

INTRODUCTION

Left ventricular function, especially ejection fraction (EF) is one of the best prognostic indicators for patients with cardiac diseases.

Multidetector Cardiac Computed Tomography (MDCT) provides non-invasive assessment of the coronary arteries however also provides an assessment of left ventricular function.

Echocardiography and single photon emission computed tomography (SPECT) are widely used to determine left ventricular ejection fraction.

This retrospective analysis compared the ejection fraction calculated by MDCT, echocardiography, and SPECT.

METHODS

127 (72.5% males) patients referred for MDCT who also had echocardiography or MPI within a 6 month period from two outpatient cardiac computed tomography angiography sites were included in the study

80 patients had both MDCT and ECHO, 100 had MDCT and SPECT and 45 had MDCT, ECHO and SPECT

EF was calculated from MDCT using auto ejection fraction software. End diastolic and end systolic phases were selected visually and cardiac contours were drawn automatically with manual adjustment. EF was calculated as: $EF\% = [(EDV-ESV)/EDV] \times 100$

For ECHO and SPECT, EF was recorded as previously estimated

TABLES and FIGURES

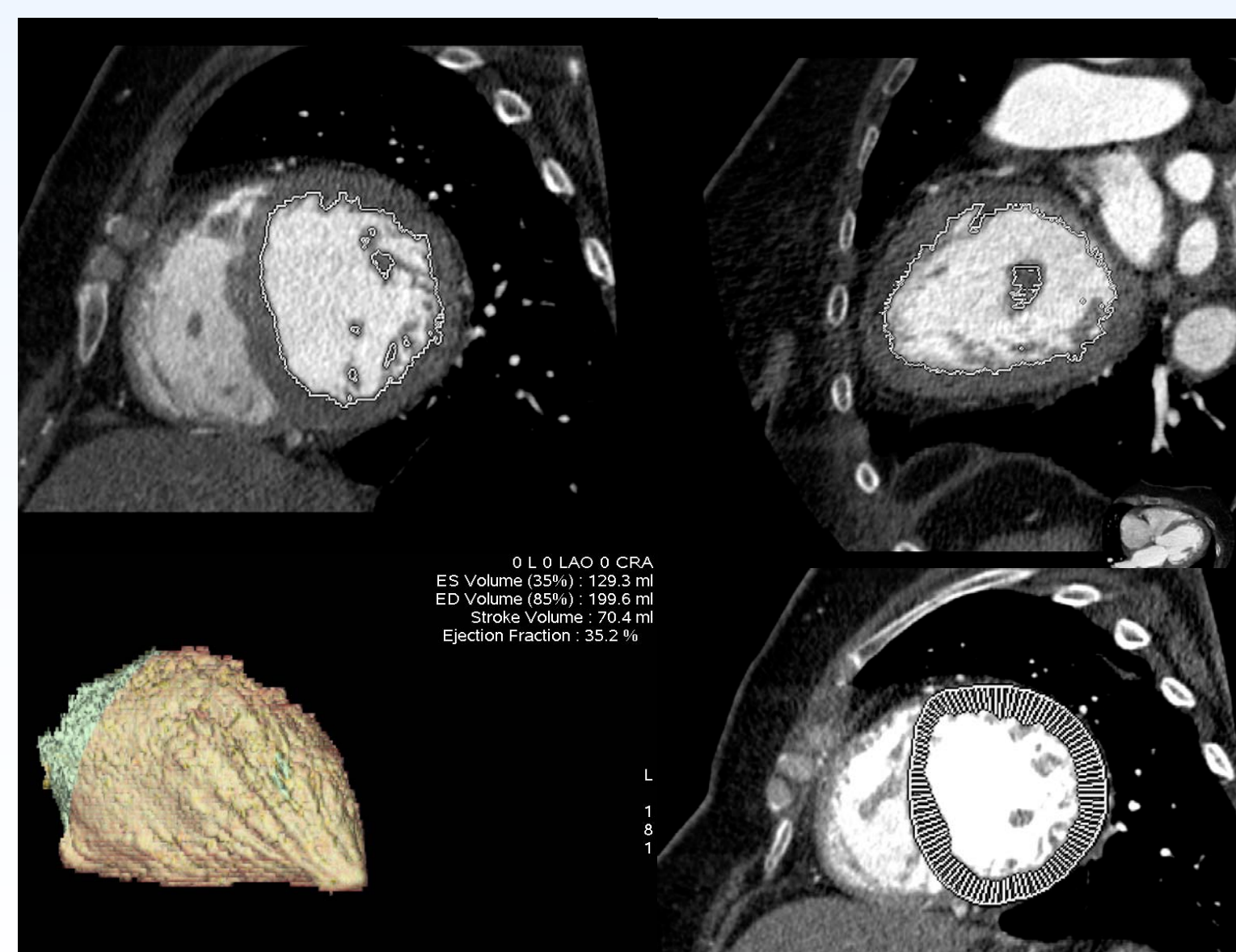


Figure 1: Evaluation of Ejection Fraction calculation by MDCT

Characteristics (Total patients: 127)	Mean +/- SD (range) OR No.(%)
Age	67.5 +/- 12.15(33-93)
Males	92 (72.5%)
Diabetes Mellitus	14 (16.87%)
Hypertension	59 (73.75%)
Dyslipidemia	62 (48.81%)
Family history of CAD	19 (26%)
Weight(lbs)	181.73 +/- 39.1 (107-315)
Race	
Caucasian	62 (48.82%)
African American	8 (6.30%)
Asian	4 (3.15%)
Hispanic	26 (20.47%)
Others	14 (11.02%)
Smoker	
Past	15 (19.74%)
current	8 (10.5%)
Ejection fraction with CTA	57.7 +/- 14.2 (15.8-89)
Ejection fraction with MPI	57.4 +/- 11.4 (28-81)
Ejection fraction with Echo	52.2 +/- 13 (15-85)
Time interval between CTA and MPI (months)mean, SE (95% CI)	3.5, 0.35 (2.8 to 4.2)
Time interval between CTA and Echo (months)mean, SE (95% CI)	2.72, 2.18 (0 to 6)
Time interval between MPI and Echo (months)mean, SE (95% CI)	1.814, 2.21 (0 to 6)

