

How much is too much? A Longitudinal Review of High Burden of Premature Ventricular Contractions in Children with Structurally Normal Hearts



Julie Aldrich MD, Naomi Kertesz MD, Anna Kamp MD

Nationwide Children's Hospital, The Heart Center, Department of Pediatrics, Division of Cardiovascular Medicine, Columbus, OH

Background

- Adult literature links premature ventricular contraction (PVC) burden and cardiac dysfunction
- There has been no known association between PVC burden >10% on 24 Holter monitor and development of cardiomyopathy in scant pediatric literature
- **We describe longitudinal outcomes of children presenting with a very high PVC burden on 24 hour Holter monitoring, defined as $\geq 30\%$**

Methods

- Retrospective chart review was performed on children with PVC burden $\geq 30\%$ on Holter monitoring over the past 5 years
- Patients with structural heart disease were excluded
- Patients were divided into **Group 1** (PVC burden $\geq 30-39\%$) and **Group 2** (PVC burden $\geq 40\%$)

Results

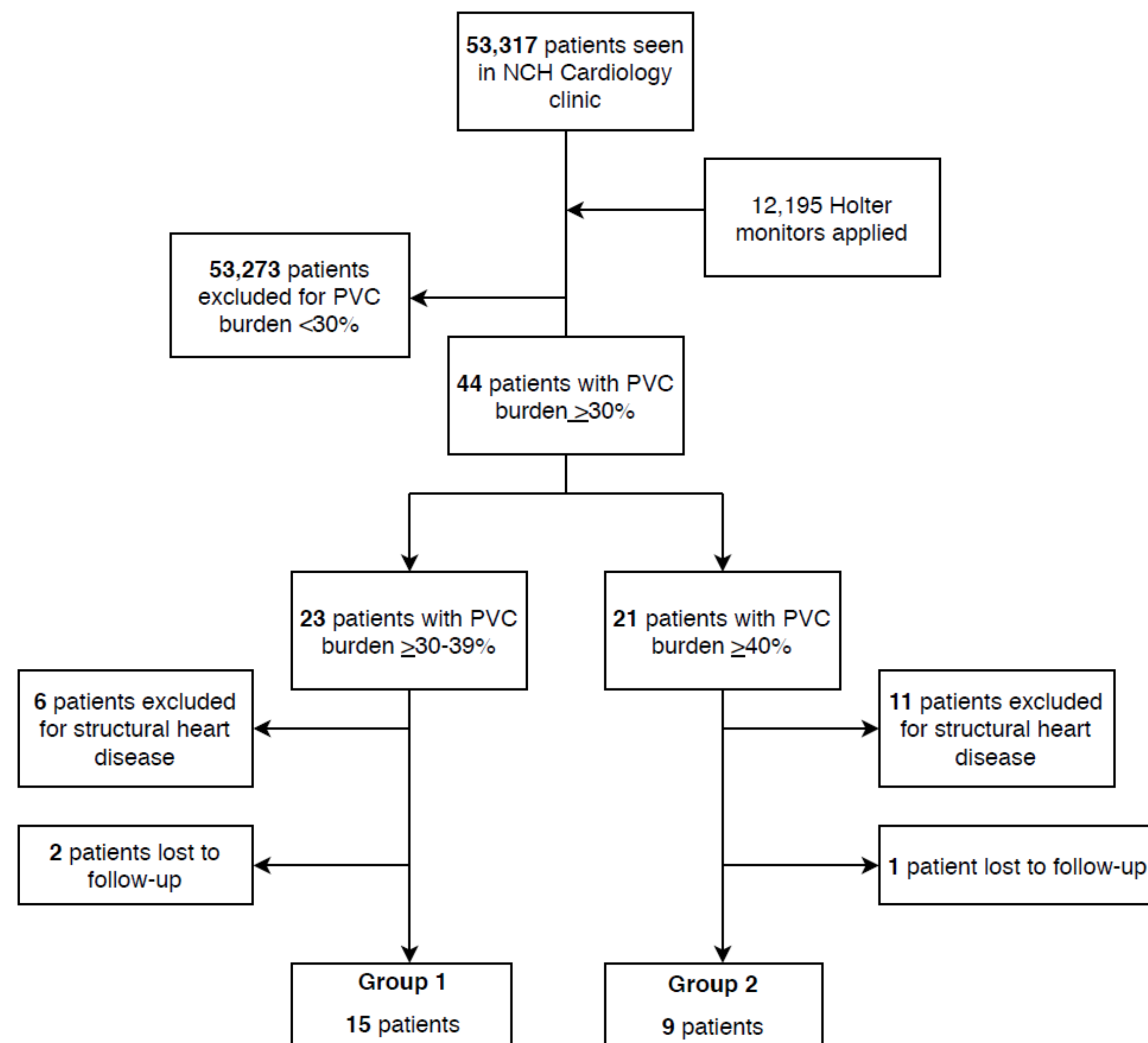


Figure 1. Patient Identification.

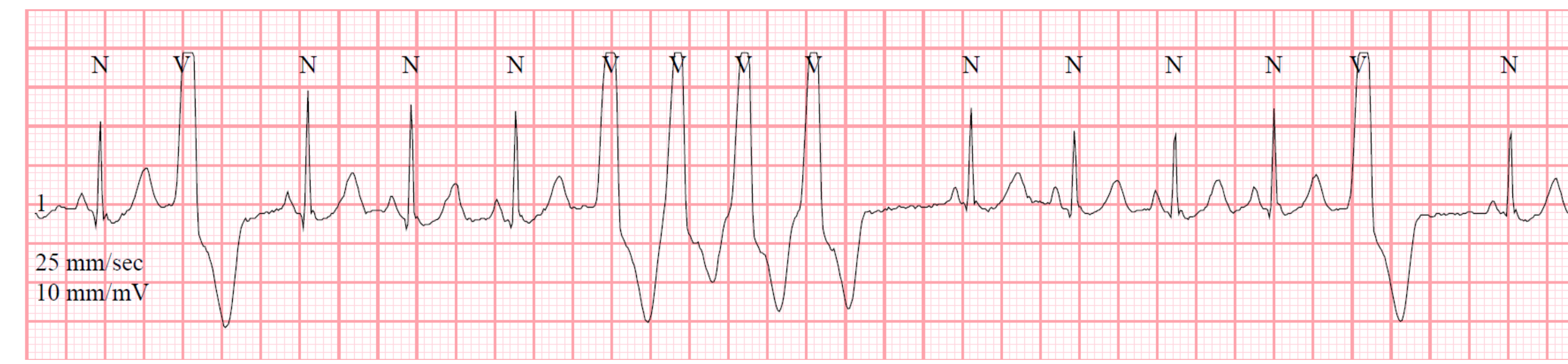


Figure 2. PVCs and non-sustained ventricular tachycardia (VT) on initial Holter monitor.

- 24 patients (0.05%) with PVC burden $\geq 30\%$ on at least one 24 hr Holter
 - All with otherwise normal baseline ECGs
- **Follow up** occurred over mean **26 months** (range 3-48 months) with an average of 6 visits per patient (range 3-10 visits)
- 22/24 (92%) patients demonstrated **monomorphic PVCs**
- **21/24 (88%)** had normal biventricular systolic function on imaging
 - 1 patient with 32% burden had biventricular systolic dysfunction on cMRI with subsequent normal echo at time of beta blocker (BB) initiation
 - 1 patient with 47% burden had systolic dysfunction on cMRI with subsequent normal echo following BB initiation with decrease to 2% burden
 - 1 patient with 46% burden had systolic dysfunction on echo, started on calcium channel blocker (CCB) for monomorphic PVCs with exercise-induced monomorphic VT, with subsequent normal cMRI
- **5/24 (21%) patients received anti-arrhythmics (BB or CCB)**
- **PVC burden decreased in 8/15 (53%) of patients in Group 1. PVC burden decreased in 7/9 (78%) of patients in Group 2**

Imaging Studies Performed (N= 24)

