

	<p>International Journal of</p> <h1>Innovative Drug Discovery</h1> <p>e ISSN 2249 - 7609 Print ISSN 2249 - 7617</p> <p><a href="http://www.ijidd.com">www.ijidd.com</a></p>
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## STAPHYLOCOCCAL SCALDED SKIN SYNDROME: A REVIEW.

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### ABSTRACT

Staphylococcal Scalded Skin Syndrome (SSSS) is a remarkable skin disease. The hallmark of SSSS is the peeling off effect on epidermal layer of skin, due to the two exfoliative toxins (ETA & ETB) released by Staph. aureus. Children below 5 years old and neonates, are the main sufferers of SSSS due to devoid of antibodies against the toxins. In adults SSSS, is rarely occurred because of their good immune system, but in immunocompromised patients SSSS can be seen. SSSS can be treated effectively with IV antibiotics, and supportive measures for wound care, prevention of dehydration, pain management can lead to the speedy recovery of SSSS in paediatrics. Prognosis of SSSS in children is excellent, complete resolution of skin observed within 10 days of treatment and mortality rate is also very low. In adults, especially patients with serious comorbid conditions and weak immune system, speedy recovery from SSSS is still challenging.

**KEY WORDS:** Staphylococcus aureus, Ritter disease, Exfoliative Toxins, Nikolsky Sign, Scalded Skin Syndrome.

### INTRODUCTION

Staphylococcal Scalded Skin Syndrome (SSSS) or Ritter disease or Ritterschein disease, is a rare skin disorder, exhibiting superficial blistering on skin due to the exfoliative toxins exerted by some strains of Staphylococcus aureus [1&2]. In 1878, Baron Gotfried Ritter von Ritterschein was the first person described the disease in the new born. He termed the disease as 'dermatitis exfoliativa neonatorum', but later it was called as 'Ritter's disease'. Melish and Glasgow in 1970, invented the causative agent for SSSS as S. aureus and recorded the skin changes of SSSS using neonatal mouse model. They labeled this disease as SSSS [2&3]. SSSS is appeared as red blistering on the skin resembles a burn or scald so it has been termed as Staphylococcal Scalded Skin Syndrome. It mainly affects the young children below 5 years and neonates. SSSS outbreak in children commonly seen in nurseries and day care centres. It rarely occurs in adults but seen in immunocompromised patients [4&5].

### Etiology:

The causative organism responsible for SSSS is the Staphylococcus aureus. Staph. Aureus can cause a spectrum

of infections due to its virulence factors. It is responsible for most of the infections in hospitalized patients. S. aureus is a gram + cocci, found on human skin, at the areas in the nose, armpit, groin. normally it is harmless but in certain circumstances it may cause skin infections, bacteremia, infective endocarditis, pneumonia etc. [6].

### Pathophysiology:

Staph. aureus secretes systemic circulating exfoliative toxins at the time of bacterial logarithmic growth phase, results in generalized skin eruptions [7 & 8]. There are 3 types of epidermolytic toxins produced by Staphylococcus aureus (ETA, ETB & ETD), among these, ETA & ETB are subjected to SSSS. ETA is a thermostable protein and prevalently secreted toxin also [9] ETB is a thermolabile protein, which is produced by very few isolates. In the remaining 7% both ETA and ETB are co-secreted [10]. Epidermolytic toxins A&B released from Staph. Aureus will bind to a molecule within the desmosomes (structures. that can carry neighbouring epidermal skin cells firmly together) named desmoglein 1, and split it up.

named desmoglein 1, and split it up. Detachment of epidermis below the granular cell layer results in skin peeling off effect in SSSS [1,9,10]. By using the electron microscope intracellular spaces widening can be seen in granular cell layer with absence of desmosomes.

#### Two types of SSSS are existing:

1. Localized form: Epidermal patchy involvement can be seen.
2. Generalized Form: It can be seen in neonates, infants and children below 5 years, significant areas are involved.