Table 1. Patient Characteristics

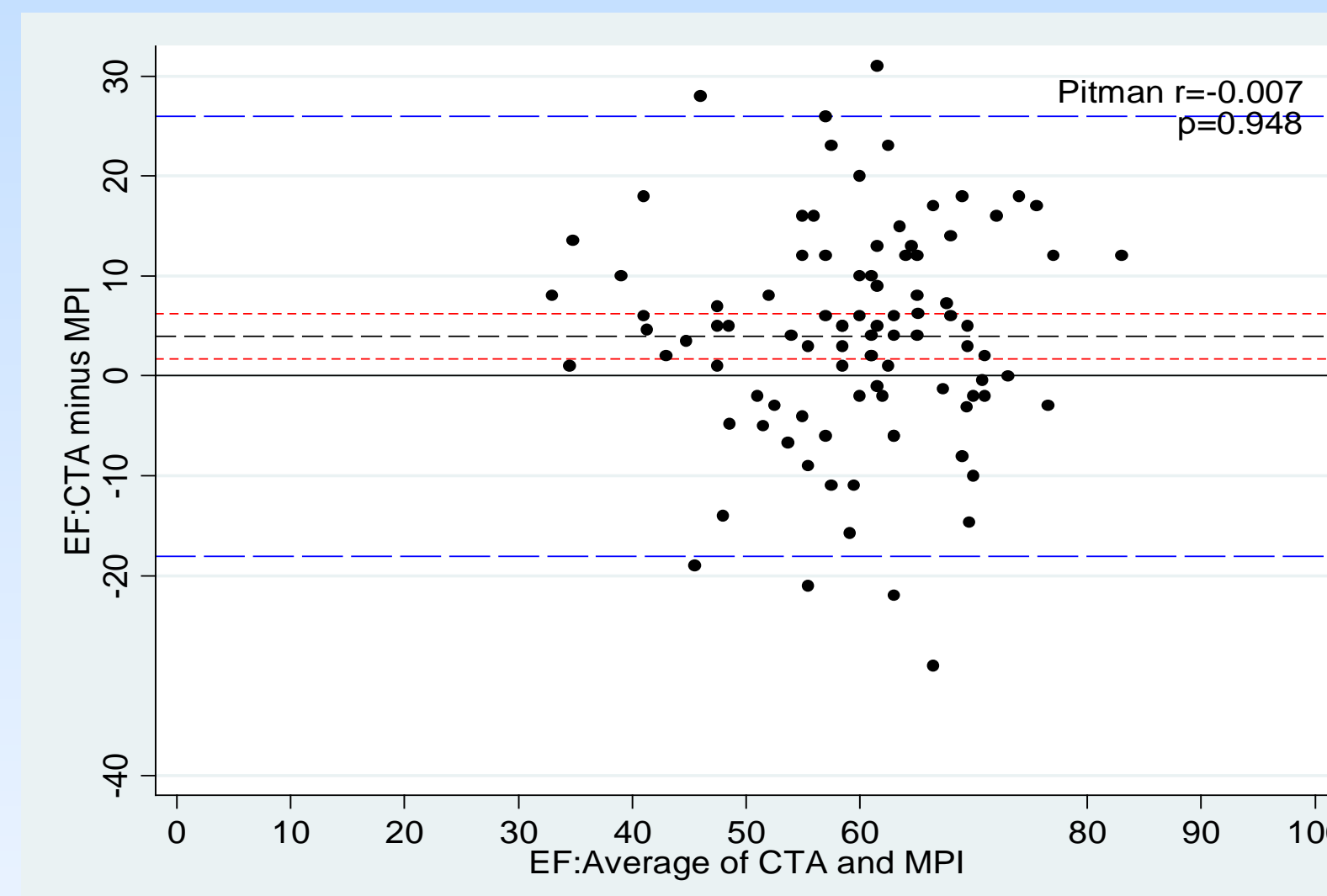


Figure 2. Bland Altman Analysis comparing Ejection fraction (EF) on Multidetector row computed tomography angiography (MDCT) with Myocardial Perfusion Imaging (MPI). Mean difference = 3.951% (95% CI: 1.697 to 6.205). Reference range of difference: -18.05 to 25.96

