

Expedited Removal of a Radial Artery Hemostatic Compression Device Following Cardiac Catheterization Is Safe and Effective at Reducing Time-to-Discharge

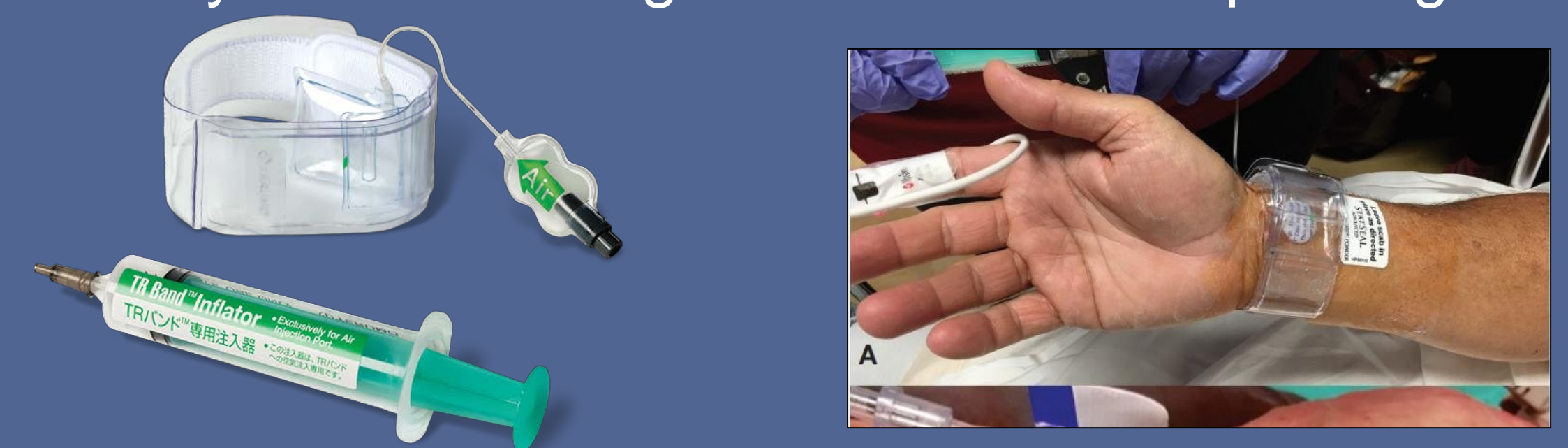
Lana Gavin, RN, MS, CCRN; Cheryl Esposito, RN, BSN; Mark Tuttle, MD; Noah Haroian, MD; Kalon KL Ho, MD, MSc
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Introduction/Problem

Radial arterial access for cardiac catheterization has become more commonly employed in the United States, owing much of its popularity to lower rates of bleeding complications compared with the femoral approach. Hemostatic compression devices (HCDs) for radial catheterization play a key role in this advantage. However, the optimal duration of compression is unknown, and there is wide variation in real-world practice. A shorter duration of compression is encouraged by consensus guidelines due to a lower risk of radial artery occlusion, but removing an HCD too quickly could result in serious bleeding.

Aim/Goal

To remove HCD safely while avoiding over inflation and prolonged compression times.



The Team

- Mark Tuttle, MD—2nd Year Cardiology Fellow
- Noah Haroian, MD—Medical Resident
- Lana Gavin, RN, MS, CCRN—Nurse Specialist
- Cheryl Esposito, RN, BSN—Holding Area Resource Nurse
- Lisa Hird, RN, MSN—Nurse Director
- Kalon Ho, MD, MSc—Quality Improvement Director
- Interventional Cardiology Holding Area and Cath Lab Nurses
- Cardiology Fellows
- Cardiology Collaborative Practices Committee

The Interventions

- We conducted a prospective study of patients undergoing cardiac catheterization via the radial artery.
- Patients underwent HCD application with a TR band® which was weaned with serial deflations after a prespecified amount of time in 3 consecutive cohorts: **120 minutes, 60 minutes, or 30 minutes.**
- Each patient was monitored for development of bleeding, hematoma, and other serious complications.

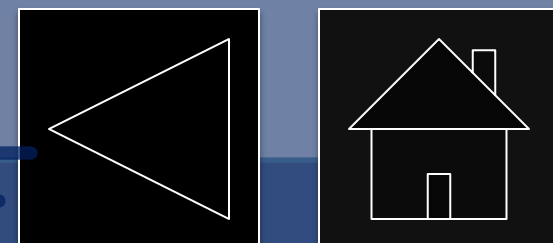
Best Practices for Transradial Angiography and Intervention



TABLE I. Strategies Associated With a Reduced Risk for Radial Artery Occlusion

Reduces risk	May reduce risk	No effect or increases risk
Anticoagulation ^a	Enoxaparin ^b	Sheath length
Patent (nonocclusive) hemostasis	Hydrophilic sheaths	Sheathless guide catheters
Sheath diameter less than radial artery diameter	Routine use of drugs to reduce radial artery spasm	
Avoiding repeated access of the radial artery	Limiting the duration of radial artery compression	

Rao, S. V. et al. Best practices for transradial angiography and intervention: A consensus statement from the society for cardiovascular angiography and intervention's transradial working group. *Catheter. Cardiovasc. Interv.* 83, 228–236 (2013).



