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CADTH RAPID RESPONSE REPORT: SUMMARY OF ABSTRACTS

Negative Pressure Wound Therapy for Patients Post-Surgery: Clinical Effectiveness, Cost-Effectiveness, and Guidelines

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Research Questions

1. What is the clinical effectiveness of negative pressure wound therapy for patients post-surgery who are at risk of lymphedema?
2. What is the cost effectiveness of negative pressure wound therapy for patients post-surgery who are at risk of lymphedema?
3. What are the evidence-based guidelines regarding negative pressure wound therapy for patients post-surgery who are at risk of lymphedema?

Key Findings

One systematic review with meta-analysis, one randomized controlled trial, and one non-randomized study were identified regarding the clinical effectiveness of negative pressure wound therapy for post-surgery patients who are at risk of lymphedema. In addition, two evidence-based guidelines were identified regarding negative pressure wound therapy for post-surgery patients who are at risk of lymphedema. No relevant economic evaluations were identified.

Methods

A limited literature search was conducted by an information specialist on key resources including PubMed, the Cochrane Library, the University of York Centre for Reviews and Dissemination (CRD) databases, the websites of Canadian and major international health technology agencies, as well as a focused internet search. The search strategy was comprised of both controlled vocabulary, such as the National Library of Medicine's MeSH (Medical Subject Headings), and keywords. The main search concepts were lymphedema and postoperative setting. Filters were applied to limit the retrieval to health technology assessments, systematic reviews, and meta analyses, randomized controlled trials, economic studies, non-randomized studies, and guidelines. The search was also limited to English language documents published between January 1, 2015 and March 3, 2020. Internet links are provided, where available.

Selection Criteria

One reviewer screened citations and selected studies based on the inclusion criteria presented in Table 1.

Table 1: Selection Criteria

Population	Patients post-surgery at risk of lymphedema (excluding orthopedic surgery for hips and knees)
Intervention	Negative pressure wound therapy
Comparator	Q1-2: Standard dressings, other forms of dressing (e.g., moist wound healing dressings, cryocuffs) Excluding: silver dressings Q3: Not applicable
Outcomes	Q1: Clinical effectiveness (e.g., healing time, lymphedema, function, mobility or mobilization, wound healing, hospital stay, quality of life, adverse events, [e.g., mortality, contact rashes, skin issues]) Q2: Cost-effectiveness (e.g., quality adjusted life years, incremental cost-effectiveness ratios) Q3: Recommendations regarding the use of negative pressure wound therapy post-surgery, recommendations regarding the indications for use or criteria around the intention of use
Study Designs	Health technology assessments, systematic reviews, randomized controlled trials, non-randomized studies, economic evaluations, and evidence-based guidelines

Results

Rapid Response reports are organized so that the higher quality evidence is presented first. Therefore, health technology assessment reports and systematic reviews are presented first. These are followed by randomized controlled trials, non-randomized studies, economic evaluations, and evidence-based guidelines.

One systematic review with meta-analysis[1], one randomized controlled trial[2], and one non-randomized study[3] were identified regarding the clinical effectiveness of negative pressure wound therapy for post-surgery patients who are at risk of lymphedema. In addition, two evidence-based guidelines[4,5] were identified negative pressure wound therapy for post-surgery patients who are at risk of lymphedema. No relevant health technology assessments or economic evaluations were identified.

Additional references of potential interest are provided in the appendix.

Overall Summary of Findings

One systematic review with meta-analysis[1], one randomized controlled trial[2], and one non-randomized study[3] were identified regarding negative pressure wound therapy (NPWT) for post-surgery patients who are at risk of lymphedema.

