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Outcomes of autoclaved banana leaf use as a skin care measure for the erosions of vesiculobullous disease and SJS/TEN patients: a retrospective observational study

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ABSTRACT

Background: Vesiculobullous diseases and Stevens-Johnson Syndrome/Toxic Epidermal Necrolysis (SJS/TEN) are characterized by extensive skin and mucosal erosion. Regular dressing changes are important for facilitating early reepithelization of skin erosion. Traditional dressing materials are expensive and often uncomfortable for patients. Autoclaved banana leaf has been suggested as an alternative dressing material, but there is limited scientific literature on its use in these conditions.

Methods: We conducted a retrospective observational study at a tertiary care hospital in Odisha, India, between January 2018 and April 2019. A total of 48 patient's medical records with a diagnosis of pemphigus vulgaris, pemphigus foliaceus, Bullous pemphigoid, SJS, and TEN, who used autoclaved banana leaf spread on bed and /or as a dressing were analyzed. Among them, only 32 patients did not develop secondary bacterial infections within 72 hours of hospitalization and were included in the study. Patient demographics, skin infections, hospital stay duration, and perceived pain during dressing change were recorded.

Results: Thirty-two patients' medical records were analyzed. The average age was 37.65 years, with a male-to-female ratio of 2.5:1. The average hospital stay for vesiculobullous diseases was 26.23 days and 15.20 days for SJS/TEN. Only 11 patients had objective pain assessments before and after the use of autoclaved banana leaf. One patient (3.12%) developed a lung infection and septicemia, which resulted in mortality.

Conclusion: Autoclaved banana leaf spread on bed and/or dressing is a safe and effective dressing material for vesiculobullous diseases and SJS/TEN patients with extensive skin erosions. Its use significantly reduces pain during dressing and the risk of bacterial infection. However, caution is advised in cases of existing infections due to the potential spread of infection to eroded areas of skin through exudates collected on the banana leaf surface. Further research is needed to validate these findings and optimize the use of autoclaved banana leaf in clinical practice.

KEYWORDS

Autoclaved; Banana leaf; Vesiculobullous disease; Bacterial infection; Pain

ARTICLE HISTORY

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Introduction

Vesiculobullous diseases and Stevens-Johnson syndrome (SJS)/toxic epidermal necrolysis (TEN) are dermatological conditions characterized by the formation of vesicles or bullae. Its rupture produces erosion on the skin and mucous membrane [1]. These conditions can be autoimmune, infectious, or genetic in nature. Autoimmune blistering disorders, such as pemphigus and bullous pemphigoid, develop when autoantibodies are produced against their own body proteins that hold skin layers together [2]. In contrast, severe drug reactions, SJS and TEN, develop from severe adverse drug reactions or, less commonly, from infections [3]. They are characterized by extensive skin detachment and mucosal erosion. In both vesiculobullous diseases and SJS/TEN, the blister of the skin and mucous membranes on rupture can lead to extensive areas of erosion. These erosions are extremely painful and may become susceptible to infection. Additionally, these conditions may involve mucous membranes of the oral cavity, eyes, and genitalia and cause discomfort and functional impairment.

Dressing of skin erosion is necessary for improving the patient's well-bing /preventing pain perceived by patients during the dressing change, and minimizing secondary infection [4]. Dressings typically prevent heat loss, infection, adhesion of cloth to raw skin surfaces and facilitate re-epithelialization of skin erosion. Currently, available dressing materials are expensive and can be painful during dressing. Various types of dressings are employed in the management of vesiculobullous diseases and Stevens-Johnson syndrome (SJS)/toxic epidermal necrolysis (TEN). These include non-adherent dressings, hydrocolloid dressings, hydrogel dressings, foam dressings, alginate dressings, transparent films, and soft silicone dressings [5]. However, the expense associated with these dressings can be considerably high, especially in hydrocolloids and hydrogel dressings. Additionally, the necessity for frequent dressing changes and the extended treatment duration often required in these conditions can be expensive. Thus, there is a need to find a

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cheaper, effective, and safer alternative dressing material.

