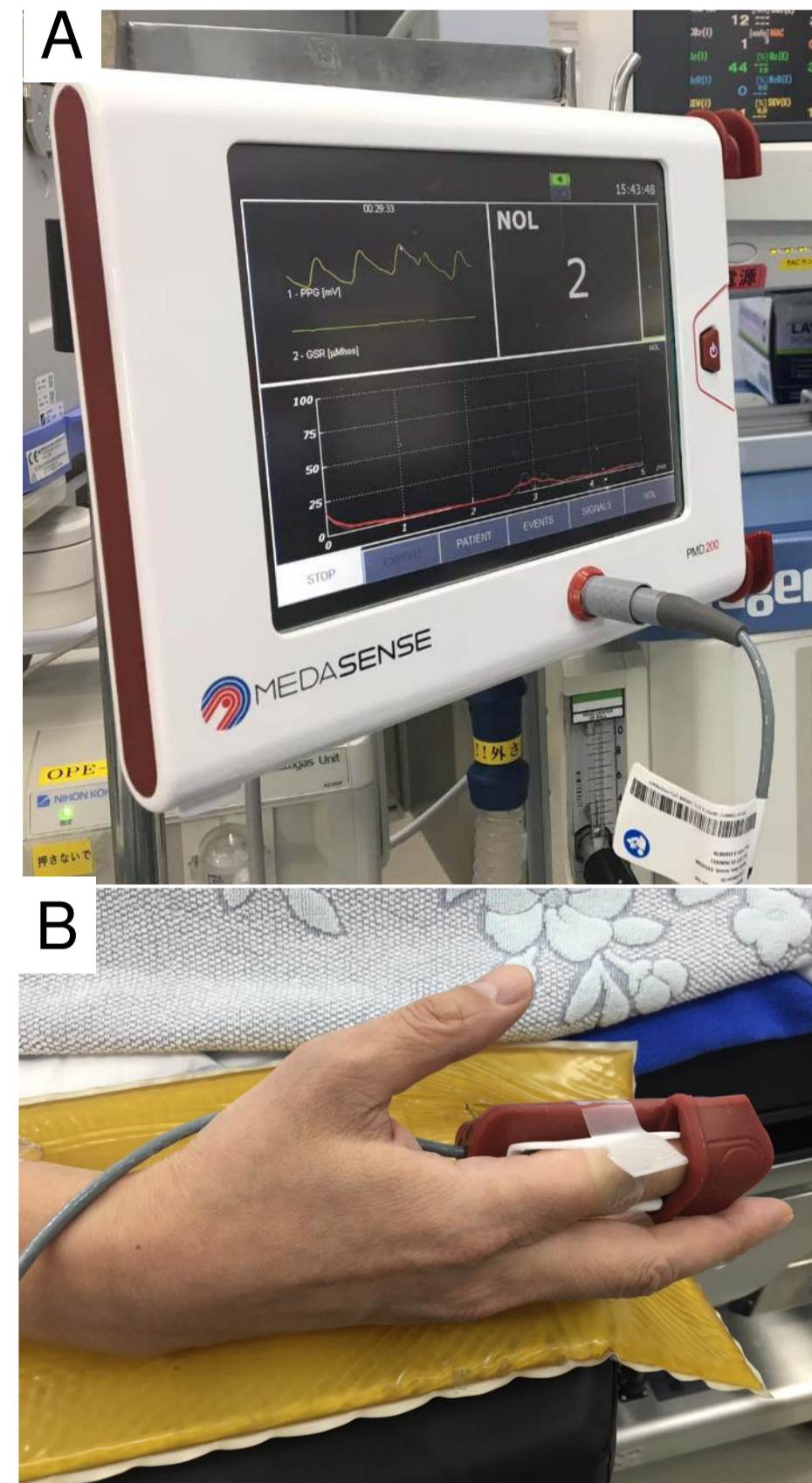


BACKGROUND

The intensity of noxious stimuli during general anesthesia has been inferred from changes in physiological parameters such as heart rate (HR) and blood pressure. In recent years, nociception level (NOL), an objective noxious stimuli index, and a device to derive it have been developed^{1,2)}. The goal of this study was to compare the response of the NOL index with HR and mean arterial pressure (MAP) to nociceptive stimuli in anesthetized surgical patients.

