

## CONSERVATIVE OR OPERATIVE MANAGEMENT (OPEN OR LAPAROSCOPIC) OF ACUTE APPENDICITIS

We read with interest the recent article on antibiotics versus appendectomy in the management of acute appendicitis.<sup>1</sup> A randomized controlled trial by Hansson and colleagues<sup>2</sup> with a median follow-up of 1 year reported that of 202 patients who received antibiotics, 96 (nearly 50%) were subsequently admitted for surgery. A trial by Styruud and colleagues<sup>3</sup> reported that of 128 patients receiving antibiotics, 18 were subsequently operated (15%). All these data confirmed that it is not possible to manage all the cases of acute appendicitis with antibiotics alone.<sup>1</sup>

The first problem in an emergency department is to establish the etiological diagnosis of inferior right abdominal pain with 1 or more associated conditions, such as leukocytosis, fever, or positive Blumberg sign. Abdominal computed tomography is recommended in patients with suspected appendicitis,<sup>4</sup> but to reduce radiation exposure in younger, female and slender patients, a graded compression abdominal ultrasonography could be the first-line diagnostic test.<sup>4</sup> To improve the diagnostic accuracy of ultrasonography, the combined transabdominal and transvaginal approach has been proposed in women;<sup>5</sup> it has been reported that the diagnostic accuracy of preoperative abdominal–pelvic and gynecological ultrasonography evaluation in women is 96%.<sup>6</sup>

Once a diagnosis of acute appendicitis is confirmed, the administration of antibiotics (e.g., ciprofloxacin, cefotaxime, amoxicillin with clavulanic acid, gentamicin with metronidazole) is mandatory. Antibiotics reduce the bacterial load and can delay appendectomy or can definitively manage, in some cases, appendicitis. Patients' clinical outcomes and consent are the

main important independent variables that would address surgeon choice. At this point, nearly 85% of the patients usually require elective or emergency appendectomy, and nearly 15% are definitively treated (almost for 1 year) with antibiotics.<sup>1</sup> The last step is to choose among open or laparoscopic approaches. Laparoscopic appendectomy has been widely proposed in the last 20 years, but it has higher hospitalization costs than open appendectomy (US\$4000 v. US\$1500).<sup>6–8</sup> The broad use of open appendectomy can reduce the annual hospitalization cost of nearly US\$765 million in the United States<sup>7</sup> (nearly US\$1 billion annually if we recalculate data with the increasing cost of laparoscopy). The laparoscopic approach seems to have lower morbidity and mortality in perforated cases, and it could be recommended in children with perforated appendicitis,<sup>7</sup> but a higher incidence of complications in patients with a periappendiceal abscess has also been reported.<sup>9</sup> Moreover, laparoscopic appendectomy during pregnancy could be associated with a significantly higher rate of fetal loss than open appendectomy,<sup>10</sup> but the data reported in the literature are discordant. In fact, some authors reported series without fetal loss<sup>11</sup> and some others reported series with 1 or more postlaparoscopic appendectomy fetal loss.<sup>10,12</sup>

**Andrea Cariati, MD, PhD**

**Elisa Piromalli, MD**

General Surgery  
San Martino IST Hospital  
Genoa, Italy

**Competing interests:** None declared.

### References

1. Fitzmaurice GJ, McWilliams B, Hurreiz H, et al. Antibiotics versus appendectomy in the management of acute appendicitis: a review of the current evidence. *Can J Surg* 2011;54:307-14.
2. Hansson J, Körner U, Khorram-Manesh A, et al. Randomised clinical trial of antibiotic therapy versus appendectomy as primary treatment of acute appendicitis in unselected patients. *Br J Surg* 2009;96:473-81.
3. Styruud J, Eriksson S, Nilsson I, et al. Appendectomy versus antibiotic treatment in acute appendicitis. A prospective multicenter randomised controlled trial. *World J Surg* 2006;30:1033-7.
4. Gaitini D. Imaging acute appendicitis: state of the art. *J Clin Imaging Sci* 2011;1:49.
5. Bondi M, Miller R, Zbar A, et al. Improving the diagnostic accuracy of ultrasonography in suspected acute appendicitis by the combined transabdominal and transvaginal approach. *Am Surg* 2012;78:98-103.
6. Cariati A, Brignole E, Tonelli E, et al. Laparoscopic or open appendectomy. Critical review of the literature and personal experience. *G Chir* 2001;22:353-7.
7. Masoomi H, Mills S, Dolich MO, et al. Comparison of outcomes of laparoscopic versus open appendectomy in children: data from the Nationwide Inpatient Sample (NIS), 2006-2008. *World J Surg* 2012;36:573-8.
8. Cariati A, Masini R. Hospital bill in open or laparoscopic appendectomy. *Ann Surg* 2004;240:562-3.
9. Pokala N, Sadhasivam S, Kiran RP, et al. Complicate appendicitis — Is the laparoscopic approach appropriate? A comparative study with the open approach: outcome in a community hospital setting. *Am Surg* 2007;73:737-41.
10. Walsh CA, Tang T, Walsh SR. Laparoscopic versus open appendectomy in pregnant: a systematic review. *Int J Surg* 2008;6:339-44.
11. Lemieux P, Rheume P, Levesque I, et al. Laparoscopic appendectomy in pregnant patients: a review of 45 cases. *Surg Endosc* 2009;23:1701-5.
12. Sadot E, Telem DA, Arora M, et al. Laparoscopy: a safe approach to appendicitis during pregnancy. *Surg Endosc* 2010;24:383-9.

