

Reduction of drainage-associated complications in cardiac surgery with a digital drainage system: a randomized controlled trial

Van Linden A, Hecker F, Courvoisier DS, Arsalan M, Köhne J, Brei C, Holubec T, Walther T. Reduction of drainage-associated complications in cardiac surgery with a digital drainage system: a randomized controlled trial. J Thorac Dis 2019. doi: 10.21037/jtd.2019.12.20

Key Facts

- Digital chest drainage and monitoring systems can be safely applied in cardiac surgery patients.
- The use of the digital drainage and monitoring system significantly decreased the incidence of chest drainage-associated complications and led to earlier chest tube removal.
- Digital chest drains provide continuous, precisely controlled, uninterrupted drainage from the operating room onwards and allow fast objective clinical decisions.

Objective, Methods and Study Population

- This trial was designed to investigate potential differences between an analog wet-seal system (Atrium Ocean; Maquet, Germany) and a digital chest drainage and monitoring system (Thopaz⁺; Medela, Switzerland) in elective cardiac surgery patients in a German hospital.
- Prospective, randomized, single-center designed study in cardiac surgery patients.
- Data collection: September 2016 until September 2017.
- All elective adult patients (≥ 18 years of age; $n=354$) scheduled for cardiac surgery could be enrolled.

Results

Primary endpoint:

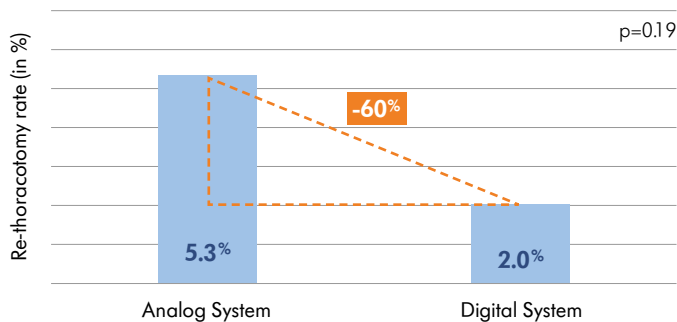
Incidence of at least one chest X-ray with a clamped drain as evaluation of suspected air leak.

The incidence of chest X-rays to detect air leaks was significantly lower for patients who have received the digital chest drainage and monitoring system (analog: 20.2%; digital: 8.6%; $p \leq 0.01$).

Secondary endpoints:

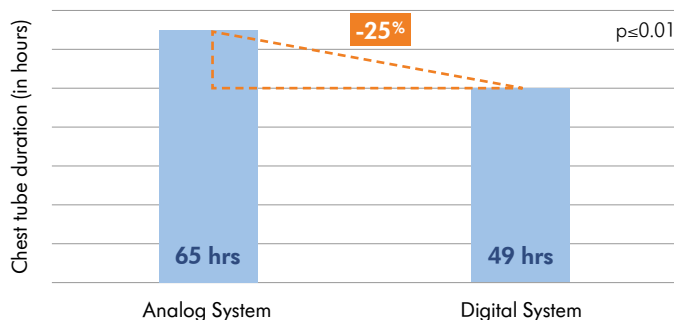
Incidence of re-thoracotomies due to tamponade or bleeding

Non-significant reduction of 3.3 percentage points in re-thoracotomies due to tamponade/bleeding, when digital chest drainage and monitoring systems were used. This means an absolute reduction of approximately 60%.



Time to chest drain removal

Significantly shortened median drainage duration of 16 hours, representing a reduction of roughly 25%.



Other secondary endpoints:

There was no evidence of a difference between both groups concerning:

- Total amount of drained fluid (median) at the time of chest drain removal.
- Length of ICU and hospital stay. This may be explained by the postoperative pathway of the clinic, where cardiac surgery patients are hospitalized for at least 1 week and then directly go to rehab.