Critical Review Form
Prognosis

PGY-4

Chen JL, Hsiao CH, Yen CC. Prognostic value of cardiac troponin in elderly patients with paroxysmal supraventricular tachycardia: A multicenter study. Am J Emerg Med. 2023 Jul;69:167-172.

Objectives: **"The objective of this study is to investigate the prognostic value of troponin levels in elderly patients presenting with SVT in the ED." (p. 168)**

Methods: **This retrospective, multicenter, observational study was conducted at 4 hospitals in Taiwan between 2016 and 2017. All patients aged 65 years or older presenting to the ED with SVT who had troponin testing were eligible for inclusion. Exclusion criteria were arrythmias other than SVT, duplicate records, or previous presentation to the ED for SVT. Presence of SVT was confirmed by review of the 12-lead ECG and corresponding documentation by the attending physicians. Patient charts were reviewed for events up to 5 years after the ED visit, including SVT recurrence and major adverse cardiac events (MACE).**

The primary outcome was MACE (defined as ischemic stroke, admission due to acute decompensated heart failure, acute coronary syndrome, revascularization, coronary artery bypass grafting, and cardiovascular mortality) up to 5 years. Secondary outcomes included hospital length of stay, admission to the general ward or ICU, in-hospital mortality, and SVT recurrence up to 5 years. Patients were divided into two groups: those with a positive cardiac troponin I (cTnI) (≥ 0.04 ng/mL) and those with a negative cTnI.
Out of 174 patients admitted to the EDF with SVT during the study period, 124 met inclusion criteria. The mean age was 74.4 years and 51.6% were male. There were 39 patients (31.5%) with a positive cTnI and 85 (68.5%) with a negative cTnI. Patients with an elevated cTnI were slightly older (76.5 vs. 73.5 years, p = 0.029).

Guide		Comments
I.	**Are the results valid?**	
A.	**Was the sample of patients representative?** *In other words, how were subjects selected and did they pass through some sort of "filtering" system which could bias your results based on a non-representative sample. Also, were objective criteria used to diagnose the patients with the disorder?*	Yes. The authors attempted to identify all patients presenting to the ED with SVT who had troponin testing who were aged 65 years or older. The only exclusions were patients with prior visits to the ED for SVT.
B.	**Were the patients sufficiently homogeneous with respect to prognostic risk?**	Somewhat. The study was limited to elderly patients aged 65 years or older. While there is some heterogeneity in this group with regards to

	In other words, did all patients share a similar risk from during the study period or was one group expected to begin with a higher morbidity or mortality risk?	prior coronary artery disease, risk factors for coronary disease, and presenting symptoms (i.e. chest pain, shortness of breath, palpitations), this should remain a homogenous enough group for the purposes of this study. However, as only patients who underwent troponin testing were included, selection bias would likely lead to a group at higher risk of coronary disease and MACEs.
C.	**Was follow-up sufficiently complete?** *In other words, were the investigators able to follow-up on subjects as planned or were a significant number lost to follow-up?*	Uncertain. While not specified, follow-up was presumptively performed by chart review alone with no prespecified duration of follow-up. I am not familiar with medical records in Taiwan and do not know if all hospitals are linked or if outcomes occurring at other hospitals would be missed during chart review.
D.	**Were objective and unbiased outcome criteria used?** Investigators should clearly specify and define their target outcomes before the study and whenever possible they should base their criteria on objective measures.	Mostly yes. Rather than using the classic 3-point definition of MACE (nonfatal stroke, nonfatal MI, and cardiovascular death), the authors' definition of MACE includes admission for decompensated heart failure and "acute coronary syndrome," which is not defined in the study and open to potential subjective interpretation.
II.	**What are the results?**	

A.	**How likely are the outcomes over time?**
	For the defined follow-up period, how likely were subjects to have the outcome of interest.
		● Patients with a positive cTnI were more likely to:
		  ○ Have a cardiology consult (20.5% vs. 3.5%, p = 0.004)
		  ○ Require admission to a general ward (53.8% vs. 24.7%, p = 0.003)
		  ○ Require ICU admission (15.4% vs. 3.5%, p = 0.027)
		● Patients with a positive cTnI had a longer hospital length of stay (7.85 days vs. 2.58 days, p = 0.023).
		● Following multivariate logistic regression, age > 75 was the only significant predictor for an elevated cTnI level (OR 2.41, 95% CI 1.07 to 5.45).
		● During the 5-year follow-up period, a MACE occurred in 4 patients in the cTnI positive group (10.3%) vs. 9 in the cTn-I negative group (10.6%): RR 0.97, 95% CI 0.32 to 2.95.
		  ○ Following adjustment for age, gender, hypertension, coronary artery disease, and antiplatelet agent use, there was no significant difference in five-year MACE between the groups.

		● There were 31 patients (25%) in the overall cohort with SVT recurrence, occurring at a median 159 days following the initial episode. Although recurrent SVT occurred less frequently among those with a positive cTnI, this difference did not achieve statistical significance (RR 0.42, 95% CI 0.17 to 1.01).
B.	**How precise are the estimates of likelihood?** *In other words, what are the confidence intervals for the given outcome likelihoods?*	See above.
III.	**How can I apply the results to patient care?**	
A.	**Were the study patients and their management similar to those in my practice?**	Likely yes. While this study was conducted in Taiwan, it is likely that elderly patients presenting with SVT (without congenital heart disease) would be similar to those seen in emergency departments in the US. It also seems likely that care would be similar in both settings.
B.	**Was the follow-up sufficiently long?**	Yes. Patients were followed for 5 years, which is sufficiently long to capture relevant major adverse cardiac events and episodes of recurrent SVT.
C.	**Can I use the results in the management of patients in my practice?**	Yes. Based on these results, cardiac troponin testing in the ED for elderly patients with SVT was not predictive of major adverse cardiovascular outcomes, but was associated with higher rates of cardiology consultation, hospital admission, ICU admission, and increased hospital length of stay. Elevated troponin values were also note associated with increased likelihood of recurrence of SVT.

Limitations:

1. **This was a retrospective chart review, and hence was at risk of selection bias, misclassification bias, and confounding, and can demonstrate association without necessarily proving causation.**

2. **The authors do not specify how patient follow-up was performed and what measures were taken to ensure that adverse events were not missed.**

3. **The primary composite outcome (MACE) included admission for decompensated heart failure and "acute coronary syndrome," which is not defined in the study and open to potential subjective interpretation.**

Bottom Line:

This multicenter, retrospective chart review of elderly patients presenting to the ED with SVT found that elevated troponin values were not associated with increased risk of major cardiac events up to 5 years out (RR 0.97, 95% CI 0.32 to 2.95)**, but were associated with increased need for hospital and ICU admission as well as increased length of stay.**