

An evaluation of PICO[◇] negative pressure dressings for complex orthopaedic surgical wounds

Introduction

Patients with wounds resulting from Orthopaedic trauma are often at high risk of infection. This may be as a result of the initial injury or from the extensive surgery or a combination of factors. Due to tissue loss and the involvement of bone and/or metal work there may be cavities and areas of undermining present in the wounds of this patient group. These wounds are commonly slow to heal and often have high volumes of exudate. Negative Pressure Wound Therapy (NPWT) systems are a useful tool with which to manage these wounds, however, many systems are not ideal for use in the patient's home, due in part to size and complexity. There are also staff training issues if transferring patients to an area which does not routinely use negative pressure systems.

A new Single-Use NPWT Device PICO (Smith & Nephew, Hull) was recently introduced, which provides the benefits of negative pressure with a more familiar dressing application. PICO provides 80mmHg of negative pressure from a very small pump which uses a dressing designed to handle 150mls of exudate. It was decided to evaluate PICO for use in the orthopaedic trauma/limb reconstruction unit of Glasgow Royal Infirmary.

Methods

10 patients were selected for this evaluation and once patients were assessed as suitable for PICO they were seen at weekly intervals to have PICO applied. Photographs were taken every seven days.

Patients with confirmed infections were given IV antibiotics. Some patients were referred to the outpatient IV antibiotic service (OPAT).

Dressings were changed as per manufacturer's instructions, either weekly or when the exudate levels had reached the port in the dressing.

Patients were assessed for comfort when the product was *in situ* and wound progression during PICO use.

Results

There were minimal problems with dressings between visits. There was obvious improvement at each visit, with granulation tissue and wound contraction noted at each dressing change. Patients found the dressing comfortable and there was no evidence of pain during dressing changes.

The time taken to change each dressing was minimal which was helpful in the busy clinic environment.

Conclusion

Recent initiatives to improve quality and cost effectiveness of patient care have highlighted the need to use innovative techniques to help facilitate this. PICO Single-Use NPWT can reduce the frequency of dressing changes required by managing the wound and exudate more effectively. In an era of austerity, the need to reduce nursing costs may be best achieved by employing new and innovative technologies.

PICO would appear to be an ideal intervention for use in both inpatient and outpatient settings. The portable nature of the product makes it easy for patients to carry around and assists with mobility. Other benefits such as no audible alarms which can disturb patients and the simple operation of the dressing reduces training issues for staff compared with current negative pressure systems.

Patient/age	Reason for admission/treatment	Wound progress with NPWT	Duration of PICO therapy
Case 1 Female 73 years	Amputation following osteomyelitis for infected tibial fracture	Wound completely healed, had been sloughy and showed signs of infection, patient on antibiotics.	28 days (4 kits)
Case 2 Male 33 years	Patient presented with osteomyelitis in tibia from previous fracture repair	Wound was open at two sites with moderate exudate. Following PICO, wounds reduced in size with epithelial tissue apparent. Wound healed in 8 weeks. PICO stopped at day 21.	21 days (3 kits)
Case 3 Male 67 years	Right valgus deformity of distal tibia	Moderately exuding cavity wound which reduced in size and depth using PICO, healing complete.	21 days (3 kits)
Case 4 Male 57 years	Infected non-union of right tibia following osteotomy	Wound continued to reduce in size using PICO, skin grafting was necessary to achieve complete closure.	21 days (3 kits)
Case 5 Male 50 years	Crush injury to left ankle, deep soft tissue damage and infection	Wound granulated and contracted, fully healed at 3 weeks.	21 days (3 kits)
Case 6 Female 56 years	Infected wound following infected total knee revision	Cavity reduced in size, bleeding stopped. Large volumes of exudate required standard NPWT.	14 days
Case 7 Female 67 years	Infected non-union of right distal tibia	Wound at risk due to multiple surgery, reduced in size, scar tissue reducing, switched to conventional dressings.	14 days
Case 8 Female 34 years	Pilon fracture to left ankle.	PICO placed on closed incision site, wound edges apposed despite presence of fixation.	7 days

Case examples

Case 1: 73-year-old female. Admitted to orthopaedics with a fractured right distal tibia. The patient also had chronic venous leg ulcers. The surgical procedure carried out was an above knee amputation due to poor peripheral circulation and existing cardiac disease.

Approximately four weeks after surgery, the stump wound started leaking and continued to deteriorate over a few weeks. A CT scan revealed osteomyelitis of the distal femur at the tip of the stump. A further four weeks later, the wound measured 12cm x 2cm and was necrotic, sloughy and leaking large quantities of haemoserous fluid and pus.

The patient was referred to a Limb Reconstruction Nurse Specialist for PICO NPWT dressing. IV antibiotics were commenced. PICO treatment was commenced to manage the wound exudate which gradually reduced over a three week period. The wound continued to contract and healing was achieved on day 35.



Case 1: Stump wound on Day 0



Case 1: Stump wound on day 35

Case 2: 33-year-old male. Sustained a left compound tibial plafond fracture. Open reduction and internal fixation carried out within 24 hours of accident.

The wound started leaking approximately one month following surgery. The patient was managed as an outpatient with various conventional dressings however wound continued to break down. The patient was referred to the Limb Reconstruction Service for assessment. PICO NPWT was commenced and the patient was referred to OPAT service as osteomyelitis was confirmed by x-ray.

Following 2 weeks of PICO therapy, the wound was almost completely healed and the tissue oedema was visibly reduced.



Case 2: Ankle wound on day 0



Case 2: Ankle wound on day 14