Cardio-metabolic risk in acromegaly patients: a study of cardiac magnetic resonance imaging

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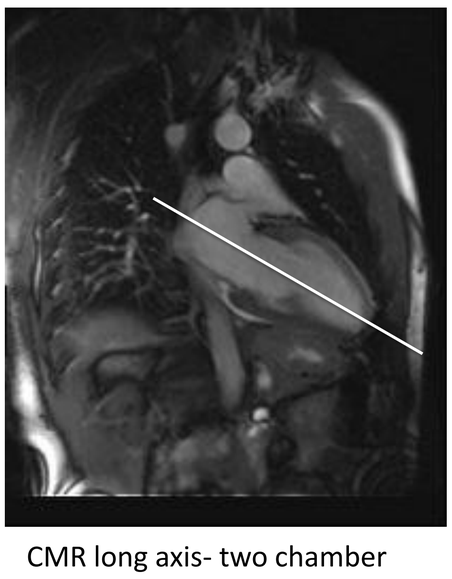
Introduction

Cardiovascular complications are one of the most prevalent in patients with acromegaly and contribute to the increased morbidity and mortality. Cardiac magnetic resonance (CMR) is the established non-invasive gold standard method for measuring structural and functional changes due to its higher accuracy and reproducibility and lower variability in comparison with echocardiography.
The current study aimed to evaluate the metabolic profile and to detect the cardiac alterations through CMR in patients with acromegaly.

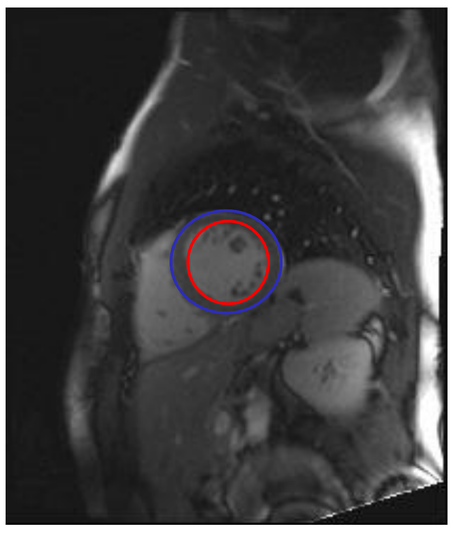
Material and Methods

This was a prospective multicentric case-control study. Consecutive patients with acromegaly, screened in the SUM study (EudraCT number: 2015-004498-34), both cured and with active disease, entered the study and were compared to a control group including sex, age and BMI matched patients with non-functioning adrenal incidentaloma. Metabolic, clinical and CMR parameters were then assessed and compared between patients and controls. Parametric and non-parametric tests were performed, as appropriate.



