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Comparison of silver sulfadiazine and nano silver colloid preparation in paediatric burn paitents

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Abstract
India being a developing country has high incidence of burns which is about seven millions. Topical anti-microbial agent is an effective way to decrease to bacteria load in burns patients traditionally silver sulfadiazine is used as topical agents but now newer nano silver colloid preparations are more efficient in this regards.
Materials and Methods: 40 patients divided two groups (each groups consisting 20 patients) one group used silver sulfadiazine and other groups used nano silver colloid agent tropically as antimicrobial agent. Results of the both the groups are compared using statistical analysis
Results: Nano silver colloid are more efficient in treatment of pediatric Second degree Burn associated with less pain.
Conclusion: Nanosilver colloid preparations are an effective alternative in treatment of 2nd degree burns in pediatric patients.

Keywords: silver sulfadiazine, Second degree burn, nano silver colloid

Introduction
Burn is an injury to skin or other organic tissue primarily by thermal, electrical or chemical elements. Although burn injury remains sterile, at first bacteria colonizes within 48hours and later gives rise to septicemia and toxaemia. Applicant of topical antimicrobial agent is an effective way to prevent it. Most common agent is silver sulfadiazine which is bacterial to both gram +ve& -veresults.
The newer nano silver colloid preparation cream on gel causes more effective way of delivering nano silver particles for antimicrobial effect. Nanonizing silver particles is more efficient as it increase surface area of silver and has better penetrating power.
The purpose of our study to compare effectiveness of two types of topical agents silver sulfadiazine and nano silver colloid preparation in partial thickness pediatric burn cases.

Aims and objectives
To compare Silver Sulfadiazine and nano silver colloid preparation in Paediatric Burn paitents.

Materials and Methods
The study is a case control study consisting of patients who were admitted to burns, plastic surgery department of SCB Medical College for 2014 & 2016.

Inclusion Criteria
- Pediatric burn patients with age 0 to 18yrs. with thermal, electrical burns
- Patients who came to hospital within 3 to 4 days
- Patients have 2nd degree burns
- Patients have burns <50% TBSA
- Patients have stable vitals and William to comply as per study protocol.

Exclusion Criteria
- Patients unable to give consent hemodynamic instability
- Patients has inhalational burns
- Patients given corticosteroids
- Patients has 3rd degree burns
- Patients study any tripe of allergic reaction
- Patients has > 50% TBSA burns

Study design: Cases divided in to two groups, Group one and Group two each consisting of 20 patients. The selection of patients were purely randomly by a study Coordinator and after initial assessment selection for study as per inclusion & exclusion criteria.
Optimized hydration using fluid therapy and intravenous or oral antibiotics were used as per need. Group one patients used silver sulfadiazine ointment after cleaning the wound with savlon water, paraffin impregnated gauze was applied, and over that normal surgical pad applied in group two patients after cleaning of burn wounds with savlon water commercially available nano silver colloid preparations were used. Every patients undergoing the study dressing procedure was done every day with above ointments.
Our primary criteria to compare efficiency was time taken for healing of wound that is 90% area epithelialisation or appearing of healthy granulation tissue. Photographs taken before dressing to compare results for assessment of pain following application of topical agents clinical parameters like active use of application sites, attitude of child, irritability, crying, heartrate increase, are taken into consideration. Healing by epithelialisation was defined as dry opalscent pink colour layer of epidermis. 90% surface area epithelialisation

was accepted as time required for healing. Any residual area with healthy granulation tissue were auto grafted.

Observations

Results of the groups, group one using silver sulfadiazine and group two using nanosilver colloid preparation are compared in a tabular form given below.

Patents characteristics

Average no days for 90% epithelialization in group 1 is 16 and in group 2 is 14.

