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ORIGINAL ARTICLE

Wound management and dressing selection in Stevens-Johnson syndrome and toxic epidermal necrolysis: a systematic review

Manejo de feridas e seleção de curativos na síndrome de Stevens-Johnson e necrólise epidérmica tóxica: uma revisão sistemática

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Abstract

Objectives: Stevens-Johnson syndrome (SJS) and toxic epidermal necrolysis (TEN) are severe cutaneous adverse drug reactions, which lead to epidermal detachment and may be life-threatening. Apart from supportive and systemic treatment of the disease, appropriate dressing and wound management are essential for the care of patients with SJS/TEN. This study aims to assess which are the most used dressings for SJS/TEN, and how wound management can contribute to skin healing. **Methods:** Searches were performed in Cochrane Library, Embase, MEDLINE, and PubMed databases, using the following search terms: (SJS OR TEN) AND (Wounds OR Dressings). Information extracted on dressings was used as well as local care (including materials for cleansing, debridement, topical therapy, fixation, and time for dressing changing) and time for re-epithelialization. **Results:** A total of 17 articles published in the last 11 years were selected. Six (35.3%) mentioned silver-based topical therapies as treatment of choice. Allografts and porcine xenografts were cited by a further 6 (35.3%) studies, biosynthetic dressings with a combination of collagen mesh and silicone by 4 (23.5%), petrolatum-based products by 4 (23.5%), and patient's own detached skin as a biological dressing by 2 (11.8%) studies. **Conclusion:** Upon analysis of collected data, it was noted that little information is available on topical treatment in SJS and TEN, with no consensus on an ideal protocol for such cases. Therefore, dressing management for these disorders remains a challenge in care, and further research on this subject should be encouraged.

Keywords: Wounds. Stevens-Johnson syndrome. Toxic epidermal necrolysis. Dressings.

Resumo

Objetivos: A síndrome de Stevens-Johnson (SSJ) e a necrólise epidérmica tóxica (NET) são reações adversas cutâneas graves a medicamentos, que levam ao descolamento epidérmico e podem ser fatais. Além do tratamento de base, os cuidados locais e a seleção dos tratamentos tópicos/pensos são essenciais para o cuidado de pacientes com SSJ/NET. E objetivo e avaliar os diferentes cuidados locais e tipos de pensos mais utilizados na SSJ/NET e o seu contributo para a reepitelização nessas doenças. **Métodos:** Foram realizadas pesquisas nas bases de dados Cochrane Library, Embase, MEDLINE e PubMed, usando os seguintes termos de busca: (SJS OR TEN) AND (Wounds OR Dressings). Foram extraídas informações sobre os

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pensos utilizados bem como os cuidados locais (materiais usados para limpeza, desbridamento, terapia tópica, fixação e tempo para troca de curativo) e sua relação com a reepitelização. **Resultados:** Foram selecionados 17 artigos publicados nos últimos 11 anos. Seis (35.3%) estudos mencionaram terapias tópicas à base de pensos impregnados de prata como tratamento de escolha. Aloenxertos e xenoenxertos porcinos foram citados em 6 (35.3%) estudos, curativos biossintéticos com combinação de malha de colágeno e silicone foram citados por 4 (23.5%), produtos à base de vaselina por 4 (23.5%), e a própria pele destacada como curativo biológico por 2 (11.8%) estudos. **Conclusão:** Após a análise dos dados coletados, verificou-se que há pouca informação disponível sobre o tratamento tópico em SSJ e NET, não havendo consenso sobre um protocolo ideal para tais casos. Portanto, os cuidados locais continuam um desafio, devendo ser encorajadas mais pesquisas sobre esse assunto.

Palavras-chave: Feridas. Síndrome de Stevens-Johnson. Necrólise epidérmica tóxica. Curativos.

Introduction

Stevens-Johnson syndrome (SJS) and toxic epidermal necrolysis (NET) belong to the same disease spectrum of a severe and acute drug reaction, with epidermal necrolysis and detachment, skin blistering, cutaneous and mucosal erosions, and, commonly, systemic involvement[1-3]. The distinction between SJS and TEN depends on the percentage of detached skin surface (up to 10% in SJS, more than 30% in TEN, and between 10 and 30% in SJS/TN overlap)[1,2]. Annual incidence varies between 1.2 and 9.2 cases/million people for SJS, and 0.4-1.9/million for TEN[4,5], with a mean mortality of 30%[1,3].

Epidermal loss may affect response to infections, termo-regulation, and hydroelectrolytic balance. Despite different pathophysiologies and the need for timely suspension of the possible culprit and use of systemic immunomodulatory or immunosuppressant drugs, skin involvement may be viewed as a severe superficial but extensive burn[4,5]. A cornerstone of treatment lies in the proper care of denuded skin, to improve its protective activity, reduce pain, accelerate re-epithelialization, and, therefore, reduce time to complete healing and decrease the main complications, namely the risk of infection and sepsis, the predominant cause of death. An appropriate choice of the dressing and its correct use are essential, although this aspect is often overlooked[1,3].

