

Negative Pressure Wound Therapy - An Alternative Approach

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Introduction

Negative Pressure Wound Therapy (NPWT) is the application of sub-atmospheric pressure through an interface to the wound bed. Until recently the only interface through which negative pressure was applied was via polyurethane foam; however with the emergence of alternative therapies the interface used to compliment these therapies is moistened gauze and a silicone drain.

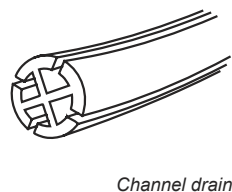
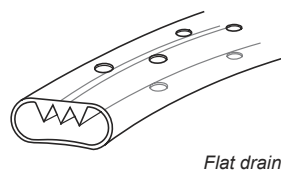
The purpose of this critique is to outline how initial concerns and perceptions relating to the application of gauze in wound management were overcome. The subsequent case studies focus on:-

- The use of gauze as the interface through which negative pressure wound therapy is applied
- Lower pressure settings
- Achievement of successful clinical outcomes

Method

All the case studies mentioned in this critique feature NPWT utilising a silicone drain, moistened gauze, and transparent film, in order to achieve the clinical outcome required.

Depending on the type of wound being treated, there was a choice of drain. The flat drain was used for moderate depth wounds with moderate drainage. The channel drain was used for sinus management and undermining.



Moistened gauze was used to cover the wound bed and fill in the dead space; the drain of choice was then placed on the moistened gauze. The entire wound was covered with a transparent dressing and the drainage system was then connected to a NPWT unit and pressures between 60-100mmHg were applied on continuous suction (Chariker et al 1989).



Discussion

The initial concern was obviously the use of gauze in wound management. Since the gauze is moistened and covered with a transparent film it remains moist to moist, not wet to dry and is easily removed on dressing change. Consequently the primary concern and perception of adherence; possible in-growth of granulation tissue and traumatic dressing removal has proved groundless, though this will continue to be monitored.

Pressure settings used with the system ranged from 60-100mmHg depending on patients' tolerance, wound type and clinical judgement. The perception that lower pressures may not stimulate granulation tissue was overcome and the evidence is presented in the case studies. The use of lower pressures with NPWT is well documented, Wackenfors et al, 2004, concluded that pressures of 75-100mmHg were more beneficial in wound healing depending on tissue type.

Results

Overall results of NPWT using moistened gauze and a silicone drain have demonstrated excellent clinical outcomes. The following case studies emphasise how the aims and objectives were met.

Case Study 1

- Patient Profile:**
- 72 year old female with dehisced wound following Hip Replacement
 - Rheumatoid Arthritis, Asthma
 - Long-term steroid therapy
- Reason for Choice of Therapy:**
- Large cavity wound
 - Excessive exudate
 - Product trial
- Aim and Objectives:**
- Debridement of a sloughy dehisced hip wound
- Type of Drain Used:**
- Flat drain
- Pressure Settings:**
- 80 mmHg initially
 - Increased to 100mmHg to aid debridement
- Duration of Treatment:**
- 10 days
- Clinical Outcome:**
- Wound bed debrided and exudate controlled for duration of treatment
 - Patient desperate to go home as hospitalised for several weeks
 - Changed to hydrofibre dressing to enable discharge



Pre-NPWT



Filling cavity with moistened gauze



After 10 days of NPWT

Case Study 2

- Patient Profile:**
- 70 year old male
 - Dehisced wound following Aorto-Iliac bypass surgery
- Reason for Choice of Therapy:**
- Large cavity wound exposing muscle layers
- Aim and Objectives:**
- Speedy closure of the wound
- Type of Drain Used:**
- Flat drain
- Pressure Settings:**
- 80 mmHg
- Duration of Treatment:**
- 25 days
- Clinical Outcome:**
- Granulation cover of wound base and reduction in wound size



Pre-NPWT



After 7 days of treatment



After 25 days of NPWT

Case Study 3

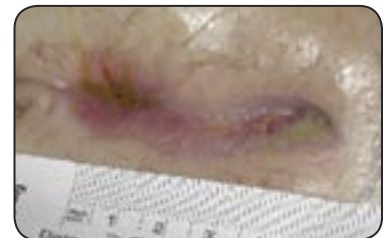
- Patient Profile:** ● 37 year old male with small bowel fistula through incision line following small bowel resection and formation of ileostomy
- Reason for Choice of Therapy:** ● Management and closure of a small bowel fistula
- Aim and Objectives:** ● Contain and reduce or close small bowel fistula
- Type of Drain Used:** ● Channel drain
- Pressure Settings:** ● 60 mmHg
- Duration of Treatment:** ● 2 weeks
- Clinical Outcome:** ● Drainage via fistula greatly reduced and output via stoma increased then went on to heal



Pre-NPWT



NPWT applied



After 5 days of NPWT

Case Study 4

- Patient Profile:** ● 65 year old woman post reduction of large umbilical hernia
● Obese dehisced abdomen with a colonic fistula
- Reason for Choice of Therapy:** ● Large dehisced abdominal wound with difficulty in containing faecal exudate
● Had previously tried alternative NPWT system to try and close fistula without success, but it did greatly reduce in size
- Aim and Objectives:** ● To contain exudate, to protect the skin and to reduce the size of the wound
- Type of Drain Used:** ● Flat drain
- Pressure Settings:** ● 80 mmHg
- Duration of Treatment:** ● 27 days
- Clinical Outcome:** ● Reduction in wound size
● Containment of faecal exudate
● Faecal drainage became too thick to come up the drainage tube
● Sent to a Nutritionist Unit



Pre-NPWT (foley catheter inserted into fistula to attempt faecal material diversion)



NPWT applied (hydrocolloids protect wound margins - foley catheter removed)



After 27 days of NPWT

Case Study 5

- Patient Profile:**
- 50 year old Male
 - Multiple Sclerosis
 - Debrided extensive Grade 4 pressure ulcer

- Reason for Choice of Therapy:**
- Reduction of dressing changes and discomfort for the patient

- Aim and Objectives:**
- Containment of exudate
 - Reduction in wound size

- Type of Drain Used:**
- Flat drain

- Pressure Settings:**
- 60 - 80 mmHg

- Duration of Treatment:**
- 7 days

- Clinical Outcome:**
- Healthy granulation
 - Comfortable dressing changes
 - Containment of exudate until patient died



Pre-NPWT



After 7 days of NPWT

Conclusion

The use of moistened gauze and a silicone drain in conjunction with NPWT appears to address current wound management needs. For both the patient and clinicians, there is now a choice that incorporates comfortable dressing changes. Nurses find the application and removal techniques simple and time saving in comparison with previous treatments, with the advantages of a closed system and measurable drainage.

The perceptions and concerns about the use of gauze in modern day wound management have been overcome,

as in reality the purpose of the gauze is to serve as the interface through which negative pressure is applied.

References

1. Chariker, M.E., Jeter, K.F., Tittle, T.E., Bottsford, J.E. (1989) *Effective management of incisional and cutaneous fistulae with closed suction drainage*. Contemporary Surgery Vol. 34, 59-63.
2. Wackenfors A, Sjogren J, Gustafsson R, Malmstro M (2004) *Effects of vacuum-assisted closure therapy on inguinal wound edge microvascular blood flow*. Wound Repair and Regeneration 12:600-606

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