Available online at www.sciencedirect.com

ScienceDirect

journal homepage: www.elsevier.com/locate/burns

Hydrotherapy in burn care: A survey of hydrotherapy practices in the UK and Ireland and literature review

Jenna Langschmidt [a], *Paul L. Caine* [b], *Christopher M. Wearn* [c], *Amy Bamford* [c], *Yvonne T. Wilson* [c,d], *Naiem S. Moiemen* [c,d,*]

[a] *Warwick Medical School, The University of Warwick, Coventry CV4 7AL, UK*
[b] *University of Birmingham Medical School, Edgbaston, Birmingham B15 2TT, UK*
[c] *Burns & Plastic Surgery Department, University Hospitals Birmingham NHS Foundation Trust, Queen Elizabeth Hospital, Birmingham B15 2WB, UK*
[d] *Birmingham Children's Hospital NHS Foundation Trust, Steelhouse Lane, Birmingham B4 6NH, UK*

ARTICLE INFO

Article history:
Accepted 12 November 2013

Keywords:
Hydrotherapy
Burns wounds
Pseudomonas
Review
Survey
Cross infection
Wound cleansing

ABSTRACT

Introduction: Hydrotherapy is widely used in burns management however there are risks associated with its use, in particular cross-infection. Data regarding indications and techniques in common use is deficient. This study aimed to investigate hydrotherapy practices in the UK and Ireland.

Methods: A survey of the hydrotherapy practice of major burn care providers was performed by e mail and where necessary, follow up telephone contact.

Results: The survey included 28 burn care providers. 27 reported using hydrotherapy. Only 11 (41%) had defined indication criteria with 4 (15%) implementing a specific protocol. Variations in hydrotherapy practice were seen.

Conclusion: Hydrotherapy is used nationwide, however considerable variation in practice exists. One area worthy of further consideration is the need for appropriate standards of infection control.

1. Introduction

Loss of the skin's protective barrier and depressed immune function secondary to thermal injury make burn patients uniquely vulnerable to infection [1], and the burn wound an ample environment for bacterial colonisation with both endogenous and exogenous organisms [2]. Following better airway management [3] and effective resuscitation, sepsis has become the leading cause of death in major burns [4,5]. The prevalent organisms in burn wounds differ between countries and even hospitals within the same country, depending on local protocols and infection control policies [6–9]. Gram-negative bacteria, specifically *Pseudomonas aeruginosa*, are widely implicated as the pathogens associated with hospital-acquired infection in burns, causing increased morbidity and mortality [10,11]. In a survey of directors of burns centres in the United States, *Pseudomonas aeruginosa* (*P. aeruginosa*) was subjectively identified as the commonest pathogen nosocomially acquired with hydrotherapy, followed by Methicillin

* *Corresponding author at*: The Healing Foundation Burn Injury Research Centre, University Hospitals Birmingham NHS Foundation Trust, Queen Elizabeth Hospital, Mindelsohn Way, Edgbaston, Birmingham B15 2WB, UK. Tel.: +44 121 3714884.
E-mail addresses: nmoiemen@aol.com, naiem.moiemen@uhb.nhs.uk (N.S. Moiemen).
0305-4179/$36.00
http://dx.doi.org/10.1016/j.burns.2013.11.006

Resistant *Staphylococcus aureus* (MRSA) [12]. In England, since MRSA has become a mandatory surveillance reportable target for all acute care hospitals, with severe financial penalties [13], MRSA incidence has declined. This shift is echoed by reports from other centres [4,5,14].

Hydrotherapy is defined as ''The medical use of water in the treatment of certain diseases'' [15] and its use in the treatment of burn wounds can be traced back to its origins in the mid-seventeenth century [16]. Hydrotherapy in burns typically involves the washing of patients in a tank, shower or agitating bath, the techniques of which have evolved over the centuries. The earliest recorded techniques saw the permanent immersion of patients in wooden baths with twice daily water changes. The late 1880s saw the move towards gentle cleansing of the burn using a brush and a mercury cleansing solution [17]. Current practice has seen a move away from traditional bath hydrotherapy towards 'shower cart-hydrotherapy' [18].

