Poster 79

Troponin I Testing in the Pediatric Emergency Department in Cases of Possible Myocardial Injury

AUTHORS: Donna M. Milner, M.D., Kerstin Halverson, B.A., M.S.
Children's Hospitals and Clinics of Minnesota, 345 Smith Avenue, St. Paul, MN 55102

ABSTRACT

OBJECTIVE: This is a pilot study, using the data from the first calendar year of implementation of Troponin testing data, to determine if recommended use has been in compliance with established adult guidelines for use of Troponin tests as established by the literature and by practice parameters from adult hospitals in the region.

METHODOLGY: Data was obtained from Children's Data Warehouse. Any data components not obtained electronically were abstracted by the study team from the EMR of patients who had troponin levels drawn. Charts were retrospectively reviewed for times of symptom onset, times of presentation to hospital and times of first & second troponin levels. Values of troponin levels, patient complaints, additional tests performed related to cardiac function (ECG, Echo, CK, BNP and Chest CT) and final diagnoses were also abstracted from the EMR at the time of chart review.

Final Diagnosis	n	%
Cardiac	27	21
Trauma	11	9
Other Musculoskeletal	17	13
Pneumonia/ asthma	27	21
PE	3	2
GERD/GI	14	11
Endocrine	1	1
Renal	1	1
Oncologic	1	1
Sickle Cell	2	2
Toxin/ Ingestion	5	4
Allergic Reaction	1	1
Neurologic	4	4
Anxiety	8	6
Undetermined	21	17
(Some have 2 diagnoses)	143	

Alternative Testing	n	%
Troponin I	126	100
ECG	115	91
CXR	106	84
Echo	51	40
CK or CK-MB	19	15
BNP	11	9
D-Dimer	20	16
Admission	60	48

RESULTS & DISCUSSION: Pediatric specialists tend to use multiple other testing modalities to more clearly determine the source of chest pain in the pediatric population. ECG, CXR and Echocardiography are the most common modalities used. As Pneumonia, asthma and trauma are the first, third and fourth most common diagnoses with this complaint, representing 30% of the medical diagnoses; chest radiography appears to be a reasonable and effective choice in the evaluation of pediatric chest pain. Echocardiograpy is currently the gold standard test for

pediatric patients in determining myocardial dysfunction, whether from hypoxic, infectious or traumatic injury. Troponin I has value and a high positive predictive value as a test for myocardial disease in the pediatric population, even for diagnoses unrelated to ischemic coronary artery disease.

First Troponin check	Evidence of Myocardial Disease	No Myocardial Disease	Total		Presence of Disease	Absence of disease
Pos Test	19	6	25	Pos test	TP	FP
Neg Test	4	97	101	Neg test	FN	TN
Total**	23	103	126			

**4 cardiac diagnoses without evidence of Myocardial injury or dysfunction by Echo or MRI

For Troponin I First Measurement:

Sensitivity	82.61%	Positive Predictive Value	76.00%
Specificity	80.16%	Negative Predictive Value	96.04%
False Positive Rate	5.83%		

For Troponin I Second Measurement:

Sensitivity	86.36%	Positive Predictive Value	95.00%
Specificity	98.80%	Negative Predictive Value	96.47%
False Positive Rate	1.20%		

CONCLUSION: Troponin measurement in pediatric populations is not seeking myocardial damage from coronary artery disease. Diagnoses sought more likely are infectious myocarditis, post arrest myocardial injury, post operative myopericarditis and traumatic myocardial disease. Pediatric specialists tend to use multiple other testing modalities to more clearly determine the source of chest pain in this population. ECG, CXR and Echocardiography are the most common modalities used. As Pneumonia, asthma and trauma are the first third and fourth most common diagnoses with this complaint, representing 30% of the medical diagnoses; chest radiography appears to be a reasonable and effective choice in the evaluation of pediatric chest pain. Nevertheless, troponin I is a useful test in the evaluation of pediatric chest pain.

The adult guideline suggesting a 6 hour follow up for normal troponin values appears to be safely applicable for the pediatric population. Providers should continue to be encouraged to check a 6 hours post symptoms troponin I level or document if the onset of symptoms is more than 6 hours from the time of drawing the level to increase specificity and positive predictive value of this test in the pediatric population.