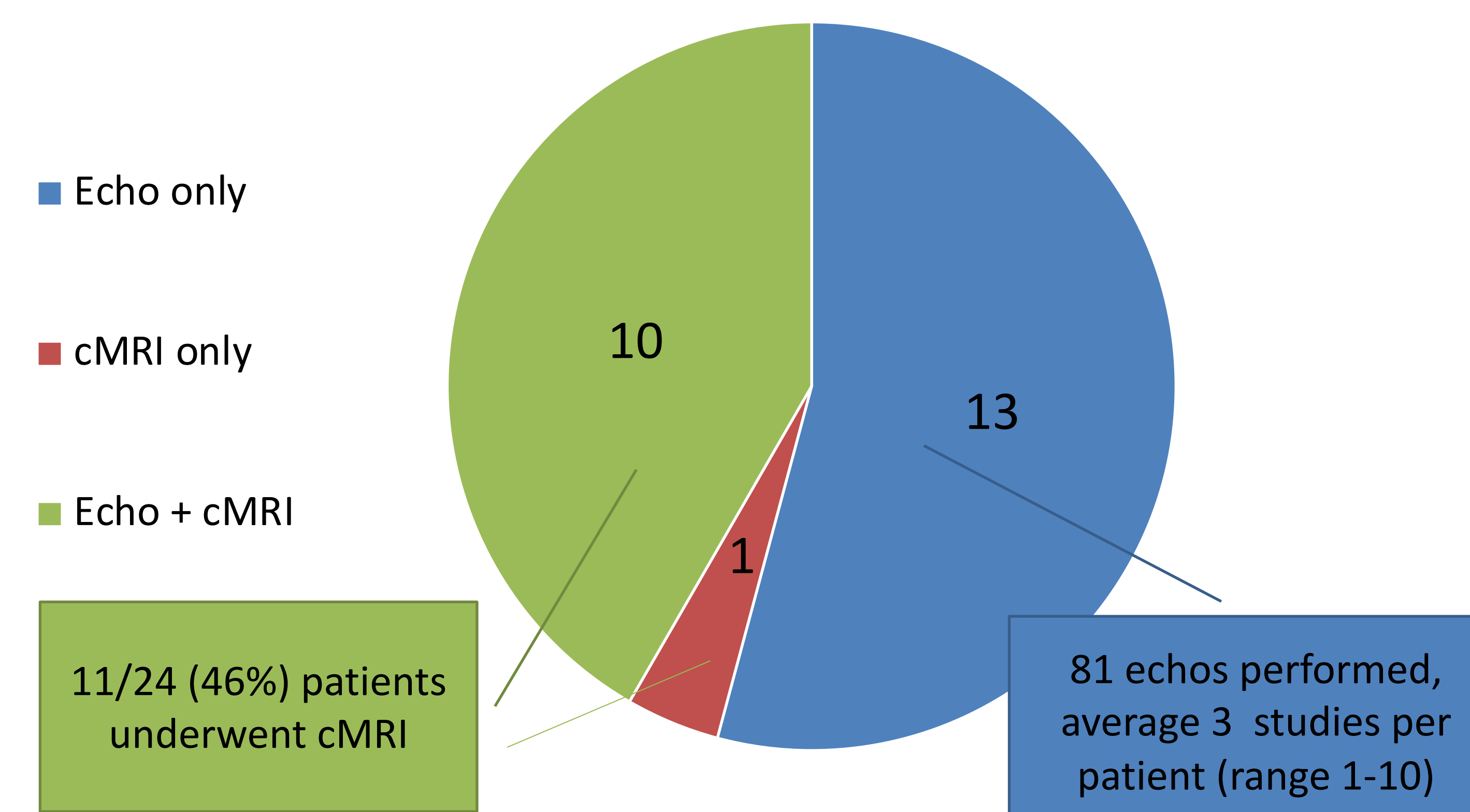


Figure 3. Echocardiography (echo) and cardiac MRI (cMRI) studies performed.

