SUBJECT: **NEGATIVE PRESSURE WOUND THERAPIES (NPWT's)**

Policy No.: C148 (NEW)
Effective Date: 05/2020

PURPOSE OF PROCEDURE: To promote wound healing and patient safety when using negative pressure wound therapies (NPWT's). Indicated for patients with chronic, acute, traumatic, dehisced wounds, partial-thickness burns, flaps/grafts, and ulcers (e.g. diabetic, venous insufficiency, pressure injuries).

PHYSICIAN ORDER REQUIRED: Yes

PERFORMED BY: Primary Care Providers, RN, LVN, and, Affiliating Nursing Students under the supervision of an RN.

DEFINITIONS:

A. **NPWT:** An integrated wound vacuum-assisted closure system, (Wound **V.A.C. ®). I**n conjunction with a specialized foam dressing, applies continuous or intermittent negative pressure to the surface of a wound or closed incision site. Benefits to reduce edema, increase localized blood flow, promote granulation tissue formation, reduce bacterial colonization, provide moist wound healing, and draw wound edges together to enhance and promote wound healing.

B. NPWTi-d: NPWT with instillation and dwell features is called **V.A.C. VeraFlo™** and uses the **V.A.C. Ulta™ Therapy Unit.** Irrigation requires use of specialized VeraFlo™ dressings (e.g. VeraFlo™Black foam, VeraFlo Cleanse Choice™).

POLICY STATEMENTS:

1. A providers NPWT order at minimum to include wound site, therapy mode (continuous or intermittent), vacuum suction setting (mmHg), type of foam, frequency of dressing change, and instillation mode (if applicable with wound irrigation solution type).

2. Providers are responsible for first dressing changes over new surgical incision sites.

3. Discontinuation of the NPWT will be considered when goal of therapy is met, no response/improvement observed within 2 weeks, contraindications are present, or if the patient is unable to tolerate or is non-adherent to the plan of care.

4. Complete a wound assessment upon admission to the facility and routinely with dressing changes as outlined in Nursing Policy C147.
   KEYPOINT: Removal of NPWT dressing upon immediate admission is not required if patient is admitted with working V.A.C. ® unit and Primary Care Provider has assessed current patient/dressing, reviewed plan of
5. care from referring Provider, and Provider continues same NPWT orders.

6. For NPWT equipment information please refer to 'Wound V.A.C.® Therapy' located in 'Equipment Info' within the nursing section of the Rancho Intranet. (Organization>Rancho Los Amigos>Nursing> Equipment Info).

7. Cleaning of units to be done weekly while in use, and prn if soiled. V.A.C.Ulta™ and ActiV.A.C. ™ hard surfaces of the unit can be cleaned using hospital-approved disinfecting wipes. Touchscreen to be wiped with Sani-Cloth AF3 (grey top) disinfecting wipes. Prevena™ to be cleaned with damp cloth or mild soap solution that does not contain bleach.
   KEYPOINT: Ensure unit is powered off and disconnected from AC power while cleaning.

8. If the patient is admitted with a **V.A.C. ® unit** from an outside facility, please notify NRO, Case Management, and Wound Nurse.

9. Notify Wound Nurse of any VeraFlo™ Instillation Therapy orders. Normal saline (0.9% Sodium chloride) irrigation bottle is used for NPWTi-d.

CONTRAINDICATIONS:

1. Wounds with malignancy in the wound itself, untreated osteomyelitis, non-enteric and unexplored fistulas, necrotic tissue with eschar present (exception with VeraFlo™ NPWTi-d), sensitivity to silver (when silver foam dressings used).

2. Do not place Granufoam™ (black foam), Granufoam Silver™ or Whitefoam™ dressings directly over exposed organs, blood vessels, anastomotic sites and/or nerves. The use of non-adherent dressings (e.g. Xeroform gauze, petroleum gauze, Adaptic® contact layer) is to be placed first directly over these areas for protection of structures, prior to placement of foam.
KEYPOINT: When using NPWTi-d with VeraFlo™, avoid using petroleum-impregnated contact layers. Use of a dry or silicone contact layer (e.g. Adaptic TOUCH™ is recommended).

3. V.A.C. ® units are unsafe for MRI procedures. Do not take V.A.C. ® units or dressings into the MRI environment. Place an alternative dressing such as temporary gauze moistened with normal saline until the dressing can be reapplied after the procedure.

4. Dressings left in place during x-ray procedures may create shadow casting in the area of the wound. If x-ray is ordered to the area where the V.A.C. ® dressing is, place an alternative dressing such as temporary gauze moistened with normal saline until the dressing can be reapplied after the procedure.

