleger *et al.*[34] and Sabat *et al.*[35,36]. The seven studies consisted of five full-text articles[24–27,31–34], one published conference abstract[35], and one conference presentation (study of Hasselmann and colleagues) referred to in a published review[29]. The latter was supplemented with the published study protocol[28], the PowerPoint® (Microsoft, Redmond, Washington, USA) presentation delivered at the conference[30], and personal communication about the randomization and allocation process.

The most common reasons for full-text exclusion were study protocol only (12), of which nine were ongoing trials with no published data; and wrong patient population (12) (*Fig. 2*). The excluded full-text articles are listed in *Table S1* (supporting information).

Included studies

The seven studies involved a total of 1049 incisions (intervention 512, control 537) in 872 patients (*Table 1*). In three studies[26,27,31–33] the numbers of patients and incisions were the same, whereas the remaining four studies[24,25,28–30,34–36] also included patients with multiple incisions. All the patients underwent arterial surgery via a groin incision, either for EVAR or a lower limb revascularization procedure. Four studies[24,25,28–31,34] included a mixture of EVAR and lower limb revascularization procedures, whereas two[26,27,32,33] included only lower limb revascularization procedures. One study[35,36] did not specify the surgical procedures included. In the study of Hasselmann and colleagues[28–30], it was possible to distinguish patients undergoing EVAR from those undergoing lower limb revascularization procedures.

Six studies[24–27,31–36] used the Prevena™ Incision Management System, whereas one[28–30] used the PICO™ system as the interventional dressing. The comparison dressings in all studies were the standard dressings used in each department, which were different brands of dry gauze dressing, or were not further specified. No study used wet dressings or refrained from using dressings altogether. In one study[26,27], 13 of 98 intervention incisions (13 per cent) and 21 of 90 control incisions (23 per cent) received an alternative dressing owing to SSI or lymphatic leakage, without further specification.

The method of assessment of SSI was the Szilagyi classification system in three studies[24–27,31]. The ASEPSIS score was used in one study[28–30]. Lee and colleagues[32,33] used both the Szilagyi classification system and the CDC criteria for SSIs. Pleger and co-workers[34] used a modified Szilagyi classification system, as follows: grade 1,

