Cardiothoracic Anesthesia, Respiration and Airway

Expert consensus for training in perioperative echocardiography in the province of Quebec

[Un consensus d'experts sur la formation en échocardiographie périopératoire au Québec]

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Purpose: Establish an expert consensus for training in perioperative echocardiography in the province of Quebec.

Methods: Cardiac anesthesiologists practicing in the province of Quebec with expertise in echocardiography were involved in the development of a multicentre expert consensus on training in perioperative echocardiography. Guidelines for training in adult echocardiography, transesophageal echocardiography and perioperative echocardiography by the American Society of Echocardiography (ASE), the American College of Cardiology (ACC) and/or the Society of Cardiovascular Anesthesiologists (SCA) were reviewed.

Results: A basic, advanced and director level of expertise were identified for training in perioperative echocardiography. The total number of echocardiographic examinations to achieve each of these levels of expertise remains unchanged from the 2002 ASE-SCA guidelines. However, the recommended proportion of examinations performed personally is increased in the Quebec expert consensus for both the basic and the advanced level of training to ensure proficiency in echocardiography while providing anesthesia care to the patient. A level of autonomy in perioperative echocardiography is also identified in the basic level of training as defined in the Quebec expert consensus. Maintenance of competence, certification in the perioperative transesophageal echocardiography (PTE) examination and duration of training are outlined for each of the three levels of training in the Quebec expert consensus but are not part of the recent 2002 ASE-SCA guidelines.

Conclusion: Adequate perioperative echocardiographic training is an important aspect of cardiovascular anesthesia. The ACC, ASE and SCA guidelines for training in echocardiography were modified to reflect the expert consensus of anesthesiologists in the province of Quebec.

Objectif : Établir un consensus d'experts sur la formation en échocardiographie périopératoire au Québec

Méthode : Des anesthésiologistes cardiaques pratiquant au Québec et ayant une expertise en échocardiographie ont participé à l'élaboration d'un consensus multicentrique d'experts sur la formation en échocardiographie périopératoire. Les lignes directrices de la formation en échocardiographie chez l'adulte, en échocardiographie transœsophagienne et en échocardiographie périopératoire produites par l'American Society of Echocardiography (ASE), l'American College of Cardiology (ACC) et/ou la Society of Cardiovascular Anesthesiologists (SCA) ont été passées en revue.

Résultats : Un niveau de compétence élémentaire, avancé et supérieur a été défini pour la formation en échocardiographie périopératoire. Le nombre total d'examen échocardiographiques à réaliser pour atteindre chacun des niveaux demeure le même depuis la parution des lignes directrices 2002 de l'ASE-SCA. Par contre, le nombre fait personnellement est plus élevé pour les niveaux élémentaire et avancé de la formation décrite par les experts québécois pour assurer le développement de compétences sûres en échocardiographie tout en prodiguant l'anesthésie au patient. Un niveau d'autonomie en échocardiographie périopératoire est aussi défini par le consensus d'experts pour la formation élémentaire. Le maintien des compétences, l'examen d'accréditation et la durée de la formation en échocardiographie transœsophagienne périopératoire (ETP) sont définis pour chacun des trois niveaux de formation par les experts du Québec, mais ils ne font pas partie des récentes lignes directrices 2002 de l'ASE-SCA.

Conclusion : Une formation adéquate en échocardiographie périopératoire est importante en anesthésie cardiovasculaire. Les lignes directrices de l'ACC, l'ASE et la SCA pour la formation en échocardiographie ont été adaptées par le consensus d'anesthésiologistes experts du Québec.

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Accepted for publication December 10, 2002.

Revision accepted April 30, 2003.

TRANSESOPHAGEAL echocardiography (TEE) is an important monitoring and diagnostic tool in the operating room and in the perioperative period. Although echocardiography was first introduced into clinical practice in 1954, it was not until the development of a high resolution TEE probe that the potential role of TEE in the operating room became clear. Since the development of the multiplane probe in 1992, TEE has had an increasing role in anesthesia practice. The number of peer reviewed articles published on the use of TEE has increased from only 159 in 1989 to 7,736 by January 2003. In Quebec, the first two hospitals where anesthesiologists pioneered the use of TEE as a routine monitor in cardiac surgical cases were the SMBD Jewish General Hospital affiliated with McGill University and Notre-Dame Hospital affiliated with the Université de Montréal. Today, most university hospitals in Quebec have the capability of performing intraoperative echocardiography. There are however no Canadian guidelines that address the issue of TEE training.

