

# Evaluating the Accuracy of Patient State Index for Measuring Anesthetic Depth in Patients Undergoing Propofol-Sevoflurane Anesthesia a.k.a.

*Can you trust the EEG-derived variables?*

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# Measuring the depth of anaesthesia

Clinical assessment – observation

haemodynamics-based approach (heart rate, arterial pressure)

clinical signs (muscle activity, ocular microtremor, oesophageal contractility, lacrimation)

isolated forearm technique

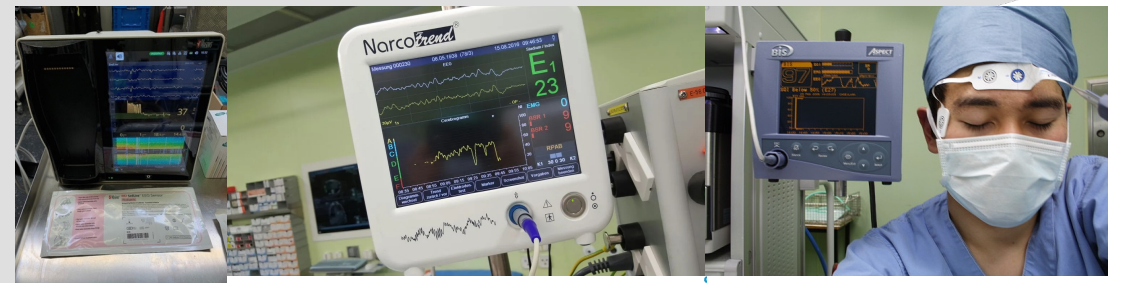


«The Technique of Anaesthesia» Series №2, Open Drop Ether, 1944

Technical approach – brain activity monitoring

EEG-based calculations – BIS, PSi

Auditory Evoked Potentials



PSi

Narcotrend

Bispectral Index

# Reliability, validation problems

- EEG data were combined and variables calculated from 64 volunteers using loss of consciousness/return of consciousness method
- BJA – BIS decreased after muscle relaxant administration to values that suggest optimal depth of anaesthesia for surgery (*in completely awake volunteers*)

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## Response of bispectral index to neuromuscular block in awake volunteers<sup>†</sup>

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## PSI 25–50 Range for Optimal Hypnotic State for General Anesthesia

*A Clinical Perspective*

# Aim of the Study

- To evaluate the ability of Patient State Index (PSi) to assess changes in level of consciousness in patients undergoing general propofol-sevoflurane anaesthesia with NMB
- PSi was compared to clinical loss of consciousness defined as absence of movement in the isolated forearm

# Materials and Methods

- 30 ASA I – III patients, standard anaesthesia technique:
  - Fentanyl 1-2 mcg/kg, Propofol 2-3 mg/kg and Atracurium 0.25-0.5 mg/kg
  - Anaesthesia was maintained with sevoflurane 0.8-1.0 MAC and 1-2 mcg/kg/h infusion of Fentanyl
- Forearm contralateral to I/V cannula was isolated each time before muscle relaxant administration
- P<sub>Si</sub>, isolated hand movement to verbal command, exhaled sevoflurane concentration were registered during:
  - induction/intubation
  - before incision
  - during surgery
  - before the end of the surgery
  - before extubation
- Specific hand movements, non-specific hand movements, no hand movements
- Intraoperative awareness was assessed using Bruce questionnaire after patient regained full consciousness

