Simulation Training Takes the Jeopardy Out of Femoral Sheath Removal

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Hannah Bohlmann, RN participates in simulation training.
Photographer: Tina Smith, RN

For patients undergoing cardiac catheterization, with or without percutaneous coronary intervention (PCI), the femoral access site remains a critical point of focus. Femoral sheath removal post-PCI can lead to adverse events such as bleeding, hematoma, infection, and vasovagal reactions, increasing both patient harm and health care costs. At the Clement J. Zablocki VA Medical Center, femoral sheath removal is typically performed in the Cath Lab. However, when sheaths cannot be removed in the Cath Lab due to patient anticoagulation status, our inpatient Cardiac Care Unit (CCU) staff must undertake the procedure.

The CCU is a 15-bed acute care cardiac medical-surgical telemetry unit providing complex care to cardiology and cardiothoracic patients. Our patient population includes those undergoing diagnostic procedures such as cardiac catheterizations, electrophysiology studies, post-op coronary artery bypass, and vascular surgeries.

Femoral sheath removal is a high-risk, low-volume procedure for CCU staff. To ensure high-quality patient care, prevent incorrect clinical procedures, and aid in clinical decision-making, education staff developed an evolving patient care simulation scenario. This scenario included assessment of the site, supply decision-making (including personal protective equipment or PPE), femoral sheath removal, and adverse event interventions.

The simulation course was a collaborative effort involving subject matter experts, the registered nurse (RN) education coordinator, a simulation instructor, and a simulation operations specialist. CCU leadership invested in the following:

- 11 simulation-based education sessions
- 2 hours per session across multiple shifts
- Sessions with a maximum of 3 learners to increase exposure and teamwork
- Training for 34 RN, resulting in 68 total learning hours (valued at $3,100)

Creation of Simulation	Creation of Femoral Overlay	Simulation	SBE Set Up Time	SBE Tear Down Time	Total
13 hours	6 hours	20 hours	10.5 hours	10 hours	56.5 hours
$1,185	$273	$2,736	$479	$479	$5,152

During the simulation, CCU RN collaborated as they would in actual patient care. Self-reflection knowledge assessments were held before and after the simulation. Each simulation scenario was followed by a debriefing session using the Gather, Analyze, Summarize (GAS) Debrief Model. Knowledge assessment scores improved from 69% pre-simulation to 92% post-simulation. Notably, RNs' ability to select the five PPE items required for sheath removal increased from 44% to 91%.

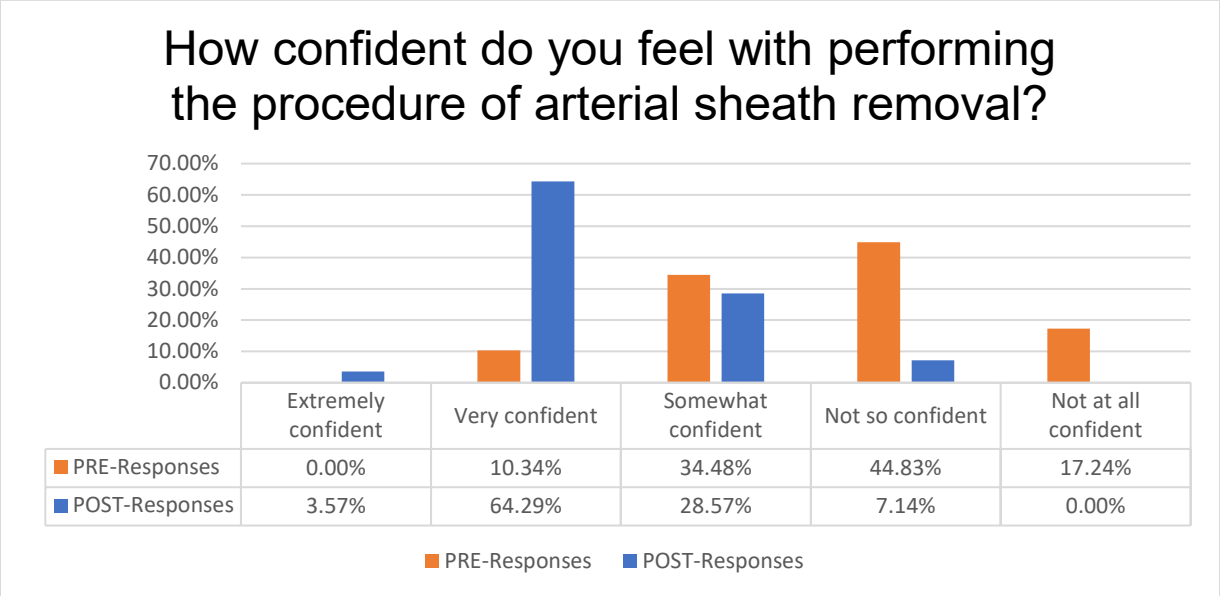
One RN requested to participate in the simulation course a second time and subsequently revised their practice for sterile technique and proper PPE based on what they had previously learned.

Staff provided additional feedback on the simulation experience:

- *"This was very helpful! The more we get practice with it here, the more prepared we'll be at the bedside."*
- *"I now know what to wear and the order of steps prior to removing a sheath."*
- *"Great simulations and discussions. Informative."*

Nurses discuss femoral sheath removal simulation training. From left to right: Hannah Bohlmann, RN, Nicole Paradiso, RN, Abigail Rodriguez, RN. Photographer: Tina Smith, RN

The structured, evolving simulation-based learning experience significantly enhanced RNs' knowledge, skills, and response to realistic situations in a simulated environment. Eighty-five percent of the RNs recommended repeating the simulation for arterial sheath removal at least yearly. Learner confidence in performing arterial sheath removal improved from a pre-simulation score of 2.5 (on a 1-5 Likert scale) to a post-simulation score of 3.75.



	Extremely confident	Very confident	Somewhat confident	Not so confident	Not at all confident
PRE-Responses	0.00%	10.34%	34.48%	44.83%	17.24%
POST-Responses	3.57%	64.29%	28.57%	7.14%	0.00%

Staff recommended annual simulation training related to femoral sheath removal. CCU leadership reviewed the outcomes and decided to increase the frequency of simulation training and incorporate it

into the onboarding orientation. The unit's shared governance committee will evaluate the outcomes to determine workflow changes that support evidence-based practice for registered nurses.

By continuously refining our simulation training programs, we aim to reduce the risks associated with femoral sheath removal and improve patient care outcomes across our institution.