Incidence and predictive value of postoperative Troponin elevation in high-risk patients undergoing Major thoracic surgery

Coronado Silva CC, Morales P, Cano E, Vázquez C, González-Tallada A, de Nadal M.
Department of Anaesthesiology & Intensive Care.
Hospital Universitari Vall d'Hebron. Universitat Autònoma de Barcelona. Barcelona, Spain

Background and Goal of Study: Cardiac troponins are considered reliable biomarkers of myocardial injury in patients who undergo thoracotomy and lung surgery ⁽¹⁾.Troponin elevation has been associated with intrapericardial resections and pneumonectomies, but the incidence reported and its predictive value largely varies upon series ^(2,3). The peak of troponin measurement during the first 3 days after noncardiac surgery was an independent predictor of 30-day mortality ⁽⁴⁾. The aims of this study were to determine the incidence of postoperative troponin elevation after major thoracic surgery in high-risk patients, and its correlation with the extension of the procedure and 30-day mortality.

Patients and methods: As part of routine postoperative care for high cardiac risk patients (≥ 65 years or < 65 years with known cardiovascular pathology), we measured serum high-sensitivity Troponin I (TnI) levels (Siemens ADVIA Centaur) during the first two postoperative days in 117 consecutive patients undergoing major thoracic surgery. Patients were divided in two groups upon TnI elevation. The TnI cut off used to define troponin elevation was the 99th percentile provided by our laboratory (TnI ≥ 0.04 ng/ml). Baseline clinical characteristics, perioperative parameters, and 30-day mortality were assessed in both groups.

Results and discussion: From January 2014 to October 2015, 117 high-risk patients underwent postoperative TnI monitoring after major thoracic surgery, of which 35 (25.7%) had a peak TnI ≥ 0.04 ng/ml on postoperative day 1 or 2. TnI elevation was more frequent after pneumonectomy and lobectomy (P-value chi-squared 0.046) (Table1). Overall 30-day mortality was of 3/117(2.6%) and no difference was found between patients with or without postoperative troponin elevation (P-value 0.154) (Table 2). Active smoking was an independent factor for postoperative troponin elevation (P-value 0.028). No differences were found in age, sex or baseline clinical characteristics (including history of coronary artery disease) neither in perioperative parameters.

Conclusions: In our study, 25.7% of high-risk patients undergoing major thoracic surgery showed postoperative troponin elevation, being more frequent in more extensive procedures. 30-day mortality showed no difference between patients with or without troponin elevation. This two results suggest that troponin elevation in thoracic surgery may be related to other mechanisms other than myocardial ischemia. Further studies are needed to confirm this issue.

References: 1. Vikenes K et al. *Int J Cardiol* 2004; 96:403-7, 2. Muley et al. *Clin Lab* 2011; 57:925-932, 3. Lucrezioti et al. *Rev Esp Cardiol* 2007; 60:1159, 4. Devereaux PJ et al. *JAMA* 2012; 307:2295–304

TABLE 1: Lung resection, TnI elevation and 30-day mortality

N (%) [95% CI]	TROPONIN I ≥ 0.04 ng/ml		Total	P - value Chi-squared
	Yes	No		
Lobectomy	26 (37.14%) [27.17%; 49.52%]	44 (62.86%) [51.93%; 74.11%]	70 (59.83%) [50.36%; 68.78%]	0.046
Pneumonectomy	3 (60%) [28.36%; 94,73%]	2 (40%) [14.66%; 85.34%]	5 (4.27%) [1.4%; 9.69%]	
Wedge resection	5 (19.23%) [8.97%; 39.35%]	21 (80.77%) [65.13%; 93.45%]	26 (22.22%) [15.06%; 30.84%]	
Pleural resection	1 (8,33%) [2.09%; 38.48%]	11 (91.67%) [73.54%; 99.79%]	12 (10.26%) [5.41%; 17.23%]	
Others	0 (0%) [.63%; 60.24%]	4 (100%) [.%; .%]	4 (3.42%) [.94%;8.52%]	
30-day mortality	0 (0%) [.84%; 70.76%]	3 (100%) [.%; .%]	3 (2,56%) [.53%;7.31%]	0.154

TABLE 2. Demographic and surgical parameters

N (%) [95% CI]	TROPONIN I ≥ 0.04 ng/ml		Total	P - value Chi-squared
	YES n=35	NO n=85		
Sex (Male /Female)	28 (31%) / 7 (26%)	62 (69%) / 20 (74%)	90 (77%) / 27 (23%)	0.606
Age ≥ 65 yr	33 (29%) [21.62%; 38.19%]	81 (71%) [62.74%; 79.16%]	114 (97.44%) [92.69%; 99.47%]	0.159
Smoker	14 (50%) [33.87%; 69.37%]	14 (50%) [33.87% ; 69.35%]	28 (23.93%) [16.53%; 32.7%]	0.028
Coronary artery disease	5 (35.71%) [17.66%; 64.86%]	9 (64.29%) [41.9%; 87.24%]	14 (11.97%) [6.7%; 19.26%]	0.613
Peripheral vascular disease	7 (33.33%) [18.11%; 64.86%]	14 (66.67%) [47.82%; 85.41%]	21 (17.95%) [11.4%; 26.12%]	0.706
Renal chronic disease	2 (25%) [8.52%; 65.09%]	6(75%) [47.35%; 96.81%]	8 (6.84%) [3%; 13.03%]	0.753
Intraoperative blood transfusion	0 (0%) [2.5%; 97.5%]	1(100%) [.%; . %]	1 (.85%) [.02%; 4.67%]	0.512