

# The impact of a comprehensive course in advanced minimal access surgery on surgeon practice

Daniel W. Birch MD;\* Cliff Sample MD;\* Rohit Gupta MD†

**Introduction:** Practising surgeons need an effective means for learning new skills and procedures in advanced minimal access surgery (MASA). Currently, available educational methods include traditional continuing medical education symposia (1-day courses), instructional videos, mentoring, or comprehensive courses that combine lectures, skills laboratories and live surgery. The impact of comprehensive courses in advanced MASA on surgeons' knowledge, skills and practice has not been clearly established. **Methods:** We completed a survey of all physicians who attended comprehensive courses in advanced gastrointestinal MASA held at the Centre for Minimal Access Surgery (CMAS) in Hamilton, Ont. **Results:** Of 158 course attendees, we received 65 responses (response rate 41%). Fifty-six men and 9 women responded, with a mean age of 44.9 years and a mean practice duration of 12.3 years. Eighty-seven percent of respondents were community-based surgeons. As a result of attending CMAS courses, respondents felt they experienced a substantial improvement in the knowledge and skills required to complete MASA. After a comprehensive course at CMAS, most respondents reported that they had introduced MASA procedures into their practice. The mean overall impact of a course on a surgeon's practice (with respect to patient referrals, procedural armamentarium and personal satisfaction) was rated by respondents at 3.92 (standard deviation [SD] 0.71; Likert scale 1–5, 1= negative, 5= positive). **Conclusions:** A comprehensive course in advanced MASA has a positive impact on attendees' knowledge and skills. Ultimately, surgeons attending MASA courses will begin to introduce new MASA procedures into surgical practice. These courses have a distinct role in the teaching of MASA to surgeons in practice.

**Introduction :** Les chirurgiens actifs ont besoin d'un moyen efficace pour acquérir de nouvelles compétences et apprendre de nouvelles techniques et procédures avancées en intervention chirurgicale avec effraction minimale (ICEM). Les méthodes de formation actuellement disponibles comprennent les symposiums classiques d'éducation médicale continue (cours d'une journée), les vidéos de formation, le mentorat ou des cours détaillés conjuguant conférences, laboratoires techniques et interventions chirurgicales en direct. On n'a pas encore établi clairement l'impact des cours intégrés de techniques avancées d'ICEM sur les connaissances, les compétences et la pratique des chirurgiens. **Méthodes :** Nous avons réalisé un sondage auprès de tous les médecins qui ont assisté à des cours intégrés de techniques avancées d'ICEM gastro-intestinale au Centre for Minimal Access Surgery (CMAS) à Hamilton. **Résultats :** Sur les 158 participants, nous avons reçu 65 réponses (taux de réponse de 41 %), dont 56 hommes et 9 femmes âgés en moyenne de 44,9 ans et qui pratiquaient en moyenne depuis 12,3 ans. Quatre-vingt-sept pour cent des répondants étaient des chirurgiens communautaires. Après avoir assisté à des cours du CMAS, les répondants étaient d'avis qu'ils avaient amélioré considérablement les connaissances et les compétences nécessaires pour pratiquer des ICEM. Après avoir suivi un cours détaillé au CMAS, la plupart des répondants ont déclaré avoir implanté des ICEM dans leur pratique. Les répondants ont évalué à 3,92 (écart type [ET] 0,71; échelle Likert 1–5, 1 = négatif, 5 = positif) l'effet global moyen d'un cours sur la pratique d'un chirurgien (en ce qui a trait aux références des patients, aux instruments d'intervention et à la satisfaction personnelle). **Conclusions :** Un cours détaillé de techniques avancées d'ICEM a un effet positif sur les connaissances et les compétences des participants. Les chirurgiens qui suivent des cours en techniques d'ICEM mettront en œuvre graduellement de nouvelles procédures d'ICEM dans leur pratique de la chirurgie. Ces cours ont un rôle particulier à jouer dans l'enseignement des techniques d'ICEM aux chirurgiens actifs.

From the \*Centre for the Advancement of Minimally Invasive Surgery (CAMIS), Department of Surgery, University of Alberta, Edmonton, Alta; the †Center for Minimal Access Surgery, St Joseph's Healthcare, Department of Surgery, McMaster University, Hamilton, Ont.

