

STUDY OF NEGATIVE PRESSURE WOUND THERAPY IN OPEN TIBIAL FRACTURES IN ANDHRA POPULATION

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Abstract

Background: Grade-III tibial fractures have surgical challenges because of severe infections hence Negative pressure therapy has a significant role to clear the infection and early healing. **Materials and Methods:** 70 (seventy) patients aged between 16 to 65 years having III rd grade tibial fractures were treated 32 (45.7%) with NPWT and 38 (54.2%) with dressings. **Result:** 32 (45.7%) had type-III A tibial fracture and 38 (54.2%) had type-III tibial fracture wound infections were observed, 11 (15.7%) in group-A, 24 (34.2%) in group-B. **Conclusion:** NPWT has rapid wound healing due to early debridement after vacuum closure hence NPWT is an ideal therapy to treat grade-III tibia fracture NPWT reduces virulence fractures as well as Bio-film components.

INTRODUCTION

In the fractures of the lower limb, Tibia is mainly fractured long bones with occurrences of around 11-26 fractures per 1,00,000 population per year.^[1] Infections rates of open tibial fractures have traditionally been renowned as 10-20 times that of additional open skeletal fractures and deep infection rates range between 8-12%.^[2] Open tibial fractures need early bony stabilization and soft tissue reform, but primary soft tissue exposure is not all time probable in a keen setting for frequent motives. Negative wound therapy (NPWT) is a method to achieve wound closure or manage the wound bed for additional surgical intercessions.^[3] Tissue demarcation in grade-III open tibial fracture often continues even after first debridement, in addition, the wound is relatively open to the hospital environment until a flap can be placed.^[4] The implant used for bony stabilization may compromise regional bone blood flow and may lead to wound problems. These factors contribute to wound bed bacterial colonization. NPWT (Negative pressure wound therapy) has been used for treatment of large, musculo-skeletal wounds and high energy fractures. The possible benefits of NPWT include increased blood flow to damaged tissue, as tibia has less vascularity as compared to other long bones of the body because of more tendinous attachment rather than fleshy muscular attachment. The NPWT creates

decreased interstitial oedema, increased granulation of wound beds and increased bacterial clearance.^[5] Hence an attempt was made to evaluate the grade-III fractures with NPWT in tibial fractures in both sexes of the adult age group.

MATERIALS AND METHODS

70 (seventy) patients admitted at the Orthopaedic department of Nimra Institute of medical sciences, Ibrahimpatnam, Jupudi, Vijayawada -521456, Andhra Pradesh were studied.

Inclusive Criteria

Patients more than 16 years and below 65 years having Grade-III tibial fractures (Gust Stilla) Anderson classification were selected for study.

Exclusion Criteria

Diabetic, malignant wounds, wounds having anastomotic sites or Nerve connected to neuro-vascular injuries and immune-compromised patients were excluded from study.

Method

For every patient routine blood examinations was carried out culture and sensitivity of the pus of wound in open tibial fractures was studied. Patients were divided in two groups – Group-A (Vacuum Assisted closure group) VAC groups. This group had 32 patients; Group-B had 38 patients

(Sterile dressing group). All the patients were treated with wound debridement and external fixation. Infected wound was managed with wound care and antibiotics based on culture and sensitive reports.

To get vacuum support closure of the wound, a polyurethane open cell sponge acquired from an upholstery shop which was cut to contest the shape of the wound and autoclaved was utilized. The whole dressing was closed by clear plastic film to create its air taut. The suction tube neither is nor associated with the suction equipment which was made to work cyclically 20 minutes in every 2 hours to get cyclical Negative pressure at the wound site. The duration of study was July-2019 to June-2022

Statistical Analysis

Type of grade-III fractures and number of wound infections in both groups were classified with percentage. The statistical analysis was carried out in SPSS software. The ratio of the male and female was 2:1.