Recent studies have demonstrated the use of organic materials as alternative dressing materials in the management of SJS/TEN. Aloe vera, honey, sterilized potato peels [6], and banana leaves have been used effectively in the treatment of skin erosion [7]. Banana leaves do not adhere to the wound [8]. Furthermore, the cost of sterilzed banana leaf dressing is 160 times lower than available materials [7]. The use of sterile banana leaf dressing also significantly reduces pain during dressing change and improves early reepithelization [9]. Banana leaves can be sterilized by autoclaving [10]. However, caution is necessary to prevent contamination-related infections when banana leaf dressings are used. It is also recommended that the autoclaved sterilized banana leaves to be used within 24-72 hours of sterilization [7,11,12].

In this retrospective observational study, we conducted an analysis of bacterial infections and the reduction in pain perceived during dressing change among patients diagnosed with vesiculobullous diseases and SJS/TEN who used autoclaved banana leaf spreads on their hospital beds and/ or for dressing of their skin erosion. The objectives of this study are twofold: First, to investigate bacterial infections in patients who used autoclaved banana leaf spreads and/or dressing for the management of skin erosions in hospitalized individuals. Second, to assess and compare the pain perceived by patients during dressing changes for erosions before and after the use of autoclaved banana leaf spreads on the bed and/or for the dressing of the patient's skin erosion.

Methods

This retrospective observational study was conducted at a tertiary care hospital in Odisha, India, after obtaining ethical approval from the Institute's ethical committee (Approval Reference: T/IM-NF/Derma/18/74) dated April 15, 2019. In total, 48 patients (14 pemphigus vulgaris, 19 pemphigus foliaceus, 8 Bullous pemphigoid, 5 SJS, and 2 TEN) were admitted during the period January 2018-April 2019.

Among these 48 patients, only 32 patients (9 pemphigus vulgaris, 14 pemphigus foliaceus, 4 Bullous pemphigoid, 3 SJS, and 2 TEN) medical records had data of having used autoclaved banana leaf, spread on bed and/or dressing change twice daily (Figure 1) and recording of pain perceived during dressing change. Patients who had signs of secondary bacterial infection (increased pain on erosion, tenderness, and localized oozing and/or positive skin swab culture) within 72 hours of hospitalization were excluded from the study. Demographic details of patients, including age and gender, as well as the presence of skin infections (either based on clinical manifestations or confirmed laboratory tests from skin swab cultures). As a hospital protocol, patient's skin swabs were tested at 7-8 day intervals during their hospital stay.