The main objective of the current systematic review is to assess the most frequently used local skin cleansing measures for SJS/TEN and, especially, wound dressings, the way they were used, and their advantages.

Methods

For this systematic review, searches were performed in Cochrane Library, Embase, MEDLINE, and PubMed databases, with the following search terms: (SJS OR NET) AND (Wounds OR Dressings). Articles published in the last 11 years were selected (from 01 January 2013 to 31 December 2024). Inclusion criteria were: articles on the subject of SJS/TEN and dressings; articles that described dressings used; and articles published in English, Spanish, or Portuguese (Fig. 1). Meta-analysis, systematic review, cohort, and case-control articles were included in the current review. Exclusion criteria adopted were: articles focusing on treatment of SJS/TEN solely on mucosal membranes (as opposed to skin), and articles that did not directly address SJS/TEN.

Three independent researchers carried out searches and all articles filtered in the four databases were then initially selected based on their titles identifying whether they meet the inclusion criteria. No automation tools were used in this review. After the exclusion of duplicate studies, abstracts were critically appraised by three independent reviewers, to choose which articles would be fully read. Reference lists of selected articles were also evaluated, looking for other eligible works. Selected articles were then assessed regarding the risk of bias, using Joanna Briggs Institute (JBI) Critical Appraisal Tools[6], by two independent researchers. When these two researchers assigned different gradings for the same article, a third researcher proceeded to evaluate that article, and the two most similar evaluations were considered. A different version of the JBI Critical Appraisal Tool was used according to the category of each study: cross-sectional, case-control, cohort, review, or systematic review. This tool is constituted by 6-11 questions (which vary for each type of study) assessing the risk of bias. For each single article, the obtained score was divided by the maximum possible score to establish its grade (for instance, if six out of eight questions were answered positively for a study, its final score was 0.75). The study was then

