

# Decreasing Arterial Line Complications: lessening ischemia, pseudoaneurysms and related complications

Combined General Surgery, Plastic Surgery Residencies and Plastic Surgery Fellowship Project  
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## Background

Radial arterial line placement and radial arterial access for procedures is not without risk to patients.

We have seen numerous complications at MUSC from radial arterial access and line placement removal including ischemia of single and multiple digits as well as hematomas and pseudoaneurysms from lack of adequate pressure after removal.

The MUSC EPIC procedure template for arterial line placement does not have a mandatory checkbox for Allen's testing

At MUSC there no formal system wide training for the use of TR bands with removal of A-lines.

The most common complication is hand ischemia from radial artery thrombosis in up to 18% of patients <sup>1</sup>

Conventional removal methods compared to patent hemostasis (with TR band devices) leads to lower rates of radial artery occlusion and ischemia, 5% vs 12% <sup>2</sup>

Kanei Y, Kwan T, Nakra NC. Transradial cardiac catheterization: a review of access site complications. Catheter Cardiovasc Interv 2011;78:840-6.

Pancholy S, Coppola J, Patel T, et al. Prevention of radial artery occlusion—patent hemostasis evaluation trial (PROPHET study): a randomized comparison of traditional versus patency documented hemostasis after transradial catheterization. Catheter Cardiovasc Interv 2008;72(3):335-40.

## Aim Statement

**Improve pre radial arterial line/access compliance to 70% by performing pre-placement Allen's test**

**MUSC Pillar: Quality**

## Methods

### Initiation:

- Initial informational PowerPoint and survey were distributed to residents/fellows
- Radial arterial line checklists were distributed the STICU resident workroom with instructions (Figure 1)
- Forms were collected at the halfway point and recorded
- We were unable to include TR band usage as part of this initial QI due to MUSC nursing policy/education

### Halfway point:

- A secondary informational PowerPoint was distributed residents/fellows
- Fliers were placed around STICU detailing project

### Reintervention:

- Forms were redistributed and collected
- Survey of project awareness was sent to general surgery and plastic surgery departments

### Radial A-line PLACEMENT Checklist

Patient label:

1. Date radial A-line placed:

Circle one for each listed below

2. Location: right hand      left hand

3. Who placed the A-line?:

Respiratory Therapist

Advanced Practice Provider

Resident: PGY1.   PGY2.   PGY3.   PGY4.   PGY5

Fellow

4. Allen's Test Performed?   YES      NO

5. Results of Allen's Test.   POSITIVE      NEGATIVE

6. Was the ultrasound used?   YES      NO

**Figure 1.** Radial arterial line checklist

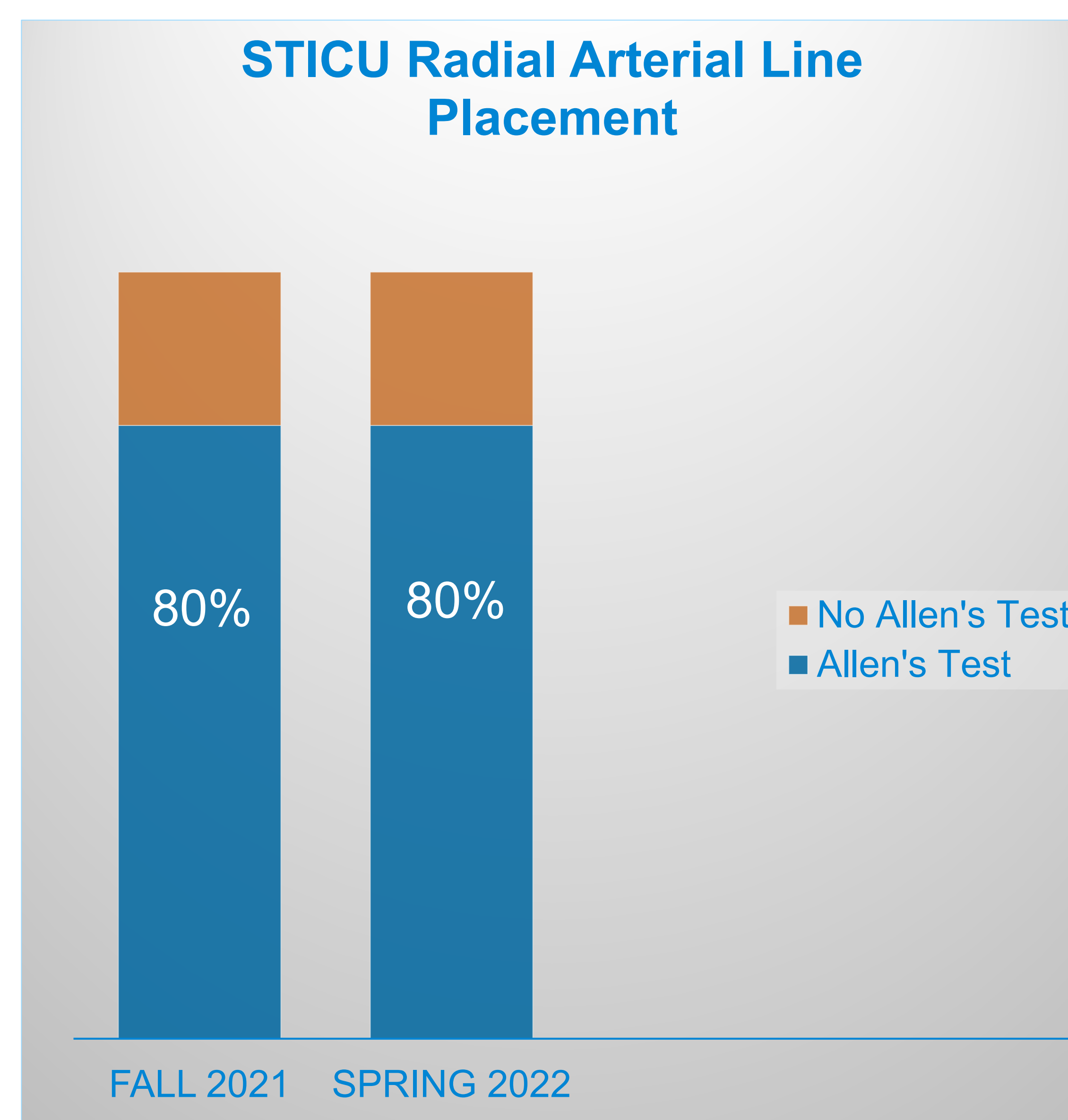
## CONCLUSIONS

- An Allen's test is easy to add as part of a pre-procedure check list prior to radial artery access
- There were no radial arterial line complications related to STICU placement of lines during this project
- There have been iatrogenic complications related to radial arterial access during this QI initiative in other departments at MUSC
- There needs to be a hospital wide initiative in order to implement patient safety measures for radial arterial line placement and access

## Barriers

- Cycling residents each month/dispersion of information
- Multiple disciplines place radial arterial lines (residents/fellows, APPs, RTs)
- Inability to include TR bands as part of this study due to hospital nursing policy/lack of education

## Results



	Fall 2021	Spring 2022
Total radial arterial lines placed	5	5
Number with Allen's Test	4	4
Complications related to STICU radial arterial line	0	0
Resident education survey participation (%)	60%	100%

## Next steps

- Increase participation with a multidisciplinary approach across ICUs at MUSC.
- Improve compliance with reliable implementation of Allen's test and completion of pre and post procedural checklists with radial A-line placement/removal.
- Currently working with EPIC to add an Allen's test checkbox under arterial line procedures, allowing for a more reliable and efficient method of documentation
- Standardize the use of adequate patent hemostasis with TR bands upon removal of a-lines across ICUs
  - Training/education sessions with hospital staff on using TR bands for achieving hemostasis following line removal, prior to initiating more widespread use of this device.