PRECAUTIONS:

1. Suction should not be interrupted for greater than 2 hours; otherwise the dressing will need to be changed.
KEYPOINT: If this occurs, remove the NPWT dressing and apply gauze moistened with normal saline until the dressing can be reapplied. Notify the provider.

2. Any exposed sutures, tendons, or bone in or around the wound without adequate tissue coverages are to be directly covered with an appropriate interface (e.g. Xeroform gauze, Vasoline gauze, Adaptic®, Whitefoam™) for protection, prior to placing prescribed foam in wound bed and administration of NPWT therapy.

3. Spinal cord injury patients may experience symptoms of autonomic dysreflexia. If this occurs, discontinue NPWT therapy to minimize sensory stimulation, notify provider, and continue to monitor the patient.

4. Close observation must be provided for patient on NPWT who are at increased risk of bleeding.
    a. Patients who have weakened or friable blood vessels/organs in or around the wound as a result of, but not limited to suturing of the blood vessel (anastomoses or grafts) or organs, infection, trauma, or radiation.
    b. Patients who have been administered anticoagulants or platelet aggregation inhibitors.
    c. Patients without adequate wound hemostasis.
    d. Patients who do not have adequate tissue coverage over vascular sutures.
    e. Avoid using 1000mL canister on patient with high risk of bleeding or on patients unable to tolerate a large loss of fluid volume, including children and the elderly.

5. Avoid placing multiple pieces of foam in wound bed, but when needed, document number of pieces and type of dressings used in EMR and write on labeled dressing. Upon removal of dressings, confirm that the number and type of foam pieces and any contact layers used (e.g. Xeroform gauze) removed from the wound corresponds to that documented for the previous dressing change.

6. Secure and/or bridge SensaT.R.A.C. ™ tubing away from areas that can cause pressure over skin or wound bed (e.g. bony prominences, plantars, buttocks) to avoid pressure injury development or obstruct blood flow to wound bed.
   KEYPOINT: Purpose of bridging is to connect multiple wounds or to prevent pressure that may be caused externally from SensaT.R.A.C. ™

7. Consider pre-medication as needed.

8. Monitor wound edges and skin for signs of infection or other complications while **V.A.C. ®** is in use.

9. Avoid cutting foam over the wound as fragments may fall into the wound bed.

10. Therapy unit alarms/alerts are to be addressed in a timely manner. Refer to therapy unit user manual as needed for troubleshooting.

11. If active bleeding develops suddenly or in large amounts during NPWT, or if frank (bright red) blood is seen in the tubing or in the canister, immediately STOP the NPWT, leave dressing in place, take measures to stop the bleeding, and notify the Primary Care Provider.

NPWT SYSTEMS AVAILABLE FOR USE:

1. **V.A.C.Ulta™ Therapy Unit:** Standard V.A.C. ® unit ideal for medical-surgical patients requiring NPWT or NPWTi-d. Available in NRO.

2. **Portable V.A.C. unit (**ActiV.A.C. ™)**:** Ideal for use on rehabilitation patients. Available in NRO.

3. **PREVENA™ Peel N'Place™ & Prevena Plus™ Customizable™ Incision Management Systems**: Surgical incisional disposable unit ideal for intraoperatively use. Available to check out in Wound Nurse Office. Used on intact linear incisions. Peel N'Place**™** is available in 13cm or 20cm. For incisions longer than 20cm, or non-linear incisions consider using Prevena Plus**™** Customizable**™** Dressing Kit. For all other surgical incisional wounds, consider use of V.A.C. Ulta unit with Granufoam and contact layer to create a surgical incisional dressing.

PROCEDURAL STEPS:

I. **WOUND BED PREPERATION**

   A. Ensure the patient has no allergies to skin preparation or wound dressing products.

   B. Gather ordered V.A.C. ® unit and foam dressing supplies (See further description in Equipment Info section within Rancho nursing intranet):

   C. Assess patient's pain level and provide non-pharmacologic interventions and/or administer premedication per the provider's order.

   D. Perform hand hygiene and don clean gloves.

   E. Position the patient to provide comfort and allow direct visualization of the wound.

   F. Ensure patient's privacy.

   G. Cleanse and irrigate wound.

   H. Assess for excess bleeding.

   I. Assess wound dimensions, tissues in wound bed, presence of undermining or tunnels, need for debridement or need for a non-adherent layer to protect blood vessels/organs/nerves.