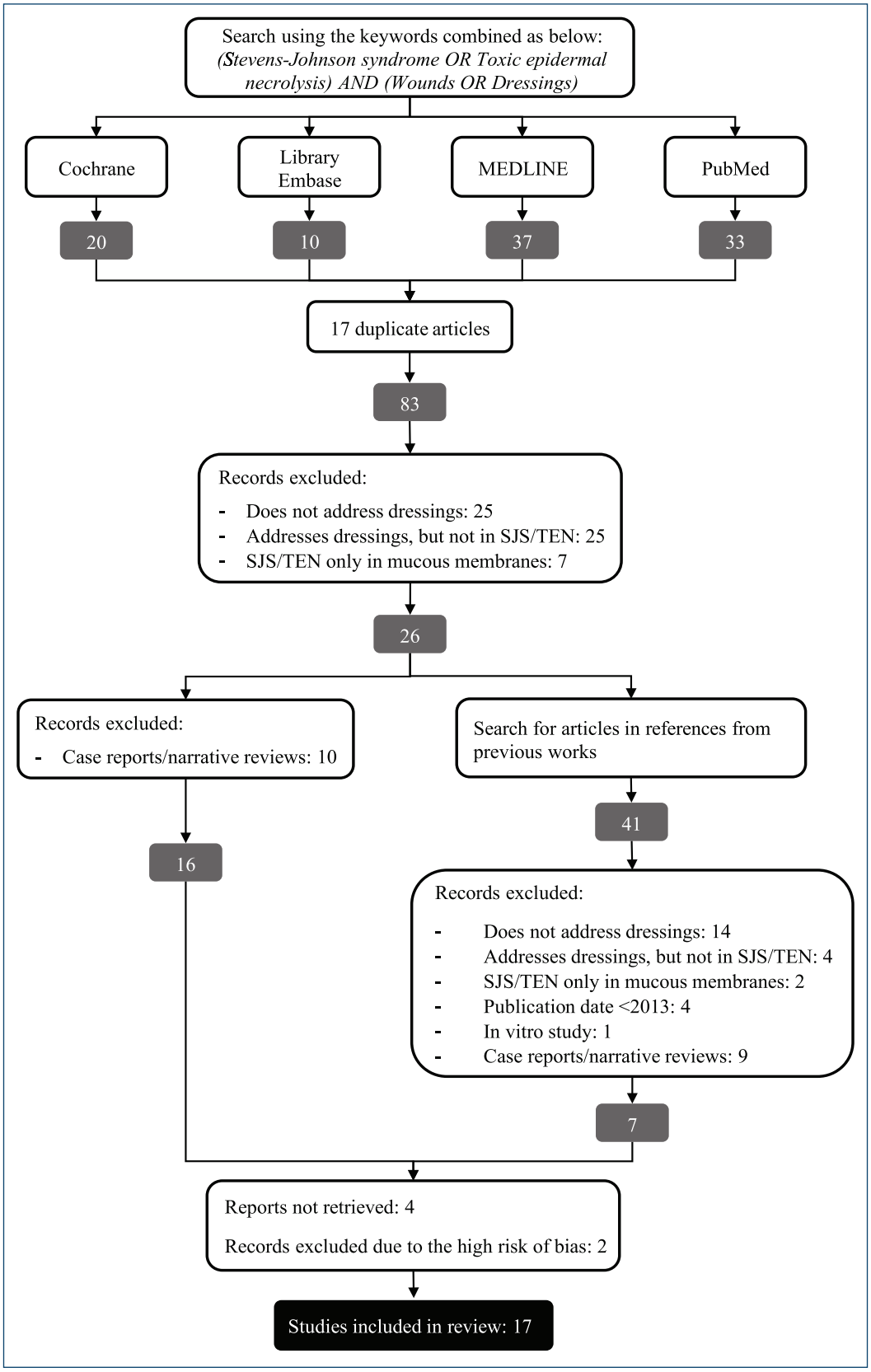

Figure 1. Flowchart for selection of studies for systematic review.

classified as high (score < 0.50), moderate (score 0.51-0.70), or low (score > 0.71) risk of bias. Articles deemed as with a high risk of bias were then excluded from this review.

Three independent authors extracted general data for each study (title, publication year, study type, name of first authors, name of journal), as well as data on study participants (mean age of patients, gender, comorbidities, nutritional status, mortality, affected body surface area, systemic treatments used, and pain assessment) and on dressings (what was used for cleansing, debridement, topical therapy/dressings and their fixation; frequency of dressing changes and time until re-epithelialization). When some of the data was not identified, it was considered "not applicable" or "not available." All data were collected in a descriptive way, given the high frequency of incomplete information.

Extracted data were aggregated into different topics, in the structure of a narrative synthesis, focusing mainly on dressings. Results obtained from studies were also aggregated and shown as tables.

The current review has passed through PROSPERO system[7] and is registered under number CRD42023483491. Moreover, it followed PRISMA guidelines[8] for its construction.

Results

Upon preparation of this systematic review, 100 articles were initially identified, out of which 17 were duplicates, and 67 did not meet the inclusion criteria. The remaining 16 articles had their reference lists searched through to find other eligible studies (41 additional articles). However, 34 out of the additional articles did not meet the inclusion criteria, and only the remaining seven were added to the 16 originals, totaling 23 articles. Out of these, four were excluded because they were not available in full, even after trying to contact authors and editors through email. Two further manuscripts were excluded because of assigned grades lower than 0.50 in JBI Critical Appraisal Tools. Ultimately, there were 17 remaining articles to be included in this systematic review (Fig. 2).

The 17 articles included five case-control studies, three systematic reviews, six expert consensus, two literature reviews, and one meta-analysis. General data for each study, including demographic/epidemiological data and systemic treatments used or recommended are displayed in table 1 and henceforth described.

General data

Out of the 17 articles included in this review, seven described the age and sex of participants (54.6% women and a mean age of 53.03 years)[9-13]. Only six articles reported the average percentage of body surface affected (BSA) in the participants, with an overall average of 52.51% BSA across these articles.

Most often mentioned comorbidities in studies were systemic arterial hypertension, epilepsy, and diabetes mellitus corroborating anticonvulsant drugs as common culprits in the pathogenesis of SJS/TEN[11].

In agreement with the lack of consensus on the best systemic treatment for SJS/TEN the majority of patients in these studies received either IVIG[4,11-15] or systemic corticosteroids[9,11,14], followed by ciclosporin[4,12,14,15]. Nutritional status, which is of utmost importance in this disease, was not commonly addressed. Nutritional therapy after hospital admission with oral or enteral feeding was frequently used, with one study reporting a daily caloric goal of 20-25 kcal/kg during the early catabolic phase and 25-30 kcal/kg during the recovery anabolic phase[16].

The next topics encompass each of the steps involved in wound management and dressing: cleansing, debridement, topical therapy, dressings, and their fixation, frequency of changes, time for re-epithelialization, pain assessment, and mortality. Data regarding employed or recommended dressings are displayed in table 2.

Cleansing

Cleansing consists of the removal of debris, foreign bodies, and sources of infection through applying solutions such as water, saline, and antibacterial solutions, among others[2]. Out of the 17 articles included in this review, 12 (70.6%) did not mention wound cleansing[4,10,11,13,15,17,18-22]. Among the others, all five reported or recommended cleansing with chlorhexidine[9,12,14,16,23], whereas two also recommended distilled water[14,16], and three saline solution[14,16,23].

