Interest and applicability of acute care surgery among surgeons in Quebec: a provincial survey

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Accepted for publication
May 22, 2013

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DOI: 10.1503/cjs.003712

Background: Acute care surgery (ACS) comprises trauma and emergency surgery. The purpose of this new specialty is to involve trauma and nontrauma surgeons in the care of acutely ill patients with a surgical pathology. In Quebec, few acute care surgery services (ACSS) exist, and the concept is still poorly understood by most general surgeons. This survey was meant to determine the opinions and interest of Quebec general surgeons in this new model.

Methods: We created a bilingual electronic survey using a Web interface and sent it by email to all surgeons registered with the Association québécoise de chirurgie. A reminder was sent 2 weeks later to boost response rates.

Results: The response rate was 36.9%. Most respondents had academic practices, and 16% worked in level 1 trauma centres. Most respondents had a high operative case load, and 66% performed at least 10 urgent general surgical cases per month. Although most (88%) thought that ACS was an interesting field, only 45% were interested in participating in an ACSS. Respondents who deemed this concept least applicable to their practices were more likely to be working in nonacademic centres.

Conclusion: Despite a strong interest in emergency general surgery, few surgeons were interested in participating in an ACSS. This finding may be explained by lack of comprehension of this new model and by comfort with traditional practice. We aim to change this paradigm by demonstrating the feasibility and benefits of the new ACSS at our centre in a follow-up study.

Contexte : Les soins intensifs chirurgicaux comprennent la chirurgie traumatologique et la chirurgie d'urgence. Cette nouvelle spécialité a pour but de faire participer les chirurgiens traumatologues et non traumatologues aux soins des patients gravement malades qui nécessitent une chirurgie. Au Québec, il existe peu de services de soins intensifs chirurgicaux et ce concept est encore méconnu de la plupart des chirurgiens généraux. Ce sondage visait à sonder l'opinion et l'intérêt des chirurgiens généraux du Québec au sujet de ce nouveau modèle.

Méthodes : Nous avons créé un questionnaire électronique bilingue au moyen d'une interface Web et l'avons envoyé par courriel à tous les chirurgiens inscrits auprès de l'Association québécoise de chirurgie. Un rappel a été envoyé 2 semaines plus tard pour améliorer le taux de réponse au questionnaire.

Résultats : Le taux de réponse a été de 36,8 %. La plupart des répondants occupaient des postes universitaires et 16 % travaillaient dans des centres de traumatologie de niveau 1. La plupart des répondants ont dit opérer beaucoup et 66 % ont dit pratiquer au moins 10 chirurgies générales urgentes chaque mois. Même si la majorité des répondants (88 %) se sont dits d'avis que les soins intensifs chirurgicaux étaient un domaine intéressant, seulement 45 % ont exprimé le souhait de participer à un service de ce type. Les répondants pour qui ce concept a semblé le moins applicable à leur pratique étaient plus susceptibles d'exercer dans des centres non universitaires.

Conclusion : Malgré un intérêt marqué à l'endroit des soins intensifs chirurgicaux, peu de chirurgiens ont semblé souhaiter participer à un service de ce type. Ce fait peut s'expliquer par la méconnaissance de ce nouveau modèle et par la force de l'habitude associée à la pratique traditionnelle. Nous visons à modifier ce paradigme en démontrant la faisabilité et les avantages d'un nouveau modèle de service de soins intensifs chirurgicaux dans notre centre lors d'une étude de suivi.

Acute care surgery (ACS) was developed in the United States in the early 2000s after a drastic restructuring of trauma surgery.[1,2] The decrease in operative case load and increase in complexity of critical care cases, coupled with long hours and night shifts, contributed to a growing dissatisfaction

within that specialty. As sustainability of trauma surgery began to be questionned,[3] the American Association for the Surgery of Trauma (AAST) incorporated emergency surgery in the trauma surgeon armamentarium and built a curriculum designed for an ACS fellowship.[4] Early in its implementation, emergency surgery services proved to be beneficial for surgeons by increasing their operative volume and for patients by improving the timeliness of care.[5,6] The cornerstone of this model is a dedicated team of surgeons and residents taking care of patients requiring trauma and emergency surgery. Most function with a "surgeon-of-the-week" on call during the day for 7 consecutive days and with a dedicated operating room (OR) reserved for emergency cases.

The Canadian approach has been slightly different. Inspired by the American model, ACS was implemented in Canada to improve access to surgical care for patients with emergency surgical conditions and to allow subspecialized general surgeons to separate their elective practices from emergency cases.[7] Unlike in the United States, ACS in Canada includes general surgeons from all subspecialties, not only trauma surgery. In 2009, there were 13 acute care surgical services (ACSS) in Canada, of which 8 were in the Western part of the country and 1 was in the province of Quebec;[8] 1 additional ACSS was created in Montréal in 2010. To date, only positive impacts on patient care and resident education have been reported.[9–11] As this model is less well understood and generates less interest in the province of Quebec, we sought to conduct a survey among Quebec general surgeons to gauge their impressions of ACS and their motivation to participate in this new model.

