Evidence-based and clinical views on acute wound healing and scar formation

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Summary

In this thesis, three aspects of wound care have been explored. The first aspect is the generation of evidence for patients with (acute) wounds (part I). The second is the assessment and patients’ appreciation of scar formation, of donor sites in particular (part II). The final aspect is the integration of available evidence with current clinical views and expertise on acute wound care in order to arrive at an interdisciplinary, evidence-based guideline (part III).

Part I: Acute wound healing

Evidence generation in wound care seems to be more difficult than in other medical areas because wound care has to contend with a variety of aetiologies and a diversity of treatment options with differing financial burdens.

In Chapter 2 we describe a longitudinal trend analysis on research in wound care in comparison with breast cancer over the last five decades. The results of this study showed a 30-fold rise in publications on wound care, but a 70-fold increase in those on breast cancer. As well as falling behind on quantity, high-quality study designs and guidelines were less frequently published in wound-care than in breast-cancer research. Despite the discrepancy in the amount of convincing evidence available for wound care in comparison with other areas, we would like to stress that sound evidence is available and recommend that caregivers take the available evidence into account in their decision making.

In order to support this decision making with evidence-based recommendations, we undertook a meta-review, compiling the best available evidence from systematic reviews regarding local and systemic wound care (Chapter 3). On the basis of 44 Cochrane systematic reviews, 109 evidence-based conclusions could be drawn as to the treatment and prevention of venous ulcers (30), acute wounds (30), pressure ulcers (15), diabetic ulcers (14), arterial ulcers (12) and miscellaneous complex wounds (8). This meta-review offered several recommendations, mostly for complex wounds, that are useful for supporting evidence-based decisions in wound care. Also, some niches in knowledge about wound care, such as the treatment of donor-site wounds and the effectiveness of various wound-care materials, were revealed by performing this meta-review. In future wound-care research, these niches should be expanded with high-level evidence.
Generating this kind of evidence requires a study design that is best suited to answering the clinical question. Therefore, in Chapter 4 we describe how we initiated a joint venture of international experts in wound care in order to propose a framework for the design and conduct of future RCTs on the effectiveness of wound-care interventions.

Unfortunately, upgrading the quality of study designs does not automatically improve the quality of the reporting of wound-care research. Selective reporting of positive study results or adverse events could lead to a reporting bias, emphasising the need for full and transparent reporting of wound-care research. Therefore, with the same international group of wound experts we proposed a step-by-step reporting standard for future RCTs in wound care in Chapter 5.

We applied this design framework and step-by-step reporting standard to a large, multicentre, six-armed RCT (Chapter 6), comparing six promising dressing materials to cover donor-site wounds in 289 adult patients. The time to complete re-epithelialisation was seven days (30%) shorter for hydrocolloid dressings in comparison with the other five dressing materials, namely, alginate, film, gauze, hydrofibre and silicone dressings. Overall pain scores were low, and they were slightly lower with use of film dressings. The infection rate among patients treated with gauze was twice as high as in those who had other dressings. Given the improved healing time, we recommend hydrocolloid dressings for patients with donor-site wounds and advise against the use of gauze because of an increased risk of infection.

**Part II: Scar formation**

In the trial described in Chapter 6 we made use of the Patient Observer Scar Assessment Tool (POSAS), which is considered to be a reliable and valid tool for enabling both patients and observers to assess scar quality. This quality may be assessed in vivo or from digital photographs. However, it is questionable whether these two methods influence the results of the scar assessment.

In Chapter 7 we addressed this question by means of an inter-method comparison and validity testing of the in vivo and digital photographic assessment of donor-site scars of 119 patients. The results showed that the reliability and agreement between in vivo and digital-photograph assessment of donor-site scars is limited (reliability was moderate at best; intra-class correlation coefficients of 0.47 and 0.45 were obtained) using the Observer Scar Assessment Scale (OSAS). As a consequence, both methods resulted in significantly different scar judgements of donor-site scars. Our findings suggest that
digital photographs are not a valid substitute for *in vivo* assessment of scar quality. We therefore recommend *in vivo* judgement of donor-site scars using the OSAS.

As well as accurate assessment, evaluating the perception of patients with donor-site scars is essential for managing their expectations and for carrying out shared and well-informed decision making.

In Chapter 8 we report on an investigation of 106 patients and eleven caregivers on their satisfaction with donor-site scars. We also studied which scar characteristics had the most influence on their judgement. The results of this inter-observer analysis showed that patients and caregivers appreciate different aspects of scar characteristics when using the POSAS. Itching and relief best predicted patients’ overall satisfaction with the scar quality, whereas pigmentation and pliability were most predictive for caregivers. This study emphasises the subjective character of scar-quality assessment. We therefore recommend that caregivers realise that a patient’s own appreciation of a scar affects their quality of life.

A follow-up study was initiated to investigate the clinical changes in scar perception of donor-site wounds during scar maturation, as described in Chapter 9. Three months after split skin graft surgery and in the longer term, patients and caregivers rate their scar quality as high. Even though the improvement of scar quality over time is limited, it does improve significantly. We recommend incorporating this notion into the pre-surgical communication with patients with regard to their expectations on eventual scar quality.

**Part III: Guideline development**

In Chapter 2 we revealed the remarkably low number of guidelines for wound care and the absence of a guideline for patients with acute wounds. To support caregivers with evidence-based recommendations tailored to the clinical dilemmas they encounter, we developed a national, interdisciplinary and evidence-based guideline (Chapter 10).

This guideline, which addresses clinical dilemmas concerning wound cleansing, wound pain, wound-care instructions, dressing materials and the organisation of wound care, was developed via collaboration between medical professionals from ten different disciplines and one health insurer. Wound caregivers and patients experienced these dilemmas as a bottleneck or a dispute in clinical practice.
Summary

For these clinical bottlenecks we formulated 38 recommendations for clinical practice, summarised in two flowcharts. Broad implementation of this guideline by the various professional societies involved is likely to improve the quality of care for patients with acute wounds and reduce practice variation.

Chapter 11 is a discussion of the entire thesis. Several barriers and future perspectives regarding the acceptance of scientific evidence and patient preferences are considered. Altogether, this thesis stands for generating and presenting strong evidence with an equal amount of attention given to the integration of this evidence in daily clinical practice.