Examining a Combination Approach to Manage Pain in Negative Pressure Wound Therapy: A Literature Review and Implementation Model

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Background and Significance

Negative Pressure Wound Therapy (NPWT) is an advanced wound healing modality that utilizes subatmospheric (negative) pressure paired with the application of a specialized dressing system. Various systems are in use today and are generally comprised of the pump unit, which controls negative pressure, a collection canister for fluid removal, and a dressing setup that is simply affixed to the wound to form an air-tight seal over the wound bed, and a foam or gauge dressing medium to apply to the wound bed.

NPWT is very advantageous in that it promotes tissue growth and proliferation via tissue injury, manages wound extraction, provides exudate management, and reduces bidirectional bracing.17 The adherence of the typical NPWT foam dressing to the wound bed can be a source of significant pain during dressing changes, which must be addressed to facilitate an environment of optimal healing.18 Although numerous studies have demonstrated that the healthcare system has not improved with regards to providing adequate pain control,16-19 it is important to always consider the patient’s well-being.

Purpose and Objectives

- To review the available methods of decreasing pain with NPWT dressing changes
- To review a combination of evidence-based interventions for NPWT pain management that can be applied in a variety of settings
- To understand the role of the Clinical Nurse Specialist in the implementation of improved NPWT pain management using the IOWA model

Literature Review

Review in 2013, showed that the administration of topical lidocaine had a significant impact on decreasing procedural pain. However, the efficacy of similar interventions was not assessed in a randomized controlled trial. Several studies and evidence reviews did not adequately report on manipulating the treatment variables of NPWT to achieve specific outcomes. The following were found to be important pain management modes during dressing changes:
- Applying a wound contact layer between wound bed and NPWT foam reduces the pain associated with the wound bed via decreasing the surface area contacted by NPWT
- Utilizing a saline bath dress change in which saline solution soaks into tissue ingrowth via decreases in granulation tissue’s wound bed and traditional polyurethane foam can be a similar process
- Changing NPWT settings to continuous front infusion or dynamic therapy to decrease trauma and to a high level of comfort and to reduce the need for pain medication
- Titrating the treatment pressure down over the first 24 hours is in accordance of decreasing the patient’s pain perception during dressing changes
- Substituting a gauge-based NPWT system to decrease pain during therapy and decreasing dressing changes by decreasing tissue contact to be optimal for traditional polyurethane foam

Interventions

The literature review suggests that when formulating an individualized pain management plan for NPWT, the provider should consider the following interventions:
- Intralipid lavage topically in the NPWT foam dressing of the more than 45mg/kg after repositing therapy 15-60 minutes before scheduled dressing changes to decrease pain associated with pain dressing will aid in reducing pain,16-19 note clinical guidelines with large wounds, or wounds with vascular issues, or other factors expected to involve potential for systemic absorption
- Apply a wound contact layer between the wound bed and NPWT foam to reduce pain or removal and demobilization.
- Utilize an alternative foam dressing such as PIP foam to decrease ingestion of tissue and pain on removal
- Reduce pressure settings down to 12mmHg or less offering at least 24 hours of therapy to decrease ingestion of tissue and decrease pain on removal
- Change NPWT dressing to continuous front infusion or dynamic therapy to decrease pain during therapy
- Selecting a polyurethane foam dressing that is appropriately main to decrease ingestion of tissue and pain on removal of dressing

Implementation

Infiltrating Change

A change in practice will include utilization of a combination of interventions with the patient to provide synergistic pain relief. The Clinical Nurse Specialist, in conjunction with the patient and/or family, will develop a plan for pain management with the organization to include these changes. ONS concepts include:
- Designing, implementing, and evaluating innovative individual and/or population-based programs of care to achieve desired goal, cost effective, and nurse-sensitive outcomes
- Implementing evidence-based interventions aimed at improving pain management in the organization in the research phase
- Advancing nursing practice through innovation evidenced-based interventions, best practice guidelines, and modification of professional practice protocols
- Assessing the effectiveness of interventions in collaboration with other nurses and across organizations to improve outcomes
- Evaluating and modifying the organizational culture to improve pain management care

Process Change: Electronic Order Entry and Nursing Assessments

To implement a change in practice, a combination of processes is needed, with NPWT dressing changes. The parameters of the order will require data input for one entry (via through face or directly site inserted), data input of the time location of the dressing change, device setting, and dressing change frequency (as well as dressing change change which is average or is time based). A pain assessment should be performed before, during, and on return after the NPWT dressing changes using a visual analog scale. Then the other interventions can be initiated if the individualized pain gain for NPWT were not met with application of the topical anaesthetic alone. Beginning with application of the wound contact layer. The clinician’s judgment and knowledge of NPWT mechanisms should be used when combining interventions.

Outcomes

Patients

Outcomes measures for patients prescribed NPWT will include pain rating and use of analgesics prior to dressing changes. Expected outcomes would include fewer pain reports and less narcotic utilization. Long-term measures which were not discussed in this research but may also be explored include length of stay and patient satisfaction.

Nurses

The outcomes for nursing staff will include a return demonstration competency of application of NPWT and confirmation of understanding of the function of each intervention to decrease pain with dressing changes. The goal is to finding the most patient adequate self-management of NPWT pain management. Nurses will at least rate their knowledge and abilities as “confident” on the post-intervention survey given afterwards.

Facility

In a 6-month capacity, the organization will apply a pain rating data for patients prescribed NPWT. Administration of topical lidocaine and order entry data will be monitored to evaluate compliance with the implementation of the pain management plan and pain feedback to the providers and nursing staff regarding the patient satisfaction. The end result is institutionalizing the IOWA approach within the organization and the direct care. Feedback about the effects of the change and documentation of the process if the expected outcomes were not met will be a tool. These processes can facilitate other quality improvement activities within the organization.

Conclusion

The population of individuals with chronic illnesses is expecting due to increased expectations of the aging population, and with it, the number of individuals experiencing chronic wounds. By implementing an individualized pain management plan for patients receiving NPWT, we improve the patient experience and continue to offer the benefits of NPWT on wound healing. The pain plan has the potential to reduce stress for the patient, nursing staff, and facility, creating a holistic care environment. By promoting providers to consider topical analgesia when considering NPWT and educating nurses on the importance of pain assessment as well as knowledge in application of selected interventions to decrease pain with dressing changes, we expect patient comfort. We must strive to provide the most evidence-based, efficacious care possible. We encourage the reader to scrutinize the evidence and consider the NPWT therapy plan that accompanies wound healing modalities such as NPWT, a very efficient tool that has become a staple in the management of complex chronic wounds.

References

- KCI-EDU