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What are the suspicious echocardiographic features of a malignant cardiac mass?

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BACKGROUND: Cardiac Masses (CM) represent a rare and heterogeneous group with a prevalence of 0.3% at autopsy, divided in benign masses - primary tumors and pseudotumors - and malignant ones - primitive tumors and metastasis, either directly invading the heart and pericardium or as a consequence of hematologic spread. 2-D Echocardiography is nowadays the first line approach to define nature and management of CM, but is it enough to guide a therapeutic strategy?

PURPOSE: To evaluate echocardiographic CM malignancy features in patients admitted to our Centre between 1997 and 2017.

MATERIALS AND METHODS: We retrospectively evaluated a population of 180 consecutive patients (45% males; mean age 60 ± 16 years; BMI 25 ± 5 Kg/m2), referred to our echocardiographic lab with suspicion CM. All patients were examined in both left lateral and supine position, and heart was visualized from all available echocardiographic windows. Definite diagnosis was obtained by histologic examination of biopsy, surgical samples or, in cases of cardiac thrombi, by radiological evidence of thrombus resolution after adequate anticoagulant treatment. We excluded normal anatomical variants in the group of pseudotumors due to the impossibility of obtaining histological examination. Comparisons between categorical variables were performed by Chi-square or Fisher exact test. P values ≤ 0.05 were considered significant. Variables with statistical signification lower than $p \leq 0.05$ in univariable analysis were included in logistic regression analysis to determinate independent predictors of malignant masses.

RESULTS: We detected 129 benign CM (76% primitive tumors and 24% pseudotumors) and 51 malignant cardiac tumors (45% primitive tumors and 55% metastasis). In 7 cases a poor acoustic window did not allow an optimal examination; in remaining 173 patients, the classical 2-D echocardiogram identified 157 masses with a diagnostic accuracy of 91%. Benign tumors and pseudotumours were localized predominantly in left heart chambers, while malignant primitive tumors and metastasis were mainly detected in right heart, in pericardium or in pulmonary artery branches ($p < 0.001$). The largest ecocardiographic diameter appeared greater for the malignant masses (mean of 49 ± 26 mm) than benign ones (30 ± 16 mm, $p = 0.003$). The occurrance of any pericardial effusion ($p < 0.001$), extension to pericardium ($p = 0.01$) or to main vessels ($p = 0.006$) were also associated with malignant masses. Finally, multivariate analysis showed only largest diameter ($p = 0.001$) and pericardial effusion ($p < 0.001$) were independent predictors of malignancy.

CONCLUSION: 2D Echocardiography is an excellent, non invasive technique for first line evaluation of patients with suspicion CM. It is safe, accurate and have high diagnostic accuracy in identifying CM and their benign or malignant nature. In particular, a large mass associated with any pericardial effusion must pose suspect of malignancy.