MATERIALS



A non-invasive nociception monitor PMD-200 (Medasense, Israel) indicates nociception level (NOL) as a numerical index from 0 to 100 by analyzing changes of multiple parameters (HR, HR variability, pulse wave amplitude, skin conductance level, number of skin conductance fluctuations, temperature) obtained from a fingertip probe with artificial intelligence (Fig.1).

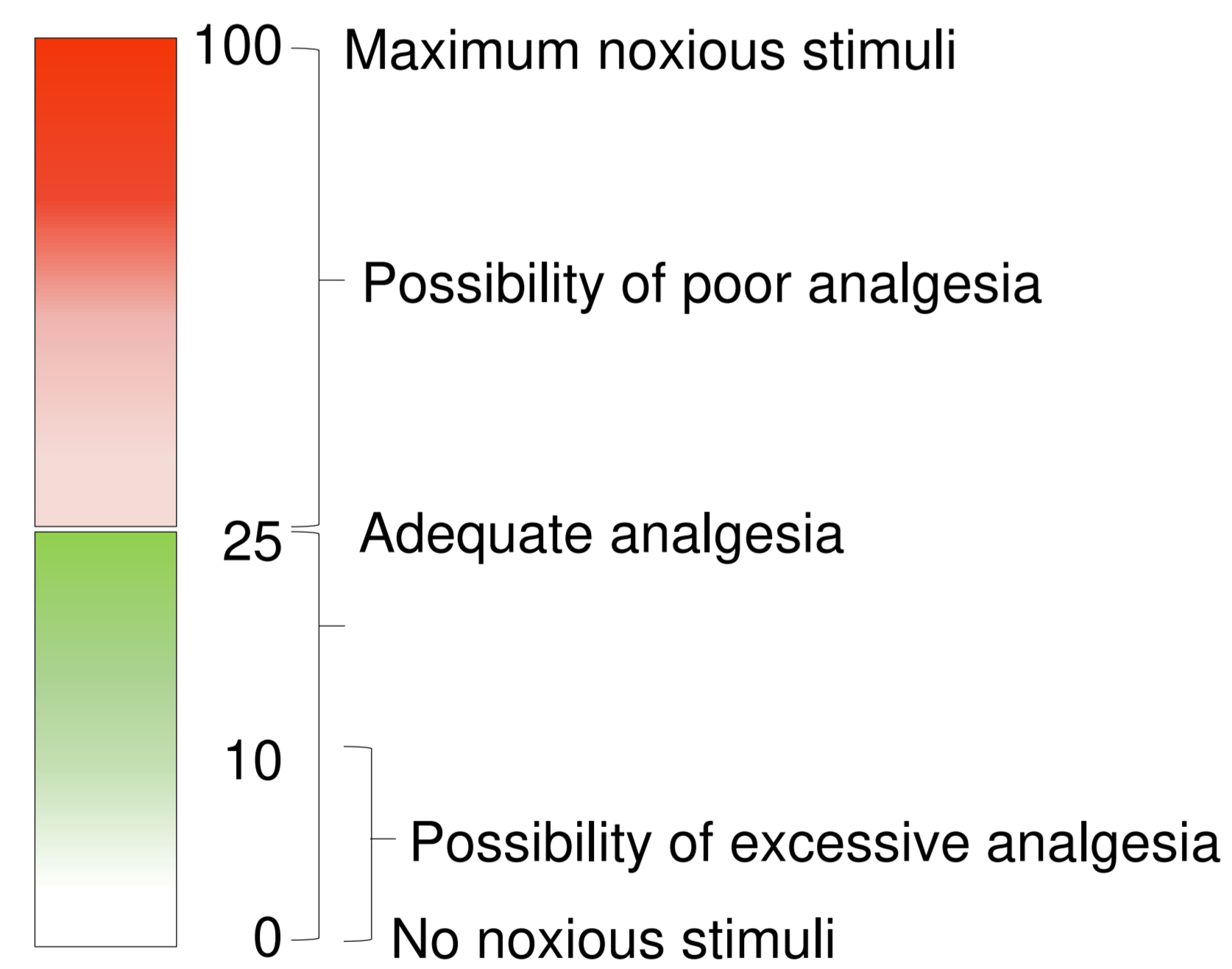


Fig.1 PMD-200 monitor (A) and a fingertip probe (B).

METHODS

<Eligibility>

- ASA PS I-III
- Age \geq 18
- Laparoscopic surgery
- Spine surgery
- Oral surgery

<Exclusion criteria>

- Arrhythmia
- Neuromuscular disease
- Chronic pain
- Analgesic user

After approval of the ethics committee, NOL, HR and MAP were recorded during general anesthesia in 50 patients.

