



Laparoscopy for perforated acute diverticulitis of the sigmoid colon: navigating the evidence

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Response to: Arezzo A. The role of laparoscopy in acute sigmoid diverticulitis. *Ann Laparosc Endosc Surg* 2018;3:102.

Received: 16 May 2019; Accepted: 30 May 2019; Published: 04 June 2019.

doi: 10.21037/ales.2019.05.10

View this article at: <http://dx.doi.org/10.21037/ales.2019.05.10>

Acute diverticulitis (AD) represents a very common disease in western countries. It has been estimated that the lifetime risk of diverticulitis in patients with diverticulosis ranges between 10% and 25% (1), even if more recent studies based on a combination of colonoscopy and computed tomography suggested that the risk is much lower (<5%) (2).

However, AD still represents an important issue, given the very high prevalence of diverticulosis in general population of western countries, and the economic burden is significant. Furthermore, as life expectancy in economically developed countries has sensibly increased due to improvements in hygienic conditions, better dietary regimens and medical advancements, the prevalence of AD in the general population is expected to increase, with no differences among hospitals and between urban and rural contexts.

It has been estimated that in the United States there are more than 2.7 million outpatient consultations and 200.000 admissions for AD, accounting for more than 2 billion \$ per year (1,3).

Laparoscopic surgery has represented a major step forward in colorectal surgery, as it allowed for reducing the perioperative surgical stress on patients, eventually achieving earlier restoration of bowel function and social activities (4). However, the benefits of laparoscopic surgery in patients with AD as compared with open surgery have been recently questioned by a systematic review with 392 patients from three randomized clinical trials (5). In details,

the authors concluded that evidence about safety and effectiveness of laparoscopic surgery versus open surgical for AD is insufficient. In addition, studies lack adequate and objective assessment of patient-reported outcomes, suggesting that this area needs to be further explored. There might be some reasons, which might explain these findings.

We read with interest the editorial by Arezzo (6) on the role of laparoscopy in AD. The article presents a balanced and comprehensive overview about the status of the art, under the lights of available data. In the article, the results from the meta-analysis by Cirocchi *et al.* (7) concerning the laparoscopic management of complicated AD (Hinchey \geq III). By including four non-randomized studies with 436 resections (181 laparoscopic *vs.* 255 open), the authors found that laparoscopy was associated with fewer post-operative complications (relative risk 0.62, 95% CI: 0.49 to 0.80) and shorter post-operative hospital stay (mean difference -6.53, 95% CI: -16.05 to 2.99). However, the authors also state that their results must be considered with extreme caution.

In this context, we would point out the crucial importance of the experience and expertise of the operating surgeon, when it comes to analyse the outcomes of laparoscopic treatment of AD. Multicentric studies, ideally randomized, represents a pillar for advancing the understanding about disease treatment, and for ameliorating the results of treatment of each given condition. Notwithstanding, some

outcomes could be difficult to assess, if specific factors are not considered.

Laparoscopic surgery for AD requires specific skills and dedication, which might not be acquired even by board certified colorectal surgeons, should they not perform minimally invasive surgery or emergency surgery at a consistent level. In other terms, colorectal surgeons need to dedicate time and effort to achieve and acquire advanced minimally invasive skills. Failure to do so would lead in results being jeopardized, making it difficult to understand the findings of systematic reviews, which would hardly be generalizable. In this context, the health system significantly differs among countries, e.g. in some countries there is a dedicated staff in charge of dealing with emergency and urgency, whereas other surgeons might only deal with elective procedures; this could not be the case in other nations. Therefore, in the era of big data, the importance of single-surgeon or single-institution series should not be underestimated.

Of note, laparoscopy has been reported to be safe and effective also in faecal diverticulitis, not excluding the possibility of performing a primary anastomosis (8). Should a laparoscopic Hartmann's procedure be performed, subsequent surgery might be easier. In the senior author's experience of 43 cases operated on of laparoscopic Hartmann's for AD (of whom, 21 Hinchey III and 11 Hinchey IV), major morbidity occurred in one patient (brain stroke), with one perioperative death (myocardial infarction), and laparoscopic Hartmann's reversal was performed in 72% of patients overall. The upcoming findings of the DIVA arm of the LADIES trial could probably also clarify whether laparoscopy can reduce the rates and the morbidity associated with stoma formation in AD.

The available evidences do not justify an indiscriminate use of laparoscopy in AD. Rather, a cautious approach is warranted, and such procedures cannot be performed without a close collaboration and continued communication with anaesthesiologists, or outside of the context of a perioperative optimization and management of such patients. These measures are only ensured in dedicated centres, under the care of dedicated teams and experienced colorectal, laparoscopic surgeons.

Acknowledgments

Funding: None.

Footnote

Provenance and Peer Review: This article was commissioned by the editorial office, *Annals of Laparoscopic and Endoscopic Surgery*. The article did not undergo external peer review.

Conflicts of Interest: All authors have completed the ICMJE uniform disclosure form (available at <http://dx.doi.org/10.21037/ales.2019.05.10>). SDS serves as an unpaid editorial board member of *Annals of Laparoscopic and Endoscopic Surgery* from Apr 2018 to Mar 2020. The other authors have no conflicts of interest to declare.

Ethical Statement: The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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doi: 10.21037/ales.2019.05.10

Cite this article as: Pellino G, Podda M, Di Saverio S. Laparoscopy for perforated acute diverticulitis of the sigmoid colon: navigating the evidence. *Ann Laparosc Endosc Surg* 2019;4:53.