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Source control and intra-abdominal infections: Still many questions and only limited answers

1. Introduction

Source control is a key element in the management of intra-abdominal infections. The general rules for achieving source control were described more than a century ago and have been progressively improved over time. Before the era of antibiotic therapy, people who underwent abdominal surgery survived the intra-abdominal infectious process, demonstrating the importance of this procedure in achieving an effective anti-infective action. A decade ago, the Surviving Sepsis Campaign guidelines emphasized the role of source control in the adequate management of life-threatening infections [1]. These guidelines led to further studies that confirmed the importance of quality and timeline in the management of intra-abdominal infections. Interestingly, there is no general consensus on the definition of adequate source control, as, in most cases, assessment of adequacy is a *post hoc* observation of cases not requiring any additional intervention. Consequently, physicians remain uncomfortable when trying to grade the quality of surgery of their patients. This situation has led to the proposal of checklists to assist surgeons to grade the quality of their procedures [2].

In their large two-center retrospective analysis, van de Groep et al. report interesting additional data on the management of critically patients who need emergent source control [3]. Their cohort, which is sufficiently large to draw relevant conclusions, very nicely illustrates the changes in the decision-making process for adequate source control over the last decade. One of the most important issues in this paper is the use of non-surgical techniques in critically ill patients. Minimally invasive approaches, including percutaneous treatments, have been advocated by many authors for the management of uncomplicated cases such as diverticulitis or cholecystitis and complex cases such as hostile abdomen. However, routine initial management of life-threatening abdominal infections by percutaneous drainage is usually not reported. Until recently, as illustrated by the paper by Politano et al., percutaneous drainage was essentially proposed as second-line therapy for less severe cases [4]. In their paper, van de Groep et al. showed that percutaneous drainage was used in 25% of the initial procedures [3]. Community-acquired and postoperative cases were both considered to present the same level of severity as surgical cases, but lower proportions of gastrointestinal sources of infection. Surprisingly, the outcome of patients who underwent an initial percutaneous procedure, in terms of ICU and hospital length of stay and mortality rates, did not differ from that of surgical cases. In addition, the rate of additional procedures was significantly higher in these patients who underwent an initial percutaneous procedure compared to the surgical cases. These observations suggest that the decision making-process for selecting percutaneous drainage was essentially related to anatomical or technical considerations. However, morbidity issues evidenced by van de Groep et al. [3] should lead to prospective investigations to determine the best strategy for source control in ICU cases admitted for intra-abdominal sepsis. In addition, these observations stress the need for close collaboration between intensivists, surgeons and radiologists, right from the diagnostic phase.

A common concern when interpreting source control studies is the definition of "complicated" intra-abdominal infections (cIAI). One of the most widely accepted definitions is infection extending into the peritoneal space, associated with abscess formation and peritonitis. However, the term "complicated" is sometimes considered to mean that the patient presents a severe and critically ill condition. This is sometimes not straightforward. Sawyer et al. performed a randomized controlled trial to assess treatment duration in patients with cIAI and the mortality rate for the entire population was around 1% [5]. In a *post hoc* analysis of the trial, up to 25% of patients with cIAI received percutaneous drainage with zero mortality [6]. This difficulty represents the reality in critical care settings.

The need for microbiological samples in the management of intra-abdominal infections has been questioned. Based on epidemiological issues and in order to more reliable target the abdominal pathogens from the index procedure, it is now recommended to obtain microbiological specimens even in the context of community-acquired infections [7-10]. Adequate surgical and anti-infective management are both important to optimize the prognosis of intra-abdominal infections, especially in ICU patients. Surprisingly, van de Groep et al. report only 64% of microbiological samples from the initial procedure and 49% of samples from repeat procedures [3]. This issue is particularly relevant in the 236 patients who underwent their first source control procedure at the time of ICU admission. The authors admit that only 28% of patients received optimized therapy guided by microbiological samples. These results suggest that there is room for improvement of anti-infective stewardship in these patients. However, stewardship is only a part of the benefit achieved by recovering surgical samples. The 93 patients who had an immediate procedural adequacy had an uneventful recovery, while only 14% of these patients had microbiological samples. On the contrary, the complicated cases were those with delayed or inadequate management, in whom surgical samples were obtained in 9% and 10% of cases, respectively. The price to pay for this lack of surgical samples was delayed discharge of survivors and dramatically increased mortality rates related to combined defects of surgical and anti-infective management. These data emphasize the need for close collaboration between intensivists, surgeons/radiologists, microbiologists and infectious disease physicians to achieve adequate management in terms of both quality and timeline, including adequate surgical samples.

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A global approach to cIAI should be threefold: control of the source of infection, appropriate antibiotics and prompt hemodynamic support. In the study by van de Groep, it was not indicated whether or not the patients were in septic shock [3]. In other manuscripts, in which source control was reported to be associated with a survival benefit, septic shock was also an independent risk factor for death [11]. The presence of septic shock is also a major risk factor for management with an on-going debate as to whether priority should be given to surgical or percutaneous source control, or to hemodynamic stabilization. Unfortunately, many questions still remain unresolved and only limited answers are available.

Conflict of interest

The authors have no competing interests to declare

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