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ORIGINAL ARTICLE

A comparative study of treatment of burns with heparin and without heparin

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ABSTRACT:
Background: Heparin is a multifaceted compound with anti-inflammatory, anti-allergenic, anti-histaminic, anti-serotonin and anti-proteolytic enzyme properties. The present study compared treatment of burns with heparin and without heparin. **Materials & Methods:** 90 patients with different degree of burns of both genders were randomly assigned to group I treated with heparin and group II treated with conventional dressings with silver sulfadiazine, intravenous antibiotics, analgesics and intravenous fluids. **Results:** Group I had 15 males and 30 females and group II had 20 males and 25 females. The cause of burns was suicidal in 20 in group I and 16 in group II, accidental 15 in group I and 20 n group II and homicidal 10 in group I and 9 in group II. The percentage of burn was 5-15% seen 25 in group I and 22 in group II, 16-25% in 13 in group I and 17 in group II, 26-35% seen 7 in group I and 6 in group II. Mean days of hospitalization was 26.5 days in group I and 35.4 days in group II. Complications reported was atelectasis 1 in group I and 3 in group II, aspiration pneumonia 2 in group I and 2 in group II, DVT 1 in group I, septicemia 1 in group II, pulmonary embolism 1 in group I and 2 in group II and UTI 2 in group II. The difference was significant ($P< 0.05$). **Conclusion:** Heparin found to be effective as compared in conventional treatment in terms of less complications and less days of hospitalisation.
Key words: Burn, Heparin, Ischaemia

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INTRODUCTION

Burned cells and tissues are destroyed as a result of direct thermal injury and damage may progress from secondary ischemic processes. The indirect destruction is derived in part from disturbances in blood circulation with stasis, thromboses, ischemia and infarctions. Mediators of inflammation are activated. These initiate a cascade which can lead to a progressive destruction of already damaged cells. Burn size and depth often increase post-burn. Burns are complicated often by lung and intestinal problems, infections, multiple organ failure and bleeding disorders. Burn wounds heal slowly and imperfectly, frequently with scars and contractures.

Heparin is a multifaceted compound with anti-inflammatory, anti-allergenic, anti-histaminic, anti-serotonin and anti-proteolytic enzyme properties. It has been used in both parenteral and topical forms in the management of thermal injuries to prevent burn extension, limit cutaneous tissue loss, promote faster healing with fewer contractures, relieve of pain, reduce tissue edema and weeping, prevent infection, and to promote revascularization, granulation and re-epithelialization of deeply burned tissue. The treatment for burn patients has been onerous and difficult, and needs improvement. Measures and means that might produce new burns therapies have been explored. It is important to know when heparin is contraindicated or not worth the potential risk. Serious bleeding is the principal danger. Thrombocytopenia occurs infrequently. Allergy to heparin is rare. Therefore, heparin cannot be used in patients who have active bleeding, trauma where bleeding is probable, a personal or familial history of bleeding or bleeding diathesis, an active gastrointestinal ulcer, a known allergy to heparin or a thrombocytopenia. The present study compared treatment of burns with heparin and without heparin.

MATERIALS & METHODS

The present study comprised of 90 patients with different degree of burns of both genders. They were enrolled in the study with the written consent.

Data such as name, age, gender etc. was recorded. Patients were randomly assigned to group I treated with heparin and group II treated with conventional dressings with silver sulfadiazine, intravenous antibiotics, analgesics and intravenous fluids. In all patients, blood was drawn to test for bleeding time, clotting time, and activated partial thromboplastin time. The dose of heparin was calculated to be 100,000 IU/15% burn surface area (BSA) per day in 3-4 divided doses. Beginning on the 2nd day, heparin was applied twice a day, using a diminishing quantity for 1 week. Blisters were rinsed with heparin solution via hypodermic syringe and were not de-roofed. Relief of pain as recorded by a visual analog scale, healing of wounds, dose of heparin, complications,

mortality and duration of hospital stay were recorded. Results were tabulated and analyzed statistically. P value <0.05 was considered significant.

RESULTS

Table I Distribution of patients

Groups	Group I	Group II
Materials used	Heparin	Silver sulfadiazine
M:F	15:30	20:25

Table I shows that group I had 15 males and 30 females and group II had 20 males and 25 females.

Table II Cause of burns

Cause	Group I	Group II	P value
Suicidal	20	16	0.08
Accidental	15	20	
Homicidal	10	9	

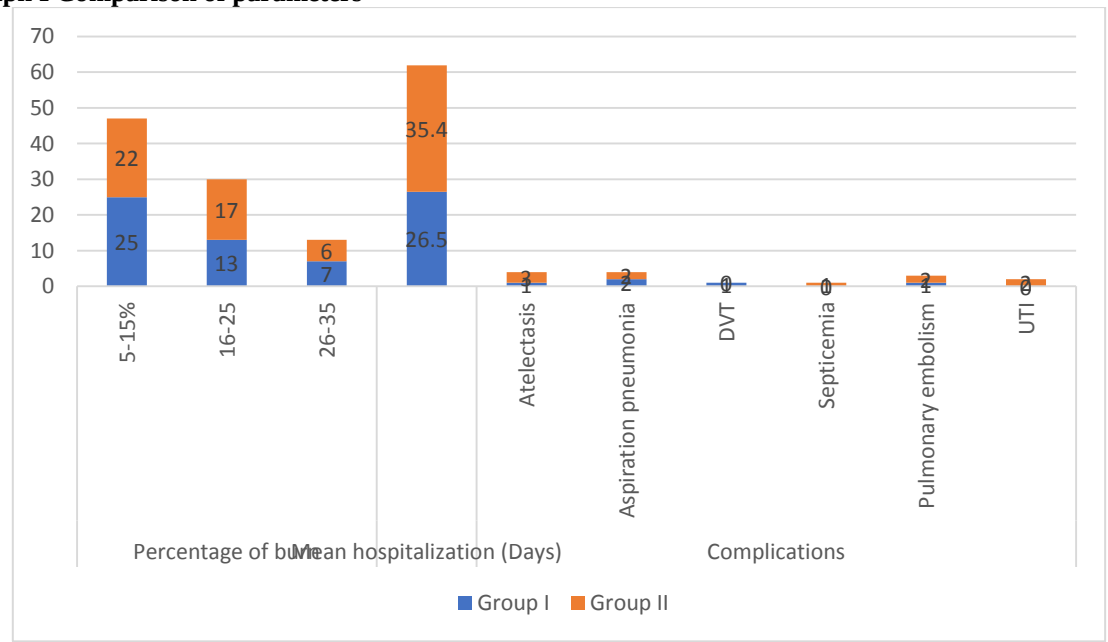
Table II shows that cause of burns was suicidal in 20 in group I and 16 in group II, accidental 15 in group I and 20 n group II and homicidal 10 in group I and 9 in group II. The difference was non- significant (P> 0.05).

