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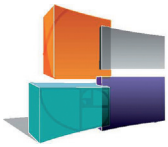

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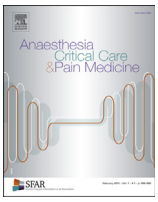

Letter to the Editor

Can intraoperative Surgical Pleth Index values be predictive of acute postoperative pain?

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Surgical Pleth Index (SPI) is a non-invasive and simple access tool used to monitor autonomous nervous system during anaesthesia. This technique is based on photoplethysmographic wave and heart beat analysis. SPI values range between 0 (no stress) and 100 (high stress level). Funcke et al. [1] demonstrated that SPI can detect nociceptive stimulations during general anaesthesia. During the intraoperative period in order to diminish stress, SPI values should be maintained < 50 and fast increase of SPI > 10 be avoided. Recently, Ledowki et al. [2] found a poor performance of SPI > 50 measuring during the ten min before the end of surgery to predict immediate postoperative pain. Therefore, the present study has three different objectives:

- Is the intraoperative SPI (occurrence of an absolute value > 50 or of a fast increase in SPI > 10) associated with postoperative pain?
- Is the absolute value of SPI just before extubation predictive of postoperative pain?
- What is the influence of the intraoperative used opioids (alfentanil, sufentanil, remifentanil) on the ability of SPI to predict postoperative pain?

After Institutional Review Board approval, we conducted a single-centre prospective observational study. We enrolled all consecutive women scheduled for gynaecologic surgery with general anaesthesia over two months. Exclusion criterions were all drugs or pathology that may interfere with autonomic nervous system (i.e. cardiac arrhythmia, beta-blockers…). Protocol of anaesthesia was at the discretion of the attending anaesthetist. The occurrences of at least one episode of intraoperative (between skin incision and closure) SPI > 50 or fast increase in SPI > 10 (i.e. in less than 60 sec) and SPI value just before extubation were recorded in each patient. In recovery room after extubation, a major pain was defined by the need for opioids when visual analogic pain scale > 3 according to the local procedure. Several statistical analyses were performed:

- comparison of the occurrence of at least one episode of intraoperative SPI > 50 or at least one episode of fast increase in SPI in patients with and without postoperative major pain (χ^2-test);
- ability of SPI just before extubation for predicting a major postoperative pain by building Receiver Operating Curve (ROC);
- same analysis in subgroups of women according to the intraoperative used opioids (alfentanil, sufentanil, remifentanil).

According to the review by Ray et al. [3], SPI could be considered as a useful tool for predicting a major postoperative pain if the 95% confident interval (95% CI) of the ROC curve area was > 0.75.

Among 250 included patients, 102 (40%) patients presented with major pain in the recovery room. Main of the gynaecologic surgery was vaginal surgery (59%). Median duration of surgery was 29 min IC (14:67). Volatile anaesthetics were used in majority of women (74%). In the overall population, occurrence of at least one episode of fast intraoperative increase in SPI > 10 was associated with major pain in the recovery room ($P = 0.007$). In the analyses performed in the subgroups of women according to the intraoperative used opioids, intraoperative SPI (absolute value > 50 or fast increase in SPI > 10) were not different whether patients presented or not major pain in the recovery room ($P > 0.05$) (Table 1). The ROC curves of SPI just before extubation for predicting a major postoperative pain are shown in Fig. 1 (overall population and populations according to opioid used). The 95% CI of the ROC curves were always < 0.75.

We showed an association between occurrence of at least one episode of intraoperative fast increase in SPI > 10 and major pain in the recovery room. Previous studies have mainly focused on the effects of intraoperative SPI values on the amount of opioids given during anaesthesia. Ledowski et al. [2] has used intraoperative SPI values to predict postoperative pain. In patients receiving intraoperative fentanyl analgesia, Ledowski et al. [2] proposed a value of SPI > 30 measured during the last ten min of surgery, before arousal, to predict major pain in the recovery room, with a positive predictive value (PPV) = 89.7% and predictive negative

Table 1
Intraoperative SPI values and postoperative pain.