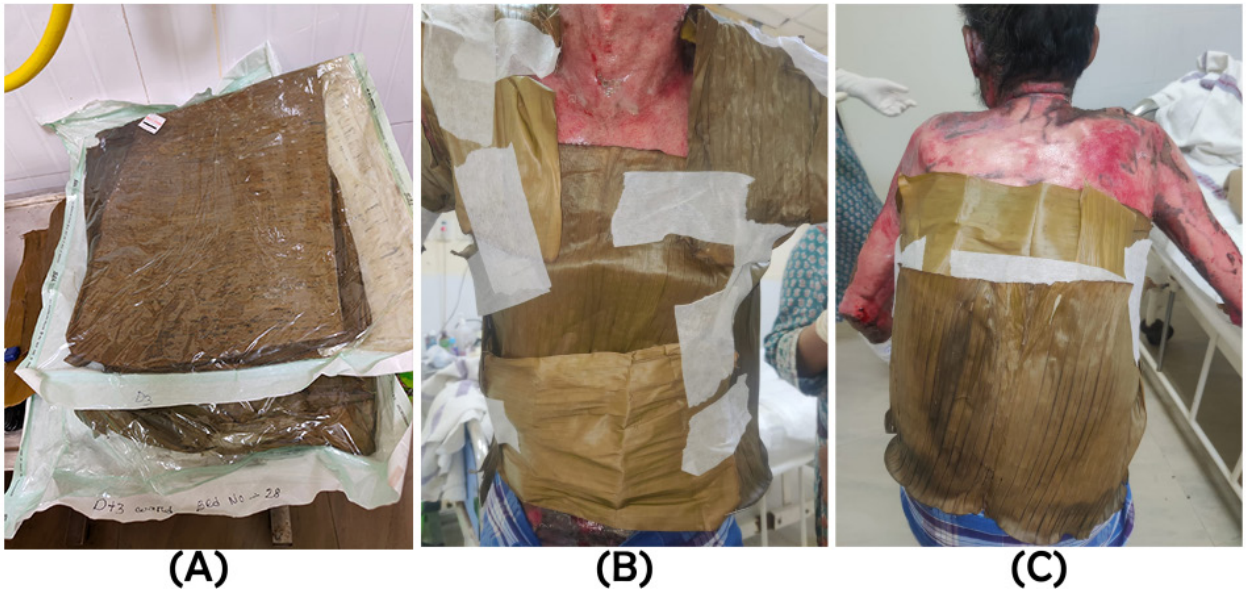

Figure 1. (A) Autoclaved banana leaf and (B,C) dressing of skin erosion using autoclaved bananan leaf in a pemphigus patient with extensive skin erosion.

Furthermore, the duration of hospital stays was noted in days, and patients' perceived pain during dressing changes was both subjective and objective (assessed using a modified Visual Analog Scale (mVAS)). The mVAS scale quantified the pain level, as 0 cm on VAS scale represented 0%, and 10 cm on VAS scale indicated 100%. Each millimeter on the VAS scale corresponds to 1%.

Results

A total of 32 patients met the inclusion criteria for this study. The average age of these patients was 37.65 years, with an age range of 10 to 55 years. Among the study participants, the male-to-female ratio was 2.5:1, comprising 23 men and 9 women. The average duration of hospitalization for vesiculobullous disease patients was 26.23 days, whereas it was 15.20 days for patients with SJS/TEN. During the course of their hospital stay, one patient (3.12%) developed lung infection and septicemia and succumbed to death.

Out of the 32 patients, data of pain perceived measure using mVAS before and after the use of banana leaf spread on bed and /or dressing was available for 11 patients (34.37%). The average pain perceived during dressing change in patients with pemphigus vulgaris, pemphigus foliaceus, and SJS/TEN erosion prior to the use of autoclaved banana leaf spread on

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bed and/or dressing was 68.00%, 75.75%, and 72.00%, respectively. While average pain was perceived by patients during the use of autoclaved banana leaf spread on bed and/or dressing, these patients were 14.16%, 20.25%, and 16.00%, respectively (Table 1), Which indicated a notable reduction in pain perceived by patients who used autoclaved banana leaf spread on bed and/or for dressing skin erosion.

Drugs administered include oral corticosteroids (ranging from 10 to 40 mg prednisolone per day), immunosuppressive drugs (such as Azathioprine at doses of 50-100 mg daily), supra-pharmacological doses of immunosuppressive or corticosteroid given as pulse therapy, biologics (e.g., Rituximab), and/or intravenous immunoglobulin (Ig IV antibody).

Discussion

Gore et al. were the first to use autoclaved banana leaf dressing for the skin graft donor area [13]. Subsequently, others explored its use in vesiculobullous diseases and SJS [7,11,12]. However, there is a paucity of well-designed studies that comprehensively assess the efficacy of banana leaf in a substantial cohort of vesiculobullous disease and SJS/TEN patients. In the present retrospective study, we analyzed 32 patients who used auto-claved banana leaves for the dressing of skin erosion in vesiculobullous diseases and SJS/TEN. Patients who used autoclaved banana leaf spread on bed and/or dressing of erosion experienced a significant reduction in pain (i.e., pain perceived on mVAS modified scale measure) (Table 1) and the occurrence of bacterial infections. Previous reports were case series or case reports. Highlighted the advantages of banana leaf spread as a bed cover and dressing in SJS/TEN [7,11] and pemphigus cases [12]. Other studies have described the use of sterilized banana leaves as dressings in surgical procedures [13] and other conditions like burn patients [14-16].