In the United States, Aronson *et al.* published a historical perspective on training and certification in perioperative TEE.¹ In 1987, the American Society of Echocardiography (ASE) published guidelines for optimal physician training in echocardiography.² These guidelines were revised by the ASE in 1992 to include TEE.³ In 1995 the American College of Cardiology (ACC) reaffirmed these recommendations and added a more comprehensive echocardiographic assessment that included Doppler hemodynamic examination for each study performed (Table I).⁴ In 1996 a task force by the ASE and the American Society of Cardiovascular Anesthesiologists (SCA) published practice guidelines for perioperative TEE identifying a basic and an advanced level of training

(Appendix, available as additional material at www.cja-jca.org).⁵ The National Board of Echocardiography established in 1998 the first examination in perioperative TEE (PTE examination). In 2002 a joint task force by the ASE and the SCA published training requirements to achieve each level of training; qualifications for training programs and for program directors were also outlined (Table II).^{6,7}

The training guidelines published by the joint task force of the ASE and SCA in 2002 provide a useful guide for quality control on the use of perioperative TEE. There are however, no Canadian training guidelines on perioperative TEE. In addition, differences in the practice of cardiac anesthesia and perioperative TEE across Canada may lead to different provincial guidelines. The current trend in the province of Quebec is for adult cardiac anesthesiologists with expertise in TEE to assume the dual role of performing the echocardiographic assessment while providing anesthesia care. In addition, as more practicing anesthesiologists are requesting training in perioperative TEE there is an increased demand for the creation of different training pathways to achieve this goal while minimizing the interference on their clinical practice. Training criteria must be established to ensure that centres with training programs in perioperative TEE provide the trainee with sufficient expertise to use this monitoring and diagnostic tool appropriately. The proposed training recommendations in this document are intended for licensed medical practitioners enrolled in or having completed an accredited residency in anesthesia.

Method

In order to define the current recommendations an initial working group was created and consisted of

TABLE 1 ACC guidelines for training in echocardiography: 1995

	BASIC	ADVANCED ^a	DIRECTOR ^b
Minimum # of examinations†	150	300	750
Minimum # performed personally§	150	300	300+
Duration of training	three months	six months	one year
CME	NS	NS	NS
TEE training & examinations‡	No	No	50

a: total for basic training may be counted towards advanced training.

b: program director qualification includes an advanced level of training with an additional 450 complete echocardiographic examinations that are either performed or interpreted by the trainee under appropriate supervision.

†: complete echocardiographic examinations that are interpreted by the trainee under appropriate supervision.

§: complete echocardiographic examinations that are performed personally and interpreted by the trainee under appropriate supervision.

‡: TEE training is limited to trainees who have achieved an advanced level of training. The guidelines recommend 50 supervised TEE diagnostic studies with a minimum of 25 esophageal intubations before independent performance.

NS = not specified. CME = continuing medical education; TEE = transesophageal echocardiography.

three anesthesiologists who are acknowledged by their peers in anesthesia as leaders or pioneers in the development of perioperative TEE in Quebec. Three of the four Quebec universities were represented in this initial working group. A Medline search with the words “credentialing, training or certification” was performed and limited to articles related to echocardiography. Training guidelines in adult echocardiography by the ASE in 1987, ACC in 1995 (Table I) and, ASE and SCA in 2002 (Table II) were reviewed and used as a template for the creation of the current expert consensus. Once a preliminary document was produced, the working group was expanded to include adult cardiac anesthesiologists from the four Quebec universities with expertise in echocardiography. Anesthesiologists who have completed a fellowship in cardiac anesthesia with echocardiography training as well as those who have obtained a passing score on the PTE examination were considered to have expertise in

perioperative echocardiography. Each of the three anesthesiologists in the initial working group was responsible for coordinating the discussion within each university so that a consensus could be reached.

