

RETAINED BLOOD SYNDROME (RBS) AFTER CARDIOTHORACIC SURGERY CLINICAL & COST IMPLICATIONS

Retained Blood Syndrome (RBS) is the composite of complications after cardiothoracic surgery, including hemothorax, pericardial tamponade, bloody pleural or pericardial effusions. RBS is detrimental to patient outcomes.^{1,2,3} and may result in additional complications including Post-operative Atrial Fibrillation (POAF), Acute Kidney Injury (AKI), Hospital Acquired Infections (HAI) and stroke.^{1,2,3,4} The root cause of retained blood is chest tube clogging.



IMPAIRED CLINICAL OUTCOMES



COST IMPLICATIONS

MEASURABLE RBS INTERVENTIONS

REPORTED IN 17-20% OF PATIENTS RECOVERING FROM HEART SURGERY^{2,4}

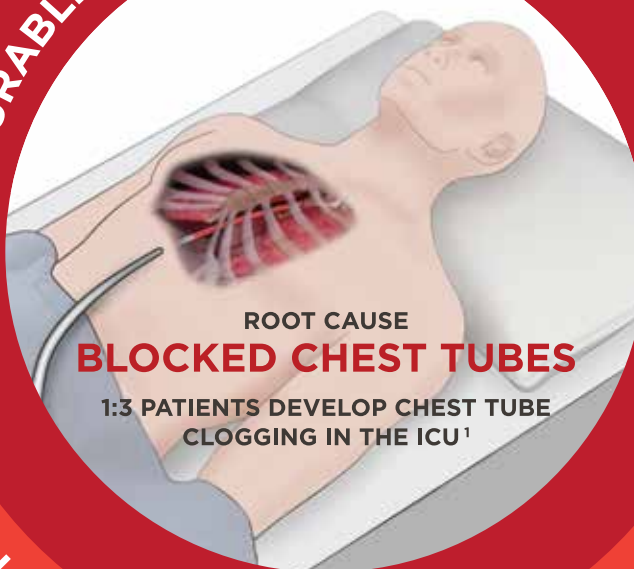
- Tamponade
- Hemothorax
- Bloody Pericardial Effusions
- Bloody Pleural Effusions

COST AND CONSEQUENCES

\$28,814 IS THE AVERAGE ADDITIONAL HOSPITAL COST PER INCIDENCE OF RBS⁴

- Increased Length of Stay
- Longer Ventilator Times
- Increased Nursing time
- Decreased ICU bed availability
- P4P Penalties
- Increased Discharges to Nursing Homes
- Increased Readmissions
- After Discharge Costs
- Medical Liability Risks

MEASURABLE RBS INTERVENTIONS



ROOT CAUSE
BLOCKED CHEST TUBES
1:3 PATIENTS DEVELOP CHEST TUBE CLOGGING IN THE ICU¹

ADDITIONAL COMPLICATIONS

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REQUIRE SIGNIFICANT HOSPITAL RESOURCES AND RESULT IN A DOUBLED MORTALITY RATE⁴

- Post-operative Atrial Fibrillation (POAF)
- Acute Kidney Injury (AKI)
- Stroke
- Delirium
- Hospital Acquired Infections (such as Pneumonia, Deep Wounds, Superficial Wounds, Sepsis)
- Mortality

COSTS AND CONSEQUENCES

PLEURAFLOW® ACTIVE CLEARANCE TECHNOLOGY® (ACT) SYSTEM HAS BEEN SHOWN TO REDUCE BOTH RBS INTERVENTIONS FROM 20% TO 11% (-43%) AND POAF FROM 30% TO 20% (-33%)².



1. Karimov, J.H., Gillinov, A.M., Schenck, L., et al. Incidence of chest tube clogging after cardiac surgery: a single-centre prospective observational study. *Eur J Cardiothorac Surg.* 2013;44(6):1029-1036. doi:10.1093/ejcts/ezt140.

2. Sirch J, Ledwon M, Puski T, Boyle EM, Pfeiffer S, Fischlein T. Active Clearance of Chest Drainage Catheters Reduces Retained Blood. *Journal of Thoracic and Cardiovascular Surgery*, March, 2016 (e-published 2015 Oct 22).

3. Boyle EM, Gillinov AM, Cohn WE, Ley SJ, Fischlein T, Perrault LP. Retained Blood Syndrome After Cardiac Surgery: A new look at an old problem. *Innovations in cardiovascular and thoracic surgery*, 2015 Sept/Oct;10(5):296-303.

4. Based on over 313,000 US adult heart surgery patients. Data extracted using ICD-9 codes from the 2010 Nationwide Inpatient Sample (NIS), from the DHHS Agency for Healthcare Research and Quality (AHRQ) Healthcare Cost and Utilization Project (HCUP).



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