Prevention of Poststernotomy Wound Infections in Obese Patients by Negative Pressure Wound Therapy

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Key event in most of sternal wound infections: (6000 pts/y in Germany)

Breakdown of skin suture

Seepage of skin flora into deeper layers
Concept of prophylactic Negative Pressure Wound dressing Treatment (NPWT)

- “Sterile” wound environment
- Foam dressing; -125 mmHg
- Stable adaptation of incision edges
- Reduction of:
  - Tensile stress (supine position)
  - Buckling stress (sitting position)
- Improved wound healing
  - Antibacterial barrier after 6-7 days
Methods

- Two-arm prospective study, 150 patients (BMI ≥ 30) with median sternotomy
  - NPWT foam dressing (PREVENA™) (n=75)
  - Control (conventional wound dressing) (n=75)

- Primary endpoint: Wound infection requiring revision within 90 days

- Mann-Whitney U-test, Fisher’s exact test, Kaplan–Meier analysis
Results (I)

Wound infections within 90 days

Control NPWT

Skin flora

Other germs

\[ p = 0.027 \text{ (all infections)} \]

\[ p = 0.009 \text{ (skin flora)} \]
Results (II)

At time of NPWT dressing removal

- Incision is closed/healed
  - even in problem zones

- Antimicrobacterial barrier is established
Results (III)

Time until diagnosis of infection

![Graph showing time until diagnosis of infection](image)
Conclusion

Prophylactic NPWT over clean, closed incisions for the first 6 to 7 postoperative days significantly reduces the incidence of wound infection after median sternotomy in the high-risk group of obese patients.
The presented study is an initiative of the Deutsches Herzzentrum Berlin (the Institution) (Investigator Prof. Onnen Grauhan)

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(The Prevena™ Closed Incision management System is the product described in this study)
Economic Considerations
(Germany, 95 000 cases/year)

- 3x VAC revision +3 week hospital stay
  - Costs: 36,261 € vs. 13,356 € per patient *
  - -9,154 € (hospital) vs. -13,751 € (health-care insurance)

- NPWT -> Wound infection rate -66% (all pts.)
- Costs of wound infections -60 to -90 million €/y
  - -24 to -36 million € (hospitals)
  - -36 to -54 million € (health-care insurance)

- 350 €/unit -> Savings 30 million €/year

How does NPWT work?

- NPWT provides a “sterile” wound environment
- NPWT supports wound healing
  - Improved microcirculation, Wound secretion drainage, Stable adaptation of incision edges
- With NPWT an adequate barrier to external infectious sources (closed skin) is established much earlier (6-7 days) than with conventional wound dressing (up to 3 weeks)