RESULTS

32 (45.7%) were classified in group-A, VAC (vacuum Assisted closure group), 38 (54.2%) were group-B (sterile dressing group)

[Table 1] Subtypes of fractures in both groups – 32 (45.7%) had type-III-A tibia fracture, 38 (54.2%) had type-III-B fractures

[Table 2] Study of wound infections had 11 (15.7%) group-A had wound infection. In group-B – 24 (34.2%) had wound infection.

Table 1: Study of types of fractures in both groups

Types of Fracture	No. of Fracture (70)	Percentage (%)
Type-III A Tibia fracture	32	45.7
Type-III B Tibia fracture	38	54.2

Table 2: Study of wound infections in both groups

Wound	Group A	Group B
Infection present	11 (15.7%)	24 (34.2%)

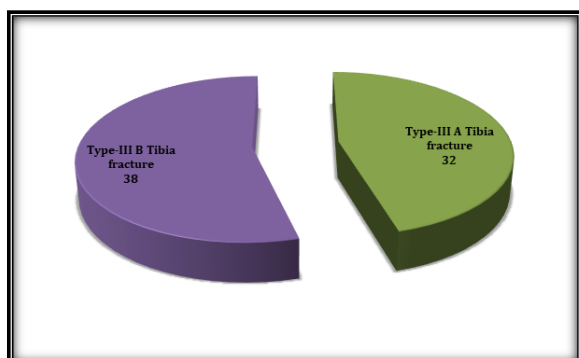


Figure 1: Study of types of fractures in both groups

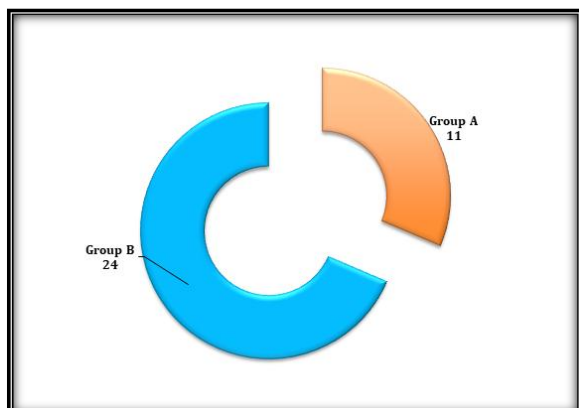


Figure 2: Study of wound infections in both groups

38 (54.7%) type-III-B tibial fractures [Table 1]. 11 (15.7%) patients of group-A and 24 (54.2%) patients in group-B had infections [Table 2]. These findings are more or less in agreement with previous studies.^[6,7,8]

It is an established fact that tibia is a notorious bone for healing due to less vascularity hence tibia is called bone with tendons.^[9] Hence vacuum assisted closure (VAC) by NPWT has a significant role to heal grade-III fractures. In NPWT there is an increase in granulations that enhances local blood flow and decreases bacterial burden and infection rates. It enhances early coverage of wounds in grade-III tibia fracture, otherwise fracture salvage of limb would be challenging,^[10] least data is available in English literature regarding NPWT like bony stabilization, fixation in terms of duration of time for external fixation or internal fixation was performed.^[11] Moreover no detailed information of other fractures, including hardware used (Stainless steel versus titanium) locking constructs plate length if existed. Hence NPWT is a novel potential factor that reduces the rate of infection considerably, nearly 80%.^[12] It was not mentioned that, how much bone was exposed, dimension of wound, the extent of wound contamination or the need of bone grafting. However NPWT is an effective strategy for the management of contaminated wounds.

DISCUSSION

Present study of NPWT (Negative pressure wound therapy) had 32 (45.7%) type-III-A tibial fractures,

CONCLUSION

In 3rd grade tibia fracture NPWT showed a significant and sustained decrease in bacterial

infection as early as 42 hours after initiation of therapy. Early wound healing presents psychological, social and financial reimbursement because of a short duration hospital stay. But this study demands further patho-physiological microbiological, genetic, immunological study because exact formation and mechanism of granulations and gravity of negative pressure and factors for early healing of wounds are still unclear.

Limitation of Study

Due to the tertiary location of research centre small number of patients, lack of latest instruments we have limited findings and results.

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