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Cardiopulmonary exercise test in cardiac risk in abdominal surgery

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Background: We have performed a cardiopulmonary exercise test (CPT) in 270 patients undergoing a major abdominal surgery (MAS). We analyzed the prognostic value of all CPT indexes in major cardiac complications (MCC), myocardial infarction (MI), stroke and cardiac death (CD) risk evaluation. Besides we analysed other cardiac complications (OCC) such as: angina, severe ventricular arrhythmia and atrial fibrillation episodes.

Methods: 270 patients underwent CPT, performed a day before surgery when all cardiac medications were optimized. We used treadmill test and modified Bruce protocol. The main indexes we analysed were: oxygen uptake (VO₂), carbon dioxide output (VCO₂), ventilation (VE), anaerobic threshold (AT), oxygen-pulse (O₂-pulse) and breath reserve (BR). We have compared three groups of patients- those who underwent surgery with no cardiac complications (G-1), patients with major cardiac complications (G-2) and patients with OCC.

Results: In 81 patients, we have detected 89 different cardiac complications. MCC: 18 MI (6.7%), six strokes (2.2%), six CD (2.2%). There was no benefit when CPT results were added to logistic-regression model in addition to routine preoperative examination of patients (AUC 0.84±0.05 vs. 0.86±0.05). Nevertheless BR and O₂-pulse appeared to be independent predictors of major cardiac complications (AUC 0.83±0.04, p=0.01). There was also a significant difference between G-2 and other patients in AT level (15.2±3.6 vs. 10.1±3.9, p<0.01) and between G3 and other patients in AT level (17.2±2.8 vs. 13.2±3.1, p<0.001). Significant difference was found between G1 and all patients with different cardiac complications in exercise tolerance (4.2 METS vs. 5.6 METS, p=0.018), max oxygen uptake (14.3 ml/kg/min vs. 18.9 ml/kg/min, p=0.021) and in oxygen-pulse level (11.7 vs. 15.2, p=0.03).

Conclusion: AT level, BR and O₂-pulse are considered to be significant independent prognostic markers of MI and cardiac death. Exercise tolerance, max oxygen uptake and oxygen-pulse level are associated with major and minor cardiac complications in patients, undergoing major abdominal surgery.

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Three dimensional echocardiography in valvular heart disease

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Indian subcontinent is where we still continue to see a large population suffering with valvular heart disease, mostly secondary to rheumatic heart disease and occasionally to congenital heart disease. Though, in lesser quantum infective endocarditis and collagen vascular disorder also seen occasionally. Conventional 2D echocardiography and transesophageal echocardiography has been the mainstay of investigation for their assessment to guide their therapy and response to therapy. But, it has its limitation, specially as the cardiac valves are three dimensional structures and so they need to be evaluated by three dimensional imaging. Transthoracic 3D echocardiography and real time transesophageal echocardiography have been of great help in the assessment of detailed anatomy of mitral valve. In mitral stenosis, mitral valve area measurement is direct and appears to be more accurate. In regards to mitral regurgitation, its quantification, its site of origin and its mechanism, specially in cases of mitral valve prolapse are very well elaborated and guide the therapeutic approach. Similarly, in aortic stenosis, the direct aortic valve area measurement is made very easy with 3D imaging. Tricuspid valve assessment is relatively less evaluated owing to its tissue characterization, but wherever possible, imaging yields good results. As regards, prosthetic heart valves, their imaging has been a difficult task, specially paravalvular leak. With 3D imaging, we are able to localize the rent and quantify and guide the therapeutic procedure. We will be showing various cases of valvular heart disease.

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