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Review

Burns management in ICU: Quality of the evidence A systematic review

Alice Henschke^{a,*}, Richard Lee^{b,c,1}, Anthony Delaney^{b,c,1}^a Intensive Care Unit, Royal Prince Alfred Hospital, Camperdown, NSW 2050, Australia^b Malcolm Fisher Department of Intensive Care Medicine, Royal North Shore Hospital, St Leonards, NSW 2065, Australia^c Northern Clinical School, Sydney Medical School, University of Sydney, Sydney, Australia

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ABSTRACT

Background: The objective of this study was to assess the quality of readily available evidence regarding critical care aspects of the management of patients with severe burn injuries.

Method: PUBMED, EMBASE, Cochrane Databases and bibliographies of included studies and burns review articles were searched from inception of databases to end of February 2015. We included systematic reviews, randomised controlled trials (RCTs) and cohort studies with concurrent controls on the topics of (a) fluid resuscitation (b) analgesia (c) haemodynamic monitoring and targets (d) ventilation (e) blood transfusion. The quality of the studies was assessed using validated tools.

Results: Fifty six studies fulfilled the inclusion criteria. Twenty three on fluid resuscitation, 22 on analgesia, nine on haemodynamic monitoring and two on ventilation. No studies were found on blood transfusion practice. There were ten systematic reviews, 38 RCTs and eight cohort studies with concurrent controls. The majority of studies were single centre trials with small numbers of patients, surrogate outcomes and high risk of bias.

Conclusions: There is very little high quality evidence to guide clinical practice in early management of the severely burnt patient. Eleven of 56 studies found in our search of critical care topics were of good methodological quality with low risk of bias.

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* Corresponding author at: C/o Dr Richard Lee, Malcolm Fisher Department of Intensive Care Medicine, Royal North Shore Hospital, St Leonards, NSW 2065, Australia. Tel.: +61 2 9463 2601; fax: +61 2 9463 2507.

E-mail addresses: alice.henschke@gmail.com (A. Henschke), rlee@med.usyd.edu.au (R. Lee).

¹ Tel.: +61 2 9463 2601; fax: +61 2 9463 2507.

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1. Introduction

Burn injuries are among the most devastating of all injuries and a major global public health problem [1]. An estimated 265,000 deaths are caused by burns annually with the vast majority occurring in low to middle income countries where burns are a leading cause of disability-adjusted-life-years lost [2,3].

In developed countries the acute hospital, rehabilitation and loss of income cost is high and there is variability in outcome of burn patients between admitting facilities [4]. It is possible that variability in outcomes stems from variability in practice due to lack of quality evidence and inconsistent guidelines [5].

Reviews of burn literature reveal that the amount of published literature is large but not made up of high-level evidence such as systematic reviews or RCTs. Many of the trials are poor quality with an unacceptable level of bias [6].

Guidelines are helpful in ensuring consistent best practice but the guidelines of large burn organisations, especially in the area of acute burn care, are not based of RCTs or systematic reviews but on cohort studies, observational studies, case series or expert opinion [7,8].

To investigate this issue, the study aimed to assess the quality of readily available evidence regarding critical care aspects of the management of patients with severe burns. The focus was on five key areas: fluid resuscitation, haemodynamic monitoring, analgesia, ventilation and blood transfusion practice.

2. Methods

The study was conducted according to a pre-specified protocol. We included only studies of adult, human subjects with burn injuries that were above level III-2 (NHMRC) or 2b (Oxford CEBM) evidence [9,10]. The studies had to cover the topics of fluid resuscitation, haemodynamic monitoring and targets, analgesia (parenteral or enteral), ventilation or blood transfusion.

A detailed search of the literature using the PUBMED, EMBASE and Cochrane Databases was performed for articles published from inception of each database to the end of February 2015. The search terms used were *burn** OR *thermal injury* with filters for systematic review, meta-analyses and controlled clinical trial. Full details of the search strategy are provided in appendix A. Bibliographies of included studies and recent review articles were searched for additional articles meeting the inclusion criteria.

The abstracts of articles found in the search were reviewed by one author (AH). If it was unclear if inclusion criteria were met, the full article was retrieved. Articles were excluded if they did not address thermal injury and one of the five specific topic areas, were not written in English, did not focus on adults, or the level of evidence was below that of cohort study with concurrent controls.

We recorded information on first author, year of study, study type, domain, population, number of subjects, single/multicentre, outcomes, intervention/comparison, results and conclusion for the articles that met the inclusion criteria. Data was collated by a single investigator (AH) (appendix B).

The quality of each manuscript was assessed by two authors separately (AH and RL). Quality was assessed using appropriate and previously validated tools depending on the study type: the Overview Quality Assessment Questionnaire (OQAQ) for systematic reviews [11], the Cochrane Collaboration Tool for Assessing Risk of Bias for RCTs [12] and the National Heart, Lung and Blood Institute Quality Assessment Tool for Observational Cohort and Cross-Sectional Studies for cohort studies [13]. These tools were modified to include the outcomes measured (patient centred or surrogate) and an assessment whether the conclusions were consistent with the data provided (if not already included). See footnotes of the relevant results tables for detailed description of the tools.

A global assessment of overall manuscript quality and its clinical applicability was determined by two authors (AH and RL) based on the results of the modified tools. For a manuscript to be judged as ‘acceptable’ quality, the results were considered

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