The authors of the identified systematic review investigated the efficacy of negative pressure wound therapy for closed incisions in post-breast surgery patients.[1] They found NWPT was significantly more effective in preventing total wound complications, surgical site infections, seroma, wound dehiscence, and wound necrosis compared to conventional dressings.[1]

Similarly, the authors of the identified randomized clinical trial found that following coronary artery graft bypass surgery, there was a significant decrease in the incidence of lymphorrhagia, lymphoedema, infection, wound dehiscence, and skin flap necrosis in the bilayered NWPT treatment group compared to the control group, which only received traditional surgical pads.[2]

Furthermore, the authors of the identified non-randomized study concluded that incisional NWPT was significantly more effective in reducing seroma compared to standard wound care for patients who underwent inguinal lymphadenectomy.[3]

Additionally, two evidence-based guidelines[4,5] were identified regarding NPWT for post-surgery patients who are at risk of lymphedema. The authors of the first evidence-based guideline[4] recommend closed incision negative pressure therapy for patients at high risk of developing surgical site occurrences, with common risk factors being obesity, diabetes, tobacco use, and prolonged surgical time. The authors of the other evidence-based guideline[5] recommend that NPWT with instillation be used in patients with comorbidities, severe wounds, or infections.

References Summarized

Health Technology Assessments

No literature identified.

Systematic Reviews and Meta-analyses

1. Cagney D, Simmons L, O'Leary DP, et al. The Efficacy of prophylactic negative pressure wound therapy for closed incisions in breast surgery: a systematic review and meta-analysis. *World J Surg*. 2020 Jan.
PubMed: PM31900568

Randomized Controlled Trials

2. Yu Y, Song Z, Xu Z, et al. Bilayered negative-pressure wound therapy preventing leg incision morbidity in coronary artery bypass graft patients: a randomized controlled trial. *Medicine*. 2017;96(3):e5925-e5925.
PubMed: PM28099357

Non-Randomized Studies

3. Jørgensen MG, Toyserkani NM, Thomsen JB, Sørensen JA. Prophylactic incisional negative pressure wound therapy shows promising results in prevention of wound complications following inguinal lymph node dissection for Melanoma: a retrospective case-control series. *J Plast Reconstr Aesthet Surg*. 2019;72(7):1178-1183.
PubMed: PM30898502

Economic Evaluations

No literature identified.

Guidelines and Recommendations

4. Willy C, Agarwal A, Andersen CA, et al. Closed incision negative pressure therapy: international multidisciplinary consensus recommendations. *Int Wound J*. 2017;14(2):385-398.
PubMed: PM27170231

5. Kim PJ, Attinger CE, Crist BD, et al. Negative pressure wound therapy with instillation: review of evidence and recommendations. *Wounds*. 2015;27(12):S2-S19. PubMed: PM26966814

Appendix — Further Information

Previous CADTH Reports

6. Tran K, Argáez C. Intermittent pneumatic compression devices for the management of lymphedema: a review of clinical effectiveness and guidelines [*CADTH rapid response report: summary with critical appraisal*]. Ottawa (ON): CADTH; 2017 May: https://www.cadth.ca/sites/default/files/pdf/htis/2017/RC0881_Intermittent%20Pneumatic%20Compression%20Devices%20Final.pdf Accessed 2020 Mar 12.

Systematic Reviews and Meta-Analyses – Setting Not Specified

7. Janssen AHJ, Mommers EHH, Notter J, de Vries Reilingh TS, Wegdam JA. Negative pressure wound therapy versus standard wound care on quality of life: a systematic review. *J Wound Care*. 2016;25(3):154-159. PubMed: PM26947696

Non-Randomized Studies – Alternative Population

8. Campisi CC, Ryn M, Campisi CS, Di Summa P, Boccardo F, Campisi C. Intermittent negative pressure therapy in the combined treatment of peripheral lymphedema. *Lymphology*. 2015;48(4):197-204. PubMed: PM27164765

Clinical Practice Guidelines

9. McKanna M, Geraci J, Hall K, et al. Clinician Panel Recommendations for Use of Negative pressure wound therapy with Instillation. *Ostomy Wound Manage*. 2016;62(4):S1-S14. PubMed: PM28657895

Review Articles

10. Apelqvist J, Willy C, Fagerdahl A-M, et al. EWMA Document: negative pressure wound therapy. *J Wound Care*. 2017;26(Sup3):S1-S154. PubMed: PM28345371

11. Chopra K, Tadisina KK, Singh DP. The 'French Fry' VAC technique: hybridisation of traditional open wound NPWT with closed incision NPWT. *Int Wound J*. 2016;13(2):216-219. PubMed: PM24698495