Results

The ASE/SCA 2002 guidelines identified three levels of training which were maintained in this document but with modifications on the training requirements to achieve each of the three levels: basic, advanced and director of an echocardiography laboratory. The training recommendations outlined in this document reflect a consensus from anesthesiologists with expertise in echocardiography from Montreal University, Laval University, Sherbrooke University and, McGill University. These guidelines do not apply to transthoracic echocardiography (TTE) or to pediatric or non-surgical intensive care unit patients where the scope of diagnosis may be quite different than those associated

TABLE II ASE-SCA guidelines for training in perioperative echocardiography: 2002

	<i>BASIC</i>	<i>ADVANCED^a</i>	<i>DIRECTOR^b</i>
Minimum # of examinations†	150	300	450
Minimum # personally performed‡	50	150	300
Duration of training	NS	NS	NS
CME (hr)	20	50	NS
PTE examination	NS	NS	NS

a: total for basic training may be counted towards advanced training.

b: program director qualification includes an advanced level of training in perioperative echocardiography and an additional 150 comprehensive perioperative transesophageal echocardiography examinations.

†: complete echocardiographic examinations interpreted and reported by the trainee under appropriate supervision. May include transthoracic studies recorded by qualified individuals other than the trainee.

‡: comprehensive intraoperative transesophageal echocardiography examinations personally performed, interpreted and reported by the trainee under appropriate supervision.

Modified from ASE/SCA Task Force Guidelines for Training in Perioperative Echocardiography^{6,7} NS: not specified. ASE = American Society of Echocardiography; SCA = Society of Cardiovascular Anesthesiologists; CME = continuing medical education; PTE = perioperative transesophageal echocardiography.

TABLE III Quebec expert consensus for training in perioperative echocardiography: 2003

	<i>BASIC</i>	<i>ADVANCED^a</i>	<i>DIRECTOR^b</i>
Minimum # of examinations†	150	300	450
Minimum # performed personally‡	100	200	300
Duration of training	three months	six months	one year
CME (hr)	50	50	100
PTE examination	yes	yes	yes

a: total for basic training may be counted towards advanced training.

b: program director qualification includes an advanced level of training in perioperative echocardiography and an additional 150 complete echocardiographic examinations including at least 100 comprehensive perioperative transesophageal echocardiography examinations.

†: complete echocardiographic examinations interpreted by the trainee under appropriate supervision. May include transthoracic and transesophageal studies recorded by qualified individuals other than the trainee.

‡: comprehensive intraoperative transesophageal echocardiography examinations personally performed, interpreted and reported by the trainee under appropriate supervision.^{6,7}

CME = continuing medical education; PTE = perioperative transesophageal echocardiography.

with the perioperative management of adult surgical patients. Grandfathering of anesthesiologists who are currently performing TEE independently at an advanced level is recommended.

Basic training in perioperative echocardiography

A three-month fellowship in perioperative TEE under the supervision of an anesthesiologist with advanced training is recommended to achieve a basic level of training. The trainee should master the acquisition of all the views of a comprehensive examination as described by the ASE and the SCA.^{8,9} During his training, the candidate should have interpreted 150 complete TTE or TEE examinations. These studies must be reviewed with a physician who has achieved an advanced level of training.^{1-4,6,7} This number should include 100 comprehensive TEE examinations personally performed, interpreted and reported by the trainee under appropriate supervision (Table III). These studies must include a variety of different surgical cases to ensure that the candidate can achieve the skills and knowledge for a basic level of training (Appendix available as additional material at www.cja-jca.org).⁵⁻⁷ Examinations that are interpreted do not need to be done in real time but can be reviewed under the supervision of a physician with advanced training from selected comprehensive echocardiographic studies in an existing database.