Debridement

Debridement, comprising strategies intended for the removal of devitalized necrotic tissues that could impair healing and cause secondary infections, is not a consensual therapy, as shown in a systematic review concluded in 2020[23]. Out of the 17 selected articles for the current review, 10 (58.8%) did not detail if debridement was performed[4,10,13,14,16-19,21,22]. In total, 6 (35.3%)

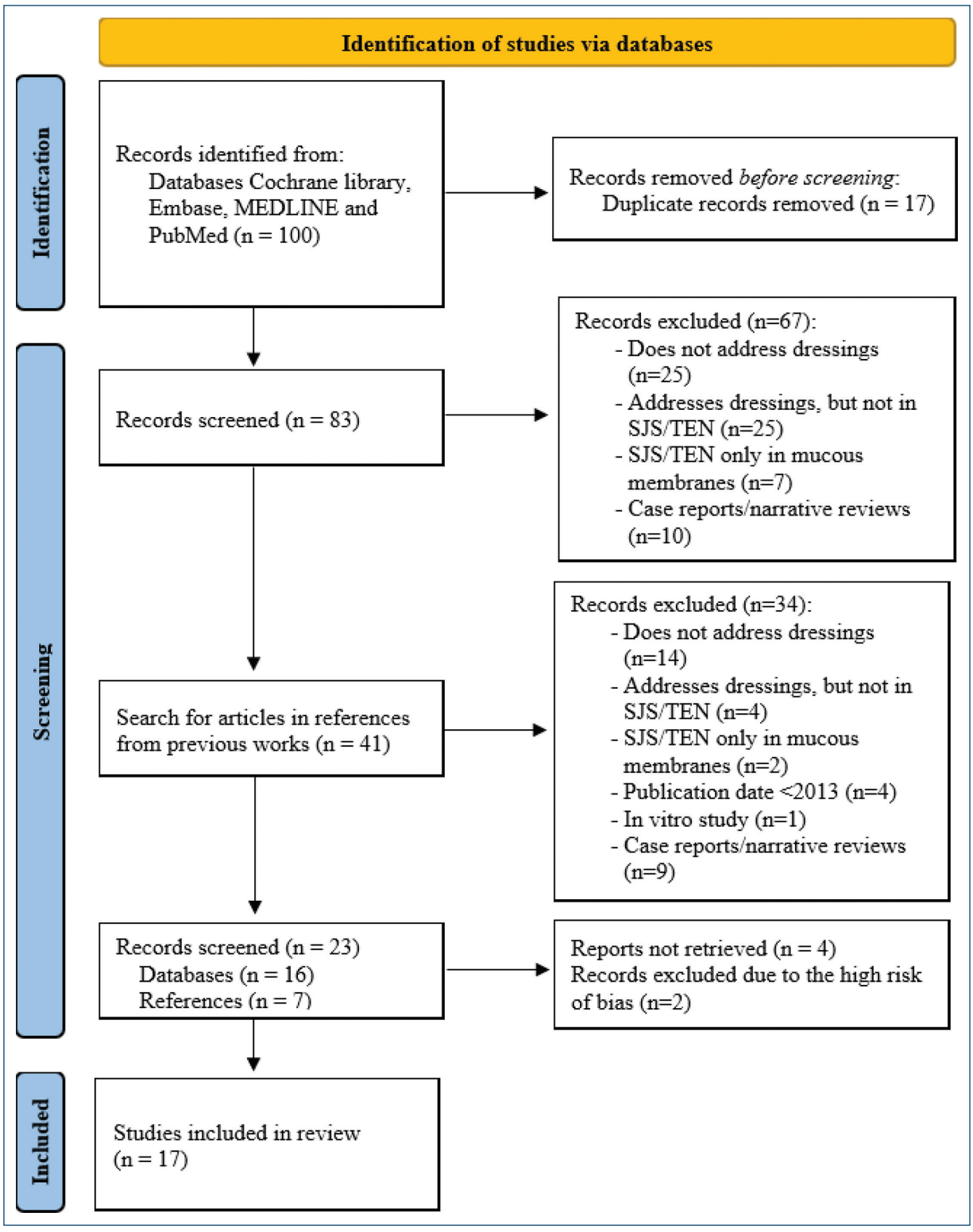

Figure 2. The systematic review on dressings in SJS/TEN.

studies opted for mechanical or surgical debridement, mostly in an operating room or under sedation upon arrival in the reference center, manually or with surgical gauzes and brushes[12,20,22]. Other types of debridement have been cited such as in hydrotherapy rooms (with or without sedation) or hydrosurgery[16]. An expert consensus published in 2016 in the Journal of the American Academy of Dermatology[24], found that 67.7% of experts

