AbThera™ Open Abdomen Negative Pressure Wound Therapy (NPWT): Care and Management

Site Applicability

VCH:

Vancouver General Hospital: Intensive Care Unit (ICU), Burns Trauma High Acuity (BTHA), Stepdown Units, and Post Anesthesia Care Unit

Lions Gate Hospital: ICU, High Acuity Unit (HAU)

Richmond Hospital: ICU

PHC: ICU

Practice Level

Registered Nurses (RNs) Advanced Skill with additional education:

- Attend Negative Pressure Wound Therapy (NPWT) – basic education.
- NPWT Level One: Monitor & Manage (found on your facilities educational centres NPWT Level One: Monitor & Manage.
- Additional education on AbThera™ as per site practice.

Requirements

A patient undergoing AbThera™ Open Abdomen Negative Pressure Wound Therapy (AbThera™) must:

- Have orders completed by the Most Responsible Provider (MRP) on a Negative Pressure Wound Therapy (NPWT) Pre-Printed Order set or Cerner Power Plan prior to leaving the recovery unit. These orders must include:
  - Pressure settings (-125 mmHg is recommended by manufacturer)
  - Frequency of change (usually Q24 – 72 hours)
  - Location of change will always be the operating room (must be in a sterile environment)
- Be monitored and managed by an RN in:
  - VGH: ICU, BTHA, PACU or Stepdown unit
  - LGH: ICU or HAU
  - Richmond Hospital, and PHC: ICU
- The AbThera™ dressing should never be opened, disassembled, or replaced outside of the sterile operating room.
- If the patient in the stepdown unit experiences any of the adverse events listed in the **Need to Know** section and/or symptoms of abdominal compartment syndrome; immediately notify MRP to urgently rule out any potential issue(s).

Need to Know

- The AbThera™ NPWT dressing is different to a wound NPWT dressing. This is identified in the Pre-Printed Order set or Cerner Power Plan.
- AbThera™ is used in conjunction with the V.A.C.Ulta™ device only.

    - *3M/KCI Customer Service: Phone: 1-800-668-5403*
        - *choose option 1 (English), then*
        - *choose option 4 (clinical support), if outside business hours then*
        - *press 1 for 24/hr support*
- Check the activity and diet orders as these can vary with each case. If there are no orders for these, or concerns with these orders, notify MRP.
- AbThera™ is not designed to prevent, minimize or stop bleeding. If sudden or increased bleeding is observed in the dressing, tubing or canister, turn off the V.A.C.Ulta™ device and notify MRP.
- Patients with spinal cord injury may experience autonomic dysreflexia (AD) or sudden changes in blood pressure or heart rate in response to stimulation of the sympathetic nervous system, which can occur with AbThera™. If AD cannot be managed with the AD medication protocol notify MRP to determine if the V.A.C.Ulta™ device should be turned off to help minimize sensory stimulation.
- Patients undergoing AbThera™ are at risk for intra-abdominal hypertension (IAH) and abdominal compartment syndrome (ACS). For clinical purposes, ACS is better defined as IAH-induced new organ dysfunction without a strict intra-abdominal pressure threshold, since intra-abdominal pressure cannot be used to predict ACS in all patients.
- In the event of ACS, the V.A.C.Ulta™ device should be turned off to decrease pressure and the MRP must be notified. Patients with open abdominal wounds must be closely monitored (vital signs and dressing integrity), as these wounds may contain hidden blood vessels, which may not be readily apparent.
- Hyperbaric Oxygen Therapy (HBO): V.A.C.Ulta™ and dressings are not compatible with HBO. If the patient requires HBO, contact MRP for management plan.

Adverse events associated with an open abdomen may include:

- An increased risk for hemodynamic instability, acidosis, altered respiratory function, infection, abdominal hypertension, abdominal compartment syndrome, development of entero-atmospheric fistulae, coagulopathies, protein loss, fluid imbalance, electrolyte instability and loss of abdominal domain due to lateral retraction of the fascia.
- If any of these events occur, notify MRP immediately for further instruction.

Guideline

Indications for AbThera™

- Temporary bridging of abdominal wall openings where delayed primary closure and/ or repeated entries are intended into the abdomen.
- For open abdominal wounds with exposed viscera, including but not limited to ACS.
- Edema.
- Visceral infection.