Table III Comparison of parameters

Parameters	Variables	Group I	Group II	P value
Percentage of burn	5-15	25	22	0.09
	16-25	13	17	
	26-35	7	6	
Mean hospitalization (Days)		26.5	35.4	0.05
Complications	Atelectasis	1	3	0.02
	Aspiration pneumonia	2	2	
	DVT	1	0	
	Septicemia	0	1	
	Pulmonary embolism	1	2	
	UTI	0	2	

Table III, graph I shows that percentage of burn was 5-15% seen 25 in group I and 22 in group II, 16-25% in 13 in group I and 17 in group II, 26-35% seen 7 in group I and 6 in group II. Mean days of hospitalization was 26.5 days in group I and 35.4 days in group II. Complications reported was atelectasis 1 in group I and 3 in group II, aspiration pneumonia 2 in group I and 2 in group II, DVT 1 in group I, septicemia 1 in group II, pulmonary embolism 1 in group I and 2 in group II and UTI 2 in group II. The difference was significant (P< 0.05).

Graph I Comparison of parameters



DISCUSSION

Surgeons have advanced considerably from the use of oil-soaked cloth applications to the use of primary tangential excisions and skin grafts with recombinant skin.[7] With the advent of dedicated burn critical care units, there has been a concomitant improvement in the survival rates of critically injured burns patients and their return to society as economically productive members.[8] The repair of burn wounds involves synthesis of new collagen and ground substance which is known to contain GAGs; and collagen is an acceptable marker to monitor healing.[9] In initial studies heparin was found to influence the remodeling of collagen at the site of wound healing by forming a complex with the enzyme collagenase which resulted in earlier epithelialization of superficial partial thickness burns.[10,11] The present study compared treatment of burns with heparin and without heparin.

In present study, group I had 15 males and 30 females and group II had 20 males and 25 females. Gupta et al[12] studied the effect of topical heparin in the management of second-degree burns. 60 consecutive patients, aged 10-60 years, with first-and second-degree thermal injuries ranging from 10% to 60%, were randomly enrolled in the study divided into a control group (C) and a heparin group (H) of 30 patients each. Patients treated with topical heparin experienced statistically significant improved pain relief, faster healing, fewer complications and shorter hospital stays. The majority of the patients admitted were in an economically productive age group and were predominantly female. The distribution between the two groups according to age, type of burns and extent of burns was not statistically different.

We found that cause of burns was suicidal in 20 in group I and 16 in group II, accidental 15 in group I and 20 in group II and homicidal 10 in group I and 9 in group II. Venkatachalapathy[13] in his study 100 consecutive burn patients (age <15 years) with second-degree superficial and deep burns of 5–45 % total body surface area size were classified as control group (C) and a heparin group (H) with 50 subjects per group—were randomly treated. The 50 control group patients received traditional routine treatment, including topical antimicrobial cream, debridement, and, when needed, skin grafts in the early postburn period. The 50 heparin group patients, without topical cream, were additionally treated, starting on day 1 postburn, with 200 IU/ml sodium aqueous heparin solution USP (heparin) dripped on the burn surfaces and inserted into the blisters two to four times a day for 1–2 days, and then only on burn surfaces for a total of 5–7 days, before skin grafting, when needed. Thereafter, control and heparin group treatment was similar. It was found that the heparin patients complained of less pain and received less pain medicine than the control patients. The heparin group needed fewer dressings and oral antibiotics than the control group. The 50 heparin group patients had 4 skin graftings (8 %) while the 50 control group patients had 10 (20 %). Five control group patients died (mortality 10 %). No heparin group patients died. The number of days in hospital for the heparin group versus control group was significantly less (overall $P<0.0001$): 58 % of heparin group patients were discharged within 10 days versus 6 % of control group.

We observed that percentage of burn was 5-15% seen 25 in group I and 22 in group II, 16-25% in 13 in group I and 17 in group II, 26-35% seen 7 in group I and 6 in group II. Mean days of hospitalization was 26.5 days in group I and 35.4 days in group II. Complications reported was atelectasis 1 in group I and 3 in group II, aspiration pneumonia 2 in group I and 2 in group II, DVT 1 in group I, septicemia 1 in group II, pulmonary embolism 1 in group I and 2 in group II and UTI 2 in group II. Dr. Saliba MJ Jr[14], originally published a report of the beneficial effects of intravenous heparin in large doses as a topical spray used to treat extensive burns in 28 patients.

CONCLUSION

Authors found that heparin found to be effective as compared in conventional treatment in terms of less complications and less days of hospitalisation.

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