Age	Group 1	Group 2
0-1	2	2
1-5	13	14
5-10	3	3
10-15	1	0
15-18	1	1

Sex	Group 1	Group 2
Male	12	9
Female	8	11

TBSA Burn	Group 1	Group 2
0-10	0	1
10-20	8	6
20-30	6	7
30-40	4	3
40-50	2	3
Flame	11	6
Scald	9	13
Chemical	0	1

Symptoms during treatment	Group-1	Group-2
Pain	17	6
Fever	18	16
Loose motion or distension	03	07
Vomiting	06	04
Itching	07	08

Pain assessment with topical agents

Severity	Group-1	Group-2
Mild	0	11
Moderator	16	09
Severe	04	01

Distribution as per Scar assessment in follow up

Vancouver scale	Group -1	Group-2
0-4	12	14
>4	6/18	2/16

- Rest patients could not be followed up

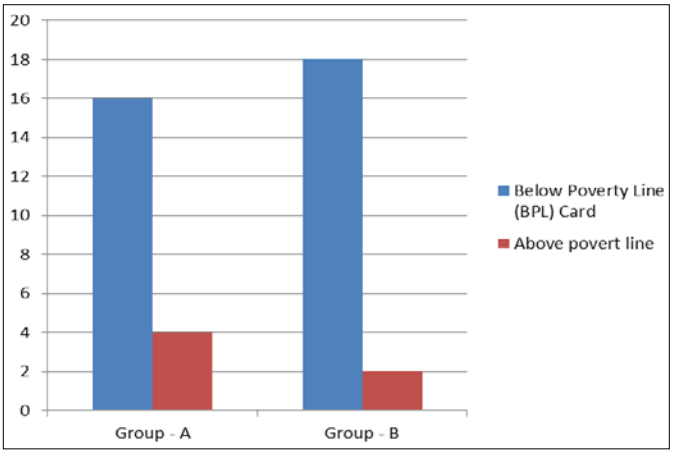


Fig 1

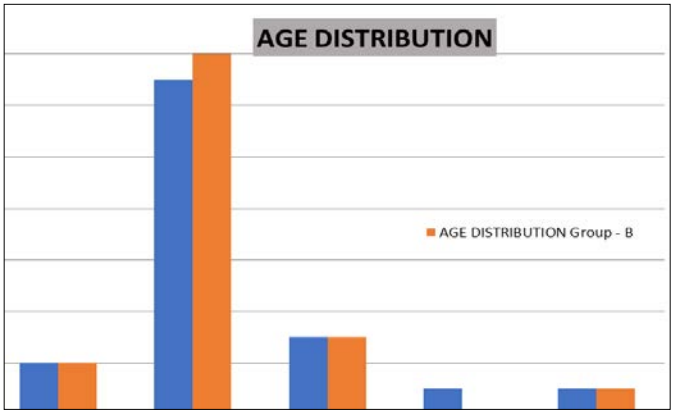
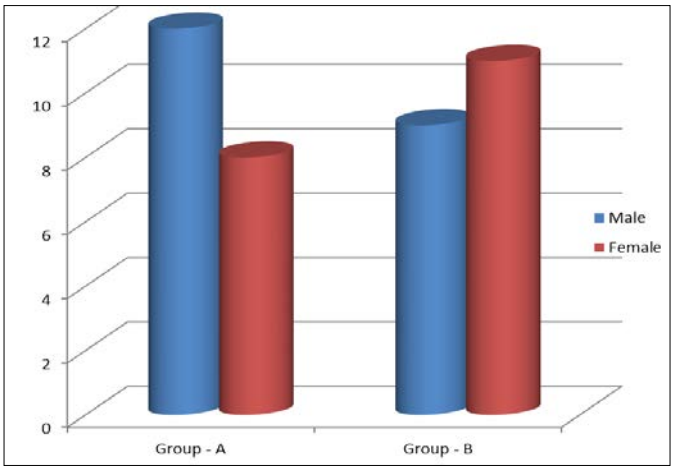