General Information

- AbThera™ may be used in conjunction with an abdominal closure device.
- AbThera™ NPWT pressure settings for abdominal closure should be set at -125mmHg unless otherwise indicated in provider orders. If the patient is at risk for bleeding or coagulopathies, pressures may be set lower by MRP as a pre-emptive measure to mitigate the potential for bleeding.

- Head of bed positioning should be determined by patient condition and site protocols. Avoid high Fowler's when possible.
- See Appendix A for Troubleshooting/ Managing Alarms on the Device or Dressing.

Safety

- NPWT should not be off for greater than 2 hours. If therapy needs to be interrupted for greater than 2 hours, contact MRP to:
  - Arrange for the dressing to be changed in the OR *OR*
  - Receive an order for allowance of more time off NPWT.
- Do not use the 1000mL canister on patients with a high risk of bleeding or in patients unable to tolerate a large fluid volume loss, including children and the elderly.
- **Defibrillation:**
  - Remove the V.A.C. Transparent dressing in the area where multifunction electrode pads will be applied. Leave the rest of the dressing in place as much as possible. Failure to remove the dressing may inhibit transmission of electrical energy and/or patient resuscitation.
- **Magnetic Resonance Imaging (MRI):**
  - NPWT machine/devices themselves **cannot go into the MRI environment**. If a canister is present, disconnect it from the machine and ensure that all tubing clamps are open to allow any exudate to flow into the canister. Abdominal binders may be beneficial to protect the drape during the procedure.

Assessment and Management

Monitor the patient as per site guidelines for the following signs of IAH/ACS. If present, contact MRP:

- Progressive oliguria
- Increased ventilation requirements
- Hypotension
- Tachycardia
- Elevated central venous pressure
- Peripheral edema
- Abdominal tenderness
- Acute respiratory decompensation
- Hypoperfusion including cool skin, decreased level of consciousness, restlessness, or lactic acidosis

Ensure the following are monitored to decrease the risk of IAH:

- Ensure the gastric/ intestinal tubes are patent and functioning,if insitu.
- Monitor and record bowel movements.
- Prevent constipation by ensuring adequate hydration, nutrition, and bowel protocol medications are given as ordered.
- Monitor and record fluid balances.
- Positioning: avoid high Fowler's position if possible.

AbThera™ Specific Assessment and Monitoring	
At the beginning of each shift or on return from any procedure or transfer:	
Assessment	**Rationale**
Verify the orders on the current NPWT PPO set or Cerner Power Plan and that the therapy settings are correct on the V.A.C.Ulta™ device.	AbThera™ pressure settings should be set at - 125mmHg (unless otherwise ordered). The settings may be lower if the patient is at risk for bleeding or coagulopathies as a pre-emptive measure to mitigate the potential for bleeding.
Every TWO hours, on return from any procedure or transfer, and as needed:	
Assessment	**Rationale**
1. Check the AbThera™ dressing has an air tight seal → the dressing must be collapsed and firm to touch with no pooling fluid.	If the dressing is not firm and collapsed, ensure the device is functioning (see below). If the device is functioning correctly, assess for a leak. If a leak is found, patch/cover the area with a sterile transparent drape. If this does not correct the problem, reinforce dressing with sterile absorbent dressing and notify MRP immediately. **DO NOT** remove the dressing. Refer to Appendix A:.
2. Assess the type of drainage in the tubing and canister. If unexpected bleeding, bile, or fecal material are observed, DO NOT remove the dressing. Notify MRP immediately.	Bile or fecal material is suggestive of a perforation in the bowel. Bleeding is considered an adverse event and should be reported to MRP.
3. Monitor the amount of drainage in the canister and document as per site policy.	Accurate fluid balance monitoring is required to reach fluid balance goals. Usually, goal is to maintain euvolemia or negative fluid balance. Usual canister change is 1 to 2 times in a 24 hour period.
4. Tubing connection(s) are secure, tubing clamps are open and the tubing is not bent or kinked.	If the tubing is twisted, it can block the negative pressure through the tubing and cause a blockage alarm.
5. Ensure the canister is engaged and does not need to be changed.	Refer to Appendix B.
6. Ensure the patient is not laying on the tubing.	This will decrease the risk of developing medical device related pressure injuries.
7. Ensure battery is charged and plugged into an appropriate power socket.	**Device will not alarm** if the battery is not charged.