Table 1. General data of studies included in a systematic review on dressings in SJS/TEN

Reference	Study design	Mean age (years)	Participants, by gender	Comorbidities (n)	Nutritional status	Mean BSA (%)	Systemic treatment (% of individuals/ studies)	Mortality (%)
Schwartz et al.[17]	Expert consensus	NA	NA	NA	NA	NA	No level of evidence for any systemic treatment	NA
Mahar et al.[9]	Systematic review	46.8	291F/218M	Nd	Nd	All > 30%	IVIG (40%); SCS (30%); fluid replacement with albumin (35%)	30
Huang et al.[10]	Case-control	59.5	10F/10M	Nd	Nd	55.2% (30-85%)	Nd	5
Dodiuk-Gad et al.[18]	Multicentric – Expert consensus	NA	NA	NA	NA	NA	Most used IVIG, SCS, ciclosporin, anti-TNF.	NA
Young et al.[11]	Case-control	52	19 F / 5 M	SAH (18), smoking (7), hyperlipidemia (6), CAD (3), CHF (4), DM (6), seizures (4)	Nd	63%	IVIG (79.17%), SCS (29.17%)	12.5
Creamer et al.[16]	Guidelines	NA	NA	NA	Daily intake of 20-25 kcal/kg (early catabolic phase); 25-30 kcal/kg (recovery anabolic phase)	NA	Mainly supportive care + causative drug withdrawal	NA
Curtis et al.[24]	Expert consensus	NA	NA	NA	NA	NA	IVIG, ciclosporin	NA
Wolkenstein and Wilson[19]	Expert consensus	NA	NA	NA	NA	NA	No consensus. Most used IVIG, ciclosporin	NA
Cartotto[20]	Literature review	NA	NA	NA	NA	NA	No consensus. Most evidence support IVIG, ciclosporin	NA
Rogers et al.[12]	Case-control	59.5	26F/16 M	Nd	Nd	30% (10%-40%)	IVIG, ciclosporin, etanercept	Nd
Paggiaro et al.[13]	Systematic review	37.3	14 F/6 M	Nd	Nd	73.9% (45%-90%)	IVIG (75%)	10
Castillo et al.[4]	Literature review	NA	NA	NA	NA	NA	SCS, IVIG	10.8

(*Continues*)

Table 1. General data of studies included in a systematic review on dressings in SJS/TEN *(continued)*

Reference	Study design	Mean age (years)	Participants, by gender	Comorbidities (n)	Nutritional status	Mean BSA (%)	Systemic treatment (% of individuals/ studies)	Mortality (%)
Richard et al.[14]	Multicentric – Expert consensus	NA	NA	NA	NA	NA	IVIG (41.9%), SCS (9.7%), ciclosporin (6.5%), plasmapheresis (3.2%)	NA
Jaller et al.[23]	Systematic review	NA	NA	NA	NA	NA	Nd	NA
Lee et al.[15]	Meta analysis	51.8	100 F/127 M	NA	NA	NA	IVIG, ciclosporin	29.1
Dastagir et al.[21]	Case-control	66.3	NA	Nd	Nd	NA	Nd	19

n: number of individuals; NA: not applicable; Nd: not described; BSA: body surface area; F: female; M: male; IVIG: intravenous immunoglobulin; SCS: systemic corticosteroids; TNF: tumor necrosis factor; G-CSF: granulocyte colony-stimulating factor; CRP: C-reactive protein; DM: diabetes mellitus; SAH: systemic arterial hypertension; CAD: coronary arterial disease; CHF: congestive heart failure; SLE: systemic lupus erythematosus; CKD: chronic kidney disease; AF: atrial fibrillation atrial; MM: multiple myeloma; HCV: hepatitis C virus; COPD: chronic obstructive pulmonary disease.

did not perform debridement, and another systematic review concerning burn centers published in 2014[9], found that only 13 out of 20 selected studies mentioned debridement, with 9 (69.3%) in favor of routine active debridement and 4 (30.7%) indicating not do debride detached epidermis. A 2024 meta-analysis evaluating surgical debridement compared to the use of a bandage alone found no difference in mortality, but there was a significantly shorter re-epithelialization time in the group without debridement[15].

Topical therapies

Topical therapy represents the dressing itself or topical pharmacologic agents applied directly on the wound surface. Dressings described for SJS/TEN varied from petrolatum-impregnated gauzes to silver-containing dressings, silicone foams, collagen dressings (not specifying the subtype of collagen), porcine xenografts, among others[23]. Most studies report silver-based dressings (mostly silver-impregnated meshes), followed by biosynthetic membranes, and by xenografts or allografts.

