

Protocol 1 · Infected or exposed prosthetic vascular graft

Evidence position: **Guarded** · Source: NPWT Evidence Library, www.wondso.org.co.za/NPWT.html, content as at 2026-10-04

Indication

Infected or exposed prosthetic vascular graft.

Evidence position: Guarded. No high- or moderate-certainty trial tests NPWT in an infected graft; the graft-preservation figures come from uncontrolled series.

What this means

A prosthetic vascular graft is an artificial tube (usually Dacron or PTFE) sewn in to bypass or replace a diseased artery. When the wound over it breaks down, the graft becomes exposed and infected. This is limb-threatening and life-threatening, because the usual answer is to remove the graft, which can cost the leg. NPWT is used to keep the graft in place and covered while the wound is cleaned and the infection controlled, so that the graft can be saved.

Why NPWT is used here

Published series report the graft being saved in 82 to 91 percent of cases when NPWT is used with surgical cleaning and antibiotics. NPWT is the wound-care part of the plan; it does not cure the infection on its own. No high- or moderate-certainty trial tests it in an infected graft, so the evidence position is Guarded.

Patient selection

- A prosthetic graft that is fully exposed and/or infected in the groin, thigh or elsewhere.
- The patient has had surgical debridement (removal of dead and infected tissue) and is on appropriate antibiotics.
- The vascular surgeon has decided the graft is worth trying to save, and the join between graft and artery (the anastomosis) can be protected.
- Not for a bleeding anastomosis or one that cannot be covered.

For all NPWT

- The patient must be compliant and compos mentis: able to understand what the device does, keep the seal, protect the tubing and pump, report bleeding, pain or alarms, and attend or receive dressing changes.
- The patient's circle of care must be included: family, carers, home-nursing service or ward team, whoever will be present when the seal fails at night. Document who was told what and who is responsible for the device between visits.

Contraindications

Specific to this indication

- An exposed anastomosis with no barrier over it. The barrier is what makes this safe.
- Active bleeding after debridement.
- Foam placed directly on a bare artery or on the anastomosis: never.

For all NPWT: do not apply if

- Active bleeding beyond capillary ooze. Stop it first; NPWT does not control bleeding.
- An uncorrected clotting disorder.
- An exposed vessel, graft, anastomosis, organ or nerve with no barrier between it and the foam.
- Dead tissue not yet debrided, untreated bone infection, or cancer in the wound bed.

Proceed with caution and record the decision

- Blood thinners: a caution, not a bar. Lowest effective pressure, barrier over any vessel, inspect at every change, record the decision.
- Pacemaker or defibrillator: the pump of the canister-free single-use device (PICO) holds a magnet. Keep it 10 to 15 cm from the device, away from the chest, and record where it sits.
- Fragile surrounding skin or adhesive allergy. Children: no NPWT system was cleared for them as at 2011; treat as a hard limit unless current labelling says otherwise.

Potential risks and side-effects

- Erosion of a vessel wall by foam under suction. In one reported case foam lay on a bare artery at 125 mmHg in a patient on enoxaparin; it eroded on day 16 and cost six units of blood. Only 600 mL was ever seen in the canister, so watch the haemoglobin, not the canister.
- A barrier reduces this risk but does not remove it: two patients bled with polyvinyl alcohol foam correctly placed.
- Bleeding: the serious harm. All six deaths in the regulator's first two-year series, and nine of twelve overall, were bleeds in patients whose bleeding risk had been missed (12 deaths, 174 injuries).
- Skin blistering: about 3.5 times more likely than with an ordinary dressing (risk ratio 3.55, 95% CI 1.43 to 8.77).
- Pain at changes (pre-medicate; soak a stuck sponge with saline) and anxiety in the first days, which settles. Say so beforehand.
- Retained foam, the regulator's commonest injury: count every piece in and out, and never cut foam over the wound. Adhesive damage to skin.

Treatment protocol

Pressure	Minus 50 to minus 100 mmHg, continuous. Start with the lowest possible pressure that allows a seal and increase the pressure gradually, only as far as needed to hold the seal and clear exudate. Minus 100 is a ceiling, not a target. Record the reason for each step up.
Mode	Continuous. Avoid intermittent mode over a vessel: cycling pressure shears the tissue.

Interface	A barrier over the anastomosis and any bare vessel: a muscle flap, polyvinyl alcohol (white) foam, or paraffin gauze. Black foam only over the mid-body of the graft, never on the join.
Change interval	Every 48 to 72 hours, with a deliberate look for bleeding at every change.
Duration	Time-limited: about one month at most. Plan definitive cover (a muscle flap or graft) as soon as the bed allows.

