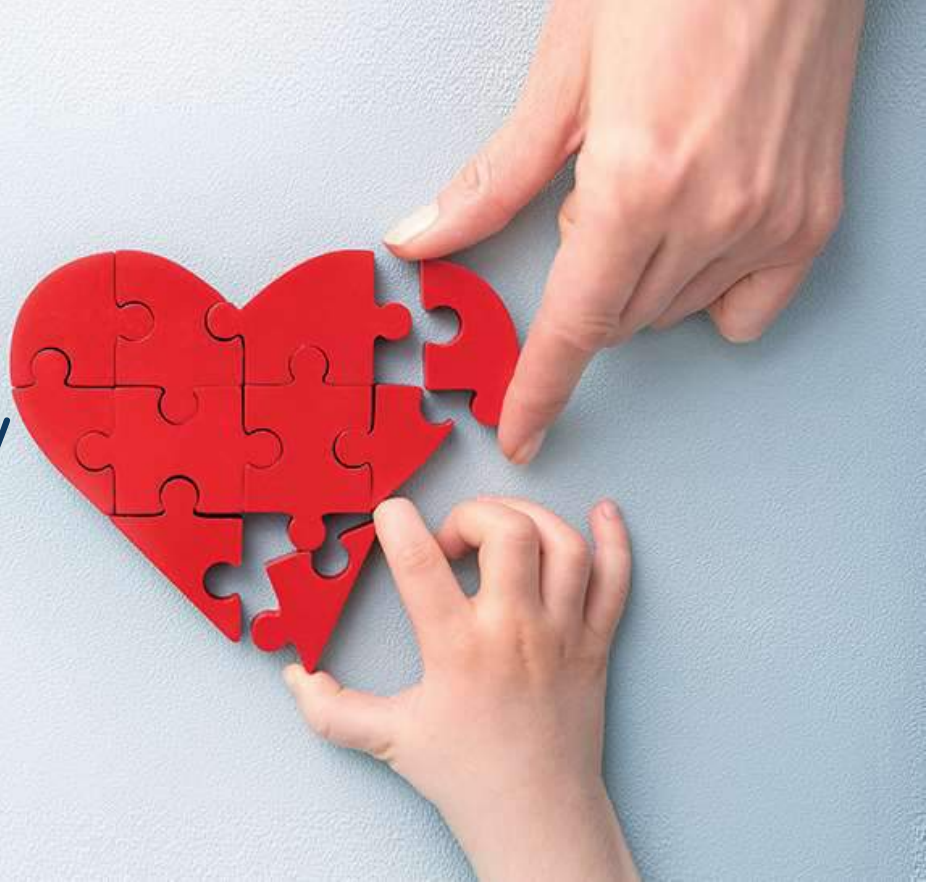
CARDIOLOGY 2024

Surgical Site Healing
A Role for
Vacuum Assisted Closure Therapy

Christy Bosler, MS, PA-C

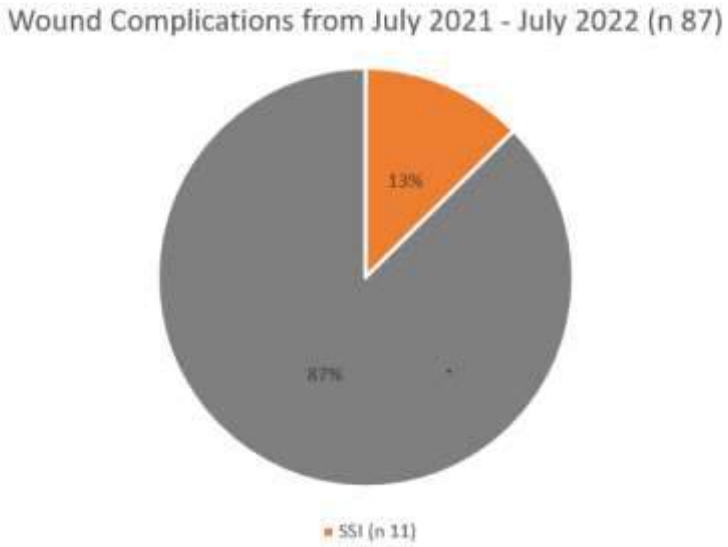
February 15, 2024

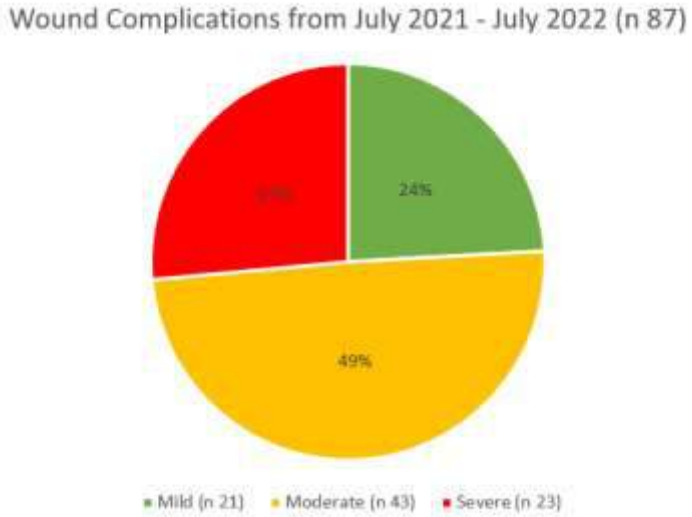


Children's Hospital of Philadelphia
Cardiac Center

POSTOPERATIVE WOUND COMPLICATIONS

SSI rates are closely monitored, but capture only a fraction of total wound complications





POSTOPERATIVE WOUND COMPLICATIONS

- Postoperative wound complications are a common problem, and they often require specialized wound treatment or additional interventions. This may have potential impacts on readmission rates, cost of care, and hospital length of stay, as well as overall patient& family satisfaction.
- Time
- Personnel
- Staff and Patient Education
- Follow-up

BACKGROUND: BEFORE VACS

- Baby FK DOL #0 term delivery with Hypoplastic Left Heart Syndrome, Birth weight 3.92kg. Started on PGE 0.01. Underwent Stage 1/Norwood with Sano Shunt on DOL #2. Delayed sternal closure on POD #2.
- POD #3 from DSC, erythema & drainage from MSI. Antibiotics started and continued for a 7 days. The incision required daily wound care with Carraklenz cleaning solution and gentle debridement and packing with aquacel ribbon.

