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Immediate skin grafting of sub-acute and chronic wounds debrided by hydrosurgery☆

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Summary A wound bed may be prepared by various non-surgical debridements using autolytic, biological or enzymatic techniques. These are all effective in selective wounds but tend to be time consuming.

Surgical debridement is not selective since healthy collateral tissue is also removed. Physical debridement uses whirlpool therapy to slough off necrotic tissues — the saline which comes out of the hand piece if vapourised over the wound — and therefore disseminates contaminated droplets. Hydrosurgery combines physical and surgical debridement but does not have their drawbacks. Water dissection works by using a high-pressure jet of sterile saline that travels parallel to the wound and creates a Venturi effect, thus enabling the selective removal of necrotic tissues without dissemination of contaminants.

In this study, the authors report on 167 sub-acute and chronic wounds from 155 patients treated under general anaesthesia by hydrosurgery (Versajet®). Of these, 95% of the debrided wounds were immediately covered with an autologous meshed graft. Compared to other debridement techniques, hydrosurgery has two main advantages: namely its tissue selectivity and its high percentage of successful engraftment after immediate skin grafting.

It is increasingly recognised that the debridement of devitalised, bacterially contaminated or senescent tissue is an essential preparation for the effective closure of acute and chronic wounds.

A wound bed may be prepared by various non-surgical debridement techniques: autolytic debridement facilitated by interactive dressings, larval therapy using sterile maggots and enzymatic debridements with ointments containing papain, urea or collagenase mixtures. These are all effective in selective wounds but are time consuming and may be unpredictable. Physical debridement uses whirlpool treatments to slough off necrotic tissues from the wound. Surgical debridement may create a very clean wound but it

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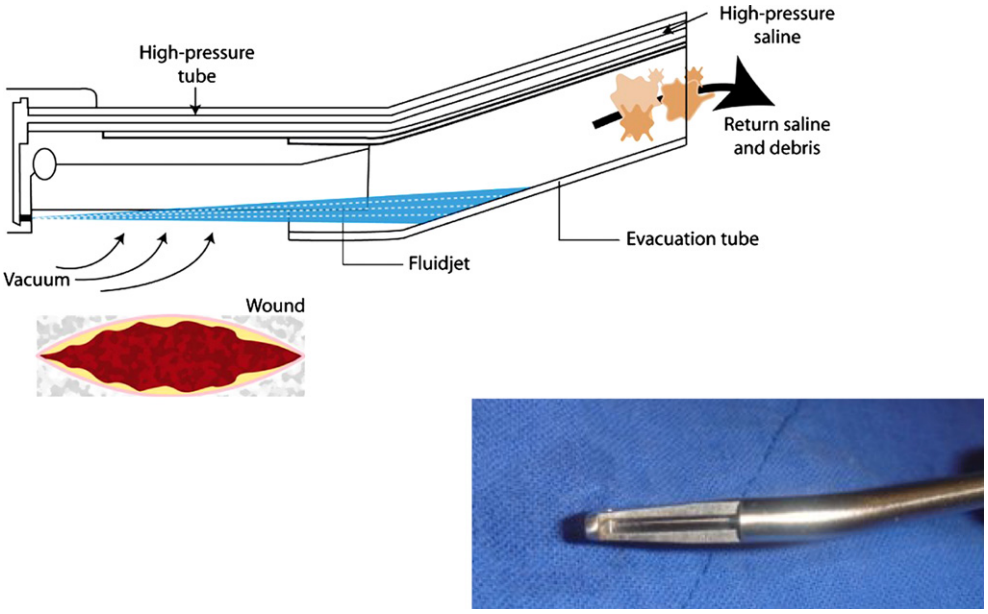

Figure 1 Schematic representation of the hand piece and description of the Venturi effect.

is not selective. Hydrosurgery (Versajet®) combines both physical and surgical debridement techniques. It creates a Venturi effect that selectively removes the necrotic tissues. It minimises the amount of normal tissue that is accidentally removed by surgery and, in most cases, the wound bed is ready for immediate skin grafting.

In this article, the authors report their experience of 167 wounds treated by hydrosurgery.

Material and methods

Hydrosurgery

The Versajet® hydrosurgery system developed by Hydrocision of Andover (USA) has been brought into clinical use by Smith and Nephew.[a] The unit is activated by a pedal. Sterile saline flows to the power console where it is pressurised. A thin stream of sterile saline is accelerated to high speed and forced under high pressure into an angled, sterile and disposable hand piece. The saline stream crosses an aperture at the end of the hand piece and is directed backwards, where it is immediately sucked into the collector tube. This creates a localised Venturi effect which enables to simultaneously grasp, cut and remove the targeted tissue (Figure 1). The larger the operating window held parallel to the wound surface, the more aggressive is the tissue excision. When the aperture is held more obliquely, a softer contaminant-vacuuming effect is achieved.

Patients

This study included 167 wounds in 155 patients (88 women and 77 men) with an age range of 1 month to 84 years (mean: 56 years). Hydrosurgery was proposed to patients with large wounds or those with smaller wounds that showed no evolution with modern interactive dressings. The wounds were treated under general anaesthesia over a 23-month period. The mean number of Versajet sessions was 1.2.

Figure 2 describes the treated wounds: 120 were vascular ulcers (85 venous and 35 arterial), 16 pressure sores, 13 delayed traumatic wounds, 12 diabetic feet, two sickle cell anaemia ulcers, two sternal osteitis in infants, one pyoderma gangrenosum and one necrotising fasciitis.

Among the delayed traumatic wounds, there were three cases of degloving of the leg in elderly patients, two cases of third-degree burns and eight cases of dry cutaneous necrosis developed over large haematomas in anticoagulated patients; in these cases, sharp excision of the dry necrosis was necessary prior to wound-bed preparation by hydrosurgery. Muscular flaps were raised in three patients in order to cover bare bone.

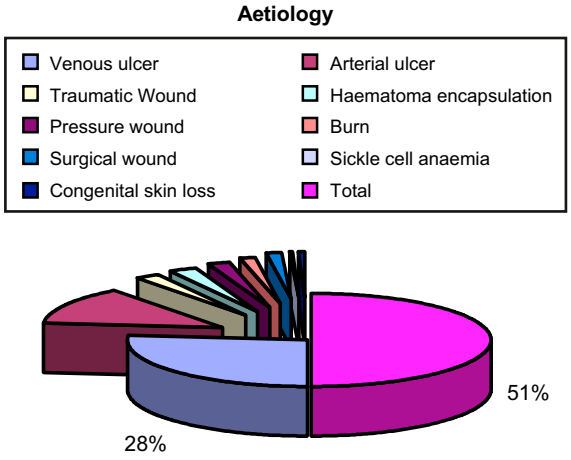

Figure 2 Diagram showing the wounds treated by hydrosurgery.

[a] Smith and Nephew Medical Limited. Hull HU3 2BN. England.