Methods

In the province of Quebec, all general surgeons are required to register with the Association québécoise de chirurgie (AQC). We obtained their email addresses from the association. We conducted our survey during the first 2 weeks of April 2011.

We created the survey (English and French versions) using the SurveyMonkey interface. One of us (É.J.) generated items on the themes of emergency general surgery, trauma surgery and subspecialization. Twelve specific emergency pathologies and surgical procedures were taken from the ACS curriculum.[4] Demographic data, such as years in practice, type of practice and case workload, were collected. Major surgeries were defined as any surgical procedure performed in the OR, thus excluding endoscopy and minor surgery. Urgent surgeries were defined as operations required within 24 hours of admission. Four general surgeons and 3 general surgery residents reviewed all items generated with a view to reducing the final number of items included in the survey. The final version included 23 items. Five-point Likert scales were used. We pretested the survey among 4 general surgery residents who were not familiar with the items. We sent the same survey 2 weeks later to the same 4 residents to assess the validity of the questionnaire; validity was 100%.

We emailed the survey to the AQC members along with an introduction letter explaining the basic principles of ACS and the goal of our survey and consent form (included in Appendix 1, available at cma.ca/cjs). An email reminder was sent 2 weeks later to boost response rates.

Statistical analysis

We conducted proportionality tests to compare groups, and we used a 2-sample χ^2 test for equality of proportions with continuity of correction. We considered results to be significant at $p < 0.05$. The difference of proportions with 95% confidence intervals (CIs) was calculated. All calculations were done using R software (R Project for Statistical Computing).

Results

Accounting for the absence of email addresses and undeliverable messages, the questionnaire was sent to 453 surgeons. In all, we received 167 electronic responses, for a response rate of 36.9%.

Demographics

Participant characteristics are shown in Table 1. Median time in practice was 13 (range 1–38) years; 43% had fellowship or subspecialty training, 56% had academic practices and 16% worked in level 1 trauma centres. Only 10% worked in health centres with an ACSS. Most respondents (72%) worked in centres with 5 or more general surgeons. Compared with the overall population of general surgeons in Quebec, our survey respondents included a greater proportion of academic surgeons (56% v. 40%, difference 14% [95% CI 5%–24%]), trauma surgeons (16% v. 7%, difference 84% [95% CI 2%–14%]) and surgeons working in centres with an ACSS (10% v. 7%, difference 6% [95% CI –0.1% to 6%]). On the other hand, the proportion of

Table 1. Demographic characteristics of survey respondents

Characteristic	%*
Years in practice, median no.	13
Existing acute care surgery service	10
Fellowship	43
Academic practice	56
Level 1 trauma centre	16
5 or more general surgeons	72
More than 100 major surgeries/yr	88
More than 10 emergency surgeries/mo	66
Total	167

*Unless otherwise indicated.

respondents working in centres with 5 or more general surgeons was similar (72% v. 75%, $p = 0.12$).

As for the number of procedures, 88% of respondents were performing more than 100 major operations per year, and half were performing 10–20 urgent operations per month.

Emergency surgical procedures

Most respondents were comfortable with the management of diverticulitis with fecal peritonitis (96%), splenic trauma (94%), necrotizing fasciitis (71%) and laceration of an iliac vein intraoperatively (60%). They were less comfortable with esophageal perforation (57% uncomfortable). We then asked about specific surgical procedures: 84% of respondents felt qualified to perform a damage control laparotomy, 82% felt qualified to repair a complex ventral hernia and 80% felt qualified to repair a diaphragmatic hernia. Half felt comfortable performing a tracheostomy. Only 23% felt qualified to perform a segmental hepatectomy.

Interest in acute care surgery

Eighty-eight percent of the respondents thought the ACS field was interesting, offering a challenge and a diversity of cases. On the other hand, 49% said that late night emergency operations were an impairment to their practices. Only 12% rated ACS as the worst part of their practices. The frequency of night calls and weeks on ACSS that respondents deemed acceptable is shown in Table 2. Overall, only 45% were interested in participating in an ACSS, although 63% felt qualified to work in such a service. Only 2% thought they were absolutely not qualified to work in such a service. We then asked about potential obstacles to the implementation of the ACSS. Results are shown in Table 3. To the statement "I think that an [ACSS] as proposed (a 'surgeon-of-the week' covering all emergency surgeries for 7 consecutive days) is applicable in my hospital," 98 of 167 (59%) answered "No." An open-ended question followed to allow the participants to explain why they thought an ACSS was not applicable; 88 participants answered the question. The most common answers were insufficient volume, excessive volume, too few surgeons to cover the call schedule and absence of a dedicated OR. Other specific comments are shown in Box 1. Compared with the respondents who thought that an ACSS was applicable in their centres, the ones who were against this concept were less likely to have fellowship training (28% v. 67%, difference 41% [95% CI 25% to 57%]), to work in academic centres (49% v. 70%, difference 25% [95% CI 8% to 41%]) and to work in trauma centres (11% v. 23%, difference 13% [95% CI –2% to 26%]). Most of these respondents worked in centres with 5 or more general surgeons.

