

Pre-Operative Pectoralis Muscle Quantity and Attenuation by Computed Tomography are Predictive of Recurrent Gastrointestinal Bleeding on Left Ventricular Assist Device Support: A Multicenter Analysis

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Background

- Pectoralis muscle mass and tissue attenuation obtained on preoperative CT scans are powerful predictors of mortality after LVAD implantation
- GI bleeding remains common after LVAD

Purpose

To determine whether these skeletal muscle measures, which correlate with frailty and tissue quality, are associated with the development of recurrent GI bleeding

Methods

- Retrospective, multi-centered study
- Chest CTs performed ≤ 3 months prior to LVAD implantation at the University of Minnesota (n=143) and Houston Methodist Hospital (n=133)
- Unilateral pectoralis muscle mass indexed to body surface area (PMI) and attenuation (approximated by mean Hounsfield units; PHU_m) were measured on preoperative chest CT scans.
- GIB events were captured for the first two years of LVAD support.

Statistical Analysis

- Negative binomial regression analyses were performed to determine the association between pectoralis muscle measures and number of GIB events on LVAD support

Axial CT Image Illustrating Method Used to Obtain Unilateral Pectoralis Muscle Measures



The image on the left is the original scan image. The image on the right has been manually shaded using a pre-defined Hounsfield unit range of -29 to 150 using SliceOmatic V5.0 software (Tomovision, Montreal, Canada). The software provided measures of cross-sectional area in cm² and mean Hounsfield units of the shaded area.

Results

- Mean age 59 + /- 13 years
- 43 % BTT
- 62 % ischemic cardiomyopathy.
- 32 patients had at last one GI bleed while on LVAD support over 2 years

Relationship Between GI bleeding and Pec Muscle Measures

- Pectoralis muscle mass, tissue attenuation associated with the incidence rate of GI bleeding on LVAD support
- Each 5 unit increase in PHU_m was associated with reduction in the incidence rate of GIB (adjusted 18 % reduction, 95 % CI 6-28 %, p = 0.005)
- Each unit increase in PMI was associated with a reduction in the incidence of GIB (adjusted 19 % reduction, 95 % CI 3- 34 %, p = 0.029)
- The final models were adjusted for age, sex, INTERMACS profile, BTT status, creatinine and albumin

Conclusion

- Preoperative pectoralis muscle size and attenuation were associated with the development of recurrent GI bleeding after LVAD implantation in this multicenter cohort
- This one time, internal assessment of patient substrate appears to predict not only mortality after LVAD, but morbidity as well

DISCLOSURES :
I will not discuss off label use and/or investigational use of the following drugs/devices:
Rebecca Cogswell : Abbott : speakers bureau. Medtronic : speakers bureau, advisory board, consultant
Jerry Estep, MD Abbott: Consultant Medtronic: Heart Failure Advisory Board
Barry Trachtenburg, MD Abbott consultant
Ranjit John: Abbott : speakers bureau, research grants