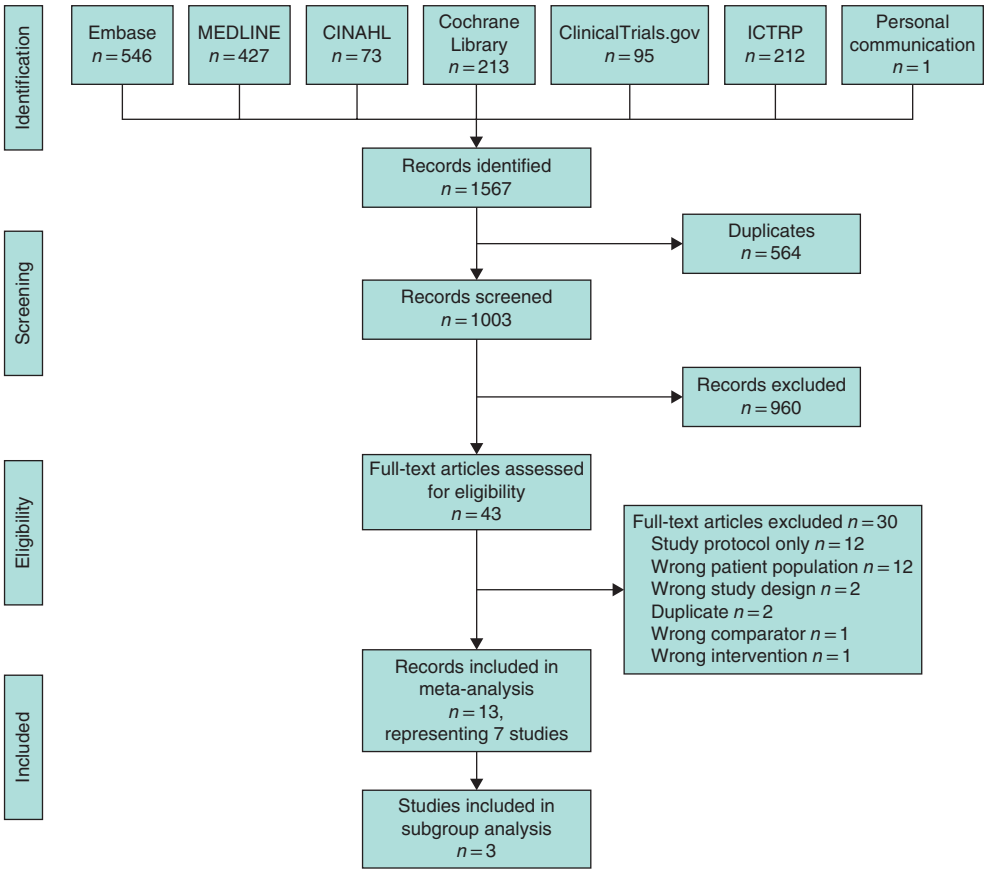

Fig. 2 PRISMA flow chart[23] showing selection of articles for review. CINAHL, Cumulative Index to Nursing and Allied Health Literature; ICTRP, International Clinical Trials Registry Platform

wounds with cutaneous wound dehiscence, skin necrosis and single local infection signs; grade 2, wounds with subcutaneous wound dehiscence, haematoma, lymphatic fistula, lymphocoele, seroma, single local infection signs and systemic infection parameters (leucocyte count over 13×10^9/dl, C-reactive protein exceeding 100 mg/l); and grade 3, wounds with pain, swelling, redness, warmth and dysfunction. The method of SSI assessment was unclear in the study of Sabat *et al.*[35,36].

In all studies patients were evaluated for SSIs up to 30 days after surgery. Three studies[28–30,32,33,35,36] had follow-up for up to 90 days. Two studies[28–30,35,36] had longer than 90 days' follow-up: Sabat and colleagues (4 months) and Hasselmann *et al.* (1 year).

Risk of bias

The risk of bias is presented as a summary for each included study in *Fig. S1* (supporting information) and in detail for individual studies in *Appendix S3* (supporting information). A summary of the distribution of biases among the studies is shown in *Fig. S2* (supporting information).

Two studies[34–36] had an unclear risk of selection because the randomization and allocation processes were not described in the retrieved records.

All studies had a high risk of performance bias as it is impossible to blind patients and medical staff to intervention and comparison treatments.

Two studies[24–27] had a high risk of detection bias because the evaluations for SSIs were not blinded. Three studies[31,34–36] had an unclear risk of detection bias because any blinding of the assessor was not stated in their reports.

One study[26,27] was graded as having a high risk of attrition bias because 34 of 188 participants (18·1 per cent) received an alternative dressing. Two studies[28–30,35,36] had an unclear risk of attrition bias because there were not enough data available and the number of patients lost to follow-up was not stated in the published conference abstracts.

Two studies[24–27] had a high risk of reporting bias. Gombert and colleagues received industry sponsorship

