

## ORIGINAL ARTICLE

# MANAGEMENT OF BURNS BY CONVENTIONAL & TOPICAL HEPARIN: A COMPARATIVE STUDY

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### ABSTRACT:

**Background:** Burn has high mortality and morbidity rates not only in India, but worldwide. Heparin has been treatment of choice since years. This study was aimed at comparing the conventional and topical heparin for the management of burns. **Materials & Methods:** This study was conducted in the department of general surgery from January 2013 to June 2014. This study comprised of 60 patients (males- 28, females -32) in the age range from 20-45 years. All patients were divided into 2 groups consisting of 30 patients each. Group I patients were put on topical heparin. Group II patients were put on conventional treatment. In group I, wounds were left exposed and received 4,200 UI of heparin for each 1% of affected body surface three times daily until the crusts appeared. We used spray with 10,000 UI of unfractionated heparin per ml. Each spray releases 0.14 ml of the product, corresponding to 1,400 UI of heparin. Patients received daily hygiene care in bed. In group II, balneotherapy was used and silver sulfadiazine dressings changed under analgesia. Morphine (0.05 mg/kg) intravenously was given to all patients; 750 mg of paracetamol was given orally in case of fever and in case of thrombo-embolism prophylaxis, 5,000 UI of heparin was given subcutaneously two times daily. Other medications, hemoderivatives and procedures were provided to all patients whenever needed. TTPA increase, thrombocytopenia, hepatotoxicity, and hypercalcemia level was assessed. Heparin's analgesic efficacy and tolerability was evaluated by the analgesics' demand and response to the pain Visual Analog Scale. **Results:** We include 60 patients (males- 30, females- 30). The difference was non significant (P-1). Group I (Heparin) consisted of 30 patients (males-15, females- 15) and group II (conventional) comprised of 30 patients (males-15, females- 15). The difference was non significant (p-1). We compared day 1, day 7, day 15 and day 21 in both groups. The group I required less analgesics as compared to group I. The difference was significant (P-0.01). The VAS score was assessed and compared in day 1, day 7, day 15 and day 21 in both groups. The group I showed lower VAS scale as compared to group II. The difference was significant among both the groups. Most common adverse effect was elevated TGP in group I (3) and group II (2), local pain seen in group I (3), group II (1) patients followed by anemia in group I (1), coma in group I (1) and group II (1) and constipation (1) in group II. The difference was non significant (P-0.1). Other adverse effects were local infection in group I (18) and group II (20), septicemia in group I (8) and group II (7), fever in group I (3) and group II (8), hypertension in group I (3) and group II (4) and hematuria in group I (2) and group II (1). **Conclusion:** Author concluded that topical heparin is effective in managing burns. The analgesic effectiveness is more with the topical heparin as compared to conventional treatment. Adverse effects are less with heparin.

**Key Words:** Burn, Heparin, septicemia

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This article may be cited as: Chandra S. Management of burns by conventional & topical heparin: A comparative study. J Adv Med Dent Sci Res 2016;4(6):121-124.

Access this article online	
<b>Quick Response Code</b> 	Website: <a href="http://www.jamdsr.com">www.jamdsr.com</a>
	DOI: 10.21276/jamdsr.2016.4.6.27

**I**NTRODUCTION  
 Burn has high mortality and morbidity rates not only in India, but worldwide. There can be many reasons for burns. It can be due to dry heat or fire burns normally causing varying areas of deep skin loss, chemical burns, electrical burns, hot fluids or scalds with burns of a widespread more superficial nature,

radiation burns, flash burns of short duration but intense heat. It can be first degree, second degree, third degree and fourth degree.<sup>1</sup> Third and fourth degree burns are main severe. According to study conducted by Sanchez<sup>2</sup>, approximately 50% of the burn patients die because they are third and fourth degree burns covering from 60 to 100%

of the total body surface area. Usually, they are due to suicidal attempt.

There is loss of water regulation by the skin, loss of protein, loss of electrolytes, wound infection, vascular thrombosis (deep burns), development of necrotic tissue, blisters and oedema.

Management involves maintaining airway, breathing and circulation. There in need to intubate if there is any evidence of airway edema. In case of carbon monoxide poisoning, administration of 100% oxygen is required.<sup>3</sup>

Heparin has been treatment of choice since years. Topical, intravenous, subcutaneous, inhalation, and in membranes are different routes of heparin administration. It has anti-inflammatory and angiogenic properties that do not depend on its well-known anticoagulant action. The anti-inflammatory action results from deactivation of pro-inflammatory cytokines such as TNF-alpha, selectins secreted by leukocytes such as CD11b integrins such as ICAM-1 and attenuation of complement activation. Angiogenic effect derives from the interaction with vascular endothelium growth factor (VEGF) and with fibroblasts' growth factors (FGFs).<sup>4</sup>

This study was aimed at comparing the conventional and topical heparin for the management of burns.