PVC Burden in Group 1

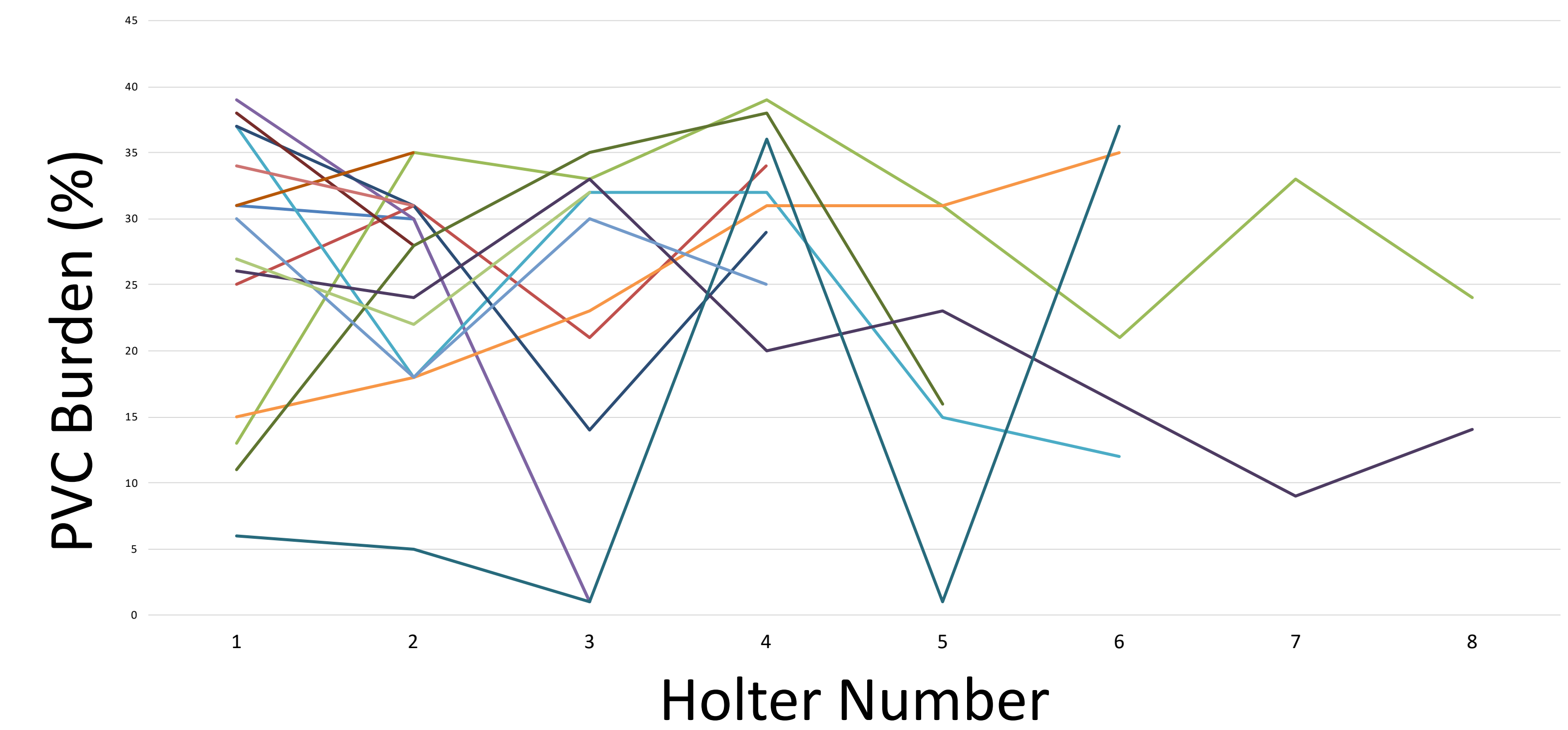


Figure 4. PVC burden over time per individual patient in Group 1 ($\geq 30-39\%$ burden).

