

Patient preparation for safe removal of surgical drains

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Summary

Drains are a common feature of the post-operative management of surgical patients. While drains serve an important function they are also associated with complications such as haemorrhage, tissue inflammation, retrograde bacterial migration and drain entrapment. It is therefore essential that nurses are familiar with the monitoring and management of surgical drains, but also the process involved in their removal.

Author

Jennie Walker is clinical educator, Department of Orthopaedic and Accident Surgery, Queen's Medical Centre, Nottingham.
Email: jennie.walker@nottingham.ac.uk

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CAREFUL POST-OPERATIVE monitoring is essential for a successful outcome of surgery with the main aims being prevention and early identification and treatment of post-operative complications. Nurses are ideally situated to closely monitor and observe patients during the post-operative period and are frequently involved in the removal of surgical attachments such as drains.

Wound drains are perforated Silastic (silicone rubber) tubes which exit through the surgical incision or through a separate small stab wound (Walsh 2002) and drain either into a sterile vacuum device (closed drain) (Figure 1) or into dressings (open drain) (Figure 2) (Smeltzer and Bare 2003). Drains inserted away from the primary incision help to prevent transmission of infection between the operation site and exit site of the wound drain as they can be dressed and managed separately (Jamieson *et al* 2002), and may therefore be preferable to those that exit the surgical wound.

Drains may be superficial, that is, placed in the wound, or deep. Deep drains may be intraperitoneal, in a hollow organ or duct such as a T-tube in the bile duct, or positioned in a deep cavity such as an abscess or a haematoma.

Purpose of drains

Drainage systems may be used to prevent the formation of a haematoma or to remove an accumulation of fluid. Box 1 lists some of the drains used in clinical practice. The primary purpose is to drain blood or serous fluids that may become infected (Smeltzer and Bare 2003) and result in tissue irritation or breakdown of

FIGURE 1

Vacuum device closed drainage system



FIGURE 2

Corrugated drain open drainage system



BOX 1

Drains used in clinical practice

- ▶ Chest drain
- ▶ Corrugated drain
- ▶ External ventricular drain
- ▶ Gravity drain
- ▶ Hemovac
- ▶ Jackson-Pratt
- ▶ Penrose
- ▶ Redivac
- ▶ T-tube drain
- ▶ Underwater seal drain

(Jamieson *et al* 2002)

overlying tissues (Beare and Meyers 1998). The use of vacuumed drains makes drainage following surgical procedures easier. Drains may commonly be used following orthopaedic surgery such as joint replacement or spinal surgery, or surgery to the face and neck where fluid may collect rapidly as a result of efficient local blood supply (Jamieson *et al* 2002). Drainage systems may also be used to monitor leakage, for example, a bile leak following biliary operations, or to divert body fluids away from a particular surgical site, for example, T-tube in bile duct operations (Ngo *et al* 2004).

The extent and site of surgery will influence the number of surgical drains used.

Removal of drains

The drain is usually removed when the drainage has ceased, which is typically 24-48 hours following surgery if it is being used to cover perioperative bleeding and haematoma formation (Walsh 2002). If a drain has been inserted to prevent accumulation of serous fluid, its removal will depend on the size and nature of the wound and the potential for complications if a seroma develops (Ngo *et al* 2004).

Ngo *et al* (2004) advocate the removal of blocked drains as they no longer serve a purpose if they cannot be unblocked. The longer a drain remains in place, the greater the risk of infection to the drain site and surrounding tissues. Similarly, drains that have been left *in situ* for prolonged periods of time may develop granulation tissue around the drain – this may make drain removal more traumatic to the local area and more painful for the patient. The duration of time the drain is to remain in position is decided by the surgeon responsible for the patient's care.

Box 2 outlines the equipment required for drain removal, patient preparation and the removal procedure.

Post-procedure

Following removal of the drain ensure that the patient is no longer exposed, and is comfortable. Analgesia should be administered if required.

All sharps and clinical waste should be disposed in appropriate biomedical waste disposal units. If scissors are not disposable then they should be returned to the sterile supplies department for decontamination.

Labelled specimens and completed forms should be dispatched to the laboratory so that investigative procedures may commence as soon as possible (Jamieson *et al* 2002). While it is not always necessary to obtain swabs or samples for testing following the routine use of surgical drains, it may be useful in patients whose drain sites may be infected, or in patients who are pyrexial.

Dressings should be monitored at regular intervals to ensure that leakage from the drain site remains minimal. However, some drainage may occur until the tract has healed and dressings should therefore be replaced as necessary to prevent further risk of infection. Leakage on the dressing should be marked by outlining the edge of the leakage on the dressing with a pen and writing the time of marking. This facilitates easier monitoring of any discharge that occurs following drain removal and provides clear indication of how much leakage has occurred since the last time of marking. Excessive leakage should be reported to the nurse in charge or the surgeon. Dressings may be removed in three to five days when the drain site has healed.

