European Journal of Molecular & Clinical Medicine

ISSN 2515-8260 Volume 06 Issue 02, 2019

Original Research Article

A REVIEW ON STAPHYLOCOCCAL SCALDED SKIN SYNDROME

Dr. K. Atchuta Kumar[1*]

[1*]Professor, Bhaskara Institute of Pharmacy, Komatipalli, Bobbili, Andhra pradesh

***Corresponding author:** Dr. K. Atchuta Kumar
*E-mail: dratchut99@gmail.com

Abstract

Staphylococcal scalded skin syndrome (SSSS) is a clinical condition primarily affecting infants, elderly individuals, and those with impaired immune systems. It is caused by Staphylococcus aureus and can be replicated by a specific extracellular toxin. The condition is also known as Ritter's disease, bullous impetigo, pemphigus neonatorum, and staphylococcal scarlatiniform rash. A study on the production of exfoliative toxins (ET) from patients with dermatological conditions revealed two identified toxin serotypes: ETA and ETB. There seems to be a correlation between the severity of the disease, the quantity of toxin generated, and whether the toxin is delivered in a localized or systemic manner. The occurrence rate was low, with a significant disparity between children and adults. The primary risk factor in children was young age, while in adults, immunosuppression and consumptive infectious disease were identified. The mortality rate in paediatric patients ranged from 3.6% to 11%, while in adults, it ranged from 40% to 63%. SSSS is a vesiculobullous condition characterized by tenderness, redness, peeling, or blister formation. The best treatment strategy involves a combined approach in specialized intensive care or burn units, with antibiotic treatment being crucial, especially for methicillin-sensitive S. aureus infections. Further research is needed to identify the specific infection site, which can be blood samples, wounds, or ocular exudates. The purpose of this review is to summarize advances in understanding of this serious disorder.

Keywords: Staphylococcus aureus, Exfoliative toxins, Nikolsky sign, Toxic epidermal necrolyis.

INTRODUCTION

Staphylococcal scalded skin syndrome (SSSS) is an established clinical condition that predominantly affects infants and, in exceptional instances, elderly individuals or those with impaired immune systems.[1] The fulfillment of Koch's postulates can be observed in the following manner: Firstly, Staphylococcus aureus has been consistently isolated from each case. Secondly, the ability of S. aureus to induce the syndrome has been demonstrated in an experimental animal model. Thirdly, the syndrome can be replicated by a specific extracellular toxin. Lastly, experimental animals can be protected from the syndrome by the presence of antibodies to the toxin. While exfoliative toxin (ET) is implicated in the dermal desquamation observed in Staphylococcal Scalded Skin Syndrome (SSSS), it does not fully explain the entirety of the clinical manifestations associated with this condition.[2]

Some of the current synonyms for this condition are Ritter's disease, bullous impetigo, pemphigus neonatorum, and staphylococcal scarlatiniform rash. The condition primarily affects new-borns and young children, however there have been reported cases in adults.[3] The user's text is too short to be rewritten in an academic manner.[4] The onset of the disease is characterized by erythema and fever, which is subsequently followed by the development of sizable bullae packed with fluid. These bullae tend to burst easily even with minimal pressure, as shown by the presence of the Nikolsky sign. This rupture leads to the exposure of significant portions of denuded skin.[5]

ISSN 2515-8260 Volume 06 Issue 02, 2019

EPIDEMOLOGY

Staphylococcus aureus is a Gram-positive coccus that commonly inhabits several regions of the human body, including the nose, perineum, axillae, eyes, wound sites, and toe webs.[6] There is a limited availability of epidemiological data regarding strains of S. aureus that produce ET.[7,8] A study was conducted to evaluate the production of exfoliative toxins (ET) in 944 Staphylococcus aureus isolates obtained from 577 patients with dermatological conditions. The screening for ET production was performed using the neonatal mouse model.[9] There are now two identified toxin serotypes, namely ETA and ETB, although it is possible that more serotypes may also exist.[10] Based on statistical computations, the findings revealed a relatively low overall occurrence rate ranging from 0.09 to 0.13 instances per 1 million individuals' year, with a 95% confidence interval of [0–4]. The age distribution exhibited two distinct groups, one encompassing young child ren and the other comprising adults. The death rate shown a significant disparity between children and adults, with the former group experiencing a notably lower rate. The primary risk factor identified in children was a young age, while in adults, immunosuppression and consumptive infectious disease were shown to be the detected risk factors.[11] The mortality rate of SSSS in paediatric patients ranges from 3.6% to 11%. Nevertheless, adults who are impacted by SSSS exhibit a mortality rate ranging from 40% to 63%, which may be attributed to an underlying comorbidity.[12,13]