PVC Burden in Group 2

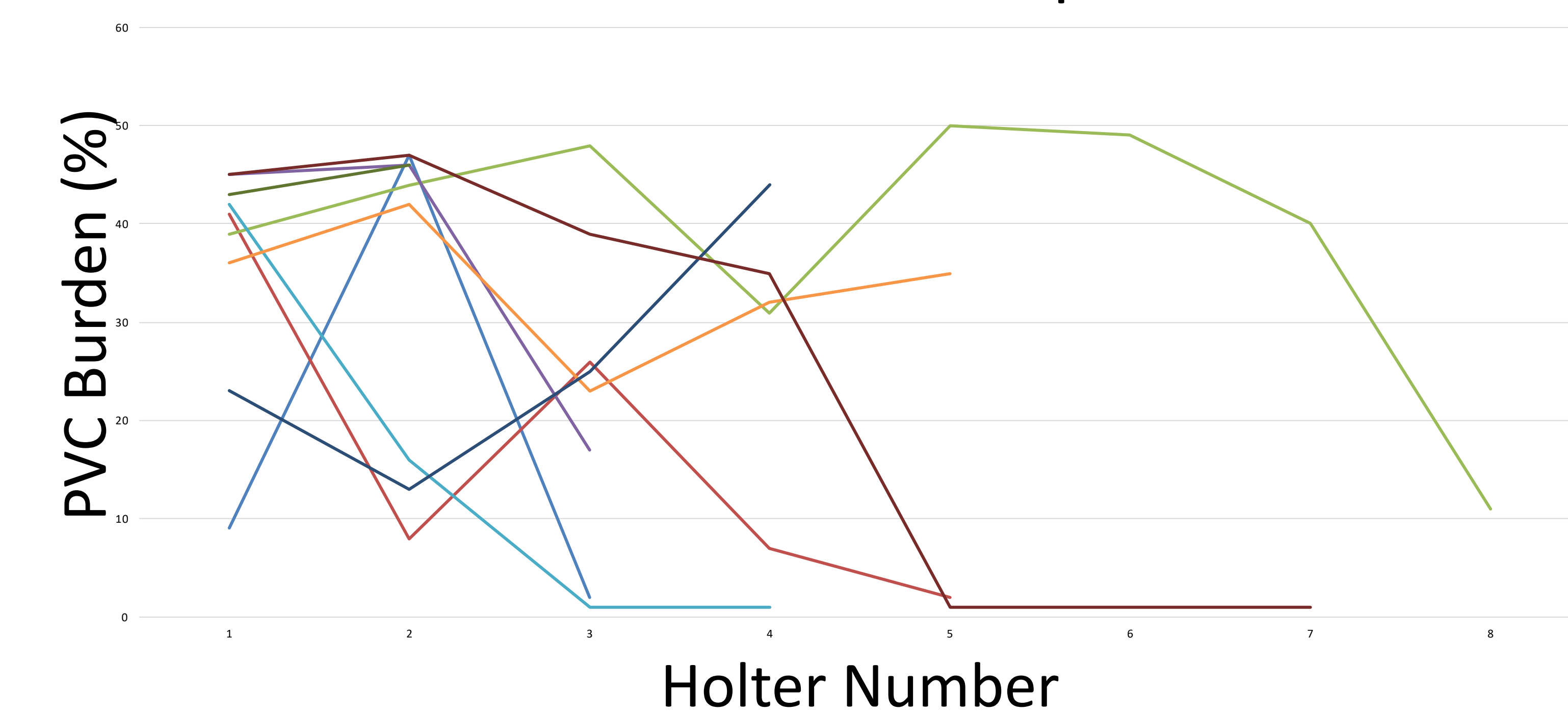


Figure 5. PVC burden over time per individual patient in Group 2 ($\geq 40\%$ burden).

Conclusions

- Development of ventricular dysfunction is rare in children with structurally normal hearts and high burden of PVCs
- The majority of patients demonstrated a spontaneous decline in the burden of ventricular ectopy over time
- Children with an extremely high burden of PVCs often do not require anti-arrhythmic therapy or invasive intervention and may be followed with non-invasive monitoring
- Larger studies of high burden of PVCs in children are necessary to determine risk factors for development of cardiomyopathy