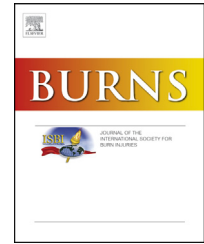


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Comparison of long-term quality of life of pediatric burn survivors with and without inhalation injury[☆]

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ABSTRACT

Objective: To examine the long-term quality of life of pediatric burn survivors with and without inhalation injuries. We hypothesized that patients with inhalation injury would report more disability and lower quality of life.

Methods: We examined 51 patients with inhalation injury and 72 without inhalation injury who had burns of $\geq 10\%$ total body surface area, were age ≥ 16 years at time of the interview, and were greater than 5 years from injury. Subjects completed the World Health Organization Disability Assessment Scale II (WHODAS II) and the Burn Specific Health Scale-Brief (BSHS-B). Multiple regression analyses were used to measure the effects of inhalation injury while controlling for age at burn and TBSA.

Results: The mean age of burn of participants with inhalation injury was 11.7 ± 3.6 years, mean TBSA $55\% \pm 18$, and mean ventilator days 8.4 ± 9 . The mean age of burn of participants without inhalation injury was 10.3 ± 34.1 years, mean TBSA $45\% \pm 20$, and mean ventilator days 1.3 ± 5.2 . Inhalation injury did not appear to significantly impact participants' scores on the majority of the domains. The WHODAS II domain of household activities showed a significant relation with TBSA ($p = 0.01$). Increased size of burn was associated with difficulty completing tasks for both groups. The BSHS-B domain of treatment regimen showed a relation with age at burn ($p = 0.02$). Increased age was associated with difficulty in this area for both groups.

Conclusions: Overall the groups were comparable in their reports of disability and quality of life. Inhalation injury did not affect long-term quality of life.

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1. Introduction

Extensive research has looked at the physiological impact of inhalation injury following burns [1,2]. Woodson and

colleagues [1, p. 229] defined inhalation injury as damage to the respiratory tract or pulmonary parenchyma by heat or chemical irritants carried into the airways during respiration. The severity of the injury varies, depending on the chemical composition of the agents inhaled, the duration of the

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exposure, temperature reached during combustion and pre-existing co-morbidities [3-5]. The prevalence of inhalation injury differs across countries. According to Pruitt and colleagues [6], up to 30% of burn admissions in the US have inhalation injury. Shirani and colleagues [7] reported that inhalation injury is an important predictor of morbidity and mortality and may increase mortality by 20%. The sequelae of inhalation injury for survivors may include obstructive lung disease, restrictive lung disease, reduced diffusion capacity, signs of fibrotic lung disease, and ventilatory limitations during recovery [8,9]. Although the pathophysiology of acute inhalation injury has been extensively studied, limited work has been done evaluating the long-term outcomes of inhalation injury. Previous work by Mlcak and colleagues [8] has shown the development of obstructive and restrictive disease patterns on pulmonary function studies 8 years after burn. However, to the best of our knowledge, long-term quality of life and adjustment following inhalation injury have not been reported.

Quality of life studies of burn survivors reveal that most survivors achieve optimal psychosocial outcomes but many continue to have long-term difficulties with physical and psychosocial functioning [10-17]. However, not much is known about the long-term psychological impact of burn survivors with inhalation injury. We are not aware of any studies that have examined the long-term quality of life of pediatric burn survivors who initially sustained inhalation injuries. The purpose of this study was to evaluate the effect of inhalation injury on the long-term perceived quality of life of pediatric burn survivors. We hypothesized that patients with inhalation injury would report more disability and lower quality of life.

2. Methods

2.1. Design

The University of Texas Medical Branch Institution Review Board approved this study (IRB #00-435). This site specific study focused on patients who were treated acutely at this pediatric burn facility. This sample was part of a larger cohort for the National Institute on Disability and Rehabilitation Research (NIDRR). It was a prospective design that consisted of two groups (inhalation injury group and non-inhalation injury group). Participants and their parents/guardians consented to participate in the NIDRR long term follow up study at this pediatric burn hospital and this was documented. Participants completed various questionnaires at different time points at their follow-up hospital appointments, at outreach clinics, or by telephone interview. The questionnaires were administered by trained research personnel.

2.2. Participants

We initially identified 135 patients with and without inhalation injuries from electronic medical records of burn survivors who were treated acutely at this pediatric burn facility between 1998 and 2009. Only 123 of these 135 patients met the inclusion criteria and had completed the outcome quality

of life measures, which included the World Health Organization Disability Assessment Scale II – (WHODAS II) [18] and the Burn Specific Health Scale-Brief (BSHS-B) [19]. Participants were age ≥ 16 at time of the interview, had burns of $\geq 10\%$ of the total body surface area (TBSA), were greater than 5 years from injury, and underwent grafting of at least 10% of their body. Inhalation injury was defined by bronchoscopy and clinical findings and documented in the medical records. Participants completed the questionnaires at their follow-up hospital appointments, at outreach clinics, or by telephone interview. Excluded from the study were participants who could not complete the long term follow up questionnaires in person or by telephone, who were unable to provide informed consent, who were considered vulnerable patients at the time of follow up due to incarceration or institutionalization, and who were deceased.

2.3. Instruments

The World Health Organization Disability Assessment Scale II – (WHODAS II) by Ustun et al. [18], is a global measure of health and disability and provides levels of functioning. It is a 36-item questionnaire with 6 domains which include cognition, mobility, self-care, getting along, life activities (home, work, and/or school), and participation in social activities. It is scored on a 5-point scale. Respondents specify their level of agreement or disagreement to a series of statements, with 1 = no difficulty and 5 = extreme difficulty or not being able to do activity. A summary score is obtained which ranges from 0 to 100, with 0 = no disability and 100 = full disability. Higher scores are indicative of greater perceived disability [18]. English and Spanish forms were used and the questionnaire was given in the persons' primary language. For participants who had difficulty reading, the questions were read to them by a trained research assistant. The WHODAS II has demonstrated stable reliability and validity and accurately discriminates between groups with various medical and psychiatric conditions [18]. Internal consistency coefficients for individual items ranged from 0.47 to 0.94, for the domains from 0.87 to 0.99, and for the total score from 0.97 to 0.99 [18]. Concurrent validity correlations varied from 0.45 to 0.65 [18].

The Burn Specific Health Scale-Brief (BSHS-B) by Kildal et al. [19], is a measure of quality of life that was developed to identify areas in which burn survivors have difficulty. It provides clinically meaningful information. It is a 40-item questionnaire with 9 domains which include heat sensitivity, affect, hand function, treatment regimens, work, sexuality, interpersonal relationships, simple abilities, and body image. It is scored on a 5-point scale. Respondents specify their level of agreement or disagreement to a series of statements, with 0 = extremely difficult and 4 = no difficulty at all. Each domain receives a mean score [19]. Unlike the WHODAS II, a greater BSHS-B score indicates fewer problems and a higher quality of life. English and Spanish forms were used and the questionnaire was given in the persons' primary language. For participants who had difficulty reading, the questions were read to them by a trained research assistant. The BSHS-B appears to have good reliability and validity when given to burn survivors. Internal consistency coefficients for the BSHS-B ranged from 0.75 to 0.93 [19,20].

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