Quantification of Pericardial Effusions by Echocardiography and Computed Tomography

Perlman, Gidon[1]; Bogot, Naama[2]; Planer, David[1]; Gilon, Dan[1]; Berman, Philip[1]; Leibowitz, David[1]

[1]Hadassah-Hebrew University Medical Center, Jerusalem, Israel; [2]Shaarei-Tzedek Medical Center, Jerusalem, Israel

Background: Echocardiography is a well-accepted imaging tool for the diagnosis of pericardial effusion (PEff). Several semi-quantitative and quantitative echocardiographic methods to define PEff volume have been described. Given the increasing use of computed tomography (CT) scanning in clinical medicine, an increasing number of pericardial effusions are being initially diagnosed by CT. No study has compared quantification of PEff by CT and echo.

Methods: We retrospectively reviewed the institutional database from the years 2006-2009 to identify patients who underwent both chest CT and echocardiography prior to percutaneous pericardiocentesis with documentation of the amount of fluid withdrawn. Digital 2-D echocardiographic and CT images were retrieved and quantification of PEff volume was performed by applying the formula for the volume of a prolate ellipse : ג x 4/3 x L/2 x D1/2 x D2/2 to the pericardial sac and to the heart.

Results: 19 patients meeting study qualifications were entered into the study. The echocardiographically calculated pericardial effusion volume correlated relatively well (r = 0.73, SEE = 182, $p < 0.005$) with the PEff volume drained. Echo tended to underestimate the actual PEff volume. A lower correlation and higher standard error was noted with CT volume quantification (r = 0.40, SEE = 271, $p < 0.025$). In contrast to echo, CT tended to overestimate the actual PEff volume.

Conclusions: Echocardiography appears to be a more accurate imaging technique than CT in the volumetric assessment of non-loculated pericardial effusions and should continue to be the primary imaging in these clinically challenging patients.