



“OUTCOME OF WOUND HEALING IN OPEN TIBIAL FRACTURES WITH VAC: A RETROSPECTIVE STUDY”

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ABSTRACT **Background:** Open fractures and injuries are the ones in which the underlying bone is exposed to the environment that multiplies the risk of increasing the severity of the injury. It has been reported that 2 person per 1000 suffer from this kind of fracture. It has also been found that one-fourth of the population suffer from such kind of fracture. The management of wound through VAC increases the local blood circulation resulting in drastic decrease in morbidity and health costs.

Aim: To assess the outcome analysis of wound healing in open tibial fractures with VAC

Methods: This was a retrospective study carried out at the department of orthopaedics in a tertiary care hospital. The study was carried out from march 2019 to march 2020. Total 20 patients were selected in the study.

Results: It was identified that 65% of the patients were aged between 21-40 years of age. Also, it was found that the 75% of the patients were male and 25% of the patients were female. 80% of the patients suffered from IIIA type of fracture. 50% of the patients treated with split skin graft were given VAC therapy for wound healing. 15% of the patients showed bacterial growth on day 4 of the surgery and 65% of the patients showed no bacterial growth on day 8 post-surgery.

Conclusion: It was concluded in the study that VAC therapy proved to be a useful and beneficial therapy for wound healing in open tibial fractures. The bacterial activity reduced drastically within 8 days of surgery and there were no cases of mortality.

KEYWORDS : Open tibial VAC therapy, Wound Healing

INTRODUCTION

Open fractures and injuries are the ones in which the underlying bone is exposed to the environment that multiplies the risk of increasing the severity of the injury. This also leads to the increase of the microbial activity in the wound thereby making it difficult to recover. It has been found that the rate of open tibial fractures is common as compared to any other type of fractures of the long bone.

It has been reported that 2 person per 1000 suffer from this kind of fracture. It has also been found that one-fourth of the population suffer from such kind of fractures. The treatment of this kind of fractures is often a difficult task for the surgeons. In the past the open tibial fractures were treated with flap coverage resulted in the loss of extremity.

However, the major challenge in the treatment of the open tibial fracture is wound healing. In addition to wound healing the pain and suffering in the absence of proper wound healing also acts as a barrier in the health, financial and social security. Therefore, attempts have been made to identify the treatment mechanisms for fast wound recovery post open tibial surgery. In the recent development it has been found that Vacuum-Assisted Closure (VAC) has proved to be effective in the treatment of the traumatic wounds.

The management of wound through VAC increases the local blood circulation resulting in drastic decrease in morbidity and health costs.

Aim

To assess the outcome analysis of wound healing in open tibial fractures with VAC

MATERIAL AND METHODS

This was a retrospective study carried out at the department of orthopaedics in a tertiary care hospital. The study was carried out from March 2019 to March 2020. Total 20 patients were selected in the study.

INCLUSION CRITERIA:

All the patients aged above 18 years were included in the study. Also, open musculoskeletal injuries in extremities that required coverage procedures were included in the study.

EXCLUSION CRITERIA:

Patients with pre-existing osteomyelitis, neurovascular deficit, diabetes, malignancy and peripheral vascular disease were excluded from the study.

RESULTS

Table 1: Age

Age (years)	Number of patients	Percentage
18-20	3	15
21-40	13	65
41-60	4	20

From the above table it was identified that 65% of the patients were aged between 21-40 years of age.

Table 2: Sex

Sex	Number of Patients	Percentage
Male	15	75
Female	5	25

From the above table it was identified that the 75% of the patients were male and 25% of the patients were female.

Table 3: Type of fracture

Type of fracture	Number of patients	Percentage
IIIA	16	80
IIIB	4	20

The above table identified that 80% of the patients suffered from IIIA type of fracture.