CLINICAL FEATURES

SSSS typically manifests in individuals aged below 5 years, often accompanied by a prodromal phase characterized by symptoms such as sore throat or conjunctivitis. Conjunctivitis can manifest as a severe condition, characterized by the presence of periorbital edema and purulent discharge. In many cases, the causal agent identified through culture is Staphylococcus aureus.[14]

The patient exhibits symptoms such as fever, malaise, and the presence of highly sensitive erythematous patches on the face, neck, axilla, and perineum within a span of 48 hours as shown in Fig. 1 & 2. Flaccid bullae are observed to form within the erythematous regions, accompanied by a positive Nikolsky sign. The user did not provide any text to rewrite. Bullae typically manifest in the flexural regions and, on occasion, may extend to include extensive portions of the skin.[15] Bullae tend to expand and rupture readily, resulting in the exposure of a damp, reddened foundation that manifests as a scalded appearance. The process of healing takes place in the absence of scar formation.

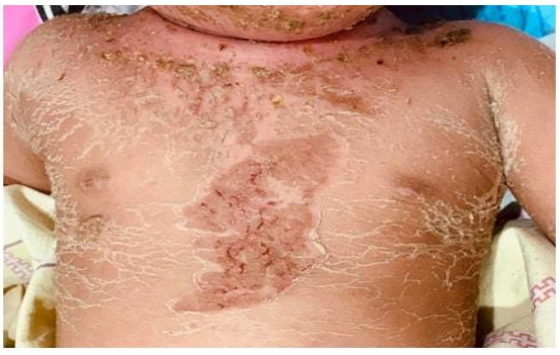

Fig. 1 SSSS in children

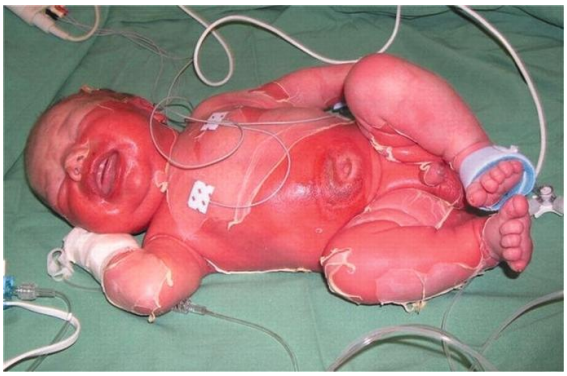

Fig. 2 SSSS in infant

DIAGNOSTIC FEATURES

The diagnosis of Staphylococcal Scalded Skin Syndrome (SSSS) relies on the evaluation of clinical manifestations, histological examination, and microbiological analysis.[16]

- The patient exhibits a clinical presentation characterized by tenderness, redness, peeling of the skin, or the formation of blisters.
- Histopathological examination reveals the presence of cleavage within the uppermost layer of the epidermis, known as the stratum granulosum.

- The identification of Staphylococcus aureus strains capable of producing exfoliative exotoxin A (ETA) and/or exfoliative exotoxin B (ETB) is crucial.
- Direct and indirect immunofluorescence tests confirm the absence of pemphigus foliaceous, ruling out this specific autoimmune disorder.