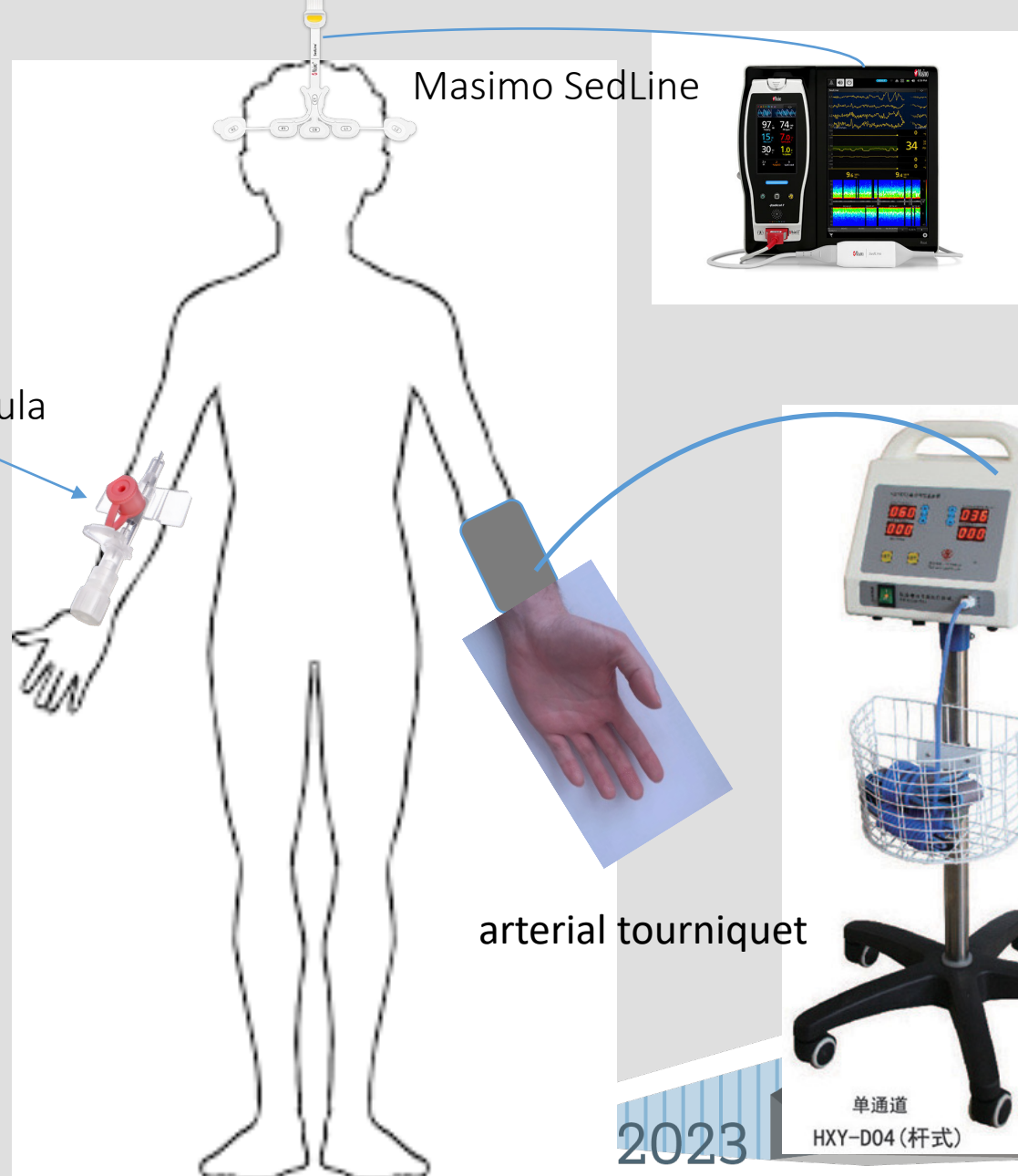


# Isolated forearm technique

- Isolation of forearm contralateral to IV cannula before muscle relaxant administration
- Tourniquet time – 30 minutes



i/v cannula



# Results and Conclusions

- Hand movements –
  - during induction/intubation - 41% specific hand movements, 12% non-specific hand movements, 47% no hand movements
  - before incision – 12% specific hand movements,
  - during surgery and immediately after surgery – no hand movement at all
- Median PSi during during intubation – 34, 31 and 25 in patients with specific, non-specific and no hand movements (PSi values recommended by Masimo – 25-50)
- Median PSi before incision was 42 vs 35 in patients with and w/o hand movement
- **No significant correlation** between PSi indicating adequate hypnosis and hand movement was found
- **PSi monitoring may not be fully reliable** for determining depth of general anaesthesia

**Thank you  
Questions?**

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