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Transient leukopenia in post-burn patients treated with topical silver sulfadiazine cream: A retrospective study

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Abstract
Silver sulfadiazine is commonly used as a topical cream in burn wound management. Transient leukopenia is a known phenomenon in early post-burn period. The total leukocyte count as well as neutrophil count drop, but recover within 2-3 days. We observed leukopenia in only five out of sixty-two patients with thermal injury early in the course of topical treatment with silver sulfadiazine. Leukopenia in burn patients on treatment with topical silver sulfadiazine application is currently seen as a harmless, self-limited phenomenon. It needs further case control and randomized controlled studies for clarifying its actual cause.

Keywords: silver sulfadiazine, leukopenia, burn

Introduction
Silver sulfadiazine cream is commonly used as a topical agent in the management of acute burn wounds. The main objective of using SSD is the prevention of infectious complications in burn patients. The silver sulfadiazine functions as a reservoir of obtainable silver in the wound. This slow liberation of silver ions is responsible for the sustained bactericidal action of silver sulfadiazine [1]. Its use has been associated with some complications but it is easier to apply than previously used topical agents, silver nitrate, Sulfamylone, and gentamicin cream [2]. There have been reports of leukopenia associated with its use as a topical cream over the burn wounds [3–5].

Material and Methods
This study was done in a retrospective manner by chart analysis of all second and third degree acute burns patients admitted in last three years (2014 to 2016) in our hospital. All burn patients were treated with topical silver sulfadiazine dressings once daily. Data regarding the age, gender, period of hospitalization, Total body surface area involved, serial total leukocyte counts from the admission day onwards, serial neutrophil counts and percentage in the blood, day of onset of leukopenia, blood culture reports, any febrile episode, signs of sepsis were collected.

Results
Out of the sixty two burn patients treated with topical silver sulfadiazine, five (8%) burn patients with ages ranging from eighteen years to eighty two years (mean 50 years) and burns ranging from 20 to 70 per cent body surface area (mean 45 per cent), were found to have developed leukopenia (white blood cell count < 3,500/mm3) [6] while silver sulfadiazine was being used as topical therapy for their burn wounds. Their white blood counts on admission were in the range of 5,400 to 32,600/mm3 (mean 19,000/mms). The maximum decline of the white blood cell count occurred on the second or third post-burn day and ranged from 2,200 to 3,400/mm3 (mean 2,800/mm3). All patients manifested neutropenia with percentage cell counts of 4 to 22 per cent (mean, 13 per cent).
Silver sulfadiazine application was temporarily discontinued in two patients as they had developed leukopenia. These patients were then started on dilute betadine dressings. However, on serial follow-up of leukocyte counts, it was noticed that the white blood cell count returned to within normal limits within 2 to 3 days [3]. But these patients were continued on dilute betadine dressings. None of the patients developed fever or any signs of sepsis. Blood cultures revealed no growth. The wound swab culture grew klebsiella and pseudomonas after silver sulfadiazine therapy had been stopped. This however settled with continued dressings with dilute betadine and further wound swab cultures showed no growth. No systemic antibiotics were administered to these patients. All five patients survived and were eventually discharged.

Discussion and Conclusion
Finland *et al*. first reported leukopenia associated with the use of silver sulfadiazine in <1% of patients [7]. Chan *et al*. reported two cases of acute leukopenia in a series of 68 burn patients [3]. Jarret *et al*. reported development of leukopenia in 10% of the burns patients [6]. Some studies [5] have revealed their observed incidence of leukopenia associated with the topical use of silver sulfadiazine to be greater than 55%. On coming in contact with body fluids, silver sulfadiazine slowly release sulfadiazine, which is systemically absorbed and is a suspected cause of leukopenia seen in patients treated with silver sulfadiazine cream [8]. Another explanation for this phenomenon could be that peripheral leukocytes are consumed early in the inflammatory of thermal injury and do not reappear until the bone marrow recovers from the initial insult [9–11]. However, it is now believed to be a self-limiting and transient change with no toxic significance. It is possible that the leukopenic reaction seen in five (8%) of our patients was a result of absorption of sulfadiazine component causing bone marrow depression [3, 4], but other factors have to be ruled out. There

were no signs or symptoms of septicemia in these patients. Moreover, sepsis caused by gram-negative organisms usually occurs after the fifth or sixth post burn day, when initial burn wound colonization by gram-positive organisms has been superseded by gram-negative colonization [6]. In our patients leukopenia secondary to silver sulfadiazine therapy was observed to happen in the initial four days following burn injury. Eventually, to arrive on a definitive conclusion regarding role of silver sulfadiazine in post-burn leukopenia, it will require a case control study or randomized controlled study on larger number of burns patients.

References

1. Fox CL, Modak SM. Mechanism of Silver Sulfadiazine Action on Burn Wound Infections. Antimicrob Agents Chemother. 1974; 5(6):582-8.
2. Silver sulfadiazine. A new topical therapy for Pseudomonas in burns. Therapy of Pseudomonas infection in burns. - PubMed - NCBI [Internet]. [Cited 2017 Jul 2]. Available from: https://www.ncbi.nlm.nih. gov/pubmed/5638080
3. Chan CK, Jarrett F, Moylan JA. Acute leukopenia as an allergic reaction to silver sulfadiazine in burn patients. J Trauma. 1976; 16(5):395-6.
4. Valente P, Axelrod JL. Acute leukopenia associated with silver sulfadiazine therapy. J Trauma. 1978; 18(2):146-7.
5. Caffee HH, Bingham HG. Leukopenia and silver sulfadiazine. J Trauma. 1982; 22(7):586-7.
6. Jarrett F, Ellerbe S, Demling R. Acute leukopenia during topical burn therapy with silver sulfadiazine. Am J Surg. 1978; 135(6):818-819.
7. Landmark Article Sulfadiazine. Therapeutic Evaluation and Toxic Effects on Four Hundred and Forty-Six Patients. By Maxwell Finland, Elias Strauss, and Osler L. Peterson [Internet]. PubMed Labs. [cited 2017 Jul 2], 1941. Available from: https://www.ncbi.nlm.nih. gov/ labs/pubmed/6366263/?from_q=FINLAND+M%5Baut hor%5D
8. Stanford W, Rappole BW, Fox CL. Clinical experience with silver sulfadiazine, a new topical agent for control of pseudomonas infections in burns. J Trauma. 1969; 9(5):377-88.
9. Eurenius K, Brouse RO. Granulocyte kinetics after thermal injury. Am J Clin Pathol. 1973; 60(3):337-342.
10. Asko-Seljavaara S. Inhibition of bone marrow cell proliferation in burned mice. An *in vitro* study of the effect of fluid replacement and burn serum on bone marrow cell growth. Scand J Plast Reconstr Surg. 1974; 8(3):192-7.
11. Thomson PD, Moore NP, Rice TL, Prasad JK. Leukopenia in acute thermal injury: evidence against topical silver sulfadiazine as the causative agent. J Burn Care Rehabil. 1989; 10(5):418-20.