SSSS is a vesiculobullous condition that exhibits a positive Nikolsky's sign and presents with a characteristic appearance of scalded skin. In its early stages, SSSS may bear resemblance to other blistering disorders, such as toxic epidermal necrolysis (TEN), is a severe and potentially life-threatening immunological reaction that can occur as a result of drug exposure. However, the phenomenon known as SSSS can be distinguished from other similar phenomena. TEN is characterised by the absence of mucous membrane involvement, as well as by the process of superficial epidermal peeling is characterised by its superficial nature, which stands in contrast to other forms of peeling.[17]

MANAGEMENT

The optimal treatment strategy typically involves a combined approach, which is most effectively implemented within a specialized intensive care or burn unit setting. Despite the fact that the progression of SSSS may persist for a further 24-48 hours following its beginning until the circulating exotoxin has been neutralized by antibodies or eliminated through renal excretion, it is crucial to initiate antibiotic treatment as soon as feasible.[18] It is advisable to administer penicillinase-resistant penicillin’s for the treatment of methicillin-sensitive S. aureus infection, which is often observed in the majority of patients.[4]

In the event that the patient exhibits an allergic reaction to penicillin, alternative antibiotics such as Clarithromycin or Cefuroxime may be considered for administration. In cases where a patient's condition does not show signs of improvement, it becomes imperative to consider the production of ET by Methicillin-Resistant Staphylococcus aureus and switch to Vancomycin.[19]

Further research should be conducted to explore the specific area of staphylococcus infection in cases where the focus of infection has not been identified. Cultural analyses should be conducted on potential locations, including blood samples, wounds, ocular exudates, and the nasopharynx.[20] In the adult population, the initial site of infection is typically characterised by a conspicuous clinical manifestation, such as pneumonia, osteomyelitis, or septic arthritis. In paediatric patients, the initial site of infection typically manifests as a moderate upper respiratory tract infection.[18]

DISCUSSION

The occurrence of Staphylococcal Scalded Skin Syndrome (SSSS) can be attributed to the presence of a specific staphylococcal toxin known as exfoliative toxin. The individual demonstrates a clinical manifestation marked by the presence of pain, erythema, desquamation, or the development of vesicles. The diagnosis was established using clinical data, which encompassed positive Nikolsky's sign, histology, and evidence of a primary staphylococcal infection. The clinical observation known as Nikolsky's sign is a valuable tool in distinguishing between various bullous dermatoses. This sign is characterized by the capacity to elicit peripheral extension of a blister when lateral pressure is applied to the border of an intact blister based on previous studies conducted.[11] In modern nations characterized by elevated hygienic standards, the occurrence of Staphylococcal Scalded Skin Syndrome (SSSS) in children can be effectively prevented or minimized to the extent that its prevalence among adults only marginally surpasses that in pediatric cases. Additionally, the examination of mortality data suggests that the impact of SSSS on adults may be more pronounced compared to its effects on children.

CONCLUSION

The prevalence of Staphylococcal Scalded Skin Syndrome (SSSS) has increased among paediatric patients, while the risk factors associated with SSSS have also risen among adults. Consequently, it is crucial for clinicians to possess a heightened understanding of SSSS in order to facilitate early diagnosis and treatment. Regular monitoring of electrolyte levels is recommended, with particular emphasis on the detection of hyponatremia caused by volume overload acquired in a hospital setting. An essential aspect of managing patients with SSSS is the equally significant task of preventing subsequent infection via the exposed skin. Although SSSS is relatively uncommon, usually easily diagnosed on clinical grounds, and readily treated with conventional antibiotics, it is important to emphasise that at present mortality rates are still unacceptably high, outbreaks are difficult to control, and the secondary complications, which are particularly common in neonates, can often be lethal.