The trainee who obtains his training after 2003 will be required to keep a log of all the studies performed. In addition, the trainee should document 50 hr of continuing medical education (CME) training in the form of either seminars, workshops or video on TEE including topics ranging from a basic to an advanced level. After completion of his training the candidate must obtain a passing score on the PTE examination. A trainee may also fulfill the requirement for a basic level of training over a maximum period of two years by documenting the required number of echocardiographic assessments when these are performed and interpreted under the supervision of a physician with an advanced level of training in a centre with recognized expertise in perioperative TEE. Following completion of his training the candidate must obtain a passing score on the PTE examination.

Basic training provides the necessary expertise for monitoring and diagnosis of hemodynamic problems related to preload, ventricular systolic or diastolic dysfunction, myocardial ischemia and valvular dysfunction. Following uncomplicated valve replacement, a trainee with basic training would have the ability to recognize valvular lesions or dysfunction that may be significant and that would require consultation with a

physician who has advanced training in perioperative echocardiography. Therefore, this level of training would allow the anesthesiologist to perform TEE independently at a basic level and identify problems that would require further consultation. TEE diagnosis that will impact significantly on the surgical procedure should be done in consultation with a physician who has advanced training in perioperative TEE.

Training centre

A minimum of two anesthesiologists with advanced training in TEE should be required before a centre can be recognized for training anesthesiologists in perioperative TEE at a basic level. The cardiac centre should be performing on average at least two cardiac surgical cases per day during a regular week schedule. The variety of cases should be sufficient for the trainee to achieve the technical and cognitive skills of basic training (Appendix, available as additional material at www.cja-jca.org).⁵⁻⁷

Advanced training in perioperative echocardiography

During his training, the trainee should interpret a total of 300 TTE or TEE studies (Table III). These echocardiographic studies must be reviewed with a physician who has achieved an advanced level of training and this number should include a minimum of 200 comprehensive TEE studies performed personally and interpreted under appropriate supervision. These studies must include a variety of different surgical cases to ensure that the candidate can achieve the skills and knowledge for an advanced level of training.⁵⁻⁷ Examinations that are interpreted do not need to be done in real time but can be reviewed under the supervision of a physician with advanced training from selected comprehensive echocardiographic studies in an existing database.

An advanced level of training can be achieved during a one-year fellowship in cardiac anesthesia with echocardiography training or alternatively during a six-month fellowship in echocardiography. A trainee who has achieved a basic level of training may also fulfill the requirements for an advanced level of training over a maximum period of two years by documenting the required number of echocardiographic assessments when these are performed and interpreted under the supervision of a physician with an advanced level of training. This would allow the trainee to acquire the necessary expertise while continuing to practice cardiac anesthesia.

The trainee who obtains his training after 2003 will be required to keep a log of the echocardiographic studies performed under supervision. In addition, the trainee should document a total of 50 hr of CME dur-

ing his training in the form of either seminars, workshops or teaching videos on echocardiography including topics ranging from a basic to an advanced level. After completion of his training, the candidate must obtain a passing score on the PTE examination.

An advanced level of training is required when TEE diagnosis will have a direct impact on the surgical management of the patient (e.g., mitral valve repair). A physician who has obtained an advanced level of training becomes a consultant in echocardiography and has the skills and knowledge to perform a complete evaluation of more complex echocardiographic cases. An advanced level of training also provides the ability to participate in the training of other physicians who wish to acquire expertise in perioperative TEE and be acknowledged as an accredited trainer in perioperative echocardiography.

Training centre

A centre may qualify for advanced training if there are at least three anesthesiologists with advanced training including at least one anesthesiologist who fulfills the requirement for director of an echocardiography laboratory as outlined in this document. Although two anesthesiologists with advanced training may be sufficient to provide advanced training, it is the opinion of the authors that it is important to expose the candidate to a more diversified approach on perioperative TEE. The cardiac centre should have the variety and number of cardiac surgical cases to ensure that the trainee has an adequate exposure to the wide scope of perioperative TEE diagnosis. As stated in the recent training guidelines published by the ASE and the SCA the authors would also like to emphasize the importance of case diversity to ensure that the trainee can use TEE effectively in all clinically established current applications.^{6,7}

Director of echocardiography laboratory

A trainee who has achieved an advanced level of training may qualify to become a director of an echocardiography laboratory if he has interpreted 450 perioperative echocardiographic examinations. This number should include 300 comprehensive TEE studies personally performed, interpreted and reported.^{2,4,6,7} These studies may be performed within a one-year fellowship in an echocardiography laboratory. The additional comprehensive TEE echocardiographic studies may also be performed following the completion of advanced training as part of the anesthesiologist's regular practice in cardiac anesthesia without direct supervision. The program director must also have completed 100 hr of CME, as outlined in Table III, within the past four years.

