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To evaluate the efficacy of indigenously developed negative pressure wound therapy (NPWT) in orthopaedic wound management

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Abstract
Introduction: Negative pressure wound therapy (NPWT) in its present form was first described by Fleischmann *et al*. 1 in 1993. In Orthopaedics it has gained popularity in past 2 decades for management of acute open fractures, pressure sores as well as chronic wounds associated with osteomyelitis2.
It involves the controlled application of sub atmospheric pressure to a local wound environment, using a sealed wound dressing connected to a vacuum pump.
In our institute, we provided NPWT using locally available materials to manage Orthopaedic wounds. This present study evaluates the efficacy of NPWT.
Aims and Objective: To evaluate the efficacy of indigenously developed negative pressure wound therapy.
Methodology: In Our study we included 15 patients in the age group of 10 to 69 years to evaluate the efficacy of indigenously developed NPWT this is 6 months prospective study.
Result
Wound Culture: Gradually cultures became negative to any microorganism.
At 3 months the wounds of all patients were healed
Granulation Tissue: About 80 percent wounds were granulated till 6 week. At 3 months 15 (100%) wounds were healed.
Conclusion: Indigenously negative pressure wound therapy has a safe and effective method of wound coverage. It decreases the bacterial load and promote the neovascularization.
Further long term controlled studies are needed which would help in providing affordable and effective wound management.

Keywords: NPWT, vacuum dressing, wound coverage

1. Introduction
Negative pressure wound therapy (NPWT) in its present form was first described by Fleischmann *et al*. [1] in 1993. In Orthopaedics it has gained popularity in past 2 decades for management of acute open fractures, pressure sores as well as chronic wounds associated with osteomyelitis2. Negative pressure wound therapy is a newer non-invasive adjunctive therapy system in treatment modality for acute and chronic wounds. It involves the controlled application of sub atmospheric pressure to a local wound environment, using a sealed wound dressing connected to a vacuum pump. Principle components of this system include filling wound with polyurethane sponge and sealing with adhesive cover, a drainage tube connected to suction device. This creates sub atmospheric pressure on wound bed which helps in granulation tissue formation.
In our institute, we provided NPWT using locally available materials to manage Orthopaedic wounds. This present study evaluates the efficacy of NPWT given by using locally available materials like sponge, sterile adhesive coverage (Ioban), suction tubes and suction system at hospital and cost effectiveness of the treatment.

Aims and Objective

To evaluate the efficacy of indigenously developed negative pressure wound therapy

Methodology

In Our study we included 15 patients in the age group of 10 to 69 years to evaluate the efficacy of indigenously developed NPWT. This is 6 months prospective study

Clinical evaluation

All the patients were Clicically evaluated on the basis of their Wound Size (CM^2), appearance of Granulation Tissue over wound and Wound Culture preoperatively and at every follow up.

Follow Up

All patients were examined preoperatively and followed up at 3 weeks, 6 weeks, 3 months and 6 months interval.

Results

Wound culture

- Preoperatively out of 15 patients,9 (60%) wounds showed positive culture and 6(40%) wounds showed negative culture
- At 3 weeks, 2(13.33%) wounds had healed, 4(26.6%) wounds showed positive culture and 9(%) wounds showed negative culture.
- At 6 weeks, 12(80%) wounds had healed and 3(20%) wounds showed negative culture
- At 3 months the wounds of all patients were healed

Granulation tissue

- Preoperatively, out of 15 wounds, 13 (86.66%) wounds had no granulation tissue and 2 (13.33%) wounds showed granulation tissue.
- At 3 weeks, 2 (13.33%) wounds were healed and 13 (83.66%) wounds showed granulation tissue.
- At 6 weeks, 12 (80%) wounds were healed and 3 (20%) wounds showed granulation tissue.
- At 3 months 15 (100%) wounds were healed.

Clinical pictures

Day-1

Day-20

Day 32

Day 90

Case 1: Fifty year old male with infected implant right proximal tibia

Day 1(elsewhere sutured)

After suture removal

After one week at 21 day After one month

Case 2: A 40 year old male having crush injury right leg. Initially wound was debrided and vacuum dressing applied three times. Granulation tissue appeared and wound was grafted on 22st day. Graft uptake was 100 percent

Discussion

Indigenously negative pressure wound therapy has a safe and effective method of wound coverage. It decreases the bacterial load and promote the neovascularization. Extending the use of negative pressure wound therapy could potentially help in this sense: secreting wounds, in particular if infected, require multiple dressing changes, sometimes daily, whereas a NPWT dressing change can last for even more than 48 h. Furthermore, suction in the NPWT reduces pooling of fluid, which can itself facilitate bacterial growth. The dressing film is water resistant so it does not allow pathogens from the skin to enter the wound. Some studies have shown that the NPWT could stop pathogens from creating their biofilm [3].

Further long term controlled studies are needed which would help in providing affordable and effective wound management.

Reference

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