The effects of implementing negative pressure therapy to promote wound healing

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The effects of implementing negative pressure therapy to promote wound healing

Abstract
Purpose: To systematically and comprehensively review, analyze and synthesize the effects of wound healing when utilizing NPWT or V.A.C. therapy in comparison with more traditional wound management with sterile gauze dressings.

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Christine Nelson-Tuttle

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The Effects of Implementing Negative Pressure Therapy

To Promote Optimal Wound Healing

Background and Significance

- Wound infection is a reoccurring problem that spans an extremely large spectrum of individuals including but not limited to chronic wounds, surgical wounds, and traumatic wounds.
- As technological advances are made, the healthcare system also adapts and advances in clinical care are also made, directly influencing the care given to individuals in need of medical assistance.
- The way in which we care for wounds has continued to improve, in large part due to research studies and adjustments of clinical care to focus more directly on an evidence-based practice module.
- A Multidisciplinary approach to wound management is the current treatment for wounds involving both wound care and administration of medications i.e. antibiotics to further prevent infection.
- Negative Pressure wound therapy (NPWT) or The Vacuum Assisted Closure (V.A.C) device was invented in 1996.
- Wound infection is a complication that results in extended time for a patients length of stay.
- NPWT and V.A.C. therapy can be used on a wide variety of wounds, making it an appealing wound management system for many providers.

Methods

- Guided by Garrard’s (2007) matrix method
- Clearly delineated literature search and inclusion criteria
- Systematic review, analysis and synthesis
- Utilize quantitative studies for data collection purposes

Literature search

- Well-defined, comprehensive search strategy was used
- Key words
- Databases used: CINAHL, EbSCO, Cochrane Library

Table 1: Specific Search and Results

<table>
<thead>
<tr>
<th>Database</th>
<th>Search Criteria</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>CINAHL Plus with Full Text (via EbSCO®)</td>
<td>“Wound VAC” Specific criteria: wound vac, split thickness skin graft, wound healing</td>
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<tr>
<td>Cochrane Library</td>
<td>Wound VAC, Negative Pressure Wound Therapy</td>
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</tr>
</tbody>
</table>

Inclusion criteria

- Published in English language
- Full-text primary source
- Quantitative Research Article
- Inpatient setting
- Split thickness skin grafts
- Burns; Surgical, chronic, and traumatic wounds

Most common reasons for exclusion

- Not published in English language
- Full-text primary source not obtainable; secondary sources and unavailability of full-text were excluded
- Outdated research
- Failure to complete study

Systematic review, analysis and synthesis

- All citations checked, abstracts reviewed and determined to meet inclusion criteria
- Construction and analysis of a Literature Matrix

Results

Final Sample (N=8)

- 8 publications: 7 quantitative studies, one review
- Publication dates ranging between 2007 to 2012
- Concentration on outcomes that focused on decrease in wound size via direct measurement of the wounds and increased granulation tissue and fibrin present
- Patient populations included individuals that required negative pressure therapy for an open wound
- A range of types of wounds was used to emphasize how different wound types can be managed by one type of management system

Table 2. Number of Individuals categorized by wound type

<table>
<thead>
<tr>
<th>Wound Type</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chronic Wound: pressure ulcer, diabetic ulcer</td>
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</tr>
<tr>
<td>Traumatic Wound</td>
<td>35</td>
</tr>
<tr>
<td>Surgical Wound: fasciotomy, split thickness skin graft, open abdominal wound</td>
<td>40</td>
</tr>
<tr>
<td>Burns</td>
<td>UTD</td>
</tr>
</tbody>
</table>

Discussion

- Each quantitative study provided data that suggests applying wound VAC therapy allowed wounds to drastically decrease in size in comparison to the control groups that were receiving the traditional gauze dressing changes.
- The articles specific to preparing the wound bed for a split thickness skin grafting suggest that the condition of the wound beds improved with the use of NPWT and VAC therapy allowing for a good base to apply a split thickness skin graft to overall resulting in adherence of the skin graft to the wound.
- Utilizing the NPWT and VAC therapy systems enabled the amount of edema to decrease in a shorter amount of time in comparison to the traditional gauze dressing changes of the control groups.
- The instances of wound infection were dramatically decreased with the use of the closed-system VAC therapy opposed to higher instances of infection in wounds that were being treated with frequent gauze dressing changes.

Conclusions

- Utilization of a NPWT or VAC Therapy system allows for optimal outcomes when managing various types of wounds including but not limited to chronic ulcers, traumatic wounds, surgical wounds, and burns.
- A decrease in the rate of infection among individuals with open wounds directly results in decreased length of stay for patients admitted to the hospital as an inpatient.
- More research needs to be completed to further support the positive effects that utilizing NPWT and VAC therapy has on promoting optimal wound healing.

Limitations related to sample selection

- Wound VAC Therapy and NPWT equipment is an expensive technology that may not be available to every individual that fits the wound type criteria.
- Utilization NPWT is a provider-specific treatment that may not be offered to every individual that fits the criteria.

Gaps

- More research is necessary to prove whether or not NPWT and VAC Therapy is the best type of wound care to be providing individuals that require medical management of wounds.

Recommendations for future research

- Further study the cost-benefit ratio of applying NPWT or VAC therapy to wounds.
- Further study the average length of hospital stay with individuals utilizing NPWT and VAC Therapy.
- Further study the rate of infection in wounds where NPWT or VAC Therapy is being utilized.

References are available upon request.