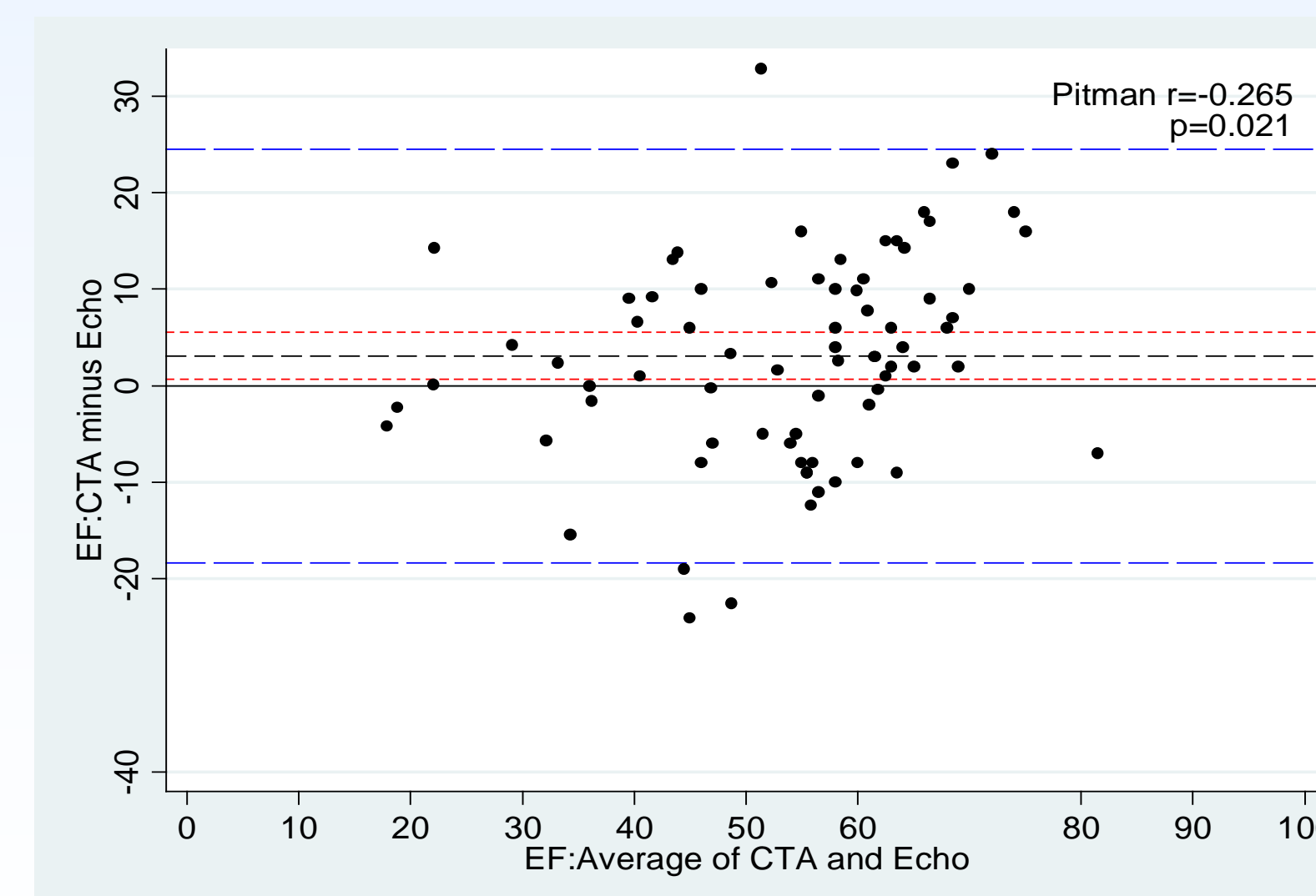


Figure 3. Bland Altman Analysis comparing Ejection fraction (EF) on Multidetector row computed tomography angiography (MDCT) with 2 D echocardiography (Echo). Mean difference = -4.2% (95% CI: 1.25 to 7.14). Reference range of difference: -15.645 to 24.045.

RESULTS

- The mean patient age was 67.5 ± 12.15 . Males made up 72.5% of the patients and 48.8% were Caucasian with 20.5% Hispanic.
- Ejection fraction (%) measured with MDCT 57.7 ± 14.2 (range 15.8-89) correlated well with both SPECT 57.4 ± 11.4 (range 28-81) and ECHO 52.2 ± 13 (range 15-85).
- Bland-Altman analysis showed good correlation between MDCT and SPECT and ECHO and SPECT.
- With all these modalities much closer ejection fraction measurement was seen at lower ejection fraction.
- MDCT overestimated EF by 3% as compared to ECHO however this relationship was linear.

DISCUSSION

- Compared with SPECT and echocardiography, MDCT is able to provide important information about left ventricular EF.
- MDCT moderately overestimated LVEF as compared to ECHO and SPECT, however the relationship was linear and is not clinically significant.
- In patients who have MDCT performed for evaluation of coronary artery disease, EF calculated provides a reliable measurement which gives information about prognosis and optimal treatment.

REFERENCES

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- Raff GL, Gallager MJ, O'Neill WM, Goldstein JA. Diagnostic accuracy of noninvasive coronary angiography using 64-slice spiral computed tomography. *J Am Col Cardiol* 2005; 46:552-557.
- Orakzai SH, Orakzai RH, Nasir K, Budoff MJ. Assessment of cardiac function using multidetector row computed tomography. *J Comput Assist Tomogr.* 2006;30(4):555-63.