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Results

Baseline Characteristics

Characteristic	All groups	Two-hour wean	One-hour wean	Half-hour wean
N	354	99	132	123
Age (mean)	67	67	67	66
Gender (% male)	65%	64%	64%	66%
Procedure type:				
Diagnostic only	81%	80%	80%	85%
PCI	17%	20%	18%	13%
Other	2%	0%	2%	2%
Anticoagulant (% heparin)	96%	96%	98%	94%
ACT Performed	23%	21%	21%	25%
ACT (mean)	247	260	246	238

A total of 354 patients participated in our study, with similar numbers in each group. Clinical characteristics, including age, gender, procedure type (diagnostic or percutaneous coronary intervention [PCI]), and anticoagulant were similar in all groups.

Results

Result	All groups	Two-hour wean	One-hour wean	Half-hour wean	p-value
Serious complications (need for unplanned admission, transfusion, surgical consult)	0	0	0	0	p=NS
Any bleeding N, (%)	49 (14%)	8 (8%)	26 (19%)	15 (12%)	p=0.032
Any hematoma N, (%)	18 (5%)	3 (3%)	7 (5%)	8 (7%)	p=0.47
Bleeding OR hematoma N, (%)	58 (16%)	11 (11%)	27 (20%)	20 (16%)	p=0.15
Time to TR removal (hours)	2.21	2.96	2.07	1.72	p<0.001
Time to discharge (hours)	3.46	3.88	3.23	3.32	p<0.001

(P-Values calculated using ANOVA)

There was a greater rate of minor bleeding in the 30 minute (12%) and 60 minute (19%) groups compared to the 120 minute group (8%), but there were no serious complications (need for surgical consultation, transfusion, or unplanned admission) in any of the groups.

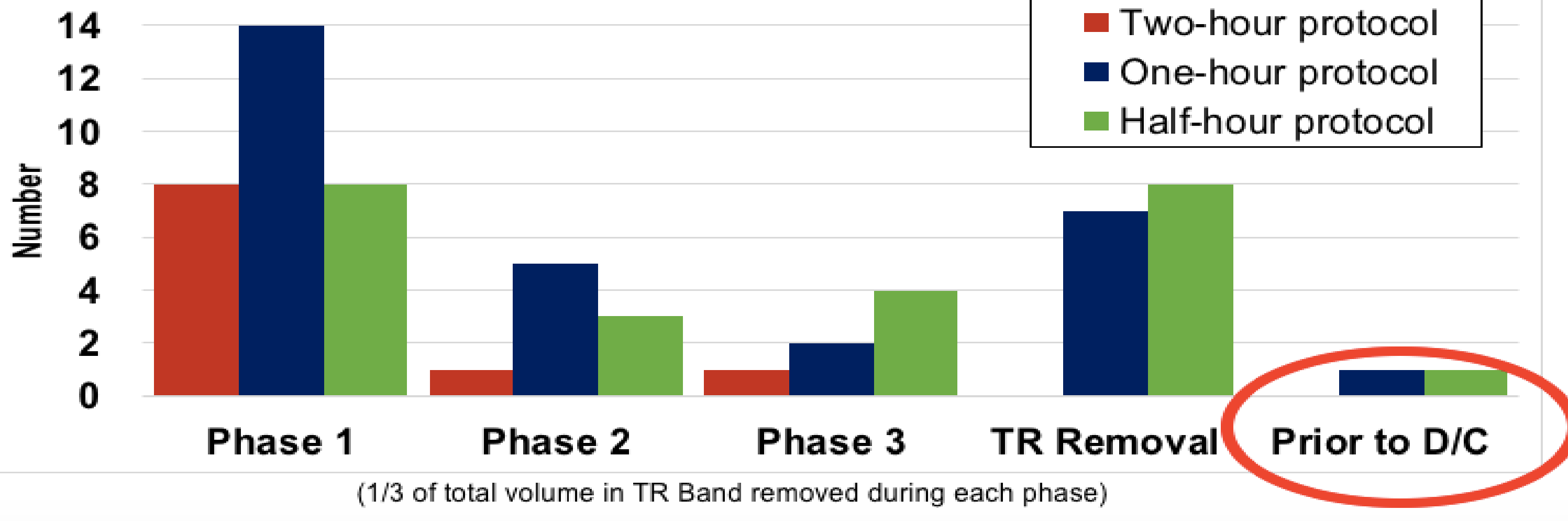
Lessons Learned

- Deflating the radial HCD at 30 minutes is safe with no increase in the observed risk of major complications. Thus, we have adopted this protocol at our institution to expedite time to discharge and minimize the risk of radial artery occlusion.
- This project identified an opportunity to improve care by incorporating the nursing assessment of perfused hemostasis for all patients with a HCD. Perfused hemostasis is a technique to assess for adequate blood flow to the hand when the HCD is inflated.
- Buy in from front line staff was a major determinant of success for the project.

Next Steps

- Nursing Education- Perfused hemostasis as standard of care
- Nursing Practice policy change and Physician Order Entry (POE) template update
- Post-Implementation Surveillance Survey

During which phase of air removal do patients experience bleeding/hematoma?



Bleeding events were minor, and generally occurred early in the serial deflations of the HCD's air cushion and resolved immediately upon reinflation without recurrence.

For more information, contact:
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