IMPEDANCE-GUIDED TREATMENT PREVENTS ACUTE HEART FAILURE IN THE COURSE OF ACUTE MYOCARDIAL INFARCTION AND REDUCED LONG-TERM MORTALITY

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Background: Patients sustaining an acute myocardial infarction (AMI) frequently develop acute heart failure (AHF) during their hospitalization. Currently, treatment is initiated only after appearance of overt signs of lung fluid overload. Ongoing monitoring of the status of lung fluid content (LFC) in AMI patients may enable to predict impending AHF and prompt early therapy, thus precluding AHF and improving clinical outcomes.

Methods: We sought to find out whether repetitive non-invasive measurement of lung impedance (LI) reliably reflects changes in LFC and predicts the evolution of AHF, and whether early LI-guided treatment initiated early before symptom onset reduces hospital stay, re-admissions and deaths. 40 healthy volunteers and 618 patients admitted for AMI, with no clinical and radiological signs of AHF on admission underwent LI monitoring throughout 76±24 hours.

Results: In the healthy volunteer group, maximal LI decrease (reflecting increasing of LFC) was 2.6% (p=NS) from baseline. Of 618 AMI patients, 423 patients did not develop AHF (Group1). Their maximal LI decrease from baseline was 5.8%, (p=0.2). 135 patients developed overt AHF (Group 2). At appearance of clinical and radiological signs of AHF, LI decreased from baseline by 19.9% (p<0.001) and at peak AHF, LI decreased by 35.8% (p<0.0001). Clinical improvement was achieved by therapy and LI returned to initial level at discharge. Preventive therapy was initiated in 60 other patients when LI decreased by 14% (Group 3). At this stage, patients had no clinical and radiological signs of AHF. In contrast to group 2 where all patients developed AHF, only 15% of group 3 patients developed AHF. Clinical characteristics, LVEF and peak CPK were similar in group 2 and 3. LI and radiological signs of fluid overload correlated well (r=-0.92). Compared to conventional treatment in AMI patients with AHF, LI-guided early therapy reduced hospital stay 1.4-fold (p<0.01), re-hospitalizations 1.6-fold (p<0.01) and 4-year mortality 3.3-fold (p<0.01).

Conclusions: Monitoring of LI in AMI patients reliably reflects LFC and predicts AHF. Early therapy in these patients prevents AHF in a sizable proportion of patients, and improves clinical outcome.