Table 1 Characteristics of included studies

Study	Country	No. of patients	No. of incisions (NPWT, control)	NPWT dressing	Duration of follow-up	SSI assessment scale	Type of surgery
Engelhardt *et al.*[31]	Germany	132	132 (64, 68)	Prevena™	6 weeks	Szilagyi	EVAR, profundaplasty, iliac TEA, inguinal interposition graft, femorodistal bypass
Gombert *et al.*[26,27]	Germany	188	188 (98, 90)	Prevena™	30 days	Szilagyi	Femoral TEA, femoropopliteal bypass, aortobifemoral prosthesis, thrombectomy
Hasselmann *et al.*[28–30]	Sweden	204	316 (150, 166)	PICO™	1 year	ASEPSIS	EVAR and open lower limb revascularization
Kwon *et al.*[24,25]	USA	97	119 (59, 60)	Prevena™	30 days	Szilagyi	EVAR, aortofemoral bypass and femorodistal bypass in high-risk patients
Lee *et al.*[32,33]	Canada	102	102 (53, 49)	Prevena™	90 days	CDC and Szilagyi	Mixed open lower limb revascularization and 'other'
Pleger *et al.*[34]	Germany	100	129 (58, 71)	Prevena™	30 days	Modified Szilagyi	EVAR and open lower limb revascularization
Sabat *et al.*[35,36]	USA	49	63 (30, 33)	Prevena™	4 months	–	Open, arterial, vascular surgery involving a groin incision

NPWT, negative pressure wound therapy; SSI, surgical-site infection; EVAR, endovascular aneurysm repair; TEA, thrombendarterectomy; CDC, Centers for Disease Control and Prevention.

from KCI (an Acelity Company, San Antonio, Texas, USA), the manufacturer of the interventional dressing (Prevena™ Incision Management System) and did not address all the secondary outcomes listed in the study protocol. Kwon and colleagues did not include or mention the results of the follow-up after 30 days in the published article[25], although this information was presented at a conference[24]. Four studies[28–31,34–36] had an unclear risk of publication bias. In two of these studies[28–30,35,36] there were not enough data published to evaluate the risk of publication bias; only abstracts of interim analysis from conferences were available. Engelhardt and colleagues[31] provided no information about funding or about the independence of the authors. Pleger *et al.*[34] claimed that the study was conducted independently, but later acknowledged medical writing and editorial support from two KCI co-workers.

Other biases identified in this review were the acceptance of support from suppliers of the intervention dressings. One study[26,27] received sponsorship from KCI. Two studies had an unclear risk of other bias owing to the lack of information about funding and the authors' independence[31], and contradictory statements found in the text regarding the involvement of KCI[34].

Where there was an unclear risk of bias, the listed corresponding authors were contacted by e-mail for clarification, but only one responded.

Effects of intervention

All the included studies reported a reduced incidence of SSIs in the NPWT group compared with the standard dressing group. The results were significant in three studies[24–27,34]. Meta-analysis of the seven studies, including all incisions from all arterial procedures, showed a reduction of SSIs, with an OR of 0·35 (95 per cent c.i. 0·24 to 0·50; $P < 0·001$) (*Fig. 3*). The total SSI rate in the incisional NPWT group was 49 of 512 (9·6 per cent), compared with 124 of 537 (23·1 per cent) in the standard dressing group. The I^2 value for heterogeneity was 0 per cent. The level of certainty for the evidence was downgraded in the GRADE score from high to moderate because of serious concerns about the overall risk of bias of the included studies (*Table S2*, supporting information).

Subgroup analysis of the three studies[26–30,32,33] comprising lower limb revascularization procedures alone showed a reduction in SSI, with an OR of 0·37 (0·22 to 0·63; $P < 0·001$) (*Fig. 3*). The total SSI rate was 24 of 187 (12·8 per cent) in the incisional NPWT group and 50 of 176 (28·4 per cent) in the standard dressing group ($I^2 = 0$ per cent). The level of certainty for the evidence was downgraded in the GRADE score from high to low because of very serious concerns about the overall risk of bias in the largest study[26,27], which accounted for 60·4 per cent of the result of the subgroup analysis.

A sensitivity analysis comparing the five peer-reviewed[24–27,31–34] and two non-peer-reviewed[28–30,35,36] studies showed no difference in statistical heterogeneity between the two groups ($I^2 = 0$ per cent) (*Fig. S3*, supporting information).