CMR long axis- two chamber

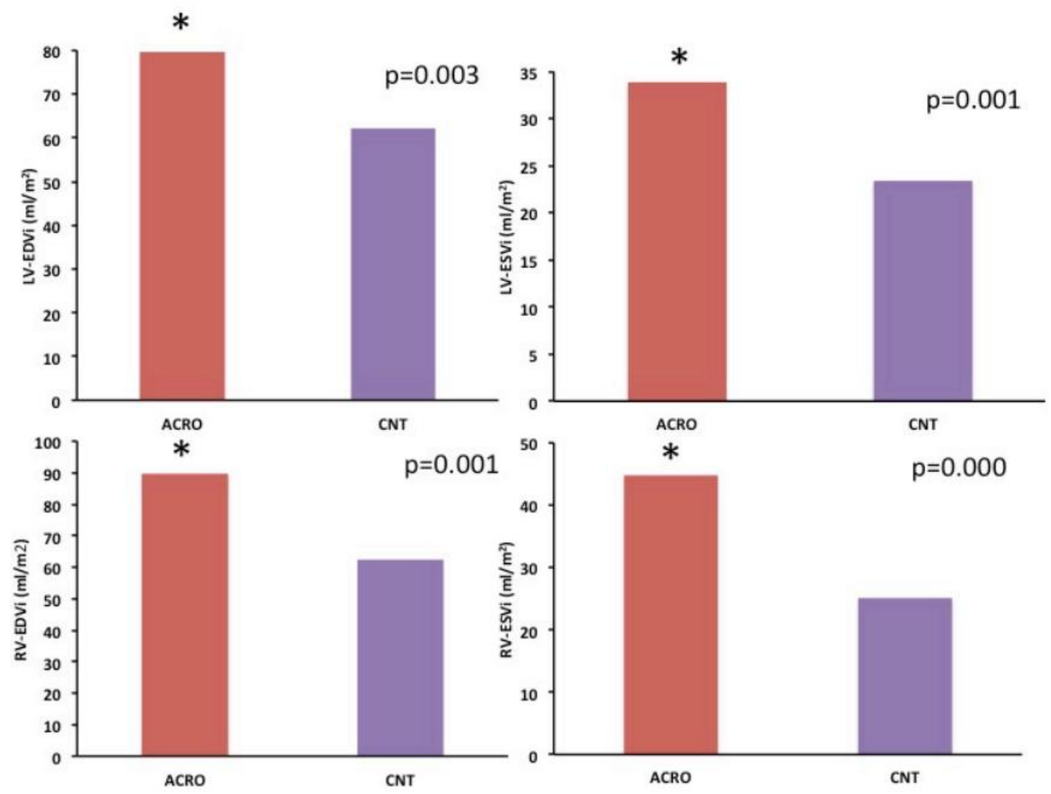
CMR long axis- four chamber



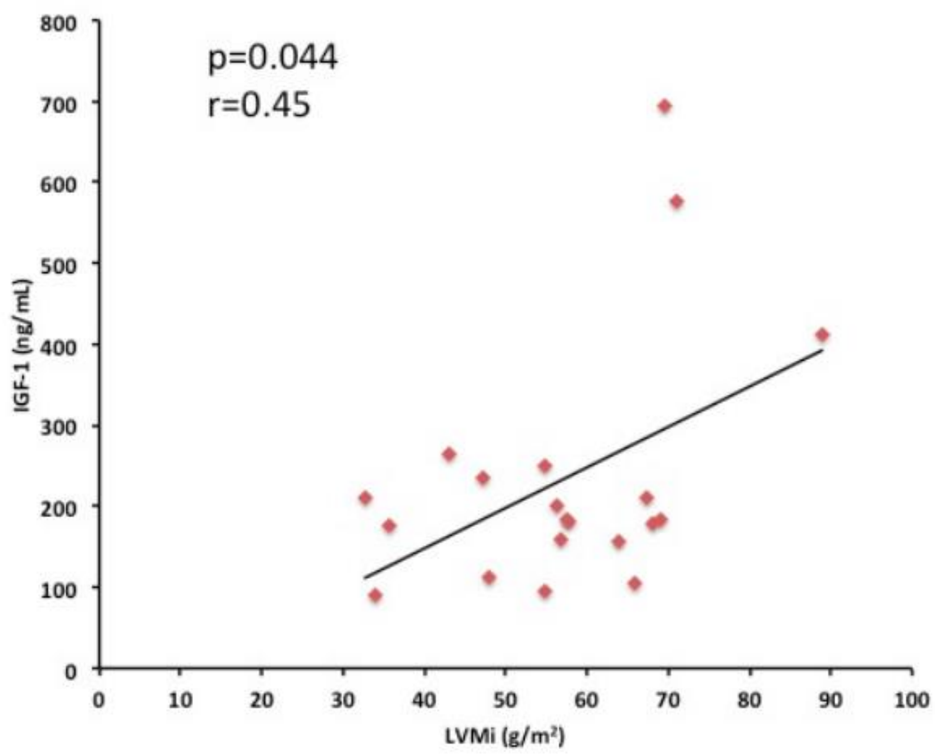
CMR short axis: blue=epicardium, red=endocardium

Results

Twenty patients with acromegaly (7 F/13 M, mean age 50 yrs, range 31-75) and 9 controls were included in the study. Fasting glucose levels were significantly higher in acromegaly patients than controls (p=0.033) in absence of significant differences in lipid metabolism, blood pressure, or cardiometabolic complications.



Mean LV-EDVi, LV-ESVi, RV-EDVi and RV-ESVi in acromegaly patients and controls.



Correlation between IGF-1 levels and LVMi in acromegaly patients.

Left Ventricular-end-diastolic volume (LV-EDV), LV-EDV index (LV-EDVi), LV- systolic volume (LVSV) and LV-end-systolic volume index (LV-ESVi) were significantly and markedly higher in acromegaly patients than controls (p=0.001; p=0.003; p=0.001; p=0.001, respectively). Left ventricular mass (LVM) was significantly higher in acromegaly patients than controls (p=0.002) with a trend also for LVMi (p=0.056). RV-EDV, RV-EDVi, RV-ESV and RV-ESVi were significantly and markedly higher in acromegaly patients than controls (p=0.000; p=0.001; p=0.000; p=0.000). Acromegaly patients had a significantly lower RV-ejection fraction (RV-EF) than controls (p=0.002). Moreover, a significant correlation was found between IGF-1 levels and cardiac parameters at CMR: LV-EDVi (r=0.47; p=0.037), LVMi (r=0.45; p=0.044).

Discussion

Acromegaly patients exhibit biventricular structural and functional impairment at CMR, which seem to have a multifactorial pathogenesis, involving a direct effect of hormone excess and disease-related cardiovascular risk factors. Our results suggest that CMR may be a useful diagnostic tool in the cardiac work-up of selected acromegalic patients.

References: 1. Pivonello R et al. Complications of acromegaly: cardiovascular, respiratory and metabolic comorbidities. Pituitary 2017; 20: 46–62.
2. Grothues F, Smith GC, Moon JC, et al. Am J Cardiol. 2002; 90:29 –34.

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