Table 2. Frequency of night calls and "surgeon-of-the-week" deemed acceptable by respondents

Call type	%
Night call	
1 in 3	21
1 in 4	44
1 in 5	17
1 in 6	18
"Surgeon of the week"*	
1 per month	41
1 per 6 weeks	30
1 per 3 months	23
1 per year	6

*One surgeon in charge of the acute care surgery service for 7 days from 8:00 a.m. to 4:00 p.m.

Table 3. Survey respondents' perceived obstacles to the establishment of an acute care surgery service at their centres

	Likert scale response, no.			
Obstacle	Agree	Disagree	Neither agree nor disagree	Missing
"Surgeon-of-the-week"*	89	35	29	14
Continuity of care	78	43	33	12
Low volume	60	68	27	12

*One surgeon in charge of the acute care surgery service for 7 days from 8:00 a.m. to 4:00 p.m.

Discussion

In Quebec, a very large proportion of general surgeons have an interest in emergency general surgery. As such, these surgical patients represent the common ground that unifies all general surgeons, including those in subspecialties. Patients with appendicitis, diverticulitis, perforated ulcers, perianal abscesses and cholecystitis are our "bread and butter" and represent our mutual training and comfort zones. In our institutions, the most commonly performed

Box 1. Open-ended question: Why do you think an acute care surgery service is not applicable in your hospital?

- A week on call for emergencies would potentially damage the health of the surgeon.
- Unless we pass a contract to insure a minimum wage for the surgeon, there will be loss of income.
- Loss of skills in emergency surgical procedures for the young surgeon who is not used to covering acute care surgery.
- Would reduce the operating room flexibility without any advantage for the patient.
- This model is only realistic in a trauma centre.
- Absence of residents for the management of patients.
- We need a minimum of 10 surgeons.
- Could generate conflicts among colleagues.
- Surgery service too subspecialized. Already 3 different call schedules.
- No operating room priorities owing to lack of nursing staff.

urgent and emergent procedures are appendectomies, cholecystectomies and exploratory laparoscopies or laparotomies for bowel obstruction. In an era where more and more young surgeons choose highly specialized areas of expertise, this finding was unexpected. We could question the fact that these highly specialized surgeons are still qualified for emergency surgical situations. This does not seem to be an issue, as 63% of respondents felt qualified and only 2% felt absolutely not qualified to work in an ACSS. The challenge offered by this patient population is thus still attractive to general surgeons.

Despite the fact that the respondents were interested in emergency procedures, half of them thought late night operations were an impairment to their practices. In fact, an important drawback to emergency surgery is the timing of the OR. Most patients get booked after the elective program, and the on-call surgeon does not have the luxury of a dedicated OR for emergency cases or of not being available for those cases (e.g., clinic, elective surgery). This often results in late-night emergency operations. Thus, a restructuring of emergency surgery that would allow emergency cases to be performed during the day could be a major improvement to practice. For this to be efficient, a dedicated OR available at least 2–3 days per week would be necessary; however, some of our survey respondents were concerned about the lack of dedicated ORs in their centres.

On the other hand, only 45% of respondents were interested in participating in an ACSS, and 41% thought it was applicable in their own health centres. The obstacles most often cited were the volume, number of surgeons and absence of a dedicated OR. An interesting finding was that, when asked if they thought the concept of "surgeon-of-the-week" would be an obstacle to the ACSS, 58% said "Yes." This response may account for misunderstanding, despite the explanation that was given in the introductory letter. In fact, many surgeons may have thought that "surgeon-of-the-week" represents a surgeon on call 24 hours for 7 consecutive days for emergencies, which is clearly not viable. What it really entails is 1 surgeon being in charge of the ACSS during daytime hours (8:00 a.m. to 4:00 p.m.), with night calls covered by a different surgeon. Most ACSS in Canada function in this manner, which benefits continuity of care.