The secondary outcomes, seroma formation, wound dehiscence and scar formation, were reported in only

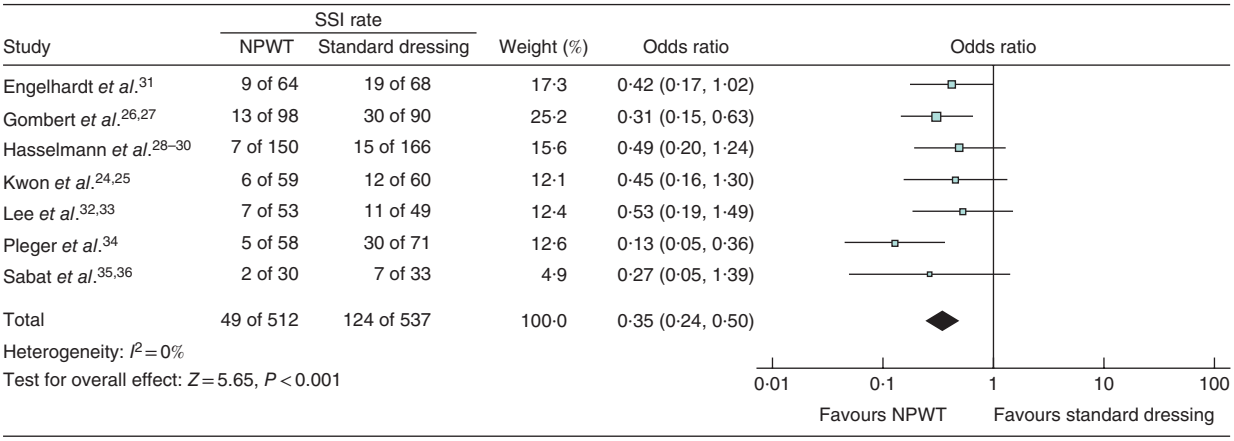

Fig. 3 Forest plots comparing surgical-site infection rates with use of negative pressure wound therapy compared with standard dressings after groin incisions for arterial surgery. **a** Meta-analysis of all studies carried out using a Mantel–Haenzsel random-effects model; **b** meta-analysis of studies of lower limb revascularization procedures only undertaken using a Mantel–Haenzsel fixed-effect model. Odds ratios are shown with 95 per cent confidence intervals. SSI, surgical-site infection; NPWT, negative pressure wound therapy

three studies[24,25,34–36]. Two participants in the study of Kwon and colleagues[24,25] developed a seroma, both in the standard dressing group (2 of 60, 3 per cent). No patient had wound dehiscence. Pleger and colleagues[34] reported that one of 71 patients (1 per cent) in the standard dressing group developed a seroma, whereas four of 58 patients (7 per cent) in the incisional NPWT group and eight of 71 (11 per cent) in the standard dressing group had wound dehiscence. Sabat and co-workers[35,36] noted that one patient in each group (3 per cent) developed wound dehiscence. Neither of these differences was significant. There was no reporting about cutaneous scar formation.

Adverse events

No study reported any adverse events. One study[32,33] documented cessation of NPWT treatment in one patient within 24 h owing to failure to achieve a complete seal.

Discussion

This systematic review according to Cochrane guidelines identified seven RCTs of incisional NPWT dressings compared with standard dressing after arterial surgery through a groin incision. Through meta-analysis, the pooled data showed a significant reduction in SSI rates with incisional NPWT compared with standard dressings. Subgroup analysis of three studies with only lower limb revascularization procedures also showed a significant reduction in SSI in the incisional NPWT group. The rate of SSI was higher in the studies of lower limb revascularization procedures only, and lower in the studies that included EVAR procedures as well, in agreement with previous studies[37].

The significant reduction in groin SSIs was based on a large number of incisions (1049), providing high scientific strength. This reduction in SSIs should lead to shorter hospital stays, reduced antibiotic treatment, less pain and suffering, fewer reoperations and potentially

fewer amputations and deaths. This might improve cost-effectiveness, but that could not be evaluated in this review because only one RCT[24,25] evaluated cost differences between the NPWT and standard dressings. Cost-effectiveness studies are needed, as well as RCTs that evaluate wound complications other than SSI, and adverse events of the NPWT systems.