REFERENCES

1. Melish ME, Glasgow LA. The staphylococcal scalded-skin syndrome: development of an experimental model. New England Journal of Medicine. 1970 May 14;282(20):1114-9.
2. Gemmell CG. Staphylococcal scalded skin syndrome. Journal of medical microbiology. 1995 Nov;43(5):318-27. https://doi.org/10.1099/00222615-43-5-318
3. ME M. Staphylococci, streptococci and the skin: Review of impetigo and the staphylococcal scalded skin syndrome. Semin Dermatol. 1982; 1:101-9.
4. Cribier B, Piemont Y, Grosshans E. Staphylococcal scalded skin syndrome in adults: a clinical review illustrated with a new case. Journal of the American Academy of Dermatology. 1994 Feb 1;30(2):319-24.
5. Ladhani S, Evans RW. Staphylococcal scalded skin syndrome. Archives of disease in childhood. 1998 Jan 1;78(1):85-8. https://doi.org/10.1016/S0190-9622(94)70032-X
6. Noble UK. Microbiology of human skin. Moscow: Medicine. 1986.
7. Dajani AS. The scalded-skin syndrome: relation to phage-group II staphylococci. Journal of Infectious Diseases. 1972 May 1;125(5):548-51. https://doi.org/10.1093/infdis/125.5.548
8. Kondo I, Sakurai S, Sarai Y. New type of exfoliatin obtained from staphylococcal strains, belonging to phage groups other than group II, isolated from patients with impetigo and Ritter's disease. Infection and Immunity. 1974 Oct;10(4):851-61. https://doi.org/10.1128/iai.10.4.851-861.1974
9. Elsner P. Epidemiology of ETA-and ETB-producing staphylococci in dermatologocal patients. Zentbl Bacteriol Mikrobiol Hyg Ser A. 1988;268:534.
10. Sato H, Matsumori Y, Tanabe T, Saito H, Shimizu A, Kawano J. A new type of staphylococcal exfoliative toxin from a Staphylococcus aureus strain isolated from a horse with phlegmon. Infection and immunity. 1994 Sep;62(9):3780-5 https://doi.org/10.1128/iai.62.9.3780-3785.1994
11. Mockenhaupt M, Idzko M, Grosber M, Schöpf E, Norgauer J. Epidemiology of staphylococcal scalded skin syndrome in Germany. Journal of investigative dermatology. 2005 Apr 1;124 (4):700-3.
https://doi.org/10.1111/j.0022-202X.2005.23642.x
12. Elias PM, Fritsch P, Epstein EH. Staphylococcal scalded skin syndrome: clinical features, pathogenesis, and recent microbiological and biochemical developments. Archives of Dermatology. 1977 Feb 1;113(2):207-19.
https://doi.org/10.1001/archderm.1977.01640020079014
13. Almquist E. Pemphigus neonatorum, bacteriologisch und epidemiologisch beleuchtet. Zeitschrift für Hygiene. 1891 Dec;10(1):253-66. https://doi.org/10.1007/BF02188520
14. Lowney ED, Baublis JV, Kreye GM, Harrell ER, McKenzie AR. The scalded skin syndrome in small children. Archives of Dermatology. 1967 Apr 1;95(4):359-69.
https://doi.org/10.1001/archderm.1967.01600340019005

15. MOSS C, GUPTA E. The Nikolsky sign in staphylococcal scalded skin syndrome. Archives of disease in childhood. 1998 Sep 1;79(3):290-. http://dx.doi.org/10.1136/adc.79.3.290
16. Falk DK, King Jr LE. Criteria for the diagnosis of staphylococcal scalded skin syndrome in adults. Cutis. 1983 Apr 1;31(4):421-4. PMID: 6851638
17. Schwartz RA, McDonough PH, Lee BW. Toxic epidermal necrolysis: Part I. Introduction, history, classification, clinical features, systemic manifestations, etiology, and immune-pathogenesis. Journal of the American Academy of Dermatology. 2013 Aug 1;69 (2): 173-e1. https://doi.org/10.1016/j.jaad.2013.05.003
18. Blyth M, Estela C, Young AE. Severe staphylococcal scalded skin syndrome in children. Burns. 2008 Feb 1;34(1):98-103. https://doi.org/10.1016/j.burns.2007.02.006
19. Ladhani S, Joannou CL. Difficulties in diagnosis and management of the staphylococcal scalded skin syndrome. The Pediatric infectious disease journal. 2000 Sep 1;19(9):819-21.
20. Handler MZ, Schwartz RA. Staphylococcal scalded skin syndrome: diagnosis and management in children and adults. Journal of the European Academy of Dermatology and Venereology. 2014 Nov;28(11):1418-23.