J. Take photos if needed.

K. Clean and dry periwound skin.

L. Trim hair around the intact periwound skin where the dressing will be applied to improve dressing adhesion and seal integrity.

II. APPLICATION OF NPWT WITH GRANUFOAMS (e.g. black, silver, white):

A. Protect periwound skin and bridging areas with skin protectant, V.A.C. ® Drape, and/or hydrocolloid. When using V.A.C. ® Drape to protect the skin, remove stabilizing back layers #1 as you apply drape. Remove back layer #2 and then remove the end handling tabs.

B. Cut the V.A.C. ® Foam dressing to fit the size and shape of the wound

C. **KEYPOINT**: Whitefoam**™** is recommended for tunneling wounds. Cut the WhiteFoam**™** dressing wide at one end and narrow at the other. Pull foam out 1-2cm from wound base and allow at least 2cm of wider end exiting from the wound bed to facilitate removal.

D. Gently place foam into wound. Do not over pack the wound or allow the foam to touch the patient's healthy periwound skin.

E. Note and document the number of foam pieces used. Confirm foam-to-foam contact if more than one piece of foam used.

F. If WhiteFoam**™** is used, place black foam over to provide for optimal pressure redistribution.

G. Trim V.A.C. ® Drape to cover foam dressing with an additional 3-5cm (1 ¼ to 2 inches) border of drape to cover the intact periwound skin.

H. Choose an appropriate SensaT.R.A.C. ™ pad application site (use a Y-connector when using two SensaT.R.A.C. ™). Avoid placing pad over bony prominences and on weight bearing areas to reduce pressure over wound.

I. Pinch drape and cut a 2.5cm (quarter-sized) hole through the drape. Apply the Sensa T.R.A.C. ™ pad directly over the hole and remove backing layers.

J. Bridging a wound: Purpose is to connect multiple wounds using one V.A.C. ® therapy unit (use Y-connector when necessary), or to displace pressure from SensaT.R.A.C. ™ tubing over wounds located on bony prominences or in areas under direct pressure when ambulating. It is important to protect the healthy skin between wounds with V.A.C. ® Drape prior to placing GranuFoam**™** used for bridging.
KEYPOINT: It is not recommended to bridge an infected wound with a non-infected wound or to bridge wounds of different etiology.

K. Position tubing away from bony prominences. Use padding as necessary when securing the tubing.

L. Connect the SensaT.R.A.C. **™** pad tubing to the canister tubing (ensure clamps on each tube are open) and canister is securely locked into unit.

M. Power on system.

N. Select 'V.A.C. ® Therapy' option displayed on the systems screen.

O. Select the pressure setting as prescribed.

P. Select 'Advanced Settings' for intensity and V.A.C. ® therapy as ordered or when needed.

Q. Ensure suction is maintained and no leaks occur. Cover any leaks with extra drape, or gently press around wound edges and the SensaT.R.A.C. ™ pad.

R. Label the dressing with the date, time of application, nurse initials, and number of foam pieces placed within the wound.

S. Reassess patient pain level and provide non-pharmacologic interventions and/or administer medication per provider orders.

T. Discard excess foam supplies, remove PPE, and perform hand hygiene. Save excess drapes for future dressing changes and/or to repair leaks.

III. APPLICATION OF NPWTi-d WITH VERAFLO DRESSINGS

A. Notify Wound Nurse of VeraFlo™ Instillation Therapy order.

B. Obtain 0.9% Sodium chloride (normal saline) irrigation bottle pre-labeled with orange sticker "V.A.C. ® Irrigation Only". Label with date and time.
KEYPOINT: Prior to initiating irrigation, inspect bottle for any indications of tampering contamination, deterioration or expiration.

C. Remove the V.A.C. VeraLink™ Casette from packaging and insert into the V.A.C. Ulta™ Therapy Unit until it locks into place. Clamp tubing and remove both caps from irrigation bottle, replace With the V.A.C. Veralink™ Casette adapter.

D. Using the V.A.C. VeraLink™ Cassette, spike and connect the irrigation solution bottle to the V.A.C.VeraLink™ Cassette.

E. Hang bottle on the V.A.C. Ulta™ unit's adjustable solution hanger arm.

F. Avoid using VeraFlo™ in wounds with unexplored tunnels, fistulas, or unexplored undermining as wound solutions may enter unintended into cavities.

G. Place a non-petroleum based contact layer (e.g. Adaptic TOUCH™) over any exposed or Superficial vessels and organs in or around the wound bed prior to foam placement.