The removal of the drain should be documented within the nursing records along with specification of any complications that occurred during the procedure, the amount of fluid in the drain and any samples that were obtained and sent to microbiology for testing. Removal of the drain should also be documented on the fluid balance chart as well as the drainage that was in the bottle.

Conclusion

Effective post-operative management and removal of surgical drains can assist patients' post-operative recovery through the avoidance of iatrogenic infection and by promoting healing and recovery. Skills such as surgical drain removal are one of the many interventions which nurses perform routinely; however, it is an important skill which requires organisation and the use of aseptic technique to minimise risk of complications **NS**

BOX 2

Equipment, patient preparation and the procedure for surgical drain removal

Equipment

- ▶ Dressing trolley or other suitable surface.
- ▶ Dressing pack including sterile towel and gauze.
- ▶ Sodium chloride 0.9%.
- ▶ Gloves: one disposable pair, one sterile pair.
- ▶ Stitch cutter.
- ▶ Sterile forceps.
- ▶ Dry dressing.
- ▶ Alcohol hand rub or hand-washing facilities.

Preparation

- ▶ Explain the procedure to the patient to gain his or her consent and co-operation and to encourage participation in care.
- ▶ Check patient comfort, for example, position, convenience and need for the toilet. Administer analgesia if required and allow appropriate time for medication to take effect.
- ▶ Clean trolley.
- ▶ Gather equipment checking the sterility and expiry date of equipment and solutions and place on the bottom of the trolley.
- ▶ Take the trolley to the bed and adjust the bed to the correct height to avoid stooping.
- ▶ Remove dressing pack from the outer pack and place on the top of the dressing trolley. Place stitch cutter, sterile gloves and forceps on the sterile field.

An appropriate risk assessment should be conducted before removal of the drain to ensure the procedure can be carried out safely and effectively. Examples may include assessment of patients' understanding or anxiety regarding the procedure, which may be addressed by enlisting the help of another member of staff to reassure the patient while the drain is removed; or the use of

appropriate barrier nursing if the patient has methicillin-resistant *Staphylococcus aureus*, for example.

Procedure

Use of an aseptic technique is essential when caring for and removing drains because micro-organisms may pass through the drain to tissue and body cavities, which may result in infection and surgical complications (Long *et al* 1997). The patient should be observed throughout the procedure for any adverse effects.

- ▶ Wash and dry hands thoroughly.
- ▶ Put on apron.
- ▶ Expose drain site and adjust patient's clothes to expose wound, taking care to maintain his or her dignity.
- ▶ Wearing disposable gloves remove the dressing covering the drain site and place in a soiled dressing bag away from sterile field.
- ▶ If the drain has a vacuum bottle attached then the tubing should be clamped with the clamp provided. This releases the vacuum and prevents suction during the removal of the drain which may cause tissue damage or pain (Nicol *et al* 2003).
- ▶ Note amount of drainage in the bottle.
- ▶ Put on sterile gloves.
- ▶ If the drain site appears inflamed or purulent a swab should be obtained and sent to microbiology for culture and sensitivity analysis (Nicol *et al* 2003).
- ▶ Skin should only be cleansed if necessary, that is, the drain site is purulent or to ensure that the suture is visible and accessible (Jamieson *et al* 2002).
- ▶ Place sterile dressing under the drain tubing.
- ▶ Lift up the knot of the suture with sterile forceps and use the stitch cutter close to the skin to cut the suture. Remove the suture with the forceps.

If a purse string suture is *in situ*, the knot should be cut at the loose end of the purse string suture so that the ends are free. On removal of the drain the strings should be pulled tight, drawing the proximal edges of the drain site together. The strings should then be tied in a double knot. Purse string sutures may be removed after a further five days (Nicol *et al* 2003).

- ▶ Fold up a sterile gauze swab several times to create an absorbent pad and hold in position over the drain site with one finger each side to support the skin surrounding the drain site (Ngo *et al* 2004).
- ▶ Warn the patient of a pulling sensation in relation to drain removal.
- ▶ Grasp the drain close to the skin using a sterile gloved hand or forceps (Jamieson *et al* 2002).
- ▶ Gently withdraw the drain on to the sterile towel using steady gentle traction as opposed to sudden jerky movements (Ngo *et al* 2004). Drains that have been left in place for an extended period may be difficult to remove if tissue growth has occurred around the drain.
- ▶ Check that the entire drain has been removed. The drain should have a clean cut edge and should not appear jagged or torn. If the drain cannot be easily removed it should be left in position and reported to the nurse in charge or the surgeon (Nicol *et al* 2003).
- ▶ Maintain pressure over the drain site with the gauze pad until the bleeding and/or drainage is minimal.
- ▶ Dress with a sterile dry dressing to maintain asepsis and to promote healing (Jamieson *et al* 2002).
- ▶ If the tip of the drain is required for microbiological investigation, it should be cut off with sterile scissors and placed in a sterile specimen container maintaining asepsis.

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