Topical therapies were variable among studies, with no consensus on which is the best. In a systematic review made in 2020[23], high-potency topical corticosteroids were recommended in areas of erythematous skin not yet detached, and topical antimicrobials (not designating which one) or silver-impregnated dressings (also not designating which one) in areas of detached skin. Other mentioned dressings were biosynthetic skin substitutes with porcine collagen and cryopreserved cadaveric allografts or porcine xenografts for areas with epidermal detachment. For detached areas, British guidelines[16] recommend a first layer of dressing with a non-adhering material, such as PHMB-impregnated non-adhering gauze or silicone mesh, and a foam or other absorbing dressing as a second layer. Another systematic review, published in 2014[9], indicates silver nitrate-impregnated dressings as the most used, followed by synthetic skin substitutes, porcine xenograft, absorbing gauze, cadaveric allograft, emollient ointments and aqueous creams (not specified).

In 6 (35.3%) selected studies, silver-based topical therapies are mentioned as the treatment of choice, varying from silver ointments/creams to silver-impregnated foams, gauzes, or meshes[4,10,11,16,18,24]. In 5 (29.4%) there are no further details on the chosen silver-based dressing[11,16,18,24], and in 2 (11.8%) studies silver-impregnated hydrofiber foam was chosen[4,10]. A 2016 expert consensus[19] advised caution when using silver-impregnated dressings over large areas, due to the risk of increased

Table 2. Specific data on most used dressings for SJS/TEN in included studies

Reference	Study design	Materials/techniques used for dressings				Frequency of dressing changes	Time until re-epitheliazation	Pain scale
		Cleansing	Debridement	Topical therapy (% of use/ citations)	Fixation			
Schwartz et al.[17]	Expert consensus	Nd	Nd	Paraffin gauzes, porcine xenografts, human allografts, biosynthetic skin substitutes with porcine collagen	Nd	Nd	Nd	Nd
Mahar et al.[9]	Systematic review	Chlorhexidine (1)	Routine active debridement (9/20 studies)	Aseptic dressings (5%), silver nitrate-impregnated (10%), synthetic skin substitutes (20%), porcine xenograft (10%), absorbent gauze (5%), cadaveric/porcine graft (5%), emulsifying ointment/ aqueous cream (5%), and silver sulfadiazine (10%)	Nd	Cadaveric or porcine graft changed daily (1)	Nd	Nd
Huang et al.[10]	Case–control	Nd	Nd	Silver-containing hydrofiber and petrolatum gauze versus silver sulfadiazine	Nd	Case versus control twice weekly versus daily	Case versus control group: 16.75 versus 17.50 days (not significant)	Hydrofiber group; lower pain scores
Dodiuk-Gad et al.[18]	Multicentre – Expert consensus	Nd	Nd	Silver-impregnated dressings, synthetic dressings, topical antimicrobials, bioactive skin substitutes	Nd	Nd	Nd	Nd
Young et al.[11]	Case–control	Nd	Hydrotherapy + sedation	Porcine xenograft versus silver-impregnated dressing	Nd	Nd	Nd	Pain score 2.8 versus 6
Creamer et al.[16]	Guidelines	Warmed sterile water, saline, or chlorhexidine	if infected or necrotic areas hydrosurgery or antimicrobials (iodopovidone or chlorhexidine)	Greasy emollient (50:50 white soft paraffin/liquid paraffin) + topical antimicrobial + non-adherent dressing. Detached areas: non-adherent dressings + secondary foam or synthetic membranes or allograft/ xenograft	Nd	Nd	Nd	Nd
Curtis et al.[24]	Expert consensus	Nd	Most no debridement	Petrolatum gauze; silver-containing non-adherent dressings	Nd	Nd	Nd	Nd
Wolkenstein andWilson[19]	Expert consensus	Nd	Nd	Detached skin as biologic dressing. Caution with silver-impregnated dressings in large areas	Nd	Nd	Nd	Nd
Cartotto[20]	Literature review	Nd	Routine removal of remaining epidermis	Porcine xenograft or cadaveric allograft or biosynthetic skin substitute + antimicrobial secondary dressing	Fixation staples	Nd	12-14 days	Nd

(*Continues*)

Table 2. Specific data on most used dressings for SJS/TEN in included studies *(continued)*