STUDY PROTOCOL

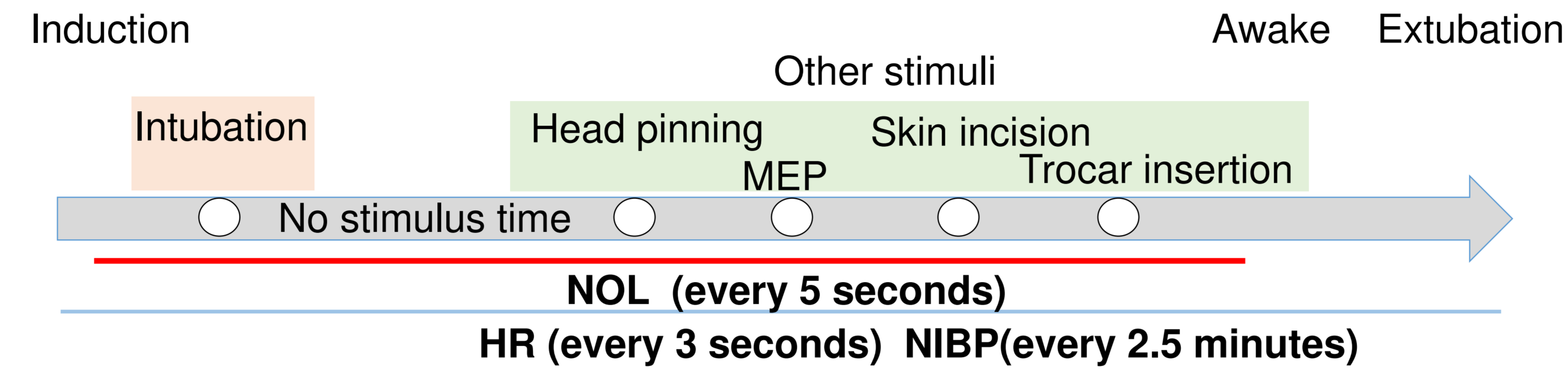


Fig.2 Study protocol

- No stimulus time: An average of 30 sec in 3 min between the intubation and incision
- Intubation: Observe changes in NOL, HR, MAP before and after intubation
- Other stimuli: Observe changes in NOL, HR, and MAP before and after each nociceptive stimulus

1. Create ROC curve for NOL, HR and MAP to compare the accuracy of discrimination between noxious and nonnoxious stimulus by comparing the AUC.
2. Compare the changes in the parameters in response to intubation and other noxious stimuli.

RESULTS

Data of 47 cases were analyzed. (3 cases were excluded from the analysis due to poor signal.)