DOI:10.1503/cjs.011812

## CONSERVATIVE OR OPERATIVE MANAGEMENT (OPEN OR LAPAROSCOPIC) OF ACUTE APPENDICITIS: THE AUTHORS REPLY

We read with interest your response to our article regarding the ongoing debate surrounding the management of acute appendicitis.<sup>1</sup> Appendicitis remains the most common cause of the acute abdomen among young adults,

and the mainstay of treatment at most centres remains an appendectomy.<sup>2</sup> This is despite the fact that other intra-abdominal pathologies, such as diverticulitis, are routinely managed conservatively with antibiotics. Consequently, we undertook a detailed review of all contemporaneous data with respect to the role of antibiotics versus appendectomy in the management of acute appendicitis and found that antibiotics do have a role to play as a bridge to definitive surgery.<sup>1</sup> However, the current evidence base does not support the routine use of antibiotics as the mainstay of treatment of acute appendicitis, albeit this evidence was minimal and of poor quality.<sup>1</sup> Therefore, we concluded that appendectomy remains the current gold standard for the management of acute appendicitis, a finding that has been echoed in a number of more recent reviews into this topic.<sup>1,3,4</sup> Despite this, our overall conclusion remains that definitive evaluation through an appropriately conducted randomized controlled trial should be undertaken to comprehensively examine the optimal management of such a common intra-abdominal pathology.<sup>1</sup>

You also highlighted a key point that regularly concerns practising surgeons regarding the decision for an open or laparoscopic appendectomy. Laparoscopy is becoming an increasingly used resource in the management of the acute abdomen, particularly in female patients, as it can assist in the diagnosis as well as potential treatment of underlying pathology without the possible deleterious effects of radiation exposure associated with computed tomography. Whereas cost-analysis will always be an issue, we believe that laparoscopy does have benefits over and above traditional open appendectomy in certain cases; however, this was not an area that we specifically examined.

**Gerard J. Fitzmaurice, BSc, MB BCH, BAO**

Department of General Surgery  
Craigavon Area Hospital  
Portadown, Northern Ireland  
Department of Anaesthetics & Intensive Care Medicine  
School of Medicine, Cardiff University  
Heath Park, Cardiff, Wales  
**Billy McWilliams, MSc**

Department of Anaesthetics & Intensive Care Medicine  
School of Medicine, Cardiff University  
Heath Park, Cardiff, Wales  
**Hisham Hurreiz, MBBS**  
**Emanuel Epanomeritakis, MD**  
Department of General Surgery  
Craigavon Area Hospital  
Portadown, Northern Ireland

**Competing interests:** None declared.

### References

1. Fitzmaurice GJ, McWilliams B, Hurreiz H, et al. Antibiotics versus appendectomy in the management of acute appendicitis: a review of the current evidence. *Can J Surg* 2011;54:307-14.
2. O'Connell PR. The vermiform appendix. In: Williams NS, Bulstrode CJK, O'Connell PR, editors. *Bailey and Love's Short Practice of Surgery*. 25th ed. London (UK): Hodder Arnold; 2008. p. 1204-18.
3. Wilms IM, de Hoog DE, de Visser DC, et al. Appendectomy versus antibiotic treatment for acute appendicitis. *Cochrane Database Syst Rev* 2011;11:CD008359.
4. Liu K, Fogg L. Use of antibiotics alone for treatment of uncomplicated acute appendicitis: a systematic review and meta-analysis. *Surgery* 2011;150:673-83.

DOI: 10.1503/cjs.011912