Reference	Study design	Materials/techniques used for dressings				Frequency of dressing changes	Time until re-epitheliazation	Pain scale
		Cleansing	Debridement	Topical therapy (% of use/ citations)	Fixation			
Rogers et al.[12]	Case–control	Soap and chlorhexidine upon admission	Mechanic debridement upon admission	Biosynthetic membrane with porcine collagen +, followed by antimicrobial mesh with nanocrystalline silver versus petrolatum ointment or silver-based dressing or greasy tulle gauze	Nd	silver-containing screen 48-72 h. Control group: Nd.	13 versus 12 days	Nd
Paggiaro et al.[13]	Systematic review	Nd	Nd	Xenograft / cadaveric allograft / amniotic membrane	Nd	Nd	Nd	Nd
Castillo et al.[4]	Narrative review	Nd	Nd	Biosynthetic dressings versus silver-impregnated fibers	Nd	weekly on average	14.16 ± 9.42 days	Biosynthetic dressings improved comfort (5/22 studies)
Richard et al.[14]	Multicentre Expert consensus	Diluted chlorhexidine (51.6%), water (22.6%), saline (12.9%), other (12.9%)	Nd	Topical antibiotics (58.1%), whirlpool baths (12.9%), topical corticosteroids (6.5%), silver foam (48.4%), biologic skin substitutes (45.2%), nanocrystalline silver mesh (32.3%), petrolatum gauze (29%), silver sulfadiazine (12.9%), and non-adherent gauze with PHMB (6.5%)	Nd	Daily (41.9%), every 3 days (22.6%), 2 days (6.5%), weekly (6,5%)	Nd	Nd
Jaller et al.[23]	Systematic review	Warm sterile water, saline, or diluted chlorhexidine (1:5000)	No consensus on surgical debridement	High-potency topical corticosteroids in non-detached skin. Topical antimicrobials or silver-impregnated dressings on denuded areas, biosynthetic skin substitutes, cryopreserved cadaveric allografts, or porcine xenografts	Nd	Depending on dressing from daily to every 7-14 days	12.5 days (biosynthetic skin with collagen versus 16 days for debridement	Nd
Lee et al.[15]	Meta analysis	Nd	Nd	Nd	Nd	Nd	17 (debridement) versus 14 days (dressing)	Nd
Dastagir et al.[21]	Case–control	Nd	Surgical	Nd	Nd	Nd	Nd	Nd
Enescu et al.[22]	Case–control	Nd	Hydrotherapeutic blister debridement (maximum of 10% BSA)	Suprathel® versus polyhexanide gel	Nd	No exchange versus daily	Nd	Nd

Nd: not described; PHMB: polyhexamethylene biguanide; BSA: body surface area.

silver absorption on detached epidermis with systemic complications in debilitated patients.

Biosynthetic dressings with a combination of collagen mesh and silicone were frequently cited in 4 (23.5%) recent studies, as they require no changes, reduce pain, and increase comfort, allowing a similar, or even shorter, re-epithelialization time when compared to traditional topical therapies[12,16,17,20].

Six (35.3%) articles mentioned the use of allografts and porcine xenografts, which are used as skin substitutes on non-infected detached epidermis, and generally do not need frequent changes[11,16,17,20]. A further option is the use of the patient's own detached epidermis as a biological dressing, a possibility mentioned by 2 (11.8%) articles: the UK guidelines and an expert consensus[16,19].

Petrolatum-based products are still often employed, as mentioned in 4 (23.5%) studies, but more commonly as emollients in areas where the skin is not yet detached[16,17,20,24]. Nevertheless, petrolatum is being progressively replaced with previously mentioned therapies. The application of petrolatum-impregnated gauzes (as a means to keep the wound moist, facilitate dressing change, and reduce pain) has not been shown to be statistically significantly beneficial over other topical therapies[10].

Fixation

Dressing fixation in SJS/TEN is an important step and should ideally be non-adhering and not cause damage to the skin[23], as the skin is fragile, and inadequate fixation may worsen the area of epidermal detachment and pain. The primary dressing, i.e., the one that is in direct contact with the wound, may or may not need to be covered by a secondary dressing. Despite its importance, out of the 17 articles in this review, 14 (82.3%) did not mention fixation at all[4,9,10,12-24], or described the use of gauzes for fixation[11,21].

Dressing change frequency

The frequency of wound dress changing was variable for each dressing. Biosynthetic skin substitutes, allografts, and xenografts usually do not require changing[12,20]. Some studies[9,21] performed daily changes, notably if there was facial epidermal detachment. However, patient discomfort is reportedly greater, when cleansing and dressing changes are more frequent. Silver-impregnated dressings were left in place for a longer interval, with changes varying from every 2 to 7 days[4,10]. In a 2018 expert consensus[14], the ideal change interval was also diverse among experts, with changes daily, every 2 or 3 days, or weekly, respectively, in 41.9%, 6.5%, 22.6%, and 6.5% weekly, and 22.6% in alternative periods.

Re-epithelialization

Time until total re-epithelialization was not mentioned in 11 (64.7%) of the selected studies[9,13,16-19,21,22,24]. On average, the time until re-epithelialization was lower than 2 weeks, regardless of the topical therapy used[4,12,20]. A 2020 systematic review[23] reported re-epithelialization time to be shorter when using a biosynthetic skin substitute with porcine collagen, with an average of 12.5 days, compared to 16 days when using paraffin gauzes with daily changes.