H. Protect periwound skin and bridging areas with skin protectant, V.A.C. ® Drape, and/or hydrocolloid. When using V.A.C. ® Drape to protect the skin, remove stabilizing back layers #1 as you apply drape. Remove back layer #2 and then remove the end handling tabs.

I. Obtain appropriate VeraFlo™ dressing kit.

J. Cut the VeraFlo™ foam dressing to fit the size and shape of the wound.

K. Gently place foam into wound. Do not over pack the wound or allow the foam to touch the patient's healthy periwound skin.

L. If using VeraFlo Cleanse Choice™, the foam contact layer (with holes) is placed in direct contact With the wound bed. Place the second foam (without holes) on top and use additional foams to fill In wound depth.

M. Confirm the foam-to-foam contact if there is more than 1 piece of foam placed in the wound.

N. Trim V.A.C. ® Advanced Drape to cover foam dressing with an additional 3-5cm (1 ¼ to 2 inches) border of drape to cover the intact periwound skin.

O. Pinch drape and cut a 2.5cm (quarter-sized) hole through the drape. Apply the appropriate V.A.C.

VeraT.R.A.C. Pad (single or duo). Avoid placing pad directly over bony prominences and on weight bearing areas.

P. Remove V.A.C. canister from packaging and insert into the V.A.C. Ulta™ Therapy unit until it locks into place. Connect V.A.C. canister tubing to VeraT.R.A.C. tubing.

Q. Connect the instillation line of the V.A.C. VeraT.R.A.C. Pad to the V.A.C. VeraLink Cassette tubing.

R. Open all 4 tubing clamps and position appropriately to prevent pressure points/or skin irritation.

S. Turn on the V.A.C. Ulta™ Therapy Unit.

T. Select 'V.A.C. VeraFlo Therapy'

U. Select target pressure and therapy mode as ordered.

V. Additional settings can be selected to individualize for patient by pressing 'Advanced Settings'.

W. Default settings will reflect the following:
1. Fill Assist: On
2. Start Phase: Instill
3. Instill Volume: Fill Assist
4. Soak Time: 10 minutes
5. V.A.C. Therapy Time: 3.5 minutes
6. Target Pressure: 125mmHg
7. Intensity: Medium
8. V.A.C. Therapy Mode: Continuous

X. Press the 'Start/Stop' green button to confirm settings & start therapy

Y. Seal check will begin. Drawdown may take up to 2.5 minutes to establish seal depending on the size of the wound. Patch with transparent film as needed for leaks that may be observed in drape. Dressing will appear wrinkled & raisin pruned on seal.

Z. Setting the FILL ASSIST:
1. Select the "START" from the Start/Stop button to begin delivering solution to the patient's wound.
2. Watch the foam as the wound fills with solution and ensure the dressing does not balloon larger than what a regular NPWT foam would appear prior to application of NPWT.
3. Select the "STOP" from the Start/Stop button again to stop the solution delivery once desired amount is delivered.
4. Restart the FILL ASSIST by pushing the RESET button if there is too much fluid in the wound or select "OK" to confirm the fluid volume.
5. By pressing the 'OK' button, the unit will automatically initiate therapy beginning with dwell/soak time.

AA. VeraLink Cassette and attached tubing/solution to be changed at minimum every 3 days and sooner if more than 11,000mL of solution has been instilled since previous change.

BB. Label the dressing with the date, time of application, nurse initials, and number of foam piece placed within the wound.

CC. Reassess patient pain level and provide non-pharmacologic interventions and/or administer medication per provider orders.

DD. Discard supplies, remove PPE, and perform hand hygiene. Save excess Drapes for future clean

dressing changes or to repair leaks.

IV. APPLICATION OF PREVENA INCISION MANAGEMENT SYSTEMS (Peel N' Place & Customizable)

A. Open the Peel N'Place dressing package and remove dressing and patch strips. If using Customizable, seal strips will be included in kit.

B. Gently peel back the center strip on the back of the Peel N' Place dressing exposing the pull tabs and adhesive.
KEYPOINT: When using the Customizable, cut the foam strip to sizes needed for each incision line and then remove white liner on backing of dressing. Then place seal strips at ends of the foam dressing where white liner was removed to help ensure a good seal.

C. Center and apply the dressings over the closed wound or incision ensuring that the adhesive will not contact or cover the surgical closure. Ensure tubing are free from bends or kinks.