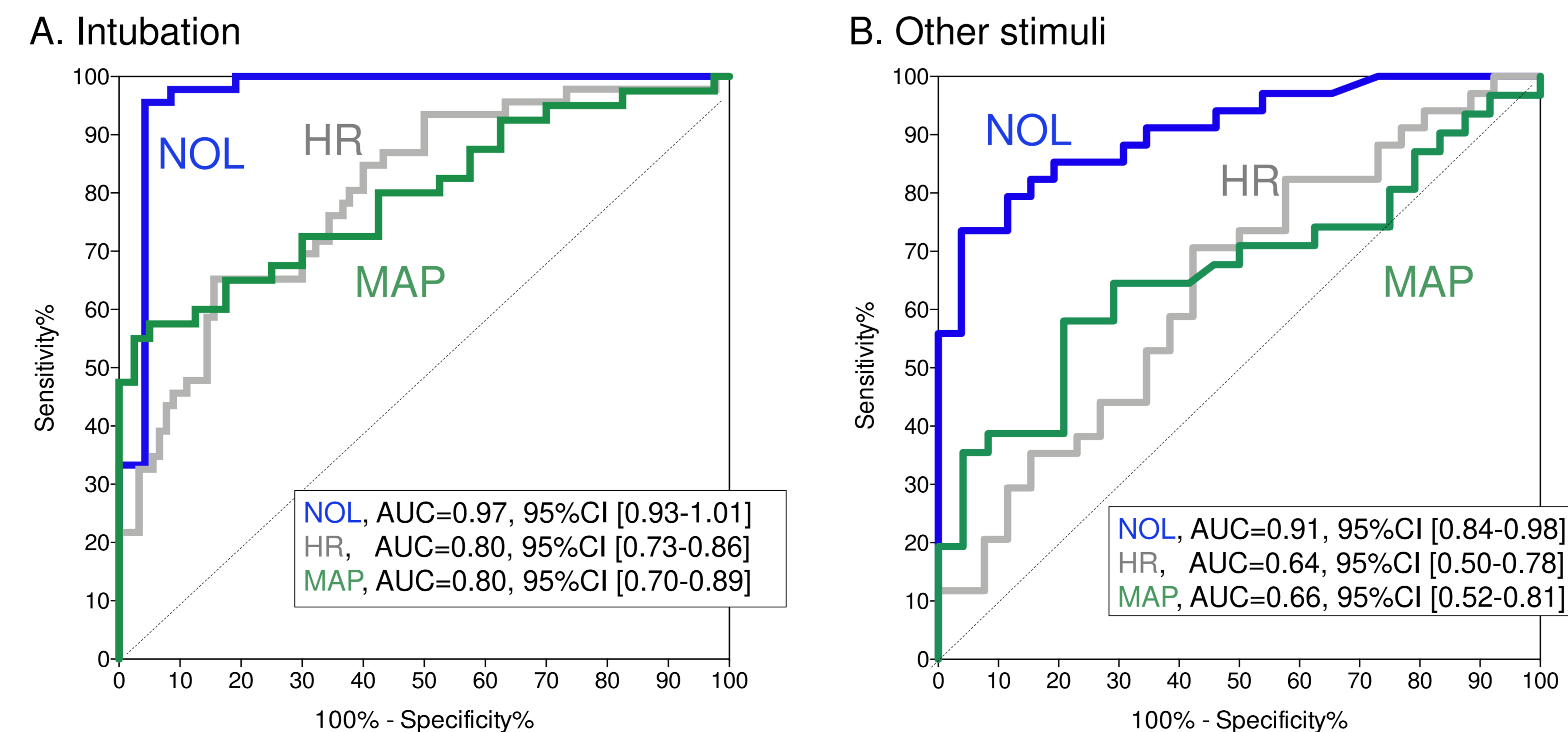
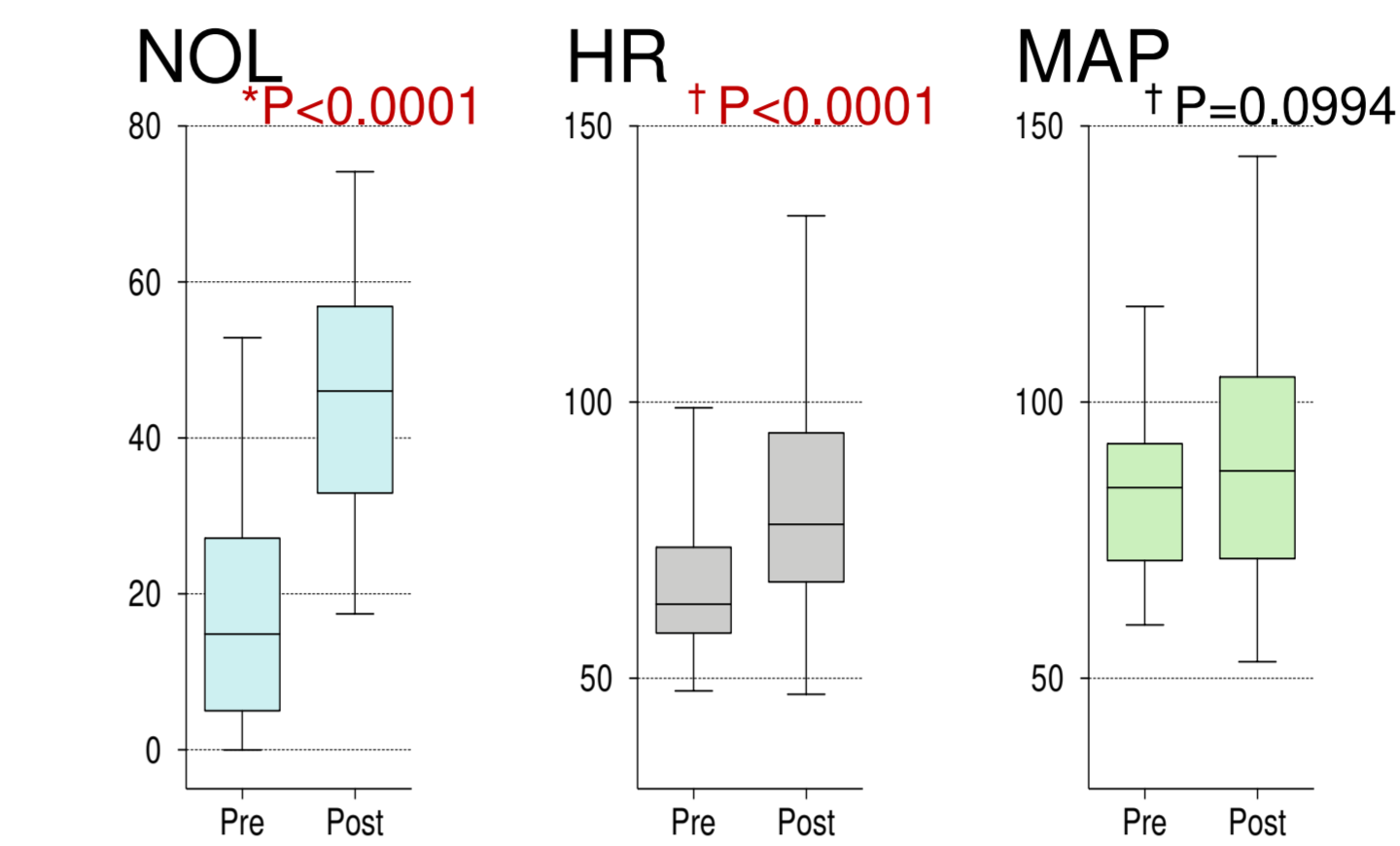