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**Correspondence to:** Dr. Daniel W. Birch, Royal Alexandra Hospital, 10240 Kingsway, Edmonton AB T5H 3V9; fax 780 735-4771; dbirch@ualberta.ca

Since the introduction of a laparoscopic approach to gastrointestinal disease, it has been recognized that appropriate training is the key to patient safety.<sup>1</sup> The pioneers of laparoscopic surgery attempted to construct a formal teaching environment to introduce laparoscopic cholecystectomy (LC) to the community of gastrointestinal surgeons.<sup>2</sup> Subsequently, surgeons realized that a limited teaching intervention, such as a short course for new and complex procedures, may be inadequate.<sup>3</sup> As a result, numerous methods for instruction in laparoscopic skills and procedures have evolved. These methods include comprehensive courses, training devices and virtual reality simulators.<sup>4,5</sup>

For surgeons in practice, there is no clear mechanism for learning and incorporating new surgical techniques into practice. Short, comprehensive courses in minimal access surgery (MASA) have flourished as academic centres try to provide a means for transferring skills and knowledge in MASA to the greater community of surgeons. Few studies have assessed the impact of these courses on surgeon practice.<sup>6</sup>

In this study, we examined the impact of comprehensive courses in MASA on surgeon practice. We evaluated the perceived changes in knowledge, skills and practise for surgeons attending courses at the Centre for Minimal Access Surgery (CMAS) in Hamilton, to define an educational role for this approach to learning.

**Methods**

We examined course records from 1999–2003 at CMAS and developed a comprehensive list of attendees. The list was filtered to select surgeons actively Practicing at the time of attending the course (trainees excluded).

Course attendees were surveyed, and professional demographics were established. We assessed the impact of a CMAS course on basic

and advanced MASA knowledge and skills. Respondents were also asked whether they were performing advanced MASA procedures in their practice as a result of attending a CMAS course and to assess the overall impact of the course on their surgical practice. All responses were entered on a Likert-type scale with specific anchors (i.e., 1= minimal change, 3 = improvement, 5 = dramatic improvement). Non-respondents were sent 2 additional surveys at 3-week intervals.

Data were abstracted from the surveys and entered into a spreadsheet for summary and analysis.

**Results**

Of 158 course attendees, we received 65 responses (response rate 41%). Fifty-six men and 9 women responded, with a mean age of 45.1 years and duration of practise of 12.3 years. Eighty-five percent of respondents were community-based surgeons. All courses attended are listed in Table 1. As a result of attending CMAS courses, respondents perceived a substantial improvement in their MASA-related knowledge (8 of 9 areas assessed) and skills (5 of 6 areas assessed) (Table 2).

For respondents attending a

**Table 1**

Advanced minimal access courses attended by respondents		
Course type	CMAS course	Other course
Colorectal	36	6
Antireflux	38	9
Solid organ	9	3
Bariatric	7	0
General	NA	14

CMAS = Centre for Minimal Access Surgery; NA = not applicable

**Table 2**

Impact of comprehensive course on surgical knowledge and skills	
Surgical knowledge	Impact score, mean (median) values of Likert scale*
Instrumentation	3.9 (4)
Required MAS skills	3.8 (4)
Surgical approach	3.8 (4)
Operating room setup	3.6 (4)
Staff support	3.3 (3)
Evidence supporting MAS approach	3.3 (3)
Follow-up	2.9 (3)
Preoperative evaluation	2.8 (3)
Basic disease	2.3 (2)
Surgical Skills	
Suturing	3.5 (3)
General MAS skills	3.4 (3)
Use of the harmonic scalpel	3.1 (3)
Two handed dissection	3.1 (3)
Use of staplers	2.9 (3)
Use of hand-assisted device	2.2 (2)

\*1 = minimal change, 3= improved, 5= dramatic improvement  
MAS = minimal access surgery

colorectal course at CMAS, laparoscopic appendectomy was adopted by 51.9%, laparoscopic colectomy by 80.6% and laparoscopic rectal surgery by 48.3%. Of those attending an antireflux course, laparoscopic fundoplication was adopted by 64.9% and para-esophageal hernia repair by 3.6%. For respondents attending a solid organ course, laparoscopic splenectomy was adopted by 85.7% and adrenalectomy by 71.4%. The mean overall impact of a CMAS course on a surgeon's practice (with respect to patient referrals, procedural armamentarium and personal satisfaction) was rated by respondents at 3.92 (standard deviation [SD] 0.71; Likert scale 1–5, 1 = negative, 5 = positive).