Patients of vesiculobullous diseases and SJS/TEN often develop extensive skin erosion and suffer from increased morbidity mortality. In these patients, mortality is predominantly attributed to bacterial infections. In our retrospective observational study involving 32 vesiculobullous and SJS/TEN patients who used autoclaved banana leaf as a bed spread, only one case (3.12%) developed lung infection followed by septicemia, which ultimately resulted in fatality. A similar observation was made by Dharnidharka and Kandoth in their reported case series: two SJS patients developed bacterial infections despite they used autoclaved banana leaf as a skin care measure over a span of four years [1]. This contradicts the reports by others using banana leaf as a skin care measure in severe drug reactions (SJS) [2] and pemphigus [3]. However, they did not encounter the development of bacterial infection in their cases.

Autoclaved banana leaf spreads have been employed in autoimmune bullous diseases and SJS/TEN to alleviate pain during dressing changes [7]. In our study of pemphigus and SJS/TEN patients, the use of banana leaf spread on the bed and/or dressing of skin erosion resulted in a notable reduction in the perceived pain during the dressing change (Table 1). Similar observations were reported by Dharnidharka and Kandoth in SJS patients [11] and by Shenoi et al. in pemphigus patients who used banana leaf for dressing pemphigus erosions [12]. Additionally, studies that explored the use of banana leaves in skin graft donor areas revealed that dressing with banana leaves lowered the pain scores compared to patients using petroleum jelly gauze [13].

Table 1. Average pain perceived by the study patients in percentage, assessed using a modified Visual Analogue Scale (mVAS) before and after the use of banana leaf spread on bed and/or dressing of skin erosion.

Disease (N=11)	Average pain perceived by patients on mVAS before the use banana leaf (%)	Average pain perceived by patients on mVAS after the use of banana leaf (%)	Average pain decreased (%)
Pemphigus vulgaris (06 case)	68.00%	14.16%	53.84%
Pemphigus foliaceus (04 case)	75.75%	20.25%	55.25%
SJS/TEN (01 case)	72.00%	16.00%	56.00%

The duration of hospitalization serves as an indirect indicator of the time required for healing. In our retrospective study, the average duration of hospital stay for the vesiculobullous disease was 26.23 days and 15.20 days for SJS/TEN cases. Unfortunately, our results cannot be directly compared to previous studies, as there is a dearth of prior studies that assessed the use of banana leaf spread on bed and/or dressing on skin erosion of vesiculobullous disease and SJS/TEN.

Prolonged storage of sterilized banana leaves may lead to the growth of bacteria and fungi on the leaf surface [18]. In our study, the autoclaved banana leaves were changed at 12-hour intervals (twice daily). This practice aligns with the use of autoclaved banana leaves by others [7,11,12]. Contradictory to the report by Gore and Akolekar, where sterile banana leaves were stored for 3-4 days [5].

Conclusions

This retrospective observational study represents the first comprehensive analysis of the effectiveness of autoclaved banana leaf use in the management of skin care for vesiculobullous disease and SJS/TEN patients. Our findings in the present study underline the importance of banana leaf as a valuable armamentarium in the management of skin erosion for vesiculobullous disease and SJS/TEN patients. The use of banana leaf spread on bed and/or dressing demonstrated

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notable advantages in reducing pain during dressing changes and a decreased risk of bacterial infection. Moreover, the accessibility of banana leaves in kitchen gardens makes them a practical option, while their smooth surface and no-sticky properties facilitate damage-free dressing of skin erosion. However, it is important to note that caution should be exercised when considering banana leaf use in infected patients, as the accumulation of body fluids on the leaf surface may potentially facilitate the spread of infections. Further research and clinical trials are warranted to validate and refine the use of autoclaved banana leaf as a skin care measure in the large population of vesiculobullous disease and SJS/TEN patients.

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Disclosure statement

No potential conflict of interest was reported by the authors.

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