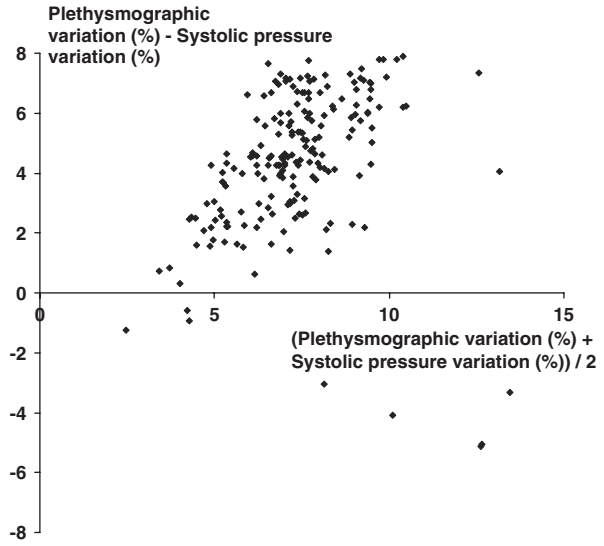

Figure 1.
Bland–Altman plot of respiratory-related plethysmographic variation (%) and respiratory-related systolic pressure variation (%).

retrieved using this timestamp. Long-duration artefacts, such as arterial blood sampling, were removed manually. The respiratory variability of the arterial pressure was compared with the variability of the plethysmograph trace in several ways. Twenty-second epochs (enclosing at least three respiratory cycles) were used to determine the periodic variability. An adjustment to the raw waveform data was made to compensate for any general upward or downward trend in the analysis period.

Systolic pressure variation and pulse pressure variation were both investigated. The plethysmogram, not having a zero baseline, was analysed by determining the envelopes that characterized the peaks and troughs, and in another analysis only the peak values were used.

No matter which technique was used, the correlations between pressure variation and plethysmographic variation were very poor and the Bland–Altman plots indicating that the substitution of respiratory related plethysmographic variation for pressure variation are inappropriate.

The graph (see Fig. 1) represents 90 min of one patient's data (nine 10-min periods during a 5-h procedure). Each measurement is from a 20-s epoch.

The results above are typical and in my view it made the use of the plethysmographic waveform variability not an appropriate substitute for respiratory-associated arterial pressure variation, I believe their comments about the drawbacks of arterial pressure monitoring are also overstated. This study was not as well-controlled as that by Cannesson and colleagues, but was carried out in realistic clinical situations. I think the clinical usefulness of respiratory-associated changes in the optical plethysmograph is still to be proven.

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Field block: an additional technique of potential value for breast surgery under general anaesthesia

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EDITOR:
Postoperative pain, nausea and vomiting are the main obstacles for ambulatory breast surgery. Although the cause of postoperative nausea and vomiting (PONV) is multifactoral, appropriate pain management during and after surgery is essential for its prevention [1,2]. Regional blocks, including thoracic paravertebral, thoracic epidural and intercostal nerve blocks applied before the incision, are known to provide prolonged analgesia and decrease the incidence of PONV in breast surgery [3]. Their main disadvantages, however, are failure rate, risk of complications, need for specific skills and time required. These potential drawbacks outweigh the

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benefits in patients with breast carcinoma undergoing lumpectomy with or without sentinel node biopsy [3].

In order to start an ambulatory breast cancer surgery programme with a high level of patient satisfaction, we evaluated the usefulness of a simple post-induction, pre-surgery, ipsilateral field block for the reduction of postoperative pain, nausea and vomiting in patients scheduled for lumpectomy with or without sentinel node biopsy under general anaesthesia.

Our Institutional Medical Ethics Committee approved this study. ASA I or II female patients scheduled in the period from March 2004 to June 2004 for lumpectomy with or without sentinel node biopsy received general anaesthesia, as was the routine at that time (GA group). Propofol was the induction agent along with a short-acting inhalational agent (desflurane or sevoflurane), sufentanil in titrated doses and atracurium or vecuronium as needed for muscle relaxation. Matched female patients scheduled for a similar procedure in the period from October 2004 to December 2004 received, after informed consent and absence of contra-indications, a similar general anaesthesia and a field block of the breast (GA + LA group). The field block was given after the induction of general anaesthesia and before the start of the surgical procedure. Contra-indications were allergy to amide-type local anaesthetics and infection at the injection site. A field block consisted of deep subcutaneous infiltration with ropivacaine 0.5% alongside the caudal border of the clavicle (supraclavicular nerves), alongside the ipsilateral parasternal line (anterior cutaneous branches of the first to sixth intercostal nerves), and along a line 1 cm posterior and parallel to the anterior axillary line extending under the fold of the pectoralis major muscle high in the axilla (lateral cutaneous branches of the second to seventh intercostal nerves). The total volume of ropivacaine varied between 32 and 60 mL depending on patient body weight. All infiltrations were performed with several 20-mL syringes attached at a 20-G Quincke-type spinal needle.