Step by step

1. Confirm haemostasis in theatre after debridement. If it is oozing, pack and wait; do not apply suction to a bleeding bed.
2. Place the barrier layer over the anastomosis and any exposed vessel. Prefer a firmer barrier over a soft one where the anatomy allows: a soft paraffin layer alone did not protect in the animal study.
3. Cut black foam to fit over the graft mid-body only. Count and record the pieces.
4. Seal, connect, and start at the lowest pressure that gives a seal (at or near minus 50 mmHg, continuous). Confirm draw-down; step up gradually only if the seal or exudate demands it.
5. Check haemoglobin daily for the first days and at every change. A falling haemoglobin with a clean canister is still a bleed.
6. At each change: photograph, measure, look at the vessel, record. Move to definitive cover when granulation covers the graft.

When to stop and call for help

- Fresh bleeding into the canister or dressing: pump off, pressure on, call the surgeon.
- New or rising pain, spreading redness, fever or a foul smell: review the same day.
- A seal that cannot be held for more than two hours.
- No progress at four weeks: stop and re-plan.

Outcome measures

- Graft preserved (not removed) at 30 days and at discharge.
- Wound closed or covered by flap or graft, and the date this was achieved.
- Any bleeding episode, with volume and action taken.
- Haemoglobin trend during therapy.
- Re-infection or need for graft removal at follow-up.

What to document at every change

- Indication; which contraindications were checked and excluded.
- Pressure, mode, interface, and the number of foam pieces placed and removed.
- Wound length, width and depth, a dated photograph, exudate, any bleeding, and the pain score.
- The planned review date and the endpoint (closure, graft or flap).

A point worth knowing

The series that report graft salvage used 50 to 125 mmHg, and none compared one pressure with another. South African measurements show that tissue pressure under the dressing rises and blood flow falls as the vacuum increases. Over a marginally perfused limb the thing being minimised is a harm. If a setting is too low the wound granulates more slowly, which is recoverable; if it is too high the anastomosis can bleed, which may not be. That asymmetry is why the protocol starts at the lowest pressure that allows a seal and increases gradually.

Funding note (South Africa)

ICD-10: T82.7 (lead); pair with I70.21 or I73.9. **PMB:** 900E (T82.7, complication of a major vascular procedure) and 915E; 48-hour decision.

References

1. Apelqvist J, Wyl C, Fagerdahl AM, Fraccalvieri M, Malmström M, Piaggese A, et al. Negative Pressure Wound Therapy — overview, challenges and perspectives. *J Wound Care* 2017;26(Suppl 3):S1–S113. doi:10.12968/jowc.2017.26.Sup3.S1
2. Mayer D, Hasse B, Koelliker J, Enzler M, Veith FJ, Rancic Z, et al. Long-Term Results of Vascular Graft and Artery Preserving Treatment With Negative Pressure Wound Therapy in Szilagyi Grade III Infections Justify a Paradigm Shift. *Annals of Surgery* 2011;254(5):754-59; discussion 760. doi:10.1097/SLA.0b013e3182365864
3. Andersson S, Monsen C, Acosta S. Outcome and Complications Using Negative Pressure Wound Therapy in the Groin for Perivascular Surgical Site Infections after Vascular Surgery. *Annals of Vascular Surgery* 2017;48:104-110. doi:10.1016/j.avsg.2017.10.018
4. Acosta S, Björck M, Wanhainen A. Negative-pressure wound therapy for prevention and treatment of surgical-site infections after vascular surgery. *British Journal of Surgery* 2017;104(2):e75-e84. doi:10.1002/bjs.10403
5. White Richard A, Miki Roberto A, Kazmier Peter, Anglen Jeffrey O. Vacuum-assisted closure complicated by erosion and hemorrhage of the anterior tibial artery. *Journal of Orthopaedic Trauma* 2005;19(1):56-59. doi:10.1097/00005131-200501000-00011
6. Vos Roemer J, Yilmaz Alaaddin, Sonker Uday, Kloppenburg Geoffrey T L. Acute mediastinal bleeding during vacuum-assisted closure. *International Wound Journal* 2013;10(3):348-350. doi:10.1111/j.1742-481X.2012.00989.x
7. Lindstedt S, Ingemansson R, Malmström M. A rigid barrier between the heart and sternum protects the heart and lungs against rupture during negative pressure wound therapy. *Journal of Cardiothoracic Surgery* 2011;6:90. doi:10.1186/1749-8090-6-90
8. Kairinos N, Solomons M, Hudson DA. Negative-Pressure Wound Therapy I: The Paradox of Negative-Pressure Wound Therapy. *Plast Reconstr Surg* 2009;123(2):589-98. doi:10.1097/PRS.0b013e3181956551
9. Birke-Sorensen H, Malmström M, Rome P, Hudson D, Krug E, Berg L, et al. Evidence-based recommendations for negative pressure wound therapy: Treatment variables (pressure levels, wound filler and contact layer) — Steps towards an international consensus. *J Plast Reconstr Aesthet Surg* 2011;64:S1-S16. doi:10.1016/j.bjps.2011.06.001
10. US Food and Drug Administration. FDA Safety Communication: UPDATE on Serious Complications Associated with Negative Pressure Wound Therapy Systems. US Food and Drug Administration, Center for Devices and Radiological Health 2011.