#### Clinical Manifestations:

- Starting with fever and blisters, later on blisters with fluid accumulation, rupturing of this blister leaves an appearance of a burn.
- In children: affected areas are: mouth, eyes and ears
- In Newborns: affected areas are: Diaper area, around umbilical cord
- Erythema
- Positive Nikolsky Sign
- Exfoliation or desquamation of skin
- Painful skin

#### Diagnosis:

It is mainly based on results from Clinical Examination, Culturing of bacteria, skin biopsy [2]

- **Clinical Examination:** Presence of Positive Nikolsky Sign, tenderness and erythema of skin.
- **Bacterial culture:** Segregation of exfoliative toxins A&B(ETA&ETB) released by Staphylococcus Aureus.
- **Skin biopsy:** In rare cases skin biopsy can be taken. it will exhibit separation of outer epidermis throughout the granular cell layer [18&19].

#### Treatment:

Penicillinase resistant penicillins such as nafcillin or oxacillin can be used for treating SSSS. Intravenous nafcillin or oxacillin in, 100–150 mg/kg per day in divided doses at every six hours can be given for children. 12 g per day is the maximum daily dose. First- or second-generation cephalosporin can be used as a substitute. Cefazolin Intravenous at 50–100 mg/kg per day in divided doses at every eight hours can be given as a substitute for children and for adults 6g per day is the maximum daily dose [20]. Nafcillin 2 g every four hours and cefazolin 2g iv at every eight hours can be given alternatively [21].

If the patient has penicillin allergy Clarithromycin or cefuroxime can be used [22]. Vancomycin should be used in the case of high prevalence of methicillin -resistant S. aureus is causing the infection or the patient is not showing any positive response towards the initial therapy [23]. Vancomycin iv 45 mg/kg per day in divided doses every eight hours can be given for paediatric therapy and the maximum daily dose should not exceed 2 g per day [20].

Vancomycin 1 g every twelve hours is prescribed for geriatric patients [21].

IV fluids can be given as an adjunctive therapy for preventing dehydration [24]. Fresh frozen plasma (FFP) in iv bolus comprising of 10 percent of the circulating volume of paediatric patients accompanied by maintenance hydration can be given as fluid loss compensation therapy., Intravenous immunoglobulin (IVIg) can be given as a third-line treatment If FFP has not benefited for children. IVIg can be prescribed at a dose of (0.4 g/kg per day) for five days. [22] Wound care and pain management, can be given as supportive measures. Peeled areas of skin can be treated with Sterile, saline-soaked gauze and a layer of emollients to soften the skin Bacterial Decolonization can be prevented by topical application of antibiotics such as mupirocin and fusidic acid [25,26].

#### Complications:[16]

- Poor temperature control in young patients.
- Severe blood stream infection (Septicemia)
- Electrolyte imbalance
- Post-streptococcal glomerulonephritis (PSG)

#### Prevention:[15]

- I. For handwashing Antibacterial/ antiseptic soaps can be used.
- II. For drying or wiping the body hygienic towel or fresh clothing should be used
- III. Hot water can be used for washing the cloths.
- IV. Antibacterial products should be used for cleaning wall.
- V. Fingernails should be shortened to prevent contamination.
- VI. Keep the children at home, if the outbreak is happened from schools/day-care centres
- VII. Do not share any personal hygiene items with anyone
- VIII. Handwashing should be done prior to contact the damaged skin.

#### Prognosis:

Prognosis of SSSS in children is fine within 10 days of treatment skin regain its normal appearance and devoid of scarring.

In adults the prognosis is delayed due to certain factors like, treatment period, comorbidities, and host immunity.

#### Conclusion:

This review article focused on the rare skin disorder, Staphylococcal Scalded Skin Syndrome (SSSS). Exfoliative toxins A & B (ETA & ETB) secreted by Staphylococcus Aureus is responsible for the SSSS. Children below 5 years and neonates are the main victims of SSSS. Peculiar symptom seen in SSSS is the detachment of epidermal layer of skin will be helpful for identifying the

disease and start the treatment accordingly. IV antibiotics and supportive treatment measures for relieving pain, regaining normal texture of skin leads to speedy recovery from SSSS in children. In rare cases, adults are the victims of SSSS, especially in immunocompromised patients.

Recovery from SSSS in geriatrics is a time-consuming process. So better treatment options for the speedy recovery from SSSS in adults is still challenging and we can expect effective treatment options in the future in this regard.

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