Inpatient Mortality Resulting from Dermatological Disorders at a Tertiary Care Center in Eastern India: A Record-based Observational Study

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Abstract

Background: Contrary to popular perception, several dermatological conditions may be associated with lethal outcome in the absence of timely intervention or due to complications.

Aims: The aim was to estimate the number of deaths and analyze their causes due to skin disorders at a tertiary level inpatient dermatology ward.

Materials and Methods: We conducted a retrospective, record-based observational study involving 538 patients spanning over 4 years (2013–2016) at our dermatology indoor setup.

Results: There were 45 deaths (male:female = 1.5:1), accounting for 8.4% or total admissions, occurring mostly in patients in their 7th decade. Vesiculobullous disorders were the most frequent cause of mortality (57.8%), followed by drug reactions accounting for 17.8% of cases. In the former group pemphigus vulgaris accounted for most deaths (31.1%) followed by bullous pemphigoid (17.8%) and pemphigus foliaceus (8.9%), whereas toxic epidermal necrolysis was the most frequent cause of death from drug reactions (8.9%). Almost half of all deaths (48.9%) occurred due to septicemia followed by cardiopulmonary complications (40%). Most of the cases presented to us at an advanced state of the disease previously being treated inappropriately.

Conclusion: Prompt diagnosis and treatment of such dermatological conditions are mandated, preferably in an intensive care set-up, to reduce mortality rates. Advanced age, the area of skin involvement, mucosal involvement, and septicemia were adverse prognostic factors in these patients.

Key Words: Dermatology, inpatient, mortality

Introduction

Several dermatological conditions are life-threatening and often result in mortality, contrary to the popular perception that skin conditions are seldom fatal. Some disorders such as pemphigus and Stevens–Johnson syndrome-toxic epidermal necrolysis (SJS-TEN) are known to be life-threatening with enhanced mortality; however, other morbid dermatological disorders can also be fatal occasionally. Although few studies have been conducted to ascertain the disease specific mortality rates, such as pemphigus[1] and SJS-TEN,[2,3] dermatological disorders in general have been studied rarely.[4,5] We have conducted this study to assess the overall mortality resulting from dermatological disorders at our center, due to paucity of similar studies.

Materials and Methods

We conducted a record-based retrospective observational study involving 538 patients spanning over 4 years (2013–2016) at our dermatology indoor setup after obtaining approval from the institutional ethics committee. The data obtained has been statistically analyzed with respect to patient demography, duration of hospital stay, overall and disease-specific mortality rates, and the specific causes of death. The data have been obtained from the medical records section; medical certification of cause of death records was used to obtain data regarding the deaths. No postmortems had been performed as the deaths occurred in dermatology ward due to known causes. All the data have been preserved for future reference.

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Results
Among 538 patients admitted to our center during the study period, 45 patients succumbed to their illness and died thus clocking a mortality rate of 8.4%. The overall all-cause mortality in the hospital during the study period was similar (8.12%) There were 27 male patients (60%) and 18 female patients (40%); male:female ratio being approximately 1.5:1. Maximum number of deaths (12, 26.7%) occurred in the age group 61–70, followed by 11 deaths (24.4%) in the age group 51–60. Only one death was recorded in the age group <10 years [Table 1]. The youngest patient to die was 7-year-old, whereas the oldest patient was 90-year-old, the mean age was 52.6 ± 19.8 years. Dermatological disorders and related complications were responsible for 35 deaths (77.8%), whereas 7 deaths (15.6%) occurred due to therapy related complications and 3 deaths (6.7%) occurred due to medical complications unrelated to the skin disorders. Vesiculobullous disorders accounted for the largest number of deaths (26, 57.8%), followed by drug reactions and erythroderma accounting for 8 (17.8%) and 7 (15.6%) deaths, respectively [Table 2]. Among the vesiculobullous disorders pemphigus vulgaris was most lethal accounting for 14 deaths (31.1%) followed by bullous pemphigoid (8 cases, 17.8%) and pemphigus foliaceus (4 cases, 8.9%). TEN was the most common drug reactions to cause death (4 cases, 8.9%) followed by SJS (2 deaths, 4.4%). Septicemia was the most common immediate cause of death accounting for 22 cases (48.9%). Blood culture yielded *Staphylococcus aureus* in 10 cases, *Escherichia coli* in 6 cases and *Pseudomonas aeruginosa* in 1 case. In 5 cases, there were no yield on culture and the diagnosis of septic shock remained clinical (done by internal medicine referral). 17 cases of mortality from septicemia (77.3%) occurred in patients with vesiculobullous disorders. There was 18 (40%) deaths from cardiopulmonary causes (myocardial infarction 3, acute decompensated cardiac failure 4, pulmonary embolism 4, and respiratory failure from severe pulmonary infection in 7) and 5 deaths (11.1%) from acute renal failure [Table 3]. Most deaths in pemphigus patients occurred due to septicemia (64.3%) while cardiac causes accounted for maximum deaths (62.5%) in bullous pemphigoid. There were associated comorbidities in 21 (46.6%) patients, all above 40 years of age. Diabetes mellitus, hypertension, hyperlipidemia, bronchial asthma, ischemic heart disease, and chronic obstructive pulmonary disease were the predominant preexisting diseases; multiple comorbidities were present in 6 patients.

