

Atrial Fibrillation and Changes in Repolarization on ECG are Associated with Higher Mortality and Severity in Acute Pancreatitis: Systematic Review And Meta-analysis



HUNGARIAN
PANCREATIC
STUDY GROUP

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INTRODUCTION

Acute pancreatitis (AP) is a systemic inflammatory disorder with rising incidence and high mortality in severe cases. Cardiac abnormalities, even heart failure, are commonly seen phenomena during and after AP-related hospitalization.

AIM

Our aim is to investigate the bidirectional association between cardiac changes and AP outcomes.

METHODS

The protocol was registered on PROSPERO (CRD42023479679, CRD42023479674). We conducted a systematic search on the 5th of November 2023 in three main databases (PubMed, Embase, CENTRAL) and selected the articles based on predefined selection criteria. We were searching for articles including patients with AP and cardiac abnormalities [e.g. atrial fibrillation (AF), changes in repolarization and QTc interval prolongation on electrocardiogram (ECG), N-terminal pro-B-type natriuretic peptide (NT-proBNP) elevation] and looked at different clinical outcomes (e.g. mortality, severity). Pooled odds ratios (pOR) and mean differences (MD) with 95% confidence intervals (CI) were calculated using a random-effects model.

RESULTS

Seventeen eligible articles were included in our meta-analysis. By analyzing 1.3 million AP patients, those with AF have almost three-times higher odds for in-hospital death, than patients without AF (pOR: 2.69, CI: 1.34; 5.38) (Fig.1.). Patients with severe (SAP) and moderate AP (MSAP) have almost three-times higher odds for in-hospital changes in repolarization on ECG (flat ST, ST depression, elevation, T-wave inversion, nonspecific changes) than patients in the mild (MAP) category (pOR: 2.75, CI: 1.19; 6.36) (Fig.2.). SAP and MSAP patients have two-times higher odds for in-hospital QTc interval prolongation than MAP patients (pOR: 2.25, CI: 0.63; 8.03), although this association didn't reach statistical significance yet (Fig. 3.). NT-proBNP levels in serum are not significantly higher in patients with SAP and MSAP compared to those with MAP (MD: 228.6 pg/ml, CI: 567.6; 1024.7) (Fig.4.).

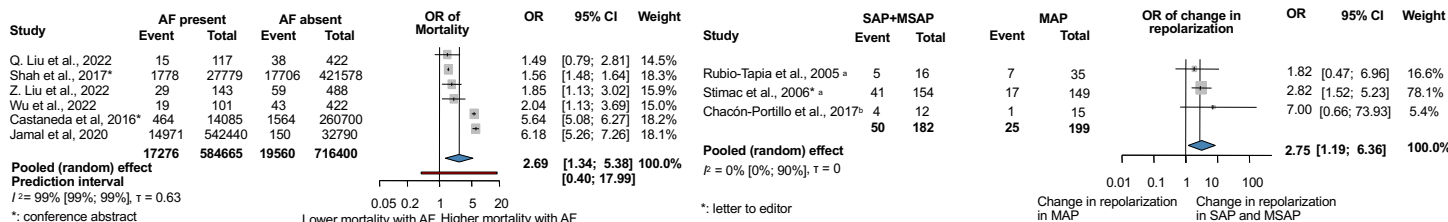


Figure 1. Patients in acute pancreatitis with atrial fibrillation (AF) have higher odds for mortality than patients without AF.

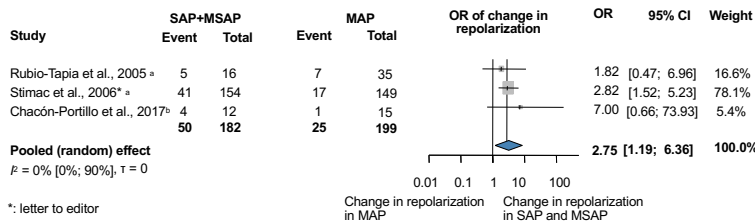


Figure 2. Patients in severe (SAP) and moderate (MSAP) acute pancreatitis have higher odds for changes in repolarization on ECG than patients in the mild category (MAP).

^aMSAP category didn't exist, ^bSAP+MSAP reported together vs MAP

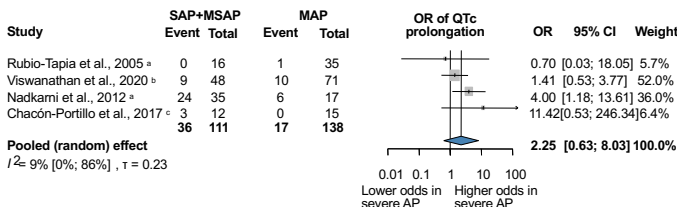


Figure 3. Patients in severe (SAP) and moderate (MSAP) acute pancreatitis have higher odds for QTc prolongation on ECG than patients in the mild category (MAP).

^aMSAP category didn't exist, ^bSAP, MSAP and MAP reported separately (SAP+MSAP added up), ^cSAP+MSAP reported together vs MAP

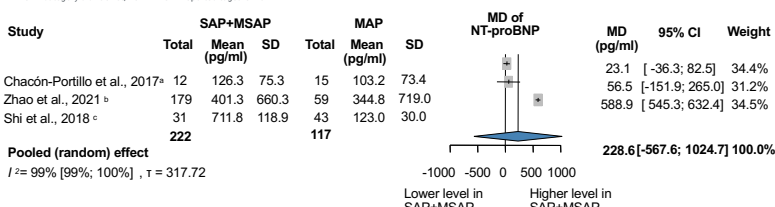


Figure 4. Patients in severe (SAP) and moderate (MSAP) acute pancreatitis have higher levels of NT-proBNP (pg/ml) than patients in the mild category (MAP).

^aSAP+MSAP reported together vs MAP, ^bSAP, MSAP and MAP reported separately (SAP+MSAP added up), ^cHemorrhagic-pancreatic vs. edema-type AP

CONCLUSIONS

Patients with AF face a threefold increased odds for death in AP, and those with SAP and MSAP are three times more likely to develop changes in repolarization on ECG. Although the higher odds for QTc interval prolongation and the elevation of NT-proBNP levels in SAP and MSAP are not statistically significant yet, the numbers are clinically very relevant. Cardiology screening, including ECG and cardiac laboratory marker measurements are crucial for AP patients. Longitudinal studies are needed to assess the long-term relationship between AP and cardiac abnormalities.