Every FOUR hours and as needed	
1. Assess for signs and symptoms of infection: • **Periwound Skin:** Tenderness, erythema, edema, induration, itching, rash, increased warmth, purulent discharge or strong odour. • **Systemic:** Fever, nausea, vomiting, diarrhea, headache, dizziness, fainting, disorientation, refractory and/ orthostatic hypotension, increased blood sugars, or erythroedema (sunburn like rash).	If signs of infection are present notify MRP as further investigations or treatment (i.e. antibiotics) may be needed.

Documentation

Document the following as per site policy on electronic documentation system or paper flowsheets:

- Assessments
- NPWT Safety/ Monitoring Checks
- Fluid Balance Record - canister output

Related Documents

Chapter 5a. NPWT Level One: Monitor & Manage - LearningHub (phsa.ca)

References

Lee, R.K., Gallagher, J.J., Ejike, J.C. & Hunt, L. (2020). Intra-abdominal hypertension and the open abdomen: Nursing guidelines from the abdominal compartment society. *American Association of Critical-Care Nurses, 40*(1), 13-26. https://doi.org/10.4037/ccn2020772

KCI (2010). Clinical Guidelines for the management of the open abdomen with KCI systems for active abdominal therapy.

KCI (2013). ABTHERA open abdominal negative pressure therapy system monograph. LifeCell Corporation and Systagenix Wound Management Limited.

KCI (2018). ABTHERA Advanced. Instructions for use. Mukhi, A.N. & Minor, S. (2014). Management of the open abdomen using combination therapy with ABRA and ABTHERA systems. *Canadian Journal of Surgery, 57*(5), 314-319.

Pereira, B. (2019). Abdominal compartment syndrome and intra-abdominal hypertension. Current Opinion in Critical Care, 25 (6), 688-696. doi: 10.1097/MCC.0000000000000665.

Appendices

Appendix A: Troubleshooting/ Managing Alarms on the VACUlta4 Device or Dressing

Appendix B: Procedure: Changing the Canister for a VACUlta4 Device

Appendix A: Troubleshooting/ Managing Alarms on the VACUlta4 Device or Dressing

To unlock the machine:

- At the Home Screen, press and hold the Screen Guard/Setting Lock for more than 5 seconds to unlock the screen.

Alerts and Alarms	How to Correct the Situation
Low Battery Alert / Battery Exhausted Alarm: • Solid yellow symbol appears when there are 2 hours left before the battery power level is too low to support therapy. This alarm is accompanied by a repeating audible tone.	Plug the machine in. Ensure the power cord's green indicator lights up when the cord is plugged into the electrical outlet. If not, plug the machine into a different outlet. It takes 8 hours to fully recharge the battery.
Canister Full Alarm: • Yellow symbol will appear when the canister is full. This alarm is accompanied by a repeating audible tone. Therapy is stopped. • The canister release button will flash.	Check the graduated marks on the canister to determine if canister is full. • If the canister is not full, press RESET and return to the home screen. • If the canister full, press RESET and return to the home screen. Change the canister. See Appendix B:. • Press the Stop / Start button to resume therapy.
Canister Not Engaged Alarm: • Solid yellow symbol will appear when the canister is not fully engaged. This alarm is accompanied by a repeating audible tone. • The canister release button will flash.	• Remove the canister by pressing on the Canister Release Button. Ensure that there is no debris on the canister (e.g., lint). • Re-attach the canister to the machine, ensuring that the canister is fully engaged (push firmly into place if needed) and latched. An audible click should be heard, indicating that the canister is properly installed.

Leak Alarm:
• Solid yellow symbol appears when a leak has been detected, accompanied by a repeating audible tone.
• If not resolved within 3 minutes, therapy is stopped.
• The Seal Check Leak Detector screen has an audible tone and a bar graph which uses height and colour to reflects the leak:
  ○ Yellow bar graph indicates a leak.
  ○ Green bar graph indicates the system is operating properly.
	• Press Reset and then the Seal Check button to access the leak detector section.
	• Check for any small lifts on the dressing edge, seal with strips of sterile adhesive drape. The Seal Check audible tone will slow down and the bar graph height will decrease as the leak is found.
	• Also ensure tubing connector is properly locked and that the canister is correctly engaged.
	• Press the ON/OFF button to restart the therapy. If the air leak is resolved, the green light will stay on. If not, the alarm will sound. Try again to seal the air leak.
	• If it does not continue to work, turn device off and immediately notify MRP.

Blockage Low Alert/ Medium Alarm:	• Ensure the tubing is not kinked or blocked.