Despite the widespread use of hydrotherapy in the United Kingdom, there is a lack of published data on the indications and efficacy of its use in the management of acute burn wounds. Benefits of hydrotherapy include: reduction of the wound bacterial load, providing an opportunity to clean the burn surface, debriding wounds, facilitating the separation of eschar, removing exudates and residual topical agents, facilitating physiotherapy and improving patient comfort [10,18,19]. However, studies have also reported negative outcomes associated with the use of hydrotherapy in burn care including the development of pyrexia and fatigue [18]. Electrolyte disturbances have also been reported associated with the use of hydrotherapy [17,18,20]. Cross-infection is of particular concern with several studies attributing outbreaks in burn centres to contaminated hydrotherapy equipment [10,21–24]. A study by Reuter et al. [25] on surgical patients (not including burns) suggested that 36–42% of healthcare associated cases of *P. aeruginosa* are due to contaminated water from the tap. Hospital acquired *P. aeruginosa* is associated with delayed wound healing, graft loss, sepsis, increased morbidity and even death [11,26,27].

Despite the conflicting evidence regarding the advantages and disadvantages of using hydrotherapy in burns management it has been estimated that 92% of burns units in the USA are using the technique with 74% of them incorporating it into their daily practice [18].

The practice of hydrotherapy in burn care varies considerably between different centres and units. A survey carried out by Thomson et al. demonstrated that variation exists with regard to whether the patient is immersed, showered or sprayed, the frequency and duration of ''tubbing'' which member of the team carries out the hydrotherapy; the type of tub used and the solution used [17]. Other documented variations include the use of disposable liners and whether equipment decontamination is undertaken [19,26–28].

To date, there has not been a published study regarding hydrotherapy practices in the UK and Ireland. Our group identified this as a worthwhile subject to investigate.

The aim of this project was to conduct a nationwide survey to investigate current hydrotherapy practices at the major burn care providers in the United Kingdom and Ireland.

2. Materials and methods

2.1. *Survey of burn providers in the United Kingdom and Ireland*

A survey addressing various aspects of hydrotherapy practice including; indication, protocol, method, frequency, additives, sedation, infection control measures, environmental surveillance and perceived benefits was sent via e-mail to all 28 burn providers. The burn providers contacted were those listed by the British Burn Association and the European Burn Association. Those who did not respond initially were followed up by telephone. Respondents were specialist burn nurses or members of staff knowledgeable in local hydrotherapy practice.

3. Results

The survey achieved 100% response rate with all 28 burn centres and units responding, 27 of them reporting the use of hydrotherapy. Only 41% (11/27) had specific indication criteria for the use of hydrotherapy, with 15% (4/27) implementing a hydrotherapy protocol.

Notable variations were reported in hydrotherapy practices (Table 1). Four providers exclusively showered patients, none exclusively performed immersion ''bathing'' hydrotherapy and only one provider reported not using showering. Bedside irrigation of wounds (as an alternative to hydrotherapy) was performed by all but one provider. Treatment sessions were very variable in duration (10 min to 4 h) and dependent upon individual patients needs.

Table 1 – Hydrotherapy practices.

	N (%)[a]
Method of cleaning wound	
Immersion in tub	21 (78)
Immersion with spraying/showering	21 (78)
Shower	26 (93)
Shower trolley	18 (67)
Frequency of wound cleaning	
Daily	8 (30)
Routinely every 3–5 days	18 (93)
Whenever dressing change is needed	14 (52)
Main cleansing agent(s) used	
Tap water	26 (96)
Regular soap	14 (52)
Povidone iodine	4 (15)
Chlorhexidine	11 (41)
None	1 (4)
Number of staff involved	
One to two	13 (48)
One to three	11 (41)
One to five	1 (4)
Five + not specified	1 (4)

[a] Percentages do not add up to 100% because more than one answer was given by many institutions.