A simple, effective and cheap device for the safe irrigation of open traumatic wounds

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ABSTRACT

This study reports the use of an overturned plastic gallipot from a sterile wound dressing pack as a splashguard during the irrigation of traumatic wounds with a device consisting of a 20 ml syringe and a 21F gauge hypodermic needle. This simple, effective and cheap device can be constructed from items readily available within the emergency department or operating theatre and minimises exposure to biologically hazardous material during wound irrigation.

Open traumatic wounds represent approximately 15% of the attendances at emergency departments. The initial management of such wounds that are contaminated requires thorough debridement to...

Figure 1  Removal of the needle from the hub of a 21F gauge hypodermic needle using the cap. The cap is lifted from the needle (A) and bends the needle in a continuous path in opposite directions (B and C) so that the needle is broken leaving the hub (D).
remove devitalised tissue and irrigation to eradicate debris and bacteria, thereby minimising the high risk of infection.\textsuperscript{1,2}

Currently, these wounds are usually irrigated thoroughly with a jet of saline under pressure and various methods of generating this pressure have been described in the literature. These include manual lavage either with saline from a syringe, with or without a hypodermic needle, or from an intravenous fluid bag either under direct manual pressure or using a manual pressure cuff, or from a pressurised cannister.\textsuperscript{3–7}

However, these methods of irrigation are all hindered by splash exposure to biologically hazardous material from the wound during irrigation. We describe a novel, cheap, readily available and disposable device that can be used to irrigate open traumatic wounds thoroughly and safely in the operating theatre or emergency department. This device is particularly well suited for irrigating traumatic wounds of the hand.

**METHOD**

**Equipment**

The irrigation device consists of an overturned plastic 60 ml gallipot from a sterile wound care pack (Frontier Multigate, Blackwood, South Wales, UK) through which the hub of a 21F gauge hypodermic needle (Stericam, B-Braun, Melsungen, Germany) has been passed. The needle is broken off from the hub using the needle sheath as previously described by Lam \textit{et al.}\textsuperscript{4} (fig 1), allowing the small fragment of the needle to pierce the centre of the gallipot carefully. The hub of the needle is connected to a 20 ml syringe (Omnifix, B-Braun) filled with an irrigating solution of 0.9\% sodium chloride (Versol, Lyon, France). The overturned plastic gallipot acts as a splash guard to minimise splash exposure during irrigation (fig 2).

**DISCUSSION**

In animal and human studies, continuous high-pressure syringe irrigation has been shown to be most effective at removing contamination by debris and bacteria while avoiding trauma to the soft tissues.\textsuperscript{6–8} The recommended irrigation pressure is between 5 and 8 psi (between approximately 250 and 400 mm Hg).

Although needlestick injuries could be sustained as the needle is carefully broken off from the hub using the needle sheath as depicted in fig 1, our experience of doing this on over 500 occasions has shown that no needlestick injuries have been sustained.

The use of an overturned plastic gallipot as a splash guard to irrigate wounds has recently been described by Govilkar and colleagues’ using a syringe attached to an intravenous cannula.\textsuperscript{9} Their method describes a syringe attached to an intravenous cannula that is passed through a hole made with a 2 mm punch in the base of an overturned polypropylene plastic gallipot. However, we believe that our modification of their method is an improvement for three reasons. First, by using a hypodermic needle a small fragment of the needle remains that can easily puncture the gallipot. This obviates the need to use extra instruments such as a punch or scalpel blade if an intravenous cannula is used. Second, as the plastic is more malleable, we have found that it is less likely to crack than the gallipot made from polypropylene plastic used in the method of Govilkar \textit{et al.}\textsuperscript{9} Third, by using a hypodermic needle instead of an intravenous cannula, the jet of irrigation can be maintained. In our experience, we have found that the cannula tends to bend and prevent irrigation. Although commercial plastic splash guards are available that effectively prevent splash exposure,\textsuperscript{10} our adaptation of the use of a gallipot is cheaper and more readily available in the National Health Service. However, to address this formally, a clinical trial should be undertaken to compare the complications of our technique with other methods of wound irrigation.

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\textbf{Figure 2}  Wound irrigation device with a plastic gallipot acting as a splash guard. The laceration (A) is irrigated with 0.9\% sodium chloride (B).
A life-threatening sign, gas in the kidney is produced by bacteria: bilateral emphysematous pyelonephritis

A 39-year-old woman presented to the emergency department with severe abdominal pain and pain in both flanks for 3 days. She had a history of treatment for pyelonephritis 7 days previously. Her blood pressure was 80/60 mm Hg. Laboratory findings were significant for a creatinine level of 4.3 mg/dl.

On conventional abdominal radiograph, air was seen within the kidney shadow. A non-contrast computed tomography (CT) scan revealed mottled air within both kidneys (fig 1).

Gas in the urinary system is produced by bacteria and may be a life-threatening sign. Emphysematous pyelonephritis represents a severe necrotising infection of the renal parenchyma and perirenal tissues. Gas can be detected in the kidneys on various imaging studies, including plain radiograph, ultrasound and CT. CT is the most sensitive method.

The common presentation is non-specific and the clinical significance is easily overlooked. Early diagnosis is important as the disease may advance rapidly.1

Physicians should take a careful look at the gas pattern in the kidneys during plain abdominal film interpretation, and any abnormalities imply a complicated lesion require an immediate CT evaluation.

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REFERENCE