A French Nationwide Survey on Anesthesiologist-Perceived Barriers to the Use of Epidural and Paravertebral Block in Thoracic Surgery

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Objectives: **To explore the barriers to the use of epidural block (EDB) or paravertebral block (PVB) for thoracotomy or thoracoscopy.**

Design: **Cross-sectional ancillary study.**

Setting: **French nationwide practice survey.**

Participants: **Lead anesthesiologists at centers practicing thoracic surgery completed an online questionnaire.**

Interventions: **A 9-item electronic questionnaire regarding perceived barriers to the use of EDB and PVB was developed, including technical factors, nursing factors (training and supervision), and reluctance of non-anesthesiologist colleagues (eg, surgeons, nurses and hospital managers). Descriptive and factorial analyses were conducted, including the current use of the techniques in the model.**

Measurements and Main Results: **The questionnaire was answered by 84 of 103 (82%) centers. For both techniques, the most frequently cited barriers were the 4 technical ones and lack of nursing supervision. There was a high rate of do not know/no opinion responses regarding barriers to paravertebral block. The type of center did not influence the responses, but paravertebral block was used more often in university hospitals. Colleague reluctance and time consumption (for both techniques), nursing barriers (for epidural block), and perception of risk and complexity (for paravertebral block), were correlated inversely with actual use. Perception of cost had no influence on practice.**

Conclusions: **This survey suggested that the use of epidural or paravertebral block to provide analgesia for thoracic surgery might be increased by multimodal actions focused on improved communication with surgical and managerial teams. Paravertebral block, as an emerging technique, still is insufficiently recognized in France.**

KEY WORDS: pain, postoperative, anesthesia, regional anesthesia, practice survey, epidural blockade, paravertebral block

THORACIC SURGERY can produce severe postoperative pain. For example, a clinical trial testing the effect of perioperative ketamine reported pain measured during the first 48 postoperative hours exceeded 3 of 10 on a visual analog scale in approximately half of the patients. It exceeded 5 of 10 in 1 of 4 patients using self-administered morphine as the main analgesic agent.[1] A systematic review published in 2008 highlighted the superiority of regional techniques for analgesia, such as thoracic epidural block (EDB) or continuous paravertebral block (PVB).[2] Furthermore, the analgesic efficacy of PVB appeared to be equivalent to that of EDB, according to a meta-analysis published in 2006.[3] Such evidence seemingly has increased recent use of these techniques, as illustrated by 2 surveys conducted in 2005 and 2009 in the British Isles, showing that more than 90% of centers practicing thoracic surgery used either EDB or PVB.[4,5] A survey conducted by the authors in 2012 showed that the use of EDB or PVB seemed to be lower in France, but reasons for this are unknown.[6] It was reported that more than 1 in 4 patients did not receive either EDB or PVB, despite dissemination of information and recommendations regarding these techniques in the main French-language journal of anesthesiology.[7,8] The aim of the current survey was to explore the barriers to the use of epidural block or paravertebral block for thoracotomy or thoracoscopy in France. It was an ancillary study of the above-mentioned practice survey.[6]

METHODS

Ethical approval was obtained locally from CECIC Rhône-Alpes-Auvergne (Grenoble, France, IRB 5921). A list of the French centers practicing thoracic surgery was collected from 2 sources: A French address book of cardiac and thoracic surgery (Axix, Saint-Max, 2011) and the list of members of the French Association of Anesthesiologists practicing cardiac and thoracic surgery (ARCOTHOVA). Each center was contacted, and an anesthesiologist for each center was identified. Each anesthesiologist was contacted by phone; the aims and procedure of the survey were explained, and informed consent was given. The questionnaire was generated on Google Docs, then Google Drive. A weblink to the questionnaire was sent by e-mail to the respondent, with a letter summarizing the general aims of the survey. Data were collected in real time and were transferred automatically to a separate datasheet (Microsoft Office Excel 2003, Microsoft, Redmond, WA). If the questionnaire was not completed within 6 weeks, a reminder was sent via e-mail and then up to 2 phone reminders were issued. The survey started in March 2012. A communication calling for participation was presented at the French annual meeting of ARCOTHOVA in June 2012.

The main part of the questionnaire consisted of a general practice survey about the centers' use of anesthesia and analgesia for thoracic surgery (ie, thoracotomy and thoracoscopy). In particular, the rate of use of each type of procedure

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was estimated by ticking one of the following answers: <5% of cases or never; 5% to 49% of cases or occasionally; 50% to 79% of cases or often; >80% or in the most possible cases. Other items concerning the type of center also were collected, such as the number of estimated procedures of thoracic surgery per center and per year, the number of full-time anesthesiologist physicians involved in thoracic surgery per center, and the type of hospital, ie, general, university, private, or private and public service hospitals. The part of the questionnaire specific to the current study aimed at identifying potential barriers to the use of continuous regional analgesic techniques in the surgical ward after thoracic surgery.