There is a statistical limitation of the meta-analyses conducted. Despite all studies being RCTs, four[24,25,28–30,34–36] were so-called cluster RCTs with some multiple (bilateral) incisions in the same patient included in the study. In this situation, randomization occurs at participant level, but the unit of analysis is the wound, leading to more type I errors and loss of power compared with correctly analysed cluster trials[38]. In two of the cluster RCTs[34–36], it was not known whether randomization occurred at participant or incision level. This prohibits a correct analysis of the included cluster RCTs, thus generating potentially more type I statistical errors and loss of power.

The statistical heterogeneity between included studies was low, with no detectable heterogeneity identified by I^2 analysis. The low heterogeneity also indicates that there was no small-study effect in the meta-analysis. However, it was not possible to construct a funnel plot to confirm this, owing to the small number of included studies. Methodological heterogeneity was considered low as only RCTs were included. Clinical heterogeneity was also considered low due to the homogeneous patient population, the vascular procedures included and the outcome studied (SSI). There remain clinical and methodological variations, including the timing of wound evaluation and the various methods of wound assessment.

The risk of bias also needs to be taken into consideration. Some risks were considered especially troublesome. One of these was detection bias by unblinded wound evaluation, which was confirmed in two studies[24–27] and unknown in two[34–36]. Wound assessment has an element of subjectivity, which makes it susceptible to external influence. Subjectivity is structurally decreased, but not eliminated, by using a predefined scale such as ASEPSIS. Another risk of bias that is considered especially problematic is the presence of sponsorship and support from the industry, a well known risk of bias that may influence the results in favour of the sponsor[39]. Performance bias, on the other hand, was not considered a major risk, acknowledging that blinding of patients and personnel was impossible.

Many studies failed to address several aspects of the Cochrane risk-of-bias tool, with two studies[24–27] graded as high risk of bias in five and three of seven domains respectively. Two studies[34–36] had five of seven domains graded as unclear. This is a limitation of the present systematic review. However, despite diverse gradings in the risk-of-bias assessments, the results showed very low statistical heterogeneity.

This review included information from interim analyses[28–30,35,36]. Furthermore, data retrieved from Hasselmann and colleagues were not published; they were only presented at a congress in Bremen[30], and received by personal communication with the main author. However, the heterogeneity between studies that were peer-reviewed and the non-peer-reviewed interim analyses was low ($I^2 = 0$ per cent) (*Fig. S3*, supporting information).

This study found that there are nine planned or ongoing RCTs evaluating incisional NPWT compared with standard dressings after arterial surgery. This indicates that future systematic reviews will be needed.

The present meta-analysis is the fifth published. Its results are in line with previous analyses by Semsarzadeh and colleagues[13], Hyldig and co-workers[14] and De Vries *et al.*[15], who demonstrated a significant reduction in SSI with NPWT. Shortly after the present systematic research was conducted, Ge[40] published an updated meta-analysis showing a significant reduction in other wound complications, but without any difference in incidence of SSI. All these meta-analyses included studies after mixed surgical procedures. The present review evaluated NPWT after arterial surgery only. It was justified by the high frequency of groin SSI after arterial surgery, and its potential serious consequences. NPWT is a promising technology in arterial surgery that needs confirmation and analysis of cost-effectiveness.

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Disclosure: The authors declare no conflict of interest.

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Supporting information

Additional supporting information can be found online in the Supporting Information section at the end of the article.