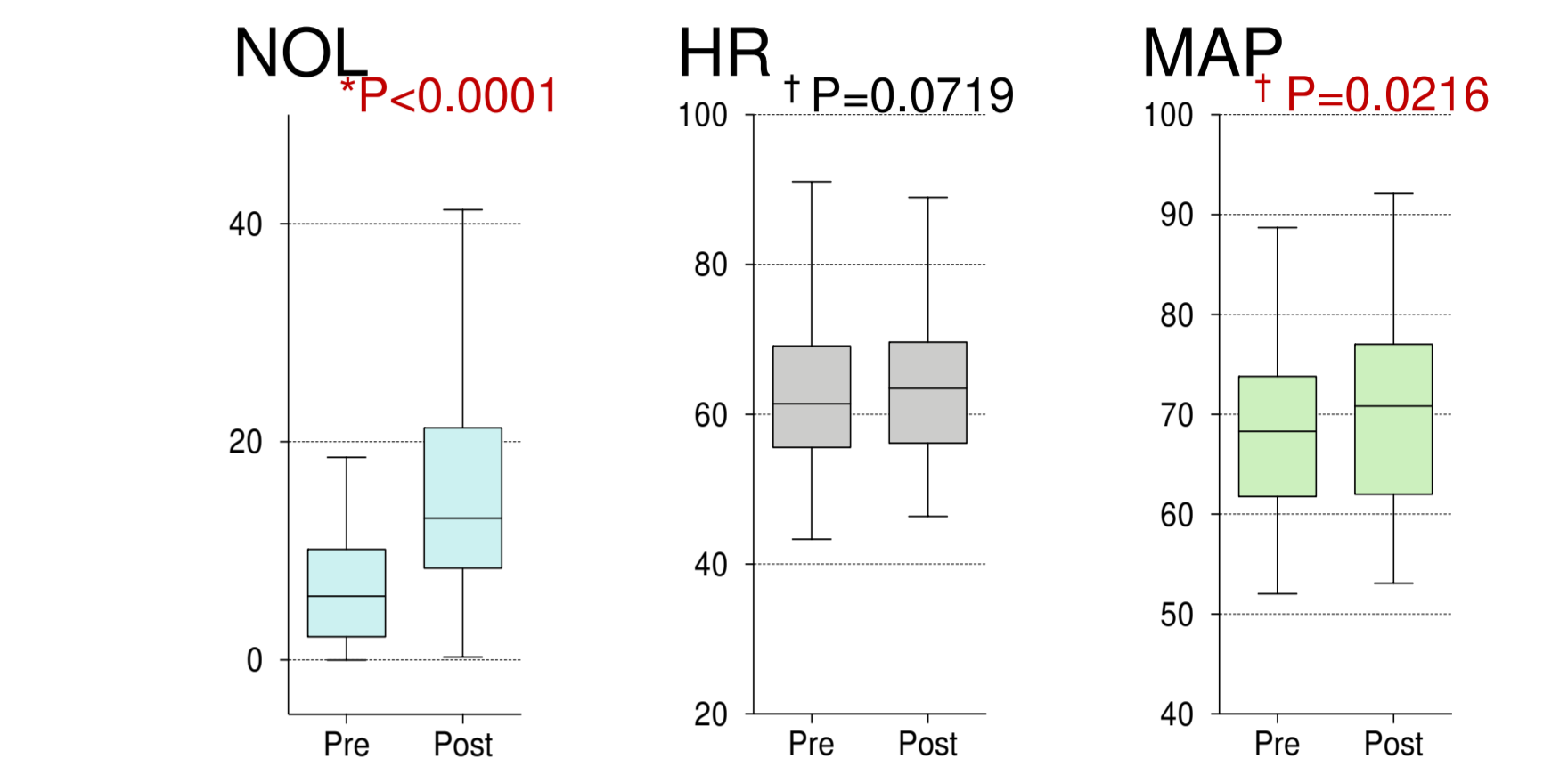