## Discussion

Surgeons require a method for learning new surgical techniques while in practice. Focused, comprehensive courses have become a popular and accessible means to acquire skills and learn procedures in advanced MASA. In the early 1990s, courses were offered to introduce LC to general surgeons in the United States and Canada,<sup>2,7</sup> and initial studies indicated that these short courses were inadequate to teach the required skills.<sup>3</sup> Training devices were also developed (body forms or skill stations) and offered as adjunctive methods of instruction.<sup>4</sup> The sophistication of training techniques has now evolved to such a degree that some authors have considered training on live animal models or cadavers to be unnecessary. Advanced methods of instruction, such as computerized simulators and virtual reality trainers, have been developed that have proven efficacy in teaching surgical skills and procedures.<sup>5,8,9</sup>

Courses in gastrointestinal, urological and orthopedic surgery have been evaluated for their success in teaching surgical skills.<sup>6,10–14</sup> See and colleagues reported one of the first studies to evaluate the impact of a comprehensive course in urology on surgeon practice and outcomes.<sup>6</sup> The

authors also assessed clinical outcomes during the incorporation of new procedures into a surgical practice. Urologists who learned laparoscopic techniques were surveyed at varying lengths of time after a formal course. The authors concluded that the participants who did not seek further training in addition to the course were more likely to experience complications. They also identified other risk factors for complications, including solo practice and variation in surgical assistants. The authors went on to assess their course participants 1 year after the course, concluding that the participants continued to use laparoscopic techniques as a result of the course training they had received.<sup>11</sup>

The role of short courses or workshops in advanced gastrointestinal surgery has been assessed. Heniford and colleagues examined the impact of 1-day courses with and without follow-up preceptor programs.<sup>12,13</sup> They found that course attendees who were subsequently preceptored were more likely to incorporate procedures into their own practice (i.e., splenectomy, laparoscopic ventral hernia repair). As well, they found that surgeons with greater precourse surgical experience in advanced MASA techniques were also more likely to complete advanced MASA procedures after a course. In this study, however, it is difficult to separate the impact of the preceptor program from the impact of the course.

Urologists have recently gone beyond the preceptor model and introduced a mini-fellowship training model for surgeons wishing to learn a laparoscopic approach to urological disease while in practice.<sup>15</sup> This model consists of a comprehensive course in laparoscopy (2 to 3 days, including training on pelvic trainers and animal models), an observership encompassing at least 6 MASA urology cases and the completion of at least 6 major MASA urology cases with a mentor. The authors report a limited but very positive experience

with the initial trainees involved in this innovative approach.

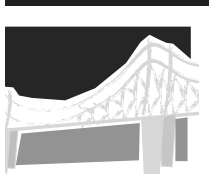
In this study, we have shown that a comprehensive course in advanced MASA improves a surgeon's perceived level of surgical knowledge, and skill and often induces surgeons to complete advanced MASA procedures in their own practice. However, surgeons attending a CMAS course are quite possibly a self-selected group and, therefore, may be more likely to complete MASA procedures in their own practice, regardless. In addition, we have not audited the course attendees to confirm the reported cases or to assess clinical outcomes. There is a large variation in the level of penetrance of different procedures into clinical practice after courses, ranging from 3.6% for paraesophageal hernia repair to 85.7% for splenectomy. This may reflect the relative difficulty of the procedures.

The most appropriate method for training and credentialing a surgeon in practice in new surgical procedures remains to be established. It is doubtful that a short comprehensive course will be adequate for all surgeons; however, the infrastructure required for a more intense teaching paradigm is currently not in place in Canada. Although centres of excellence may serve as the touchstone for new and innovative techniques, there are too few "expert" minimal access surgeons to train Canadian surgeons in advanced MASA. Leadership is needed to define the most appropriate template for introducing new surgical techniques into surgical practice in an appropriate manner that is logistically feasible for all stakeholders. Moreover, national experts must remain committed to ensuring that Canadian surgeons can become proficient in the most efficacious approach to gastrointestinal surgery. Until a clear mechanism emerges, technically complex and challenging procedures, such as advanced MASA for gastrointestinal disease, may continue to be completed in selected centres with specialized resources.

Competing interests: None declared.

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