D. In Peel N'Place, remove the remaining bottom adhesive covers by grasping the bottom tabs and gently pulling.

E. Firmly press around the dressing to ensure a good seal where the adhesive contacts the skin.

F. Remove top stabilization layers.

G. Connect to therapy unit.

H. Remove the Prevena canister from the package and insert the canister into the therapy unit. Canister is fully inserted when the side tabs are in contact with therapy unit.

I. Connect the dressing tubing to the canister tubing by twisting the connectors until they lock.
KEYPOINT: Dressing can be connected to a V.A.C. Ulta with the use of a Prevena V.A.C. connector when drainage exceeds canister capacity. Notify MD prior to connecting to V.A.C. Ulta.

J. Begin therapy by pressing and holding the ON/OFF button for 2 seconds; an audible beep will confirm that therapy is on. A green light on the front of the unit will display.
   1. Prevena pressure settings are preset to 125mmHg.
   2. Therapy should be continuous for a minimum of 2 days up to a maximum of 7 days.

K. Label the dressing with the date, time of application, and nurses initials.

V. CREATING A SURGICAL INCISIONAL DRESSING USING A V.A.C.ULTA OR PORTABLE ACTI V.A.C. UNIT

A. Apply V.A.C. drape to the area surrounding surgical incision, being cautious not to cover incision line or sutures/staples surrounding incision.

B. Apply a single contact layer dressing (e.g. Adaptic, Xeroform gauze) directly over the incision line, staples, or sutures.

C. Cut Granufoam dressing to the size of surgical incision and apply over contact layer dressing.

D. Secure entire dressing with V.A.C. drape. Do bridging if needed.

E. Pinch drape and cut a 2.5cm (quarter-sized) hole through the drape. Apply the Sensa T.R.A.C. pad directly over the hole and remove backing layers.

F. Position tubing away from bony prominences. Use padding as necessary when securing the tubing.

G. Connect the SensaT.R.A.C. pad tubing to the canister tubing (ensure clamps on each tube are open) and canister is securely locked into unit.

H. Power on system.

I. Select 'V.A.C. ® Therapy' option displayed on the systems screen.

J. Select the pressure setting as prescribed.

K. Select 'Advanced Settings' for intensity and V.A.C. ® therapy as ordered or when needed.

L. Ensure suction is maintained and no leaks occur. Cover any leaks with extra drape, or gently press around wound edges and the SensaT.R.A.C. pad.

M. Label the dressing with the date, time of application, nurse initials, and number of foam pieces placed within the wound.

N. Reassess patient pain level and provide non-pharmacologic interventions and/or administer medication per provider orders.

O. Discard excess foam supplies, remove PPE, and perform hand hygiene. Save excess drapes for future dressing changes and/or to repair leaks.

VI. DISCONTINUING THE NPWT SYSTEMS:

A. **V.A.C. Ulta™ and ActiV.A.C. ™ Therapy Units**: Discard all used disposable items into biohazard waste bag. Clean unit as instructed. Place the therapy unit into clear plastic bag. Adhere patient identification label sticker to sealed bag. Return therapy unit to NRO.

B. **PREVENA™ Incision Management Disposable Systems:** Dispose of system into biohazard waste bag.

PATIENT CARE

A. Change dressing according to provider order.
B. Monitor frequently for dressing patency, signs of wound infection, drainage output, and periwound condition.
C. Monitor and assess patient for pain in wound bed.
D. Collaborate with Case Management in planning for discharge (e.g. patient/caregiver training, supplies/equipment).

PATIENT/FAMILY EDUCATION

A. Purpose of NPWT, monitoring of the wound, periwound tissue and exudate for signs of infection, worsening of wound or other complications.
B. Instruct patient/family to report to Provider any signs of infection (fever, tenderness, redness, swelling, itching, rash, increased warmth in the wound or periwound area, purulent discharge or strong odor).
C. Teach the patient/family to report any sounding alarm to providers and how to troubleshoot if patient will be taking NPWT home for therapy.
D. How to apply dressing and/or direct wound dressing care for home discharge if applicable.
E. Inform patient going home with NPWT to contact case manager for any equipment concerns and vendor for any equipment operating concerns.

DOCUMENTATION

A. Label dressing with number of foam used, date, time and nurses initials. Also document in EHR.
B. Drainage output and describe characteristics each shift according to nursing protocol.
C. Amount of irrigation instilled.

D. Record your wound assessment within the electronic medical record and take photos according to policy C147.
E. Describe status of dressing and surrounding skin within every shift wound assessment in EMR.
F. Patient/family teaching, understanding of teaching and return demonstration in EMR.
G. Unexpected outcomes and related treatment.
H. Patient's response to procedure.

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