All patients received 75 mg diclofenac intravenously before the surgical incision. In both study groups, the laryngeal mask airway or endotracheal tube was removed in the operating room when the patient was fully awake before transport to the post-anaesthesia care unit (PACU). Postoperative treatment consisted of a fixed schedule of 1000 mg acetaminophen (paracetamol) combined with 50 mg diclofenac at 8-h intervals, supplemented with opioid rescue medication if needed. A visual analogue scale was used to assess pain and a score greater than 3 (on a scale from 0 to 10) was considered as inadequate analgesia. Trained nurses collected data in both groups prospectively in the recovery room and afterwards on the ward. Rescue opioid medication was given at any time during the first 24 h postoperatively, if the pain score exceeded 3.

PONV was defined as nausea or vomiting or retching at any time during the first 24 h postoperatively. All patients who received any opioids at any time during the first 24 h after surgery were considered opioid-rescue-medication positive. The two groups were analysed and compared based on the following data:

1. pain measured by visual analogue scale (0–10) on arrival at the post-anaesthetic care unit;
2. number of patients with PONV during the first 24 h after surgery;
3. number of patients who need opioid rescue medication. Data are expressed as median (range) or as number of patients and were analysed by Wilcoxon two-sample test or Fisher's exact test when appropriate.

We included 36 patients in the GA group and 24 in the GA + LA group. Contra-indications for amide-type local anaesthetics or refusal for field block were absent. All patients recovered uneventfully and had no adverse events (ECG disturbances, hypertension, hypotension, bradycardia or tachycardia) during anaesthesia and surgery or signs of local anaesthetic systemic toxicity, or mental confusion in the PACU. Nine patients (25%) in the GA group vs. one (4%) in the GA + LA group suffered from nausea in the first 24 h after surgery ($P = 0.04$). No patient from the GA + LA group vomited during the first 24 h after surgery but six patients in the GA group vomited ($P = 0.07$)

Pain score on arrival at the PACU was 3.5 in the GA group vs. 0 in the GA + LA group ($P = 0.00015$). Eighteen (50%) patients in the GA group vs. 1 (4%) in the GA + LA group had a pain score >3 on arrival at the PACU. Opioid rescue medication during the first 24 h after surgery was necessary in 18(50%) patients in the GA group vs. 5(20%) in the GA + LA group ($P = 0.031$).

The incidence of PONV after breast surgery under general anaesthesia is high and its aetiology is complex [1,2]. Appropriate pain management during and after the operation remains a keystone in the prevention of PONV [2]. Its incidence is reduced by regional block techniques, which provide a long-term analgesic effect after surgery [1].

However, in breast surgery, the commonly used thoracic epidural and paravertebral blocks need specific skills. They are time consuming and have complications including pneumothorax or accidental dural puncture. Therefore they are less appropriate for minor breast surgery [3].

We used a simple post-induction, pre-surgery field block as descripted by Niesel [4].

This technique is comparable with that used for herniorrhaphy under general anaesthesia supplemented by peripheral nerve block [5].

There were no signs of systemic toxicity in any patients treated with local anaesthetics, but adverse effects are difficult to identify under general anaesthesia in the absence of ropivacaine blood-concentration measurements. However, no mental confusion was noticed in patients during the PACU period, and cardiovascular disturbances were absent during both anaesthesia and the peri-operative period. Ropivacaine was chosen because of its superior toxicological profile compared to bupivacaine in humans [6]. The maximum dose of 300 mg ropivacaine, which was given to a female weighing 85 kg, was similar to those reported as routine in brachial plexus block for a patient of a similar body weight [7].

In the absence of a routine preventative antiemetic regimen and despite the use of opioids and volatile anaesthetics that promote PONV, the reduction of nausea in the small GA + LA group was statistically significant ($P = 0.04$). Remarkably, only patients in the GA group vomited; possibly because of the greater number of patients who needed opioid rescue medication. The difference in vomiting was not statistically significant probably due to the relatively small number of patients. With respect to postoperative wellbeing and functional recovery, similar results have been reported after local infiltration anaesthesia before the incision in patients with inguinal herniorrhaphy [5].

Regional blocks have been reported to have an advantage over general anaesthesia in breast surgery in terms of postoperative nausea, vomiting and opioid use [3]. Although this was not a randomized controlled trial comparing general anaesthesia with and without additional field block, the potential benefits of a field block in patients undergoing lumpectomy with or without sentinel node biopsy under general anaesthesia became clear.

In conclusion, this comfortable and simple technique may have potential for clinical anaesthesia care, especially for ambulatory breast surgery. Its value in breast surgery warrants further study.

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