

## Role of Topical Heparin in Management of Burns

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### Abstract:-

**Introduction:-** Recent Studies have uncovered anticoagulative, anti-inflammatory and neoangiogenic properties of glycosaminoglycans. Heparin is most sulfated and acidic GAG that has been recently used in burn patients.

**Material & Methods:** It is a Study of 50 consecutive thermal burn patients and admitted during period of 2 years. Burns Percentage were in range of 15-40 % and age group 15-50 Yrs.

**Results:** Pain Relief was more in Patient taking topical heparin therapy. There was significant reduction in use of intravenous fluid administration alongwith faster wound healing. Average Duration of hospital Stay in heparin group was less than control group.

**Conclusion:-** There is Significant improvement in clinical Outcome in the treatment of burn patients with topical heparin.

**Keywords:** Topical heparin, Thermal burn, case and control group.

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### I. Introduction:

Ever since Man discovered fire, burns are among the oldest injuries Man still suffer. Burn Injuries are difficult to treat as wound healing is complex, slow and is complicated by scar and contracture formation. They are managed classically by parenteral fluid resuscitation, antibiotics, wound excision etc. Recent studies have uncovered heparin which has anticoagulative, anti-inflammatory and neoangiogenic properties. Heparin has shown to relieve pain, inhibit clotting & inflammation and restore blood flow and enhance healing. Heparin is a multifaceted compound with anti-inflammatory, antihistaminic, antiserotonin and antiproteolytic enzyme properties. It has been used in both parenteral and topical forms in management of thermal burn to promote fast healing, limit cutaneous tissue loss with fewer contracture, relieve pain, reduce tissue edema.

### II. Material & Methods:

A prospective study of fifty thermal burn patients admitted in Jawahar Lal Nehru Medical College Hospital Bhagalpur between the year 2017-2019 was conducted.

**Inclusion Criteria:** Age group 15-50 Yrs, Thermal burn of 2<sup>nd</sup> & 3<sup>rd</sup> degree with range 15-40%.

**Exclusion Criteria:** Elderly patients beyond 60 Yrs. Patient having diabetes Mellitus, peripheral vascular diseases and other immune Compromised Status. Patients having more than 40 % TBSA Burn, History of bleeding diathesis, Full thickness burns, Pregnant patient.

**Control Group[C]:** Topical antibiotic cream after resuscitation was given.

**Heparin Group[H]:** Topical heparin application was done by spraying 5 ml of injection. Heparin (5000 IU/ml) was diluted in 200 ml of normal saline and sprayed over the entire burnt area with a 5ml syringe. Dose of heparin requirement was calculated based on % of burns. For each 15 % Burn surface area 1 Lakh IU of heparin was used and accordingly solution was prepared.

The burn wounds of all patient were evaluated on Day 4 and those with the deep burns were taken for tangential excision. In all the cases topical heparin application was continued till day 7. For each patients wound were evaluated on day 1,4,14 and 21 days. All patients were followed up to study the following parameters:

- Pain relief.**
- Resuscitation fluid requirement.**
- Burn wound healing.**
- Length of hospital stay.**

After 2-7 days heparin requirement was calculated again according to certain signs of response of heparin spray like erythema, reduction of edema, blanching, formation of Eschar and signs of epithelialisation. Coagulation profile was noted on 1<sup>st</sup> 3<sup>rd</sup> & 5<sup>th</sup> day. Inj morphine in dosage of 0.1 mg/kg body weight I v was given to all cases at admission for pain relief. There after patients were given inj morphine as per requirement if needed.

### III. Results:

Fifty burns patients were taken over a period of two years based on inclusion and exclusion criteria. Of them twenty five were treated with topical heparin and other twenty five by conventional methods. Results of both the groups were compared with various variables to know the effectiveness of topical heparin therapy.

PAIN RELIEF DAY 4	Heparin Cases	Heparin Control	Total	P Value	Significance
Mild	0(0)	19(79.2)	19(38.8)	<0.001	Significant
Moderate	23(92)	6(20.8)	29(57.1)		
No pain	2(8)	0(0)	2(4.1)		
Total	25(100)	25(100)	50(100)		

	Heparin Cases	Heparin Control		
Total Resuscitation fluid Requirement	Mean ± Std. Deviation	Mean ± Std. Deviation	p Value	Significance
Day 1	1768 ± 2213.17	3900 ± 4717.77	0.047	Significant
Day 2	908 ± 1140.15	2125 ± 2628.65	0.04	Significant
Day 3	852 ± 1066.58	1979.17 ± 2442.73	0.04	Significant

Epithelialisation DAY 14	Heparin Cases	Heparin Control	Total	P Value	Significance
No	1(4)	9(33.3)	10(18.4)	0.008	Significant
Yes	24(96)	16(66.7)	40(81.6)		
Total	25(100)	25(100)	50(100)		

	Heparin Cases	Heparin Control		
Total Hospital Stay(days)	Mean ± Std. Deviation	Mean ± Std. Deviation	p Value	Significance
Total Hospital Stay(days)	28.28 ± 9.49	37.42 ± 9.84	0.002	Significant



### IV. Discussion:-

1. **Pain Relief** - On day 4, moderate relief of pain was seen in 23 patients (92%) and no pain was present in 2 patients (8%) in Heparin case group. In comparison, in control group, 19 patients (79.2%) had mild relief of pain and 6 patients (20.8%) had moderate relief of pain. (p<0.001)

2. **Total Fluid Resuscitation Requirement** On day 1, the resuscitation fluid requirement in Heparin cases was 1768 ml on average with standard deviation of 2213ml and in Control group was 3900 ml on average with standard deviation of 4717. On day 2, the fluid requirement was around 908ml with standard deviation of 1140 ml in heparin cases group and around 2125 ml with standard deviation of 2628 ml in control group. On day 3, the fluid requirement was 852 ml with standard deviation of 1066 ml in heparin cases group and 1979 ml in control group with standard deviation of 2242 ml. The fluid requirement was found to be significant ( $p=0.04$ ) and in heparin case group was less by 50% when compared to control group.
3. **Epithelialisation** – twenty four patients had healed wound with Epithelialisation in heparin group. On day 14 sixteen patients had healed wound in control group.
4. **Total hospital stay** - The average duration of stay of patients in Heparin case group was 28 days as compared to control group where average duration of stay was around 37 days. ( $p=0.002$ )

#### V. Conclusion:-

The current study on use of topical heparin was done on fifty patients in our hospital dividing into two groups- heparin group & control group. This study showed an advantage of early healing of wounds and decrease in resuscitation fluid requirement with decreased hospital stay along with pain relief in patients who were administered topical heparin.

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