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Editorial

Open abdomen for the management of catastrophic abdomen: Evidence and controversies☆

Abdomen abierto en el tratamiento del abdomen catastrófico: evidencia y controversias

Open abdomen is defined as a condition where the abdominal wall is left unclosed after surgery and managed with a temporary cover (temporary abdominal closure, TAC). It can be a result of a surgical procedure or complication, but is also a technique for managing difficult abdominal conditions. The former refers to situations where part of the abdominal wall is lost due to partial resection for necrotizing infection, trauma or tumor, while the latter is associated with situations where the abdomen is deliberately left open.[1]

Catastrophic abdomen usually covers situations where inflammation, infection and previous abdominal surgery has distorted the normal anatomy, the organs are frail and edematous, and in some cases, there are uncontrolled intestinal fistulas or leaks. If this is combined with extensive adhesions or scarring, a term hostile abdomen has been used.[2] Finally, if the intestinal fistulas open directly to the granulation tissue covering the viscera, enteroatmospheric fistulation has occurred.[3] In 2016, an amended classification of the open abdomen was published that characterizes the different stages depending on the degree of contamination and fixation ranging from a clean, non-adherent open abdomen to a frozen abdomen with one or more enteroatmospheric fistulae.[4]

In some patients, open abdomen is used as a management technique and combined with some form of TAC method. The established indications for therapeutic open abdomen include prophylactic or therapeutic treatment of Abdominal Compartment Syndrome (ACS), first phase of damage control surgery for trauma, and the planned need for a second look after surgery for acute mesenteric ischemia.[5] In addition, the management of recurrent laparotomy wound dehiscence can be considered a form of therapeutic open abdomen, and new surgical techniques have been developed to manage this difficult and morbid condition.[6] A more controversial issue is the indication for open abdomen in abdominal catastrophes, such as severe secondary peritonitis, where it is analogous to the damage control approach for severe abdominal trauma.[7]

Secondary peritonitis results from hollow organ perforation (usually the bowel) with gross contamination of the abdominal cavity and extensive local reaction of the peritoneal surface together with systemic organ dysfunctions, often also called abdominal sepsis. The established treatment of secondary peritonitis consist of surgical source control, cleaning of the abdominal cavity and wound closure, systemic antibiotics and support of the organ systems usually in an Intensive Care Unit (ICU). However, many surgeons have questioned this paradigm and compared peritonitis to an abscess where opening the abscess and leaving it open is considered best practice.[8,9]

There are no randomized, controlled studies comparing management with closed or open abdomen for severe secondary peritonitis. Obviously, both approaches require source control and appropriate supportive treatment. An additional question related to the damage control approach with open abdomen is whether bowel anastomoses or stomas should be performed at the initial operation or during the planned reoperation 1-2 days later.[10]

The potential benefits of the damage control strategy for severe secondary peritonitis include shorter operation times in patient requiring urgent critical care in an ICU, avoiding the

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development of ACS, and the ability for a second look operation without the need to reopen the abdominal wall incision.[11] Furthermore, some animal studies suggest that using the modern TAC techniques with negative pressure, removing cytokine-rich and contaminated fluid from the abdominal cavity could alleviate the systemic inflammatory response to the septic challenge.[12]

The potential risks involving the open abdomen strategy are usually related to the specific complications of the open abdomen, intestinal fistulae and inability to close the abdomen later resulting in incisional hernia or even ''planned'' hernia with early skin grafting and delayed abdominal wall reconstruction. However, with modern TAC methods combining the negative pressure effect with progressive mechanical traction of the fascial edges, the enteroatmospheric fistula rate is low and the delayed fascial closure rate is high, as shown by two meta-analyses.[13,14]

Is there then evidence to support the use of open abdomen in severe secondary peritonitis? There are numerous, usually small sample size cohort studies reporting some benefits of the open abdomen strategy. There are some consensus statements and recommendations based on these studies, but in general, the level of evidence is low.[15,16] One of the controversies include the indications for open abdomen. Obviously, there are many patients with secondary peritonitis, who do well after the traditional, one-operation approach, and should not be exposed to the potential morbidity of the open abdomen. A recent study tried to summarize the criteria for severe secondary peritonitis that would be ethically justified and could be used as inclusion criteria for a prospective, comparative study.[17]

It is clear that open abdomen is here to stay. What needs to be defined is the criteria of its use especially in catastrophic abdominal conditions, and hopefully the planned randomized studies will clarify the indications further. We also need to be familiar with modern TAC methods, learn to use them wisely, and develop even better techniques [18,19] Finally, it is important that experience and knowledge of the indications and techniques of open abdomen are shared with surgeons treating these patients to guarantee that every patient has the chance to receive the best, evidence-based treatment, but after careful assessment based on the individual situation and circumstances.[20] No one solution is good for every patient.

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