Mortality

Few articles associate the choice of topical therapy for SJS/TEN with mortality rates. Among selected studies, 11 (64.7%) did not mention mortality[12,14,16-20,22-24]. In the remainder, mortality was < 30% of cases, with no reduced mortality reported for any specific dressing[4,9,10,11,13,15,21].

Pain assessment

Thirteen (76.5%) studies did not mention whether a pain scale was used[9,12-14,16-20,23,24], and few studies related it to the wound dressing choice. A pain Visual Analog Scale was used to compare groups with distinct silver-based therapies in a 2014 case–control study[10]. The group using silver hydrofiber scored significantly ($p = 0.02$) better on this scale (5.75/10, standard-deviation 1.39) than the group using silver sulfadiazine (7.42/10, standard-deviation 1.31), probably as a result of decreased need of manipulation and dressing changes in the silver hydrofiber group. A 2016 case–control study[11] compared patients with porcine xenografts to patients with silver-impregnated dressings and found pain to be considerably lower for the first group (2.8 vs. 6/10 points). Another systematic review published in 2018[4] found, in five out of 22 articles that cite pain assessment, that biosynthetic dressings result in better comfort, although without altering healing time.

Discussion

The percentage of epidermal detachment in SJS/TEN has a direct relationship with mortality and worse prognosis, therefore a fundamental part of care in SJS/TEN includes local wound management and use of

proper dressings[23]. An ideal dressing should be comfortable for the patient and protect denuded skin from secondary infections, hypothermia, or fluid loss, reduce pain, avoid expansion of detachment, and promote re-epithelization[1]. Dressing change may be performed in an operative setting, under general anesthesia, considering the extreme pain[1]. It is recommended that care of SJS/TEN patients be done, whenever possible, in specialized centers or burn units, but there are no specific guidelines for dressing application and there is a great deal of variability in topical therapies used in all steps of wound care in these conditions[14].

The current systematic review highlights that there is still no established consensus on wound management in patients with SJS/TEN, especially when regarding the choice of proper dressing. A range of different dressings have been used, such as silver-based dressings, biosynthetic membranes, xenografts, allografts, and the patient's own detached skin (which may be kept in place and used as a biologic dressing). High variability in care reflects the lack of standardized guidelines and differentiation of treatment according to each center and the patient's individual characteristics.

Silver-impregnated dressings are commonly employed due to antimicrobial properties, but attention should be given to risks of systemic absorption and adverse effects, notably if used in extensive areas[19]. Biosynthetic dressings and xenografts have shown advantages regarding patient comfort, pain reduction, and need for less frequent dressing changes, and may favor re-epithelization and decrease infection risk, but scientific evidence is still scarce and unable to infer superiority for any specific class of dressing[11-13,16,17,20].

This review highlights priorities for future research in this area. There appears to be little information regarding the importance of topical treatments in SJS/TEN. Consequently, choosing the best dressing for these diseases remains a challenge. There are several options in medical literature for each step of wound management but it is not clear what initial measures should be taken by doctors and healthcare teams when admitting patients with SJS/TEN, or what subsequent measures and dressings should be performed. There was likewise no conclusion on the best way of wound cleansing and/or fixation, and whether debridement should or not be performed.

In view of this, there is a clear need for clinical trials to directly compare different available topical therapies to establish protocols that optimize clinical outcomes, decrease mortality, and improve the quality of life in patients with SJS/TEN. Until then, an individualized and multidisciplinary approach remains the most suitable means of managing these severe and potentially lethal diseases.

Our study has some strengths – it provides an updated review of an important subject for which there is a scarcity of data published in medical literature. This study, however, also has several limitations. An important one is the overall small number of studies included. Furthermore, there is a lack of studies with a higher level of evidence–for instance, there was no randomized clinical trial available that would fulfill the inclusion criteria. Another limitation is the heterogeneity of articles–different designs such as case-control studies and guidelines, for instance, do not allow direct comparison among selected studies.

Conclusion

Regarding topical therapies in the management of SJS/TEN patients, the most used dressings were silver-containing ones, followed by synthetic membranes and allografts or xenografts. However, despite miscellaneous therapeutic options, there is no consensus on an ideal protocol for SJS/TEN patients. More powerful study designs are needed to methodologically assess which are the best topical therapies in practice. In this way, considering that wound management is essential for proper healing and reduction of morbidity and mortality in SJS/TEN, further research on this subject is highly needed.

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Conflicts of interest

None.

Ethical considerations

Protection of humans and animals. The authors declare that no experiments involving humans or animals were conducted for this research.

Confidentiality, informed consent, and ethical approval. The study does not involve patient personal data nor requires ethical approval. The SAGER guidelines do not apply.

Declaration on the use of artificial intelligence. The authors declare that no generative artificial intelligence was used in the writing of this manuscript.

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