Majority of our patients have presented to us in an advanced stage after being previously treated by alternative systems of medicines or had inadequate or inappropriate medical treatment by practitioners of modern medicine.

Discussion
The study reported a mortality rate of 8.4%, However, death rate of our patients was almost double of that reported by Nair et al. (3.58%).[4] This may be explained by the admission of patients at an advanced stage at our center after they have tried all indigenous treatment methods. However, a study conducted at Lome, Togo found the mortality rate to be 13.5% which is much higher than ours.[5]

Mostly male patients died belonging to the age group 61–70. This finding is similar to the result obtained in other studies thus corroborating the fact that old age acts as an added risk factor in these morbid patients.[4]

Pemphigus vulgaris was the most lethal disease in our study accounting for 31.1% of the total deaths. This figure is low when compared to the findings of Nair.

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**Table 1: Age-wise distribution of the patients who died (n=45)**

| Age group (years) | Number of patients | Percentage of total |
|-------------------|--------------------|---------------------|
| <10               | 1                  | 2.2                 |
| 11-20             | 4                  | 8.9                 |
| 21-30             | 2                  | 4.4                 |
| 31-40             | 3                  | 6.7                 |
| 41-50             | 7                  | 15.6                |
| 51-60             | 11                 | 24.4                |
| 61-70             | 12                 | 26.7                |
| 71-80             | 3                  | 6.7                 |
| 81-90             | 2                  | 4.4                 |
| Total             | 45                 | 100                 |

**Table 2: Dermatological disorders leading to death (n=45)**

| Disease                | Number of patients | Percentage of total |
|------------------------|--------------------|---------------------|
| Pemphigus vulgaris     | 14                 | 31.1                |
| Bullous pemphigoid     | 8                  | 17.8                |
| Erythroderma           | 7                  | 15.6                |
| Pemphigus foliaceus    | 4                  | 8.9                 |
| TEN                    | 4                  | 8.9                 |
| CTCL                   | 2                  | 4.4                 |
| Drug hypersensitivity syndrome | 2 | 4.4 |
| SJS                    | 2                  | 4.4                 |
| Reactive arthritis     | 1                  | 2.2                 |
| SLE                    | 1                  | 2.2                 |
| Total                  | 45                 | 100                 |

TEN: Toxic epidermal necrolysis, CTCL: Cutaneous T-cell lymphoma, SJS: Stevens–Johnson syndrome, SLE: Systemic lupus erythematosus
et al. (35.1%) and Sánchez et al. (51%). However, several other studies have indicated a mortality rate of 5%–20% for pemphigus. This low mortality rate may be attributed to the fact that these patients received state-of-the-art advanced medical care in the burns and intensive care unit (ICU) units at these centers. However, this may not be possible in India as surgical and medical patients are given priority in the burn units and ICUs. An interesting feature in our study was the presence of severe mucosal involvement in all these patients probably highlighting its role as an adverse prognostic factor. Bullous pemphigoid was the second most common disease associated with mortality; similar finding has been reported by Nair et al. SJS/TEN accounted for 13.3% deaths in our study which is comparable to that of Nair et al. (10.8%), Saka et al. (12.5%) and McCullough et al. (10%). In all these patients oral and genital mucosae were involved along with >90% of body surface area. A higher mortality rate (30%) was reported by Monteiro et al. as it included only referred SJS/TEN patients thus explaining the ambiguous result. In our study Carbamazepine was the most common offending drug followed by allopurinol. Cutaneous T-cell lymphoma (CTCL) was the only malignancy in the present study accounting for 4.4% deaths, whereas in other studies, malignancies (chronic lymphatic leukemia, non-Hodgkin lymphoma and squamous cell carcinoma with lung secondaries) have led to more deaths (15.3%). In our center, all malignancy patients were referred from general medicine department except for CTCL.

Septicemia was the most common immediate cause of death in our study (48.9%) followed by cardiopulmonary causes (18 cases, 40%), and acute renal failure (11.1%). Nair et al. reported cardiorespiratory complications to be the most common cause. The higher occurrence of septicemia at our center probably reflects inadequate hygiene measures, which needs to be addressed at the earliest.

Conclusion

This study shows that several dermatological disorders may be lethal for a patient, contrary to the popular belief that skin disorders have a negligible mortality rate. Among these conditions, immunobullous disorders and severe cutaneous adverse reactions like SJS/TEN have been found to be most lethal. Advanced age, area of skin involvement, mucosal involvement, associated comorbidities, and development of septicemia may be considered as adverse prognostic factors. The authors recommend prompt referral of these conditions to higher centers for management preferably in burn units and ICUs to bring down their mortality rates. Patients should also be advised to seek medical intervention at the earliest to avoid any catastrophe in the future.

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Conflicts of interest
There are no conflicts of interest.

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