Fig 2



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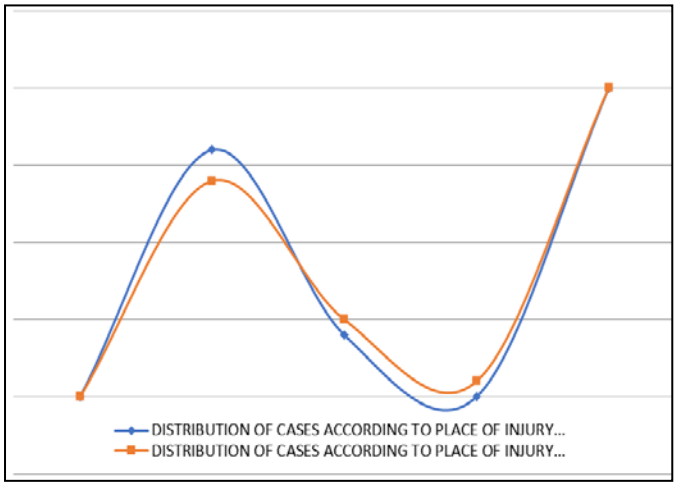


Fig 4

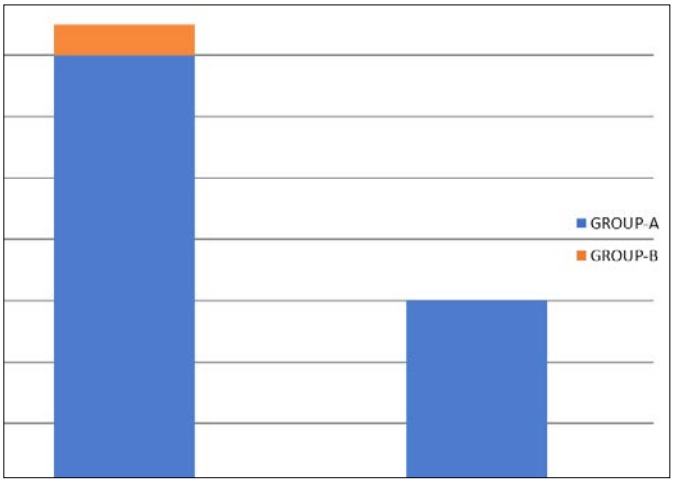
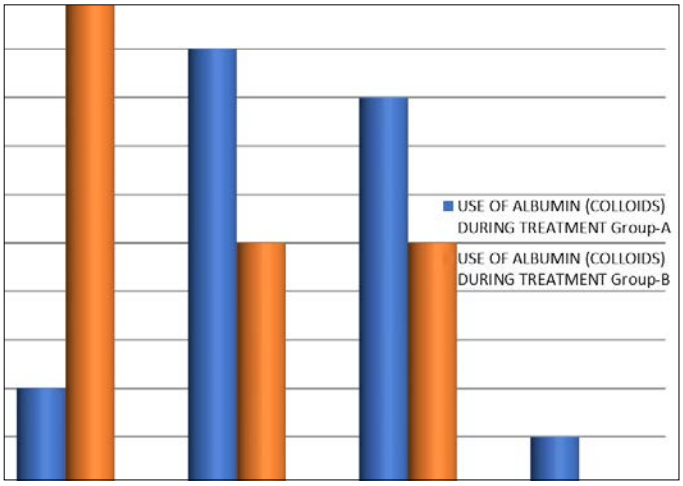


Fig 5



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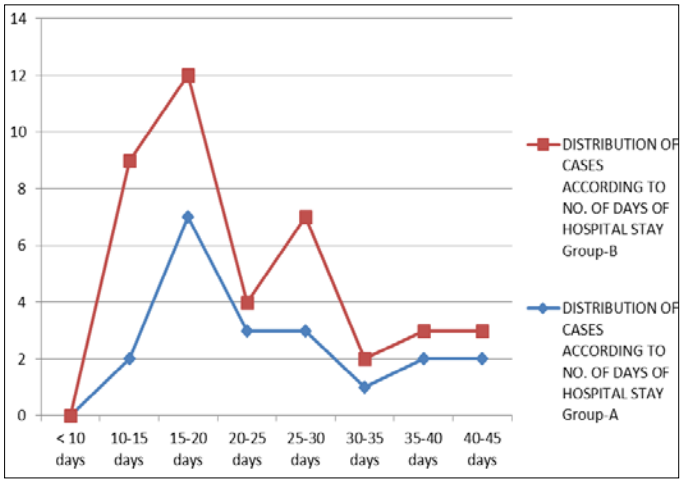