Fig.3 ROC curve analysis. Discrimination of intubation (A) and other stimuli (B) from "no stimulus time".

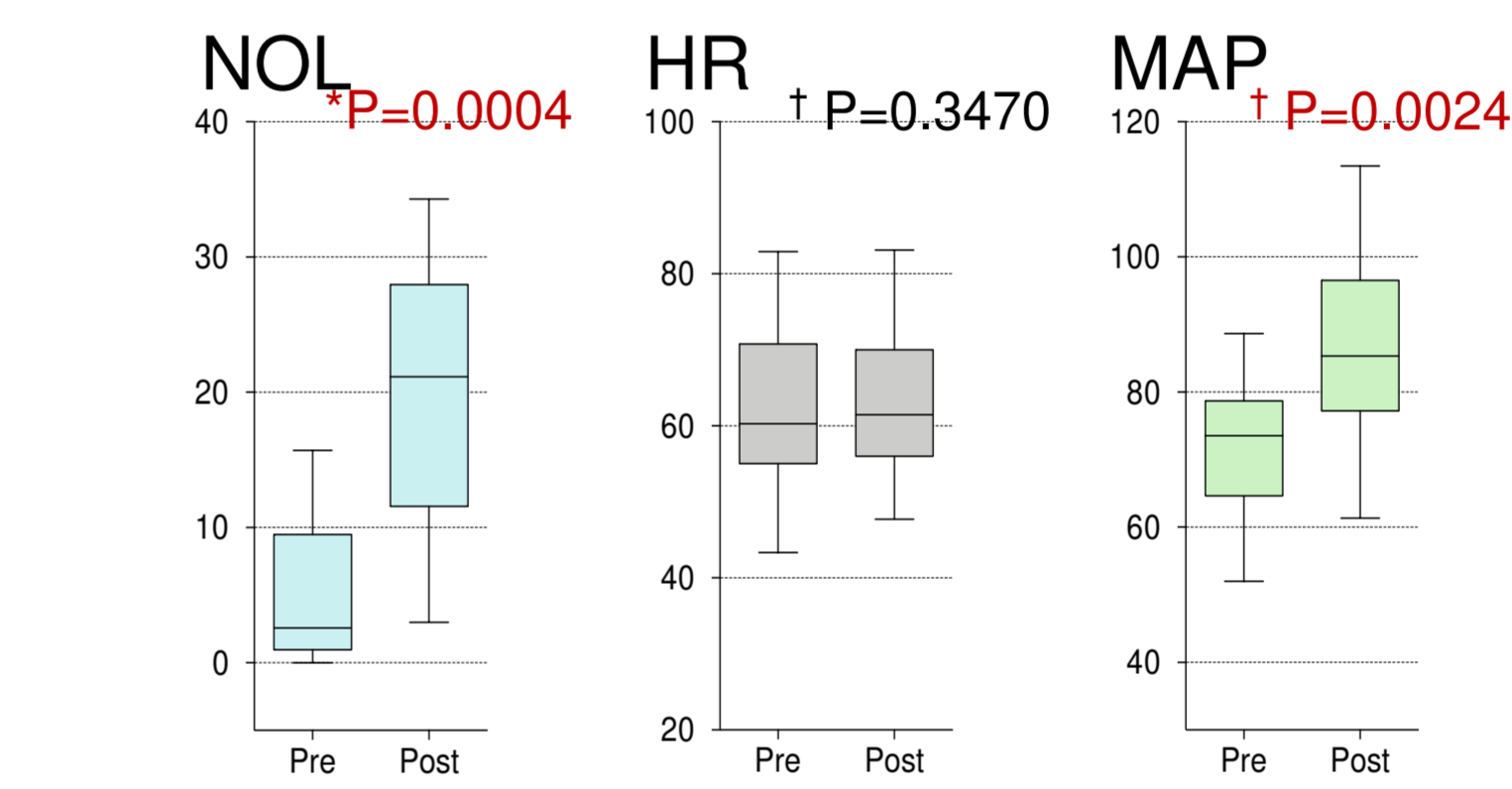
A. Intubation



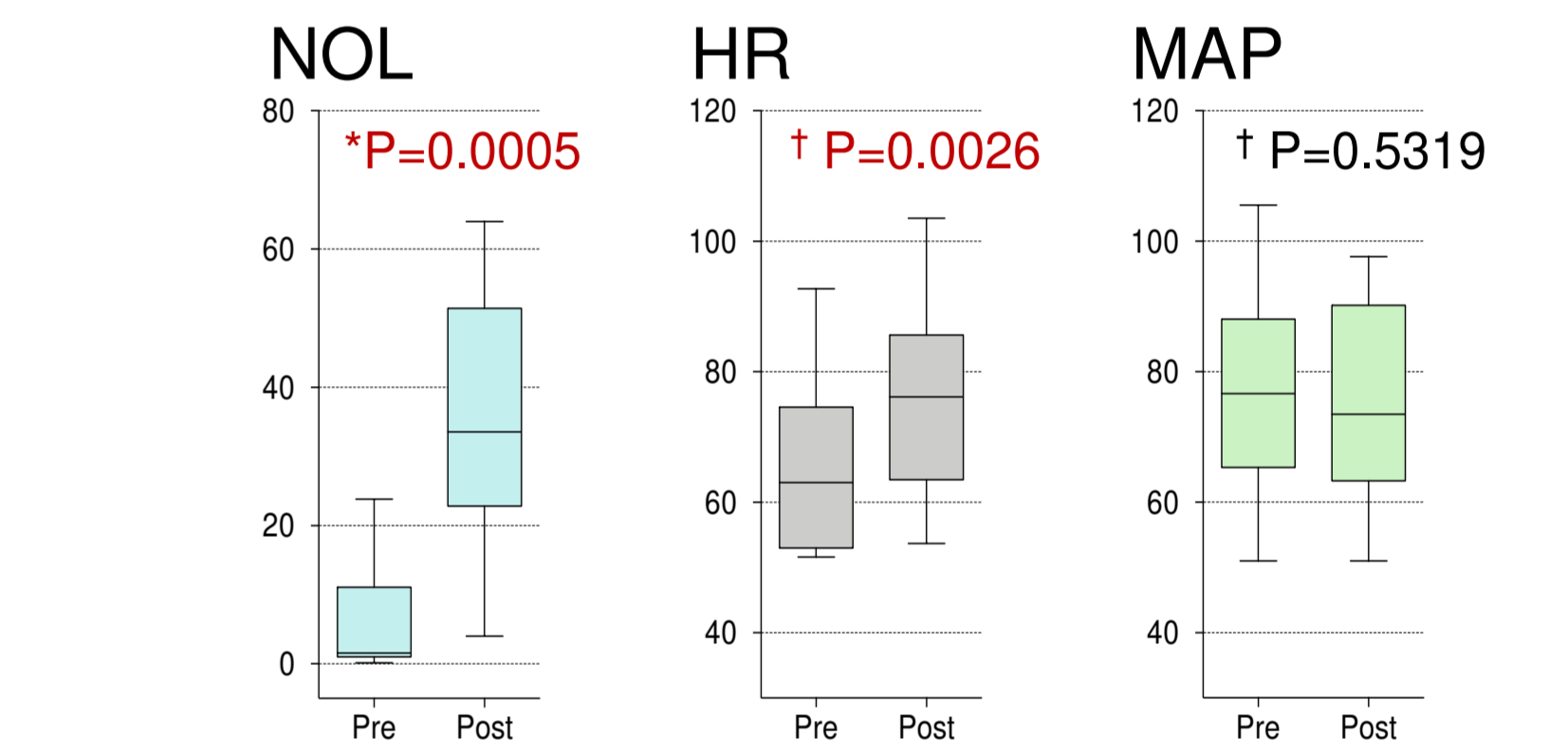
B. Skin incision



C. Trocar insertion



D. Head pinning



E. MEP

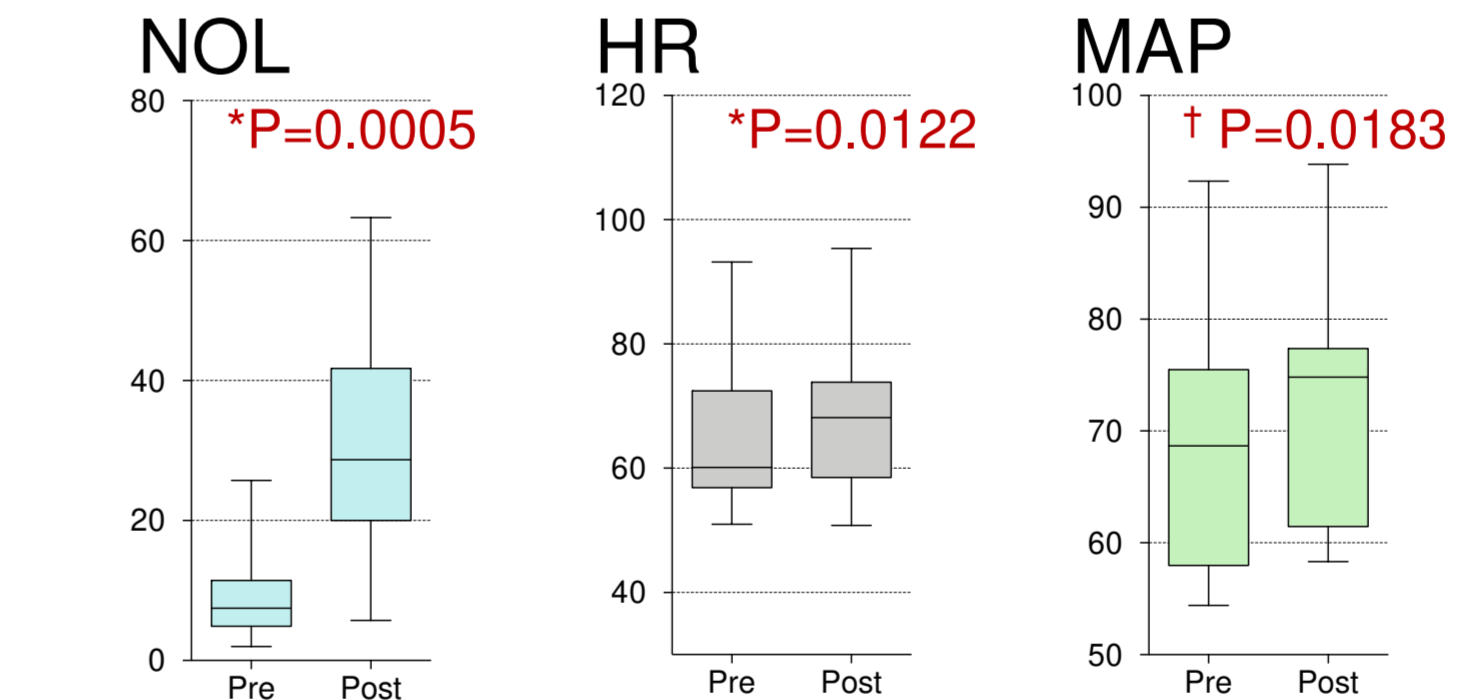


Fig. 4 Changes in each parameter associated with intubation (A) and other stimuli (B) – (E).

CONCLUSION

The NOL index was more sensitive to detect noxious stimuli in anesthetized patients compared to HR and MAP.

REFERENCES

- 1) Martini CH, Boon M, Broens SJ, et al. Ability of the nociception level, a multiparameter composite of autonomic signals, to detect noxious stimuli during propofol-remifentanyl anesthesia. *Anesthesiology*. 2015;123(3):524-534.
- 2) Edry R, Recea V, Dikust Y, Sessler DI. Preliminary Intraoperative Validation of the Nociception Level Index: A Noninvasive Nociception Monitor. *Anesthesiology*. 2016;125(1):193-203.