Discussion

A basic and an advanced level of training are described in previous guidelines.¹⁻⁷ This distinction remains important and is also outlined in the recent training guidelines of the task force by the ASE and the SCA.^{6,7} It is important to define both the training required to achieve these levels of training and the extent of the diagnostic role for each level of training. The knowledge and skills required to achieve these levels of training have been previously outlined in the report of the joint task force of the ASA and SCA in 1996.⁵ These have been updated and modified in 2002 by the joint task force of the ASE and SCA on physician training in perioperative echocardiography to include epicardial echocardiography and epivascular echocardiography.^{6,7} Although the knowledge and skills for the advanced level of training remain the same as described in the 2002 ASE and SCA task force, the role of the physician with basic training is increased in the Quebec guidelines to reflect the current practice profile of most university hospitals in this province (Appendix, available as additional material at www.cja-jca.org).⁵⁻⁷ The training requirements in the province of Quebec to achieve a basic level of training are also increased to provide the anesthesiologist with autonomy in the use of TEE as monitor and diagnostic tool at a basic level as outlined in this document.

Differences with previous guidelines for basic training

I. NUMBER OF EXAMINATIONS PERFORMED PERSONALLY

Previous guidelines for basic training in 1987 and in 1995 on transthoracic echocardiography have required that the trainee interpret 150 examinations including 75 examinations performed personally.^{2,4} In 1992 the ASE identified that 50 TEE examinations including 25 probe insertions would be required for training in TEE in addition to obtaining a level two training as defined in Table I.³ In 2002, the ASE and SCA task force guidelines for training in perioperative echocardiography identified 150 complete echocardiographic studies as the minimum number of examinations required. These examinations must include at least 50 comprehensive intraoperative TEE studies personally performed, interpreted and reported by the trainee in the ASE/SCA 2002 guidelines (Table II).^{6,7}

The goal of basic training is different in anesthesia than in cardiology because TEE is used even at a basic level of training for monitoring and diagnostic purposes. Most anesthesiologists in Quebec with expertise in echocardiography, have the dual role of providing anesthesia care and performing intraoperative TEE. It is therefore important to achieve the nec-

essary technical skills to perform a complete and efficient TEE assessment in a timely fashion. The anesthesiologist is not only expected to obtain the echocardiographic information rapidly but also to interpret that information and integrate it in the anesthetic care of the patient. The documentation of a complete examination with adequate images should be obtained for each patient so that if consultation is later required, the necessary information will be available. It is the opinion of the authors that 100 TEE examinations personally performed, interpreted and reported will better enable the anesthesiologist to perform this task.

An important difference with the 2002 ASE/SCA guidelines involves echocardiographic examinations that are not personally performed. These examinations, in the Quebec expert consensus, do not need to be reported by the trainee and do not need to be interpreted in real time provided they include complete echocardiographic studies. However, these studies must be reviewed with a physician who has achieved an advanced level of training. The interpretation of selected complete echocardiographic examination from an existing database can be used for this purpose.

II. TRAINING PERIOD

The guidelines published in 1987 and 1995 include a three-month training period for a basic level of training.^{2,4} However, the guidelines on training in perioperative TEE published by the ASE/SCA in 2002 do not include any duration of training.^{6,7} To facilitate the organization of a focused training process, the recommended duration of training to achieve a basic level of expertise has been included in the Quebec guidelines but this goal may also be achieved over a maximum training period of two years.

