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Modified Vancouver Scar Scale score is linked with quality of life after burn

Vidya Finlay *, *Sally Burrows, Rosemary Kendell, Aaron Berghuber, Vincent Chong, Jason Tan, Dale W. Edgar, Fiona Wood*

Burn Service of Western Australia at Fiona Stanley Hospital, Australia

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ABSTRACT

Introduction: This study aimed to determine if a scar quality is associated with quality of life (QoL) at six months post-burn and beyond.

Methods: Quantile regression models adjusted for covariates were used to demonstrate the relationship of modified Vancouver Scar Scale (mVSS) total (with and without pigmentation) and the mVSS components, to the Burn Specific Health Scale-Brief (BSHS-B) scores (full scale, Affect and Relations domain, Skin Sensitivity domain).

Results: The sample (n=341) comprised 67% males, 83% with skin grafts with a median age 38 years, total body surface area (TBSA) 4%, length of stay seven days, mVSS total score of five and BSHS-B total score of 153. Between six and 12 months of injury, mVSS total, TBSA and female gender were significantly associated with the BSHS-B, a situation that was not affected by the presence or absence of pigmentation scores. The mVSS components did not individually influence QoL.

Discussion: mVSS total score, gender and burn size data may be a useful adjunct to experienced clinical judgment for identifying at risk patients and directing appropriate, timely resource allocation.

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1. Introduction

Burn is traumatic with potential for lifelong disability and disfigurement resulting in suboptimal recovery associated with psychosocial and physical dysfunction [1]. Incidence of poor recovery in terms of scar quality has been reported as high as 77% [2,3]. Risk factors for pathological scarring have been identified as female gender, young age, burn size, burn depth, burns of the neck or upper limb, more than one surgical operation, and meshed skin grafts [2,4].

Standardised assessment is essential for rating scar quality as well as initiation, monitoring and evaluation of scar management regimes [3]. The modified Vancouver Scar Scale encompasses several scar parameters, is easily accessible and is widely used to provide structured expert opinion of scar [5,6]. Despite the limitations of the mVSS, in particular the contribution of the nominal Pigmentation category score, the total score is commonly employed to assess scar outcome in numerous intervention and validation studies, prompting further investigation [7–11].

Abnormal burn scarring can be associated with reduced quality of life (QoL) related to disruption of daily activities, altered sleep patterns, anxiety, depression and issues of social acceptance. [3] The impact of burn scars on QoL is of interest to

* *Corresponding author at*: Burns Research Office, Level 4, Fiona Stanley Hospital, 11 Robi Warren Drive, Murdoch, Western Australia 6150, Australia. Fax: +61 8 6152 4404.
E-mail address: vidya.finlay@health.wa.gov.au (V. Finlay).

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patients and clinicians resulting in the recent development of the Brisbane Burn Scar Impact Profile [12]. However, previous research has demonstrated a discrepancy between clinician and patient evaluation of scar [13,14]. The Burn Service of Western Australia has incorporated the mVSS and the Burn Specific Health Scale-Brief (BSHS-B) as part of a prospective outcome battery into routine clinical practice with the goal of evaluating the impact of scar outcome on patient experience to assist clinicians in guiding timely and patient-centred interventions [15].

The aim of this study was to evaluate the relationship between clinician rated scar quality using the mVSS and BSHS-B assessed QoL. It is anticipated that higher mVSS rated scars will be associated with lower QoL between six and 12 months from injury. Understanding the relationship between abnormal scarring and QoL of an individual may guide intervention responsive to scar related well-being of burn patients with the goal of improving quality of recovery for burn survivors.

2. Method

2.1. Study design

This was a retrospective single cohort analysis of prospectively collected data approved by the South Metropolitan Health Service Human Research Ethics Committee of Western Australia (Reg 2016-030).

2.2. Patients and data collection

The study investigated routinely collected information from patients managed by the Burn Service of WA at RPH between January 2006 and December 2014. Burn patient demographic, injury and outcome data collection was aimed at one, three, six, 12 and 24 months post burn. Patients with outcome information obtained between six and 12 months post-injury from both the mVSS and BSHS-B were included with the last result examined. In the event that a patient had more than one scar, the scar with the worst mVSS score was included. No other specific inclusion or exclusion criteria were applied.

2.3. Scar assessment

The Vancouver Scar Scale, developed to identify pathology, describes pigmentation, vascularity, pliability and height of hypertrophic scars [16]. In this study, the more reliable modified Baryza and Baryza version was used (Table 1) [17]. Each individual parameter of the mVSS was assessed and scored separately (Pigmentation and Vascularity 0–3, Pliability 0–5, Height 0–4) with higher scores indicating, in most subjects, greater pathology [18]. Aggregated category scores are commonly used to indicate increased overall scar severity although it has been suggested that a higher Pigmentation score does not always indicate a worse scar, particularly in patients with darker skin [8,19]. Recently, Thompson et al. demonstrated that the Height component is the most important factor linked to hypertrophic scar [20]. In this study, the mVSS total score (maximum 15 points), each of the mVSS categories, a combined Height, Vascularity and Pliability score (maximum 12 points) and Height score as dichotomous variable (0, $\geq$1) were used as independent variables [20].

2.4. Quality of life assessment

The Burn Specific Health Scale-Brief (BSHS-B) comprises 40 questions with a maximum score of 160, with a higher score indicating better QoL. As per previous studies in a WA burn population, the questions are grouped into four major domains: Work (16 points), Affect and Relations (56 points), Physical Function (36 points) and Skin Involvement (56 points), the latter which contains questions about body image, patient perception of scar and self-management of burn [15]. Each domain may be affected differently by aspects of the injury and recovery process [15,21]. Along with the BSHS-B total score, the domains of Affect and Relations and Skin Involvement were chosen as outcome variables as previous studies have shown that psychosocial and burn related factors can be affected by scarring more so than physical aspects, particularly in a mostly minor burn cohort [22–24]. This study focused specifically on the impact to the domains of psychosocial, scar and burn related factors rather than the physical and work domains.

2.5. Data analysis

Sample demographic, injury and treatment information were summarized using percentages or medians with 25th and 75th percentiles. The BSHS-B total score and the domains of Affect and Relations and Skin Involvement were examined for, and indicated, deviation from normality. In the absence of a simple transformation to achieve normality, quantile regression analyses were employed to examine strength of associations between mVSS (total score, component scores, total score minus pigmentation, dichotomous height (0, $\geq$1)) rated quality of scar and BSHS-B rated QoL. The assumption of linearity was investigated for all continuous independent variables using

Table 1 – mVSS—Baryza and Baryza version.

Pigmentation	Vascularity	Pliability	Height
0=normal	0=normal	0=normal	0=normal/flat
1=hypo-pigmentation	1=pink	1=supple	1=>0 to 1mm
2=mixed pigmentation	2=red	2=yielding	2=>1 to 2mm
3=hyperpigmentation	3=purple	3=firm:	3=>2 to 4mm
		4=banding	4=>4mm
		5=contracture	

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