VACUUM ASSISTED CLOSURE THERAPY

Historically used in Orthopedics, Trauma, Abdominal Surgery

Vacuum Assisted Closure Therapy (VAC)

1. Open Wound VAC Therapy
2. Closed Skin VAC Therapy, Skin VAC

-Incisional VAC, -iVAC

CT Surgery Implementation 2015

- Wound VACs
- Skin VACs
- used sparingly at first

VAC BENEFITS

Clinical Benefits

- Closed wound environment
- Even distribution of pressure
- Negative pressure pulls and brings the surgical skin edges closer together
- Promotes tissue granulation at a cellular level
- Increases blood flow to the surgical wound
- Allows exudative material and fluid to be drawn out of the wound
- Decreased tissue edema

WHEN WE USE WOUND VAC THERAPY

Indications for use at CHOP:

- Midsternal /Thoracotomy / Pacemaker incisions
- VAD Driveline/Cannula Sites
- s/p I &D
- Drainage

Partial, superficial & deep wound dehiscence

WOUND VAC THERAPY

- 7 year old pt s/p VAD
- Driveline Sites s/p Transplant

WHEN TO USE SKIN VAC THERAPY

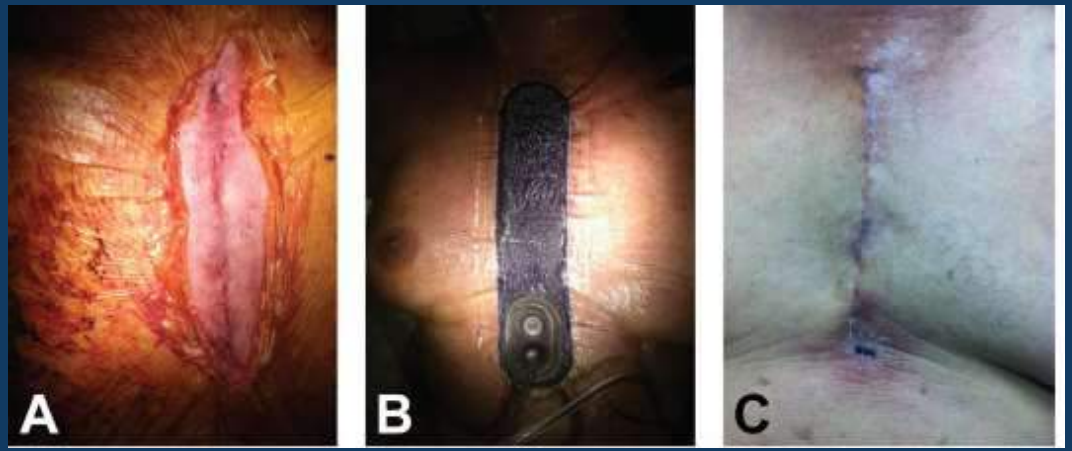
- All Incisions
- Treated as a surgical dressing
- Placed under sterile conditions at end of OR case
- Removed post-op day #7
- High risk patients
  - Neonates
  - Delayed sternal closure
  - Unplanned reoperation
  - Transplant / Immunocompromised
  - At surgeon discretion