European Colorectal Congress

28 November – 1 December 2022, St.Gallen, Switzerland

Monday, 28 November 2022

09.50
Opening and welcome
Jochen Lange, St.Gallen, CH

10.00
It is leaking! Approaches to salvaging an anastomosis
Willem Bemelman, Amsterdam, NL

10.30
Predictive and diagnostic markers of anastomotic leak
Andre D'Hoore, Leuven, BE

11.00
SATELLITE SYMPOSIUM
ETHICON

11.45
Of microbes and men – the unspoken story of anastomotic leakage
James Kinross, London, UK

12.15
LUNCH

13.45
Operative techniques to reduce anastomotic recurrence in Crohn's disease
Laura Hancock, Manchester, UK

14.15
Innovative approaches in the treatment of complex Crohn Diseases perianal fistula
Christianne Buskens, Amsterdam, NL

14.45
To divert or not to divert in Crohn surgery – technical aspects and patient factors
Pär Myrelid, Linköping, SE

15.15
COFFEE BREAK

15.45
Appendiceal neoplasia – when to opt for a minimal approach, when and how to go for a maximal treatment
Tom Cecil, Basingstoke, Hampshire, UK

16.15
SATELLITE SYMPOSIUM
Medtronic
Further,Together

17.00
Outcomes of modern induction therapies and Wait and Watch strategies, Hope or Hype
Antonino Spinelli, Milano, IT

17.30
EAES Presidential Lecture - Use of ICG in colorectal surgery: beyond bowel perfusion
Salvador Morales-Conde, Sevilla, ES

18.00
Get-Together with your colleagues
Industrial Exhibition

Tuesday, 29 November 2022

9.00
CONSULTANT'S CORNER
Michel Adamina, Winterthur, CH

10.30
COFFEE BREAK

11.00
SATELLITE SYMPOSIUM
INTUITIVE

11.45
Trends in colorectal oncology and clinical insights for the near future
Rob Glynne-Jones, London, UK

12.15
LUNCH

13.45
VIDEO SESSION

14.15
SATELLITE SYMPOSIUM
BD

15.00
COFFEE BREAK

15.30
The unsolved issue of TME: open, robotic, transanal, or laparoscopic – shining light on evidence and practice
Des Winter, Dublin, IE
Jim Khan, London, UK
Brendan Moran, Basingstoke, UK

16.30
SATELLITE SYMPOSIUM
Takeda

17.15
Lars Pahlman lecture
Søren Laurberg, Aarhus, DK

Thursday, 1 December 2022
Masterclass in Colorectal Surgery
Proctology Day

Wednesday, 30 November 2022

9.00
Advanced risk stratification in colorectal cancer – choosing wisely surgery and adjuvant therapy
Philip Quirke, Leeds, UK

09.30
Predictors for Postoperative Complications and Mortality
Ronan O'Connell, Dublin, IE

10.00
Segmental colectomy versus extended colectomy for complex cancer
Quentin Denost, Bordeaux, FR

10.30
COFFEE BREAK

11.00
Incidental cancer in polyp - completion surgery or endoscopy treatment alone?
Laura Beyer-Berjot, Marseille, FR

11.30
SATELLITE SYMPOSIUM

12.00
Less is more – pushing the boundaries of full-thickness rectal resection
Xavier Serra-Aracil, Barcelona, ES

12.30
LUNCH

14.00
Management of intestinal neuroendocrine neoplasia
Frédéric Ris, Geneva, CH

14.30
Poster Presentation & Best Poster Award
Michel Adamina, Winterthur, CH

15.00
SATELLITE SYMPOSIUM
OLYMPUS

15.45
COFFEE BREAK

16.15
Reoperative pelvic floor surgery – dealing with perineal hernia, reoperations, and complex reconstructions
Guillaume Meurette, Nantes, FR

16.45
Salvage strategies for rectal neoplasia
Roel Hompes, Amsterdam, NL

17.15
Beyond TME – technique and results of pelvic exenteration and sacrectomy
Paris Tekkis, London, UK

19.30
FESTIVE EVENING

Information & Registration **www.colorectalsurgery.eu**