Of the 59% of respondents who thought the ACSS was not applicable, only 28% had fellowships and 49% had academic practices, compared with 67% and 80%, respectively, of the respondents who thought it was applicable. This is not a surprise, considering that ACS was developed and has proven to be functional in academic centres.[12] Subspecialized surgeons may be more inclined to focus solely on their elective practices and then spend 1 week doing emergency surgery from time to time. One study has successfully shown that the implementation of ACSS enhances elective surgery practice.[13] We hypothesize that in a high-volume centre with more than 5 surgeons, this practice could be feasible and beneficial for surgeons. In Quebec, there are 7 such centres where ACSS could be implemented. The question of resident coverage then comes into mind. Again, as ACS is an academic model, all existing ACSS are staffed with 2 or more residents, enhancing timeliness of care and surgical education.[14] In a smaller centre, could this model be implemented without resident coverage?

Since the early implementation of ACS in the United States, followed by our experience in Canada, many studies have demonstrated patient benefits of this dedicated emergency surgery service. For patients with appendicitis, we know that time interval from consultation to operation, morbidity and length of hospital stay are decreased.[15,16] The same trend has been shown for biliary disease.[17] In our centre in Québec, an ACSS was created in July 2011. We are a level 1 trauma centre with 8 surgeons, not all of whom are subspecialized in trauma. The concept of "surgeon-of-the-week" was applied, yielding a frequency of 4–8 ACS weeks per year, with all surgeons participating. Until now, this new model has been well accepted among surgeons, with an unknown impact on patient care and outcomes. We propose to do a cohort study of pre- and postimplementation outcomes in a near future. A positive result of this study could demonstrate the feasibility and applicability of ACSS in the province of Quebec. A survey of surgeon satisfaction postimplementation will also be done, to validate the benefits to surgeons' elective practices and quality of life as a result of ACSS implementation.

To our knowledge, this is the first survey of all general surgeons from a single province on the topic of ACS. Its strength lies in the inclusion of academic as well as nonacademic surgeons, who responded in a proportion of 44%. Despite feeling qualified to work in an ACSS, 72% of these nonacademic surgeons did not think it was applicable in their health centres. As for the methodology, we carefully tested our items as well as validated the questionnaire among peers. The open-ended question about respondents' perceived obstacles to an ACSS allowed us to pinpoint issues we had not uncovered in our items.

Limitations

Our study has several limitations. The first was the low response rate despite the reminder sent after 2 weeks and the preannouncement made at a local congress earlier in the fall. In Quebec, response rates to surveys have traditionally been quite poor, especially among general surgeons. As an example, AQC surveys done twice a year yield between 50 and 100 responses (rate of 10%–20%). Our response rate may have been improved if we had used a mailed questionnaire. Second, the population of respondents is not perfectly representative of the population of general surgeons in Quebec. As such, there was a higher proportion of academic surgeons, surgeons who worked in a trauma centre and in an ACSS in our survey than in the

population of Quebec surgeons. This difference could bias the results, as the academic/trauma centre/acute care surgeons were more likely to be interested in the concept of ACS. Third, this concept of ACS may have been misunderstood, as surgeons in our province are less exposed to the United States' influence and somewhat apart from the rest of Canada. Our introduction letter briefly describing ACS was potentially not read by most of the respondents.

Conclusion

We think that ACS is an asset for any general surgery service with a high enough volume of emergency surgical patients. Although this model has proven to be efficient in an academic setting, we believe that its application could be possible in high-volume rural centres with more than 5 surgeons taking call. In Quebec, there are 10 hospitals with 6–10 surgeons, and 5 hospitals with more than 10 surgeons. The lack of residents should be mitigated by the lighter case load, providing surgeons with an ACS week with a reasonable workload and giving them more time for elective practice. The low interest expressed by Quebec general surgeons in such a model may represent incomprehension or comfort with their traditional practices. We strive to demonstrate the benefits of ACS in many domains, including patient care and outcomes, surgical education, collaboration between surgeons and surgeon quality of life. Rigorous data sets evaluating specific aspects of the ACSS should be put in place to constantly improve quality of care. Administrative support and cooperation, along with dedicated resources for emergency surgery, will potentiate the willingness of surgeons to participate in the creation of ACSS in Quebec hospitals. The cornerstone of the accessibility of care is the daytime OR dedicated to emergency general surgery cases. This is constantly an issue, as surgeons have to compete with orthopedic surgery, neurosurgery and other specialties for every emergency case. Communication between the emergency department and the surgical service needs to be enhanced. Finally, the practice of emergency surgery should be continually valued to keep surgeons from all subspecialties interested in this aspect of their practices. As such, we strongly agree with the Canadian Committee on Acute Surgery and Critical Care that ACS is a "unifying factor in general surgery."[8]

Acknowledgments: We would like to acknowledge the participation of Dr. Julie Hallet in the generation of ideas and reduction of items. We also thank Drs. Philippe Bouchard and Jean-François Ouellet, who also participated in the item reduction. We also want to say a special thanks to Dr. Dan Deckelbaum for the inspiration of this project.

Competing interests: None declared.

Contributors: All authors designed the study, analysed the data, reviewed the article and approved the final version for publications. É. Joos acquired the data and wrote the article.

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