- ~10% Reduction in Wound Dehiscence of Neonates

VAC Supplies

SKIN VAC THERAPY

SKIN VAC THERAPY



SKIN VAC THERAPY

3 y/o male
s/p Heart
Transplant

4 month old
Lymph
patient
s/p Right
Thoracotomy

SKIN VAC THERAPY

21 month old female s/p redo sternotomy and PPM revision

SKIN VAC THERAPY REMOVAL

19 day old female with CBH

s/p Pacemaker Placement

POD#7

15 year old female

s/p VAD Placement

POD #7

SKIN VAC REMOVAL

Children's Hospital of Philadelphia

SKIN VAC REMOVAL

s/p Norwood Procedure on DOL#2

Skin VAC Removal POD #7

2 week old s/p PA Thrombectomy Skin VAC Removal POD#7

VAC MONITORING

Frequency of Changes:

- Wound VAC: 2-3x/wk
- Skin VAC: Remove POD #7

Pain control:

- Wound VAC - premedication
- Skin VAC = “Sticky Band-Aid”

DOCUMENTATION

Documentation
Photos
Note
EMR

Vacuum Assisted Closure and Dressing Change				
VAC Location				
Cumulative Volume (mL) in Canister				
VAC Drainage Amount (hourly mL)				
VAC Drainage Appearance				
VAC Dressing Status				
Vacuum Assisted Closure and Dressing Change				
VAC Location				
Cumulative Volume (mL) in Canister				
VAC Drainage Amount (hourly mL)				
VAC Drainage Appearance				
VAC Dressing Status				

LIMITATIONS

Few Limitations:

Do not use on

- Areas with poor blood flow
- Exposed Organs
- ECMO cannulation sites with exposed blood vessels

Post-op Imaging, ECHO

Discharge prior to POD #7

VAC BENEFITS

- Keeps the wound bed and surgical sites clean
- Reduces swelling and inflammation
- Increased blood flow to the wound
- Draws wound edges together
- Efficiency for Surgical Staff = overall less time doing Daily wound care
- Ease of placement
- Once placed, works independently “Set it and Forget it”
- Staff and Family Acceptance
- Results Speak for Themselves!

WHAT DID WE LEARN?

ESTABLISHING VAC THERAPY PROGRAM

- Surgeons / CT Surgery Team Ownership
- Equipment
- Start Using!
- Support & Education
- Multidisciplinary Team Approach
- Patient & Family Education
- Guidelines
- Outpatient Support

SUMMARY

- Background
- How We Use VACs
- Benefits
- Education & Training
- Successful VAC Therapy Program

Success!!

REFERENCES

- Joice, Gregory. Prevention of Surgical Site Infections with Prophylactic Incisional Negative Pressure Wound Therapy in a Radical Cystectomy ERAS Protocol. Abstract. https://www.sciencedirect.com/science/article/abs/pii/S2405456919302925. https://doi.org/10.1016/j.euf.2019.09.016
- Muacevic A, Adler JR Reddy VS(. Use of Closed Incision Management with Negative Pressure Therapy for Complex Cardiac Patients. *Cureus*. 2016; 8 (2). https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4807920/. doi:10.7759/cureus.506.
- Onan, I.S., Yildiz, O., Tüzün, B., Timur, B., & Haydin, S. (2019, February). Vacuum-Assisted Closure for Mediastinitis in Pediatric Cardiac Surgery: A Single-Center Experience. *Artificial Organs*, *43*(2), 119-124. https://doi.org/10.1111/aor.13321
- Suelo-Calanao RL, Thomson R, Read M, Matheson E, Isaac E, Chaudhry M, et al. The impact of closed incision negative pressure therapy on prevention of median sternotomy infection for high risk cases: a single centre retrospective study. *J Cardiothorac Surg*. 2020; 15 (1): 1-9. https://www.ncbi.nlm.nih.gov/pubmed/32814569. doi:10.1186/s13019-020-01265-1.
- Tarzia, V., Carrozzini, M., Bortolussi, G., Buratto, E., Bejko, J., Comisso, M., Mescola, V., Penzo, V., Guarino, M., De Franceschi, M., Pagnin, C., Castoro, M., Guglielmi, C., Testolin, L., Bottio, T., & Gerosa, G. (2014, July). Impact of vacuum-assisted closure therapy on outcomes of sternal wound dehiscence. *Interactive CardioVascular and Thoracic Surgery*, *19*(1), 70-75. https://doi.org/10.1093/icvts/ivu101

THANK YOU