

Life-threatening Skin Disorders Treated in the Burn Center

Impact of Health care–associated Infections on Length of Stay, Survival, and Hospital Charges

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KEYWORDS

- Stevens-Johnson syndrome • Toxic epidermal necrolysis • Life-threatening skin disorders
- Hospital-acquired infections • Health care–associated infections

KEY POINTS

- Patients with life-threatening skin disorders, including those with Stevens-Johnson syndrome (SJS) and toxic epidermal necrolysis (TEN), are best treated in a burn center, because of the availability of subspecialists in surgical critical care, wound management, and rehabilitation.
- Critically ill patients with acute skin disorders have an increased need for intensive care unit care, compared with the SJS-TEN cohort, but both groups have similar length of hospital stay, survival, and incidence of hospital-acquired infections.
- Hospital-acquired infections, which are theoretically preventable, significantly increase both mortality and hospital charges, to an even greater degree, in the SJS-TEN subgroup.

INTRODUCTION

Stevens-Johnson syndrome (SJS) and toxic epidermal necrolysis (TEN) are part of a clinical syndrome that represents a medication-induced desquamation disorder. In 1922, Drs Stevens and Johnson first described SJS as an acute mucocutaneous syndrome presenting in 2 young

boys.^{1–3} Alan Lyell later presented 4 patients in 1956 with a cutaneous eruption and coined the term TEN.^{1,2,4–7}

SJS-TEN are the 2 most common adverse drug reactions in hospitalized patients. SJS-TEN are grouped along with acute generalized exanthematous pustulosis, drug-induced hypersensitivity syndrome, and drug reaction with eosinophilia and

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systemic symptoms (DRESS), to encompass severe cutaneous adverse reactions.^{8,9} The two entities are distinguished from each other by disease severity, which is characterized by the extent of detachment of epidermis and erosions of mucous membranes.^{2,4,6,8-14} The total body surface area (TBSA) involved in SJS is less than 10%, 10% to 30% in SJS-TEN overlap, and greater than 30% in TEN.^{1,2,6,8-13,15,16} In more than 95% of TEN cases, the mucous membranes involved include the eyes, lips, mouth, pharynx, trachea, bronchi, vulva, glans penis, urethra, and anus.^{1,8,9,11,12}

Patients admitted to a burn center with a potential diagnosis along the SJS/TEN spectrum often have high hospital morbidity and mortality. However, little is known about patients admitted to a burn center with life threatening skin disorders (LTSDs) not caused by SJS/TEN. This group includes severe rashes, nonhealing wounds, erythema multiforme, and unknown skin lesions requiring hospitalization for critical care, skin biopsy, and aggressive wound care.

This article compares and contrasts patients admitted to a single burn center and diagnosed with LTSD or SJS/TENS, focusing on intensive care unit (ICU) care, hospital charges, cost, and mortality. Furthermore, the impact of hospital-acquired infections (HAIs; also known as health care-associated infections) on these patient outcomes is assessed.

METHODS

Patient Population

Over a 10-year period from 2003 to 2013, 445 patients were admitted to the North Carolina Jaycee Burn Center with life-threatening dermatologic conditions other than thermal injury. The University of North Carolina (UNC) Health Care System is a conglomerate of health care providers and organizations that includes the School of Medicine, UNC Hospitals in Chapel Hill, and multiple hospitals and physician practices across the state of North Carolina.

Study Design

The authors conducted a retrospective, descriptive review of the 445 patients who had a diagnosis of a dermatologic condition requiring hospitalization in our burn center. Patients were identified from a prospectively managed database, and a post-hoc analysis was performed. These charts, divided into SJS-TEN and LTSD, were cross-referenced with the hospital-wide infection control database to identify patients who developed HAIs. We used the definitions developed by the Centers for Disease Control and Prevention National

Healthcare Safety Network to accurately and consistently diagnose HAIs.

Statistical Methods

Continuous discrete data (age, TBSA involved, length of stay, ventilation days, ICU days, HAI, mortality, mortality with HAI, cost, cost with HAI, catheter-associated urinary tract infection [CAUTI], blood stream infections [BSIs], and urinary tract infections [UTI]) were compared using either 2-tailed *t*-test or χ^2 analysis for nominal and categorical variables, respectively. Statistical significance was assigned to *P* values less than .05.

Study Approval

The UNC Biomedical Institutional Review Board approved this project as Institutional Review Board study number 14-1789, under the title Anticipating Changes in Bundled Payments For the Treatment of Patients with Acute, Life-threatening Dermatologic Emergencies, Through Prevention of Healthcare Associated Infections.

Data Points

The charts of 445 patients with dermatologic conditions requiring hospitalization were queried for age, gender, and TBSA involved. Main outcome measures included length of hospital stay, ventilation days, ICU days, and overall cost, generated by the facility. Complications assessed included HAIs, inpatient mortality, CAUTI, BSI, and UTI. Inpatient mortality associated with HAIs and cost associated with HAIs were also calculated.

RESULTS

Patient Demographics

Between 2003 and 2013, 445 patients were identified with dermatologic emergencies who were admitted to our burn unit. There were 316 patients in the LTSD group and 129 patients in the SJS-TEN cohort. The mean age in the LTSD group was 52.8 ± 23.3 years and 48.3 ± 22.6 years in the SJS-TEN group. Patients presenting with LTSD were more likely to be female compared with patients with SJS-TEN (78.4% vs 58.1%; *P* = .04). There was no difference in TBSA involvement between the two groups (19.3% vs 21.2%; *P* = .61).

Cause

Patients with LTSDs (*n* = 316) included more than 30 different diagnostic groups, with the top 11 involving drug rash (*n* = 43), exanthematous pustulosis (*n* = 22), staphylococcal scalded skin syndrome (*n* = 13), necrotizing fasciitis (*n* = 12), erythema multiforme (*n* = 12), pemphigoid

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