

# Targeting intraoperative sub-endocardial perfusion to prevent postoperative myocardial injury in major orthopedic surgery: an observational study

Dott. ANDREA PISA (1), Dott. RICCARDO PINCIROLI (2)(1), Dott. ANDREA DANIELI (1), Dott. SIMONE CHECCHI (1), Sig. DAVIDE VERGALLITO (3), Sig.ra ALICE MARRADI (3), Dott.ssa CHIARA PAOLA GUARNERIO (2), Dott.ssa ANNA SIGURTÀ (2), Dott. MARCO PULICI (2), Dott. PAOLO SALVI (4), Prof. GIANFRANCO PARATI (4), Prof. ROBERTO FUMAGALLI (2)(1)

(1) Università degli Studi di Milano-Bicocca, Italia.

(2) ASST Grande Ospedale Metropolitano Niguarda, Italia.

(3) Università degli Studi di Milano, Italia.

(4) Istituto Auxologico Italiano, Italia.

Argomento: Anestesia generale

## BACKGROUND

Myocardial Injury after Noncardiac Surgery (MINS) is a known peri-operative complication, particularly in patients with underlying cardiovascular diseases. The Sub-Endocardial Viability Ratio (SEVR) estimates the oxygen supply/demand status. It is derived from the computation of left-ventricular and aortic pressure curves. Purpose of this study was to investigate the potential utility of a peripheral intra-operative SEVR monitoring as a predictor of postoperative myocardial ischemia. We hypothesized that a decreased intraoperative SEVR would be associated to an increased incidence of MINS.

## METHODS

We enrolled high-risk patients undergoing major orthopedic surgical procedures in a prospective observational study conducted in a large tertiary urban hospital. In order for eligible patients to be included in the protocol, peripheral artery catheterization had to be performed for clinical purposes. The arterial waveform was digitally acquired throughout the whole procedure. The pulse-contour was then analyzed off-line to calculate the SEVR. For every patient, high-sensitivity cardiac Troponin T (hs-TnT) was measured preoperatively, at 6-12 hours and at 24-72 hours after surgery. MINS was defined as an increase of hs-TnT  $\geq 14$  ng/L for patients with a normal baseline value ( $< 14$  ng/L). Alternatively, in patients with an elevated baseline level, an increase  $\geq 50\%$  was considered a positive result.

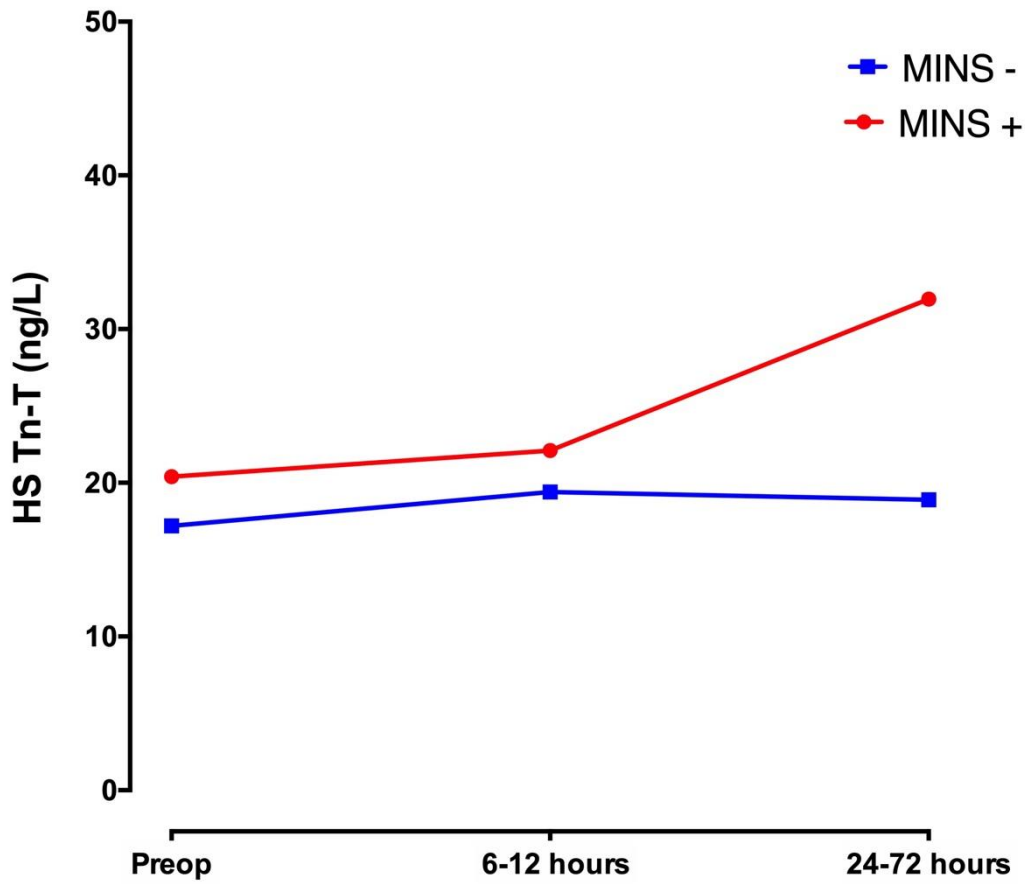
## RESULTS

Data from 40 consecutive patients undergoing major orthopedic surgery were collected between April 2018 and February 2019. A positive hs-TnT elevation was detected in 11 subjects (27.5%, MINS+), while 23 patients did not show a significant increase (MINS-, Fig.1). The average intraoperative SEVR decreased significantly, compared to the baseline value, in the MINS+ group (-11.5[-17.3;3.9]% vs. 6.5[2.8;10.1]%, median[interquartile range],  $p < 0.001$ , Fig.2).

## **CONCLUSIONS**

Our findings suggest a high, often underdiagnosed, incidence of MINS in patients with cardiovascular risk factors undergoing major orthopedic surgery. Relative intraoperative SEVR variations, even if estimated from the periphery, might be a promising intraoperative index of subendocardial hypoperfusion.

### A) HS Tn-T Variation MINS+ vs. MINS-



### B) $\Delta$ SEVR % vs. baseline MINS+ vs. MINS-