III. CME AND PTE EXAMINATION

The guidelines published recently by the ASE and SCA recommend 20 hr of CME. In the Quebec guidelines, the role and skills of a physician with basic training are increased and he is also required to achieve a passing score on the PTE examination. Learning activities that qualify as CME are defined in the current document and in the authors' opinion, 50 hr of CME represent a minimum for the candidate to achieve a passing score on the PTE examination. Although the PTE examination may be considered as a more advanced level of training it represents a standardized mechanism to ensure that the candidate has acquired the necessary knowledge to perform TEE studies appropriately at a basic level of training.

Differences with previous guidelines for advanced training

I. NUMBER OF EXAMINATIONS PERFORMED PERSONALLY

Previous guidelines for advanced training in cardiology have required that the trainee interpret 300 examinations including 150 examinations performed personally.^{2,4} In Quebec, anesthesiologists are often responsible for the TEE assessment while providing anesthetic care for the patient. Therefore, although the same total number of examinations is used in these guidelines, a higher proportion of examinations personally performed and interpreted is included because of the necessity to obtain the required information rapidly while integrating this information in the hemodynamic management of the patient. It is therefore important for anesthesiologists who will be using TEE in their practice to be proficient in the skills required for TEE probe manipulation and image acquisition.

An important difference with the 2002 ASE/SCA guidelines involves echocardiographic examinations that are not personally performed. These examinations, in the Quebec expert consensus, do not need to be reported by the trainee and do not need to be interpreted in real time provided they include complete echocardiographic studies. However, these studies must be reviewed with a physician who has achieved an advanced level of training. The interpretation of selected complete echocardiographic examination from an existing database can be used for this purpose.

II. TRAINING PERIOD

Guidelines written in 1987 by the ASE and in 1995 by the ACC on training for TTE recommend six months of training to achieve an advanced level of training.^{2,4} In 1992, guidelines for credentialing in TEE include 50 TEE examinations with at least 25 probe insertions in addition to a level two training in echocardiography as defined above. More recently the ASE and SCA task force established training recommendations but the duration of training was not included.^{6,7} The current recommendations propose a six-month period to achieve an advanced level of training. This was included as a guideline but alternative training schedules were also outlined with an emphasis on the goals and objectives for learning perioperative echocardiography.

III. CME AND PTE EXAMINATION

The ASE/SCA 2002 guidelines on physician training recommend 50 hr of CME for advanced training but does not require the candidate to obtain a passing score on the PTE examination. Learning activities that qualify as CME are defined in the current document

and in the authors opinion, 50 hr of CME represent a minimum for the candidate to achieve a passing score on the PTE examination.

Differences with previous guidelines for director qualifications

The total number of comprehensive TEE examinations personally performed and reported remains the same as described in the ASE/SCA 2002 guidelines but different pathways for achieving this goal are outlined in the current document. Although qualifications for a program director can be obtained within a structured one-year fellowship, this level of expertise can also be obtained during an anesthesiologist's clinical practice without loss of anesthesia coverage at their institution and without the financial burden that comes with obtaining training in a different centre. This alternate avenue of obtaining credentialing for director qualification will facilitate the creation of training centres and had never been proposed previously.

The guidelines published by the ASE and SCA recommend 50 hr of CME in echocardiography for advanced training but there are no guidelines on CME for the program director in echocardiography. It is the opinion of the authors that the program director responsible for supervising trainees for advanced training should have at least 100 hr of CME during the previous four years to remain current with the new developments in echocardiography.

Transthoracic echocardiography

The authors consider that although training in TTE may be useful to achieve expertise in perioperative TEE, it is not required. Although the views are different in TTE, the principles of echocardiography are very similar and can, usually, be applied to TEE. The large number and variety of TTE cases in an echocardiography laboratory can allow the trainee to rapidly acquire significant knowledge in echocardiography. The technical skills in TTE and TEE are however very different and TEE can easily be learned without any prior knowledge of TTE. Although the purpose of this article is to focus on perioperative TEE, increasing use of epivascular echocardiography and manipulation of the epivascular probe is more similar to TTE than TEE. Training in TTE may thus be more useful in learning this technique and can also be used towards the completion of the recommended echocardiographic studies for both basic and advanced training.