Fig 7

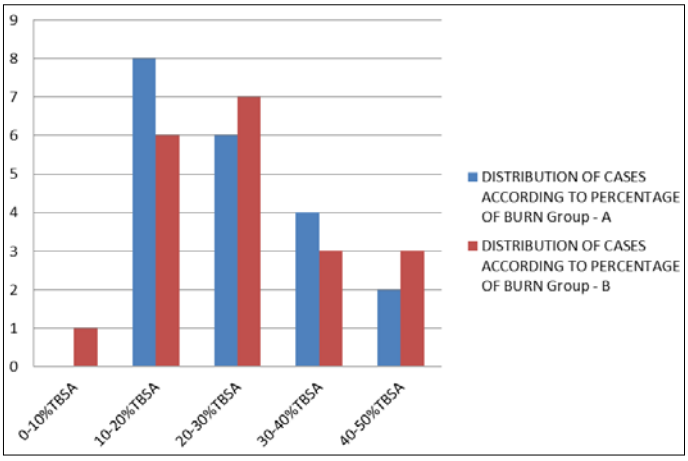

Fig 8

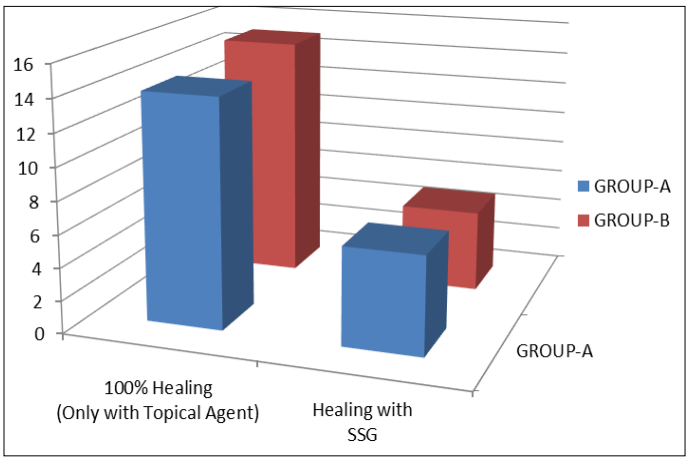

Fig 9

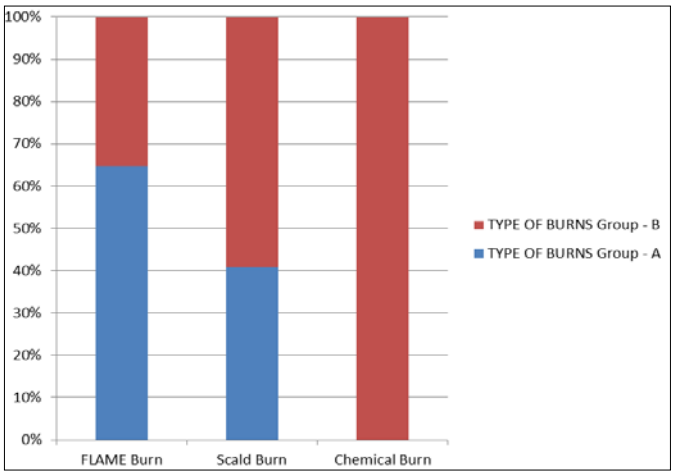

Fig 10

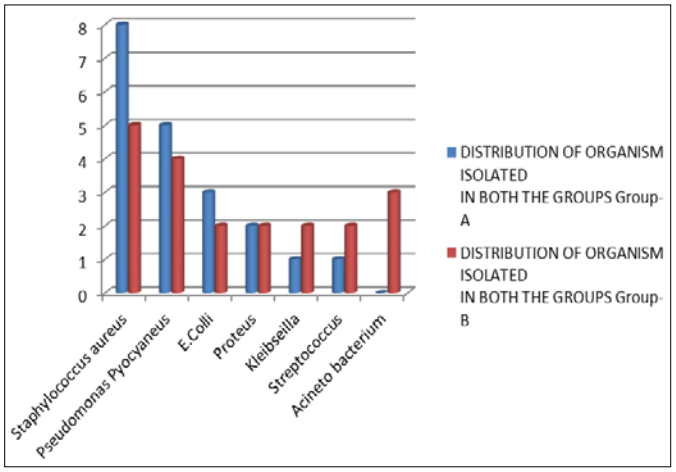

Fig 11

In both group one and group two similar age and sex distribution overall scald burn is common in pediatric group patients. The overall hospital stay is less in case of group two than group one. The time taken for 90% epithelialisation is less in group two which is 14.

Discussion

Topical Antimicrobials are one of the most effective way to decries microbial local and reduce septie episodes in burn paitents.

Different topical antimicrobials are (Total Burn Care) available such as-

- Silver nitraite
- Silver sulfadiazine
- Mafenide acetate
- Povidone iodine
- Gentamycin sulfate
- Bactracin / polymyxin

Nitrofurantion, mapiroa, acticoat nyslast silver sulfadiazine is 1% water soluble cream combination of sulfadiazine and silvercon silver con hinds with DNA of microorganism and sulfora interferes with metabolism palhiry of microbes.

Silver in ionic form blocks bacterial thiol group blocking vital enzymes of bacteria and blocks cellular division by accumulating intracellular vacuoles. So silver exhulmts bactericidal property. But silver cations form bond with negatively charged cons so prevent silver from penetrating deeper tissue Nanonising of silver causes better penetration of silver so it can achive greater antimicrobial activity (weight it al 49) Yin *et al* 1999; Thomasl *et al* 2003; Holder *et al* 1952;Freser to 2003; Forg *et al* 1944

In paediatric age group burn injury is 2nd most common cause of trauma related death and children accounts for 15% of burn patients large burn centres (prirecuple & practice of burn centre in paediatric group i.e infants have large body surface area so evaponation [7, 8, 9, 10] is greater and electrolyte abnormally is more. As heart rate is higer, metabolic rate is higher is children. As epidermis is thinner and loosely attached so scald burns can cause deep humures in children even if they look bright red colom [5, 6].