**MATERIALS & METHODS**

This study was conducted in the department of general surgery from January 2013 to June 2014. This study comprised of 60 patients (males- 28, females -32) in the age range from 20-45 years. The following inclusion and exclusion criteria were used.

**INCLUSION:** 2<sup>nd</sup> degree burns covering 10-30% of area caused by fire and reported upto 48 hours.

**EXCLUSION:** 1. 3<sup>RD</sup> degree burns, 2. Intolerance to heparin, 3. Chemical or electric burns.

All patient were divided into 2 groups consisting of 30 patients each. Group I patients were put on topical heparin. Group II patients were put on conventional treatment.

In group I, wounds were left exposed and received 4,200 UI of heparin for each 1% of affected body surface three times daily until the crusts appeared. We used spray with 10,000 UI of unfractionated heparin per mL. Each spray

releases 0.14 mL of the product, corresponding to 1,400 UI of heparin. Patients received daily hygiene care in bed.

In group II, balneotherapy was used and silver sulfadiazine dressings changed under analgesia.

Morphine (0.05 mg/kg) intravenously was given to all patients; 750 mg of paracetamol was given orally in case of fever and in case of thromboembolism prophylaxis, 5,000 UI of heparin was given subcutaneously two times daily. Other medications, hemoderivatives and procedures were provided to all patients whenever needed. TTPA increase, thrombocytopenia, hepatotoxicity, and hypercalcemia level was assessed.

Heparin's analgesic efficacy and tolerability was evaluated by the analgesics' demand and response to the pain Visual Analog Scale. Results obtained were tabulated and analyzed using chi-square test. P value<0.05 was considered significant.

**RESULTS**

We include 60 patients (males- 30, females- 30). The difference was non significant (P-1). (Table – I). Table II shows that, Group I (Heparin) consisted of 30 patients (males-15, females- 15) and group II (conventional) comprised of 30 patients (males-15, females- 15). The difference was non significant (p-1). Table III shows requirement of analgesics in group I and group II patients. We compared day 1, day 7, day 15 and day 21 in both groups. The group I required less analgesics as compared to group I. The difference was significant (P-0.01).

The VAS score was assessed and compared in day 1, day 7, day 15 and day 21 in both groups. The group I showed lower VAS scale as compared to group II. The difference was significant among both the groups (Table- IV).

Graph I shows adverse effects recorded in both groups. Most common adverse effect was elevated TGP in group I (3) and group II (2), local pain seen in group I (3), group II (1) patients followed by anemia in group I (1), coma in group I (1) and group II (1) and constipation (1) in group II. The difference was non significant (P-0.1).

Other adverse effects were local infection in group I (18) and group II (20), septicemia in group I (8) and group II (7), fever in group I (3) and group II (8), hypertension in group I (3) and group II (4) and hematuria in group I (2) and group II (1).

**TABLE I:** Distribution of patients

TOTAL- 60		
GENDER	MALE	FEMALE
NUMBER	30	30

**TABLE II** Distribution of patients in groups

GENDER	GROUP I	GROUP II	P VALUE
MALE	15	15	1
FEMALE	15	15	
TOTAL	30	30	

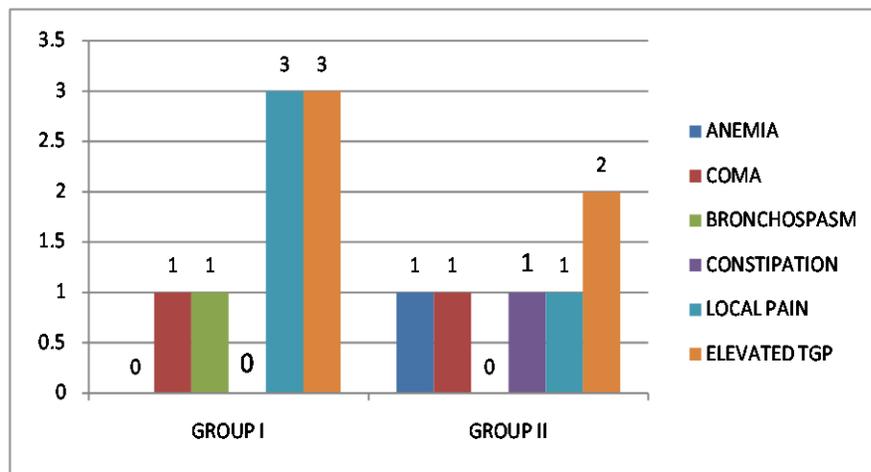
**TABLE III:** Daily requirement for rescue analgesics