	No major pain	Major pain	*P*
Overall population	148	102	
Occurrence of SPI > 50	71 (48%)	58 (57%)	0.20
Occurrence of fast increase	86 (58%)	77 (75%)	0.007
Sufentanil	38	39	
Occurrence of SPI > 50	25 (66%)	27 (69%)	0.81
Occurrence of fast increase	30 (79%)	30 (77%)	1.00
Remifentanil	34	43	
Occurrence of SPI > 50	19 (56%)	25 (58%)	1.00
Occurrence of fast increase	23 (68%)	36 (84%)	0.11
Alfentanil	76	20	
Occurrence of SPI > 50	27 (36%)	6 (30%)	0.76
Occurrence of fast increase	33 (43%)	11 (55%)	0.45

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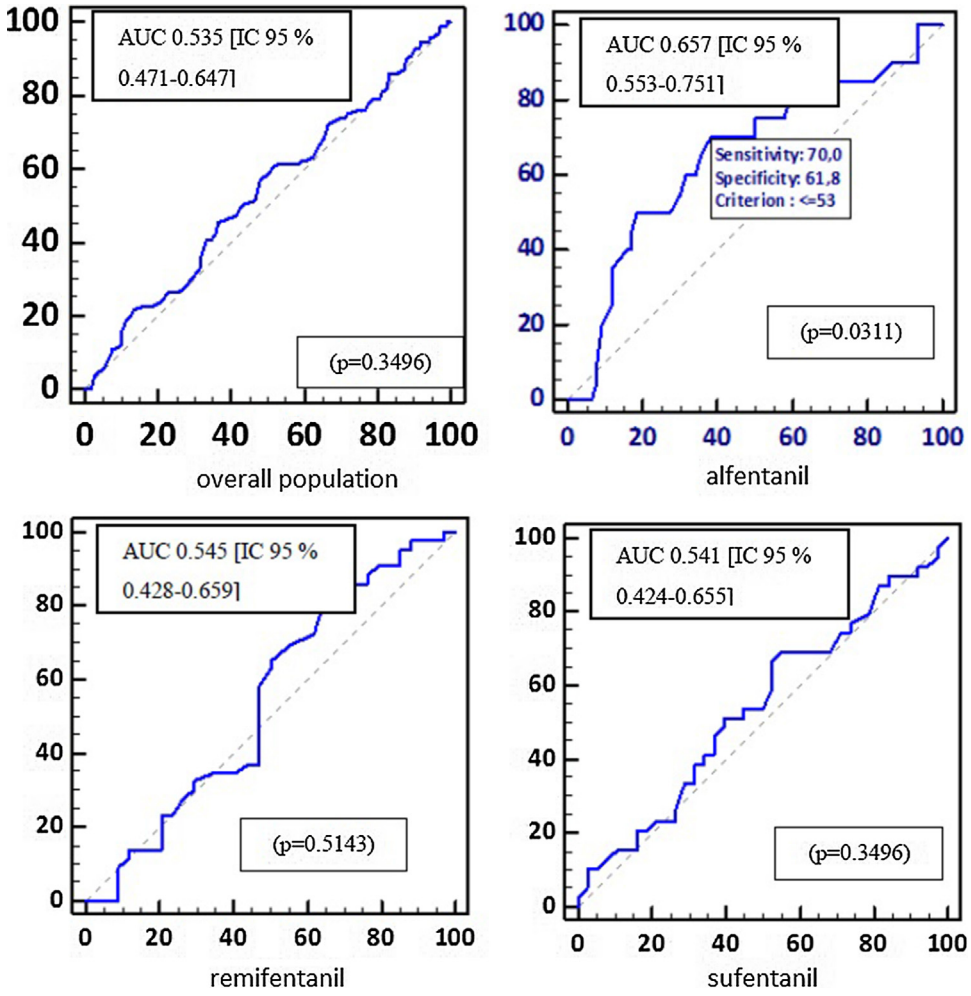

Fig. 1. ROC analysis of SPI measured just before extubation to predict major pain in the recovery room.

value (PNV) = 50%. The value of SPI measured just before tracheal extubation were not predictive of major pain in the recovery room. This is not surprising because the phase of arousal may per se interfere with SPI values. Previous study also showed poor agreement between postoperative SPI values and postoperative pain. In order to predict postoperative pain, future studies are necessary to find the optimal SPI cut-off according to the intraoperative used opioids and when to record him.

Disclosure of interest

The authors declare that they have no competing interest.

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L. Bapteste*, A.S. Szostek, D. Chassard, F.P. Desgranges, L. Bouvet
Department of anaesthesia and critical care, East Group Hospital of Lyon 69500 Bron, Hospices Civils de Lyon, France

*Corresponding author
E-mail address: lionel.bapteste@chu-lyon.fr (L. Bapteste).

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