Table 4: Procedure and therapy

Procedure	VAC therapy	Percentage
Primary closure	2	10
Split skin graft	10	50
Fasciocutaneous flap	3	15
Musculocutaneous flap	4	20
Secondary closure	1	5

The above table depicted that 50% of the patients treated with split skin graft were given VAC therapy for wound healing.

Table 5: Bacterial growth

Wound healing (Day)	Number of patients without bacterial growth	Percentage
Day 4	3	15
Day 8	13	65

It was observed that the patients with VAC therapy showed wound reduction within eight days of application only. It was also observed that the length of hospital stay and surgical site infection also reduced drastically. From the above table it was identified that 15% of the patients showed bacterial growth on day 4 of the surgery and 65% of the patients showed no bacterial growth on day 8 post-surgery.

DISCUSSION

In the current study the age group most affected by open tibial fractures was 21-40 years. on the other hand, according to the study of *Venu et al., (2016)* the most affected age group was 31-50 years. In the current study, it was found that there was male preponderance as the number of male patients was more than the female patients. Similar results were obtained in the study of *Chandewar et al., (2018)*⁷. The method of wound closure in the current study for more number of patients was split skin graft. However, as per the study of *Virani et al., (2016)* the wound closure for more number of patients was delayed closure. In the current study it was found that more number of patients had IIIA type of fracture. On the flip side, as per the results of the *Patil et al., (2018)* more number of patients suffered from the mid shaft and proximal tibial fractures. In the current study it was observed that the 15% of the patients were without bacterial growth on the 4th day of surgery while 65% of the patients were without surgical site infection on the 8th day of surgery. According to the study of *Patil et al., (2018)*¹⁰ it was found that the 20% of the patients suffered from surgical site infection in the VAC therapy group while 40% of the patients suffered from 40% surgical site infection in the non-VAC therapy group.

CONCLUSION

It was concluded in the study that VAC therapy proved to be a useful and beneficial therapy for wound healing in open tibial fractures. The bacterial activity reduced drastically within 8 days of surgery and there were no cases of mortality. The wound healed early and other complications were also not seen. Therefore, it was clear that VAC therapy resulted in better wound healing.

Cases

Case 1: A 29-year-old male post traumatic case of right sided midshaft tibia and fibula fracture compound grade 2 with no neurovascular deficit was admitted and operated by tens nailing. Post-surgery the patient was given 3 sittings of vac dressing and after vac dressing the wound had completely healed.

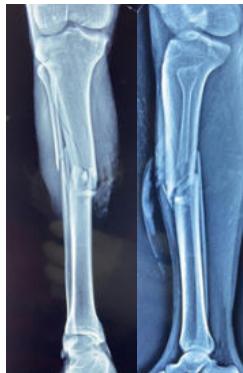


Image 1 Pre-operative Xrays, Anteroposterior and Lateral Views



Image 2 Post-Operative Xrays, Anteroposterior and Lateral views



Image 3 Wound at the time of presentation



Image 4 Wound status after debridement and before VAC Application



Image 5 Wound status after two VAC sittings



Image 6 Wound status after one sitting of VAC



Image 7 Wound status at 6 weeks showing Complete healing



Image 8 Wound status after 3rd VAC sitting

Case 2: A 30-year-old male post traumatic right sided distal third tibia and fibula fracture compound grade 3b with no neurodeficit. External fixator was applied and post-surgery and three sittings of VAC dressing were given to patient which showed excellent granulation of the wound and eventually skin grafting was done to cover the wound.



Image 9 Pre-operative Xrays, Anteroposterior and Lateral view



Image 10 Post-operative Xrays, Anteroposterior and Lateral

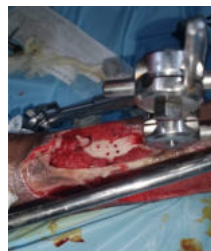


Image 11 Wound status after one sitting of VAC



Image 12 Wound status post-surgery



Image 13 Wound status after two VAC sitting



Image 14 Wound Status after 3rd VAC sitting

Image 15 Skin Grafting of wound

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