In our study most common group of burns in paediatric cases over 1 to 5yr. and scald burn is most common (Shobha Chamania *et al*) [5].

Mean hospital stay of group one is 24days and group two is 21days in group one or ‘A’ silver sulfadiazine patients has moderate to severe patients whereas group ‘2’ or ‘B’ with nano silver colloid mild to moderate pain is the.

In the study average healing time in nano silver group is end ‘44’ days with less pain compound to silver sulfadiazine group using (SPSS Sulfadiazine) statistical assessment we find ‘p’ value to be significant. It significant nanosilver are effective alternative to silver sulfadiane. The difference between them is narrow as both compounds have silver as their active ingredient.

In our study most common group is 1-5yrs. and scald burn is most common and next to scald burn flame burn is there.

Mean hospital stay of group one is 24 days and group two is 21days.In group one with silver sulfadiazine patients having moderate to severe pain whereas group two with nanosilver colloid mild to moderate pain occurred.

Using statistical analysis we have found nano similar colloids preparation are an effective alternative to silver sulfadiazine. The difference between them is narrow as both has silver as active components and we have also used oral or intravenous antibiotics during treatment.

Conclusion

Above results clearly shows that nanosilver colloid preparations are an effective alternative in treatment of 2nd degree burns in pediatric patients.

Conflicts of Interests- None

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