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The correlation between cardiac biomarkers and findings on transthoracic echocardiography in the intensive care unit.

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BACKGROUND

Trans-thoracic echo (TTE) is a commonly performed non-invasive investigation for the cardiovascular assessment of critically ill patients in the Intensive Care Unit (ICU). Raised cardiac biomarkers are commonly cited as an indication for TTE, however the significance of these biomarker elevations in the critical care setting is unclear.

PURPOSE

The aim of this study was to describe findings on TTE in an Irish ICU cohort and to determine if there was any correlation between these findings and serum N-terminal pro b-type natiuretic (NT-proBNP) and high sensitivity troponin T (HsTnT) levels.

METHODS

Patients admitted to the ICU and who received a TTE between January 2018 and February 2019 were identified. Based on TTE findings, patients were divided into two groups: ‘Normal group’ and ‘Abnormal group’. For the purpose of this study, minor abnormalities including concentric left ventricular hypertrophy, diastolic dysfunction and hyper-dynamic left ventricular function were included in the Normal group. The Abnormal group included reductions in LV function, regional wall motion abnormalities and significant valvular heart disease. Continuous variables were expressed as medians and interquartile range. The groups were compared using the z-test for continuous variables and fishers exact test for categorical variables, with a p value of < 0.05 considered significant.

RESULTS

There were 358 patients admitted to the ICU during the study period. The mean age was 59.8 ± 17 years and over half of the patients (55%) were male. One hundred and fifteen patients (32%) had a reported TTE, of which 55% were normal and 22% had minor abnormalities (Normal group). The remaining 23% showed significant abnormalities (Abnormal group).

The prevalence of a NT-proBNP result over 4 times the upper limit of normal (>4xULN) was not significantly different between groups (67% in Normal group vs 71% in Abnormal group, Fisher exact test statistic value is 0.7887, $p < .05$). However a HsTnT value >4xULN was more common in the Abnormal group than the Normal group (73% vs 46%, Fisher exact test statistic value is 0.0231, $p < .05$). Similarly, Median NT-proBNP did not differ significantly between the groups; (2254pg/mL; IQR: 11,758 in the Normal group vs 6428pg/mL; IQR: 5,789 in the Abnormal group, $p = 0.52218$) but Median HsTnT level was significantly higher in the Abnormal group than Normal group; (123ng/L ; IQR: 656 vs 51ng/L; IQR: 163.5 ,$p = 0.0278$).

CONCLUSION

TTE is performed commonly in the ICU, with one-third of ICU admissions receiving a TTE. Over 75% were reported as normal or showing only minor abnormalities. NT-Pro BNP was commonly significantly elevated but did not correlate with the subsequent diagnostic yield of significant abnormalities on echocardiography. HsTnT levels were more commonly significantly raised in patients with abnormal TTE results and the role of troponin in this setting requires further evaluation.