An Educational Approach to Emergent Re-Sternotomy for ICU Nurses

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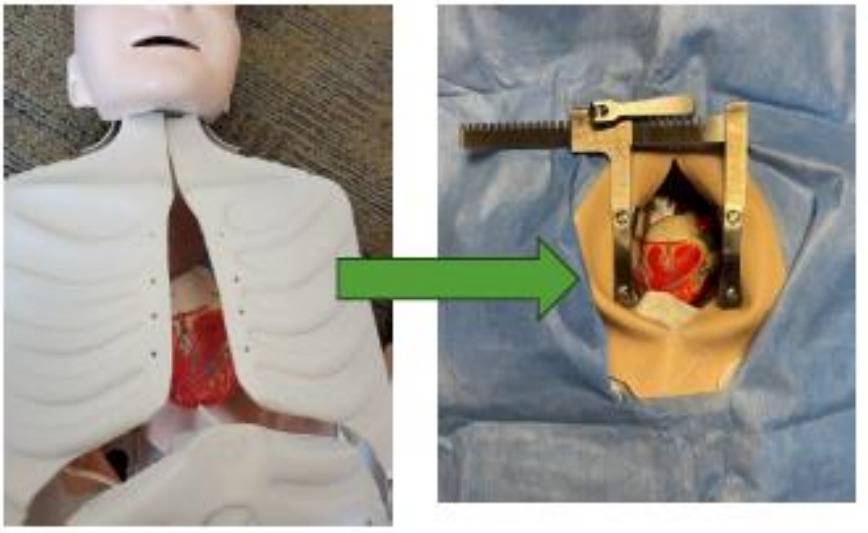
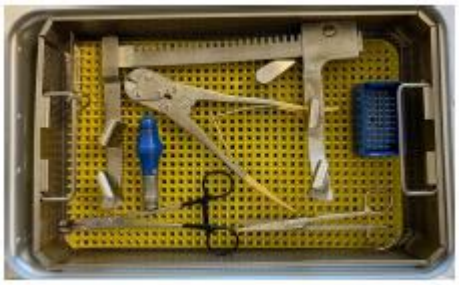


ICU nurses at William S. Middleton VA Hospital practice emergency re-sternotomy on a manikin during a hands-on simulation training session, preparing for critical, real-life cardiac emergencies. (VA Courtesy Photo)

In critical care, every second counts — especially when it comes to cardiac arrest following heart surgery. Cardiac arrest following cardiac surgery occurs in up to 8% of cases. Of these, 20-50% may require emergency sternotomy. Rapid identification and intervention are crucial for patient survival, with successful resuscitation and emergency sternotomy ideally performed within 5 minutes, according to the Society of Thoracic Surgery Guidelines.



An 'Open First Tray' prepared for emergency re-sternotomy procedures.

Staff at William S. Middleton Memorial VA worked to develop an efficient, standardized approach to emergent re-sternotomy in the Intensive Care Unit (ICU) for post-cardiothoracic surgery patients at a low-volume cardiac medical center. To prepare for this initiative, a streamlined 3-step cart and an "Open First Tray" were created. This allowed ICU nurses quick access to essential chest instruments, specialty supplies, and sterile equipment.

A series of two-hour re-sternotomy simulation sessions were conducted, led by an interdisciplinary team of a cardiothoracic surgeon, nurse educators, and ICU nurses. These sessions included:

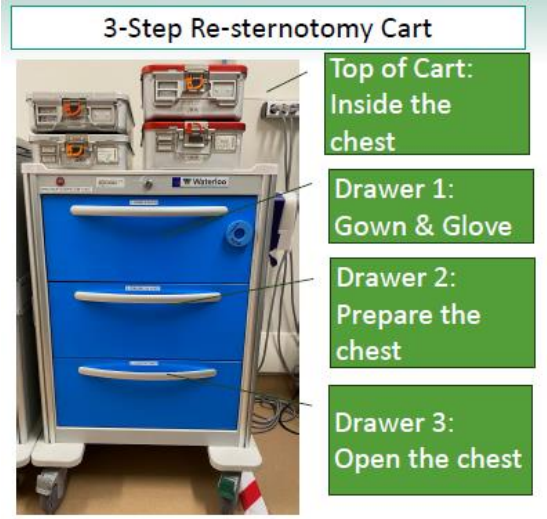
- A pre-test
- Hands-on simulations with a manikin
- Simulation debriefing
- Didactic training
- Post-training knowledge assessments and surveys

Additionally, follow-ups on action items from team debriefings were conducted, and a nine-month reassessment was carried out to evaluate knowledge retention.

Results

From July 18, 2023, to September 5, 2023, 12 re-sternotomy training simulation sessions were held, with a total of 41 ICU nurse participants. A nine-month refresher training occurred on nine occasions from March 13-27, 2024, with 47 ICU nurses.

Statistical analysis using a two-tailed t-test demonstrated a significant improvement in knowledge, with scores increasing from 69% pre-training to 92% post-training and remaining at 90% nine months later ($p < 0.05$). Confidence levels in all five areas related to re-sternotomy also showed statistically significant improvement ($p < 0.05$).



The 3-step cart designed for efficient access to critical instruments during an emergent re-sternotomy

Moreover, there was a notable reduction in the time from the decision to perform re-sternotomy to the placement of the retractor, both immediately after the training and at the nine-month reassessment ($p < 0.05$).

Conclusion

The re-sternotomy educational simulation program successfully initiated manikin-based training in the ICU, significantly enhancing nurse knowledge, confidence, and response times in emergency re-sternotomy scenarios.

Next Steps

- Continue offering initial two-hour simulation training for new ICU nurses
- Conduct annual simulation training for all ICU staff
- Involve additional cardiothoracic surgeons in the training program
- Expand training to include non-surgeon providers to ensure the five-minute gold standard for off-tour emergencies is met

By embracing this simulation-based approach, the ICU team at William S. Middleton VA Hospital is improving response times and boosting confidence, ensuring that Veterans receive the best possible care in high-stakes cardiac emergencies.