Maintenance of competence

A minimum of 50 to 75 echocardiographic examinations per year are recommended for maintenance of

competence in the guidelines on physician training in stress echocardiography. Although there are no clear guidelines for TEE in this area, it is the opinion of the authors that a minimum of 50 comprehensive TEE examinations per year personally performed, interpreted and reported are required to maintain an adequate level of expertise for an individual who has achieved a basic or an advanced level of training.¹ In addition a total of 50 hr of CME training would be required over a four-year period to ensure that the level of knowledge remains current with new developments in echocardiography.

Conclusion

Perioperative TEE provides us with a powerful monitoring and diagnostic tool. Misinterpretation of TEE examinations can have catastrophic implications for the patient. With patient safety and quality of care in mind, and as the availability and use of TEE increases, it is imperative that physicians obtain the necessary expertise and an appropriate level of training prior to their routine performance of examinations. Although the total number of interpreted echocardiographic examinations is the same as those specified in the 2002 ASE/SCA guidelines, the number of echocardiographic examination personally performed has been increased to ensure proficiency in the use of TEE while providing anesthesia care to the patient. In addition, a passing score on the PTE examination is required in the Quebec guidelines. Both the role of an anesthesiologist with basic training as well as the training requirements are increased in the Quebec guidelines as compared to those proposed by the ASE/SCA task force, to provide anesthesiologists with autonomy in the use of TEE at a basic level of training. Therefore, with these guidelines in place, the anesthesiologist with basic training will not only be able to perform a complete independent TEE examination during non-complex cardiac surgical procedures, but also, while ensuring proper anesthetic care, be able to identify findings requiring more advanced echocardiographic evaluation.

References

- 1 Aronson S, Thys DM. Training and certification in perioperative transesophageal echocardiography: a historical perspective. *Anesth Analg* 2001; 93: 1422–7.
- 2 Pearlman AS, Gardin JM, Martin RP, *et al.* Guidelines for optimal physician training in echocardiography. Recommendations of the American Society of Echocardiography Committee for Physician Training in Echocardiography. *Am J Cardiol* 1987; 60: 158–63.
- 3 Pearlman AS, Gardin JM, Martin RP, *et al.* Guidelines

- for physician training in transesophageal echocardiography: recommendations of the American Society of Echocardiography Committee for Physician Training in Echocardiography. *J Am Soc Echocardiogr* 1992; 5: 187–94.
- 4 Stewart WJ, Aurigemma GP, Bierman FZ, et al. Guidelines for training in adult cardiovascular medicine. Core Cardiology Training Symposium (COCATS). Task Force 4: training in echocardiography. *J Am Coll Cardiol* 1995; 25: 16–9.
 - 5 Practice guidelines for perioperative transesophageal echocardiography. A report by the American Society of Anesthesiologists and the Society of Cardiovascular Anesthesiologists task force on transesophageal echocardiography. *Anesthesiology* 1996; 84: 986–1006.
 - 6 Cabalan MK, Abel M, Goldman M, et al. American Society of Echocardiography and Society of Cardiovascular Anesthesiologists task force guidelines for training in perioperative echocardiography. *Anesth Analg* 2002; 94: 1384–8.
 - 7 Cabalan MK, Stewart W, Pearlman A, et al. American Society of Echocardiography and Society of Cardiovascular Anesthesiologists task force guidelines for training in perioperative echocardiography. *J Am Soc Echocardiogr* 2002; 15: 647–52.
 - 8 Shanewise JS, Cheung AT, Aronson S, et al. ASE/SCA guidelines for performing a comprehensive intraoperative multiplane transesophageal echocardiography examination: recommendations of the American Society of Echocardiography Council for intraoperative echocardiography and the Society of Cardiovascular Anesthesiologists task force for certification in perioperative transesophageal echocardiography. *Anesth Analg* 1999; 89: 870–84.
 - 9 Shanewise JS, Cheung AT, Aronson S, et al. ASE/SCA guidelines for performing a comprehensive intraoperative multiplane transesophageal echocardiography examination: recommendations of the American Society of Echocardiography Council for intraoperative echocardiography and the Society of Cardiovascular Anesthesiologists task force for certification in perioperative transesophageal echocardiography. *J Am Soc Echocardiogr* 1999; 12: 884–900.