The survey was developed by the authors following a stepwise procedure. Initial content was suggested from professional experience in postoperative analgesia and anesthesia for thoracic surgery. The initial version was tested in parallel by 2 team managers at a university hospital and then was rewritten by the project leader. This second version was tested for clarity and absence of ambiguity of the questions by the resident in charge of the survey and then underwent final circular validation. Nine items/barriers were identified; 4 were technical (risk/complexity/time consumption/cost); 2 were nursing-related (insufficient nursing supervision/insufficient training for nurses); 3 were related to the reluctance of colleagues (surgeons/nurse managers/hospital managers). For each item, the surveyed anesthesiologist had to tick one of the following answers: Totally disagree; somewhat disagree; do not know/no opinion; somewhat agree; and totally agree. An additional free field (for each technique) was left for additional comments. The same questionnaire was applied for EDB and for PVB, consecutively (Appendix 1).

After closure of the survey, data were transferred from the original file to Excel files dedicated to analysis. To estimate the declared use of EDB and PVB for each center with correction of irrelevant data, the original semiquantitative data of practice rates were transformed, through a standardized procedure. This aimed at obtaining a sum-of-rates for all analgesic procedures at 1 for each center, by adjustments when this original sum differed from 1. Quantitative data (such as the centers' activity or practice rates) were expressed as second and [first – third] quartiles. For the raw description of perceived barriers (1 answer per center and per item), data were expressed as percentage of positive answers of the whole sample. To allow correlation analyses and descriptive (factorial) multivariate analyses, the aspect of the variables was harmonized in accordance with clinical relevance. Then, an ordinal value was affected to each categoric value (–2, –1, 0, +1, and +2 for totally disagree, somewhat disagree, do not know/no opinion, somewhat agree, and totally agree, respectively. The other data were kept as original. Correlation analyses were performed by calculating the Spearmans ρ coefficient, and the difference between ρ and 0 was tested. Correlation of perceived barriers was analyzed within each technique and followed by principal component analyses (PCA) built of a Spearmans correlation matrix; cluster analyses on the PCA coordinates (Wards ascending hierarchical classification) also were conducted. Correlation also was analyzed between techniques for each of the 9 items.

Finally, multivariate descriptive (factorial) analyses were conducted to study—within each technique—the relations among the different perceived barriers, the actual use of the technique (the rate of acts estimated as performed with the technique), and the descriptors of the centers' activity (the estimated yearly number of thoracic procedures, the number of full-time-equivalent physicians per center, and the estimated yearly number of thoracic procedures per anesthesiologist). PCAs built of Spearmans correlation matrices also were used; the variable type of center was added to the PCAs without entering into the model for descriptive purposes only. In parallel, the significance of the relationship between the type of center and the perceived barriers to practice was tested by a Kruskall-Wallis test. When relevant, further inferential analyses using the generalized linear model also were conducted.

Statistical analyses were performed using XLStat (Addinsoft, Paris, France). Figures were generated using Microsoft Office Excel 2003, PowerPoint 2003 (Microsoft, Redmond, WA) and Photoshop Elements 7.0 (Adobe, San Jose, CA).

RESULTS

The first questionnaire was completed on March 13, 2012. The survey was closed on September 28, 2012, 28 weeks after initiation. Among the 103 centers identified as practicing thoracic surgery regularly, 84 (81.6%) confirmed this activity and completed the questionnaire. No missing data were noted within the answered questionnaires.

The results relating to current practice already have been published.[6] Briefly, the number (%) of centers by type was 13 (15.5%), 30 (35.7%), 34 (40.5%), and 7 (8.3%), respectively, for general, university, private, and private and public service Hospitals. There was no difference in the type of center between responders and nonresponders. The scope of the survey was an estimated yearly practice of 13,089 thoracoscopies and 14,067 thoracotomies. Within the whole sample, the estimated yearly number of thoracic procedures was 240 per center (150-400), the number of full-time-equivalent anesthesiologists per center was 5 (4-9), and the estimated yearly number of thoracic procedures per anesthesiologist physician was 48 (21-96).

The raw responses to the questionnaire about perceived barriers to the use of EDB and of PVB are shown in Figure 1. The rate of agreement rarely was superior to 50%, except for the items risk, complexity, and time consumption as barriers to EDB. In general, for both EDB and PVB, the technical barriers were more often cited, followed by barriers related to nursing, then those related to the reluctance of colleagues. The number of anesthesiologists replying *I don't know* or *no opinion* was high for all items relating to PVB (19.0% to 33.3%, 25% overall), compared with those for EDB (1.2% to 11.3%, 4.9% overall). No recurrent comment was noted about a perceived barrier potentially missing from the semiquantitative survey.

When studying the correlation of perceived barriers within each technique, a strong multicollinearity was noted (correlation matrices; Table 1). Both for EDB and PVB, 3 clusters of variables could be identified, which were the same as those predefined (ie, technical barriers, nursing barriers, and reluctance of colleagues). Also, for each item, there was significant correlation between the answer for EDB and the answer for PVB (Fig 2). For either of the 2 techniques, no significant relationship was found between any perceived barrier and the type of center.

Table 2 shows, for each technique, the correlations between (1) actual use (the rate of procedures declared as performed