Saving Limbs and Decreasing SSIs: A Vascular Perspective

This is a brief summary of a presentation from the Spring 2019 Symposium: New Perspectives in Diabetic Limb Preservation, held in Toronto, Ontario, on May 31, 2019, with financial support from Smith & Nephew. The speaker was Dr. Gustavo Azoubel, vascular and endovascular surgeon, Scarborough Health Network, and lecturer at the University of Toronto. The presentation provided a vascular surgeon's perspective on the importance of preventing surgical site infections in high-risk patients, thereby supporting limb preservation.

Surgical Site Infections: Consequences and Impact

There are higher rates of surgical site infections (SSIs) in vascular surgery than in any other surgical specialities due to the increased prevalence of older patients, diabetes, end-stage renal disease, smoking, obesity, emergency cases, prosthetic vascular grafts, immunosuppression and poor nutrition. SSIs can have grave consequences on patients, including limb loss. As a result, preventing SSIs to minimize serious consequences is a constant concern in vascular surgery. Approximately 19% of morbidities in peripheral vascular surgery are attributed to wound complications, which can result in delayed healing. Arterial or graft infections can lead to limb loss and even mortality in extreme cases.

Along with the physical and emotional impact, the socio-economic burden of SSIs is also staggering:

- Length of hospital stay increased by 7–12 days at an additional cost of $38,656[1]
- Average cost of treatment increased by $25,000 and up to $200,000 in some cases[2]
- Hospital re-admissions increased
- Patient satisfaction and quality of life (QoL) decreased

Negative Pressure Wound Therapy

To minimize SSIs, clinicians should consider advanced healing therapies such as negative pressure wound therapy (NPWT) for surgically closed incision sites. While standard dressings work to provide a barrier to external infection and help absorb exudate,[3] NPWT has multiple mechanisms of action and can help:

- improve wound contraction[4–8]
- promote changes in blood flow (perfusion)[4]
- increase lymphatic clearance[7]
- reduce/absorb edema[8–9]
- promote evaporation of exudate[4]
- stimulate growth of new blood vessels (angiogenesis)[4, 10]

PICO: A Single Use Negative Pressure Wound Therapy

Launched in 2011, PICO, a single use negative pressure wound therapy (sNPWT) system, is canister-free and provides 80 mmHg to a sealed wound for sevens days of treatment. PICO's sealed system soft port dressing is designed to prevent fluid ingress into soft port tubing and into the pump. Evidence has demonstrated its efficaciousness in minimizing various surgical site complications, including SSIs.

Each dressing has four layers:

- a silicone adhesive wound contact layer to minimize pain and damage
- a proprietary AIRLOCK layer for even distribution of pressure
- an absorbent layer to lock exudate away from wound
- a top film layer, which has a high moisture vapour transmission rate and protects the wounds from contamination

Reviewing the Evidence

A meta-analysis of randomized controlled trials (RCTs) and observational studies by Strugala et al. (2017), had the following findings:[11]

continued . . .

- In RCT studies: Application of PICO reduced the rate of SSI by 51% (9.7% to 4.8%) compared with standard of care
- In observational studies: SSI rate was 7.4% in PICO group and 22.5% in control
- Significant mean reduction in hospital length of stay for those treated with NPWT

A 2018 study by Fleming and colleagues found that the routine use of PICO dressings is associated with reduction in wound complication rates following peripheral vascular surgery and is cost-effective.[12]

NICE Review

The National Institute for Health and Care Excellence (NICE) in the UK reviewed evidence from 31 studies and determined that, in both RCTs and observational studies, evidence shows fewer SSIs when high-risk patients were treated prophylactically with PICO dressings than with standard wound dressings. In addition, personal experiences from users of PICO have shown positive clinical and economic outcomes in both closed incisional and open wounds, thereby preserving limb integrity.[13]

As a result, NICE published the following recommendations:[13]

- Evidence supports the case for adopting PICO sNPWT for closed surgical incisions in the NHS, as it is associated with fewer surgical site infections and seromas than standard dressings.
- PICO sNPWT should be considered prophylactically as an option for closed surgical incisions in people who are at high risk of developing SSIs.
- PICO sNPWT provides extra clinical benefits at a similar overall cost compared with standard wound dressings.

Summary

PICO is the sNPWT technology of choice due to ease of use, affordability and effectiveness in dealing with both closed and open wounds due to reduction in SSIs, thereby preserving limb integrity.

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