• Yellow symbol will appear indicating a possible blockage and is accompanied by a repeating audible tone.	• Ensure the canister is fully engaged. • Try lowering the tubing and the machine below the wound level. • If the above does not work, press RESET and return to the home screen. If the machine is not ON, press Start / Stop button to restart therapy. • If it does not continue to work, change to another device. If this is not effective, turn device off and immediately notify MRP.
Therapy Inactive Alarm: • Solid yellow symbol will appear when the therapy has been paused for more than 15 minutes with the machine powered on. • This alarm occurs with a repeating audible tone.	• Press RESET to return to the home screen. • Press Stop / Start to restart therapy. • To shut OFF therapy, press the POWER button.
Low Pressure Alarm: • Solid yellow symbol appears when the machine has not reached its targeted Therapy Pressure. • This alarm is accompanied by a repeating audible tone.	• Ensure canister is engaged. • Ensure clamps are open. • Ensure tubing is not bent or blocked. • If the above does not clear the blockage: ○ Lowering the tubing and machine below the wound level may correct the therapy pressure. ○ Consider that the TRAC pad itself may be blocked. • If it does not continue to work, change to another device. If this is not effective, turn device off and immediately notify MRP.
Therapy Pressure Deviation Alarm: • Solid yellow symbol appears when the wound site positive pressure has exceeded its allowable limits. • This alarm is accompanied by a repeating audible tone.	• Ensure the clamps are open. • Ensure tubing is not kinked or blocked in any way. • Reposition the client to ensure no pressure on the dressing. • Press Reset and ensure that therapy is ON. • If it does not continue to work, change to another device. If this is not effective, turn device off and immediately notify MRP.
Therapy Internal Temperature Alert: • Solid yellow symbol appears when the internal temperature of the VACUlta therapy machine is outside of specified limits.	• Move the NPWT machine to an environment where there is air flow. It may take 2 hours for the therapy machine to return to normal operating temperature.

• This alert is accompanied by a repeating audible tone.	
System Error (Machine Failure) Alarm: • Solid yellow symbol appears when there is a system fault with the VACUlta therapy machine after it has been powered ON. • This alarm is accompanied by a repeating audible tone.	• Power machine OFF, if not already, and then restart to see machine will work. • If not, record error number on service request and replace machine. • If unable to restart therapy in 2 hours, notify MRP immediately.
3M/KCI Customer Service: Phone: 1-800-668-5403 1. choose option 1 (English) 2. choose option 4 (clinical support), if outside business hours then 3. press 1 for 24/hr support	

Appendix B: Procedure: Changing the Canister for a VACUlta4 Device

Steps	Key Points
1. Assemble equipment and supplies: • Sterile replacement NPWT canister • Alcohol swab x 1 • Appropriate PPE	Avoid the 1000ml canister if indicated.
2. Set up for the procedure: • Perform hand hygiene and put on PPE. • Stop the therapy by pressing Start/Stop button. Close all the tubing clamps. • Open the sterile canister package and leave the canister resting on the sterile packaging.	Do not power off the machine.
3. Prepare the tubing connector site: • Scrub the used canister and dressing tubing connection site with the alcohol swab for 30 seconds, and let it dry for 30+seconds. • Disconnect dressing tubing from used canister tubing.	Alcohol must be allowed to dry for 30+ seconds for it to be effective.
4. Change the canister: • Keeping the new tubing tip sterile, attach the new canister tubing to the dressing tubing. • Press the ejection button on the used canister to release it from the machine. • Click the new canister into place. • Unclamp both tubing clamps. Restart the therapy by pressing the Start/Stop button. • Write the date on the canister.	The alarm will sound if not fully clicked into place.
5. Clean up work space: • Discard the old canister and used supplies.	

Effective Date:	30-JAN-2024	
Posted Date:	30-JAN-2024	
Last Revised:	30-JAN-2024	
Last Reviewed:	30-JAN-2024	
Review Due by:	30-JAN-2027	
Approved By: *(committee or position)*	PHC	VCH
	PHC Professional Practice Standards Committee	VCH: (Regional DST Endorsement - 2nd Reading) Health Authority & Area Specific Interprofessional Advisory Council Chairs (HA/AIAC) Operations Directors Professional Practice Directors Final Sign Off: Vice President, Professional Practice & Chief Clinical Information Officer, VCH
Owners: *(optional)*	PHC	VCH
		VCH, CNS Wound, Ostomy & Continence