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Commentary: New technology impact on chest tube clotting after cardiac surgery. A possible paradigm shift?

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CENTRAL MESSAGE

CTCTS could represent a valid treatment option for retained blood syndrome; nevertheless, caution is warranted due to cost-benefits and results confirmation from larger randomized studies.

Chest tube occlusion and the consequent blood retained syndrome after cardiac surgery remain a burden. Complications include a greater incidence of reinterventions/urgent operations, clot malformation due to coagulation disorders, and the use of blood products while various surgical strategies are adopted to reduce its incidence.[1-3]

In this issue of the *Journal*, Obafemi and colleagues[4] present the Centese Thoraguard Chest Tube System (CTCTS) to resolve the tube clotting issue. The device has an automated air sweep mechanism integrated with an automatic clearance system.

The presence of chest tube clotting after cardiac surgery has been previously demonstrated to represent a significant incremental risk for chest reopening whereas retained blood syndrome has been associated with a greater rate of hospital mortality and length of stay.[5] In the current case, the CTCTS device was found to be noninferior to an historical control group regarding chest tube clotting, reintervention, and hospital readmission.

When CTCTS is required during a prolonged chest drainage scenario, some concerns require further investigation. First, the device inflates air into the tube, which passes through the filter to be sterilized. However, the timing of the filter function/replacement and its need to become sterilized remain hindered. Second, the SmartValve functional timing and the need to be replaced also necessitates further investigation. Third, further investigations are mandatory regarding the high suction negative pressures of the device (up to –100 mm Hg during the opening phase of the SmartValve when compared with conventional suction pressures of –20 to –40 mm Hg). In this context, the high negative pressure can be associated with potential trauma on the right ventricle and venous grafts after coronary artery bypass procedures (chest tube positioning away from the grafts sometime is not possible). In addition, chest tube proximity to a venous graft can induce traumatic injury with consequent life-threating bleeding event, when high negative pressure is applied.

In addition, whereas the competitor of the CTCTS system (PleuraFlow) offers a clearance system for both curved and straight chest tubes, this conclusion cannot be deducted from the manuscript by Obafemi and colleagues.[4] Moreover, PleuraFlow data suggest a significant reduction in retained blood flow products, reduced hospital length of stay, and atrial fibrillation incidence,[6] whereas Obafemi and colleagues[4] have excluded patients with previous atrial fibrillation. Future studies comparing Blake drains (Blake drains,

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Ethicon, Inc) (which are common in the United States) with the CTCTS are mandatory to offer a complete overview of the current available treatment options.

In conclusion, the authors should be praised for the innovative use of the CTCTS to resolve the chest tube clotting issue. However, a word of caution is mandatory regarding costs–benefits and long-term outcomes. The rising health care costs in the current era are a burden for hospital administration. Adding a lot of technology and costs to something as simple as a chest tube with no difference in patient benefits compared with the standard of care[6] makes it difficult to justify the use of the CTCTS.

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