

Utilization trends of Cardiovascular CT Angiography compared to standard of care in Emergency department in patients presenting with chest pain: Results from National Emergency Database

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Abstract:

Introduction: Chest pain is one of the most common reasons for admission to an emergency department (ED) with up to eight million patients with clinical suspicion of acute coronary syndrome (ACS) presenting to the ED each year in the USA. These patients present a clinical challenge. We analyzed data from the National Emergency Department Sample (NEDS) to assess the utilization of Cardiac Computed tomography angiography(CCTA) compared to traditional stress testing including SPECT MPI, Dobutamine Stress echo, and stress EKG.

Methods: Using the NEDS from 2006 to 2017, we identified ED visits due to chest pain and stratified by presence of CCTA, SPECT MPI, stress echocardiography, or stress EKG. Data are presented as rates with year-over-year trends estimated using orthogonal polynomial contrasts. All analyses accounted for the NEDS sampling design with $p < .05$ used to indicate statistical significance.

Results: NEDS results showed that there was an overall 300% increase in CCTA utilization in ED visits specific to chest pain from 2006 to 2017 (Table 1). However, it only constitutes a small proportion of procedures utilized in the ED to rule out ACS as compared to SPECT MPI (17% vs 41%) (Figure 1A). There was a trend of lower-cost when CCTA was utilized as compared to SPECT MPI, but it did not reach the statistical significance (Figure 1B).

Conclusions: Nationwide emergency data shows that the number of CCTAs performed during ED visits due to chest pain have steadily increased from 2006 to 2017. Nonetheless, CCTA is utilized at a lower rate than SPECT MPI or exercise EKG.

Table 1. Estimated procedure rates in ED visits for chest pain.

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Change
CCTA	0.00	0.00	0.00	0.00	0.14	0.12	0.20	0.29	0.35	0.38	0.47	0.58	3.1x +
MPI	0.00	0.00	0.00	0.00	0.33	0.39	0.52	0.47	0.68	1.04	0.91	1.43	3.4x +
Echo	0.10	0.12	0.15	0.20	0.25	0.33	0.35	0.33	0.52	0.55	0.58	0.57	4.4x +
EKG	0.91	1.53	1.89	2.49	0.84	0.90	0.82	0.76	0.99	1.21	0.99	0.91	–

Table 1B. Estimated procedure rates in ED visits for chest pain in which a procedure occurred.

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Change
CCTA	0.00	0.00	0.00	0.00	9.10	6.62	10.68	15.51	13.78	11.84	15.87	16.59	0.8x +
MPI	0.00	0.00	0.00	0.00	21.05	22.32	27.63	25.23	26.91	32.73	30.82	40.86	0.9x +
Echo	10.59	7.43	7.37	7.58	16.10	18.90	18.37	17.78	20.50	17.26	19.58	16.41	0.5x +
EKG	89.41	92.57	92.63	92.39	53.74	52.10	43.24	41.40	38.63	37.99	33.61	26.09	0.7x –

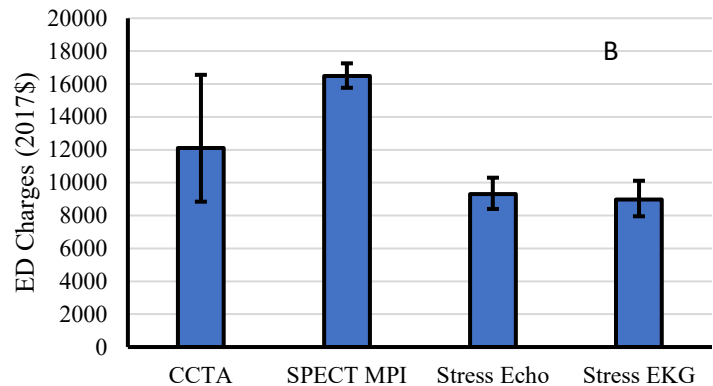
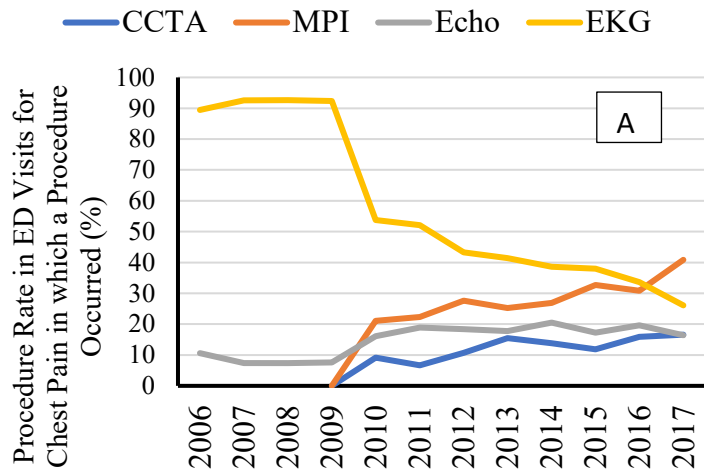


Figure 1: (A) Estimated procedure rates in ED visits for chest pain in which a procedure occurred. (B) Inflation-adjusted patients charges per ED visit. Error bars represent 95% confidence intervals (right).