DAY	GROUP I AVERAGE± S.D	GROUP II AVERAGE± S.D	P VALUE
1	1.42 ± 1.36	2.64 ± 1.32	0.01
7	0.74 ± 0.62	1.55 ± 1.24	0.02
15	0.48 ± 0.86	1.80 ± 1.36	0.01
21	0.00 ± 0.00	1.04 ± 0.76	0.1

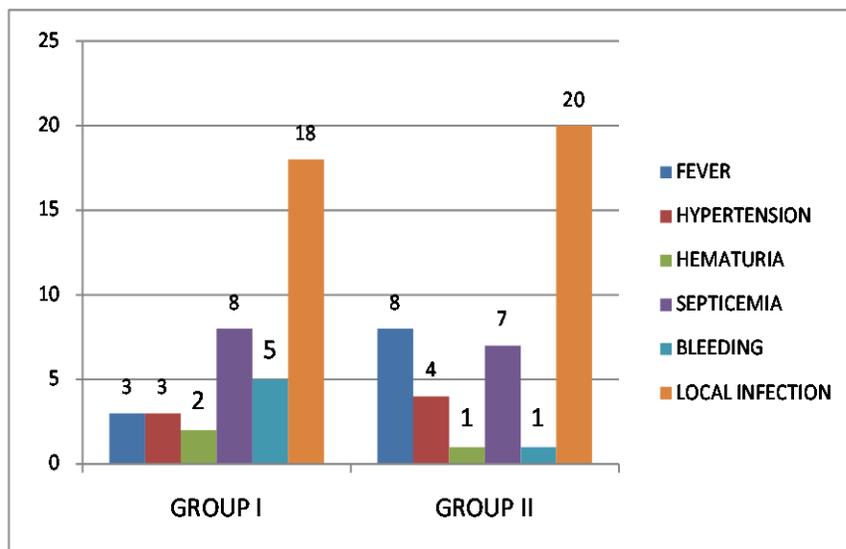
**TABLE IV:** Visual analogue scale

DAY	GROUP I AVERAGE± S.D	GROUP II AVERAGE± S.D	P VALUE
1	1.14 ± 1.06	2.34 ± 1.02	0.01
7	0.64 ± 0.20	1.65 ± 1.42	0.03
15	0.40 ± 0.12	1.68 ± 1.17	0.02
21	0.00 ± 0.00	1.02 ± 0.64	0.1

**GRAPH I:** Adverse effects in both groups



**GRAPH II:** Adverse effects in both groups



## DISCUSSION

Management of burns is a challenging task. Various local remedies includes, application of savlon solution and betadine and flamazine. The wounds are normally covered with gauze dressings and bandages. Skin grafting is done to cover the burned area as soon as possible. Split thickness skin graft is the first choice but biological dressings like porcine or cadaver skin can be used if operation must be delayed due to systemic illness.<sup>5</sup>

The present study, aims at comparing two treatment modalities for burns. In this study we included 60 patients (males-30, females- 30) divided into two groups. Group I patients received topical heparin and group II patients received conventional treatment.

We compared requirement of analgesics in both the groups in day 1, day 7, day 15 and day 21. The group I required less analgesics as compared to group I. The difference was significant (P-0.01). Ribiera<sup>6</sup> found in his study that heparin is effective in managing 2<sup>nd</sup> degree burns more effectively as compared to other modalities. We also found that in group I patients, analgesic requirement was less.

We also analyzed VAS score in both groups and compared in day 1, day 7, day 15 and day 21 in both groups. The group I showed lower VAS scale as compared to group II. The difference was significant among both the groups. De-souza DA<sup>7</sup> also found similar results in his study.

In present study, we compared the adverse effects in both groups. Most common adverse effect was elevated TGP in group I (3) and group II (2), local pain seen in group I (3), group II (1) patients followed by anemia in group I (1), coma in group I (1) and group II (1) and constipation (1) in group II. Other adverse effects were local infection in group I (18) and group II (20), septicemia in group I (8) and group II (7), fever in group I (3) and group II (8), hypertension in group I (3) and group II (4) and hematuria in group I (2) and group II (1). Saliba<sup>8</sup> found that most common adverse effect seen in patients with topical heparin are local infection, septicemia and local pain.

## CONCLUSION

Author concluded that topical heparin in effective in managing burns. The analgesic effectiveness is more with the topical heparin as compared to conventional treatment. Adverse effects are less with heparin.

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**Source of support:** Nil

**Conflict of interest:** None declared

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