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Editorial

Futility, failure to cure, failure to rescue and aborted surgery: New ways to measure the real usefulness of surgery

Futilidad, fallo de cura, fallo de rescate y cirugia abortada: nuevas formas de medir la utilidad real de la cirugia

Surgical management tools are usually positive in nature. The *textbook outcome*, for instance, determines which patients present the ideal postoperative recovery.[1] However, the measurement of negative postoperative outcomes has been less studied, probably because it could be perceived as negative for surgeons. In reality, it is these patients with unexpected surgical outcomes (i.e., lack of effectiveness) who represent substantially higher healthcare costs that could be redirected towards improving the quality of life of these patients using other non-surgical treatments. This would reduce not only costs but also the great negative emotional burden of surgical ineffectiveness for patients and their families.[2,3]

A major problem is how to define a futile or ineffective surgical treatment, as there are various factors involved in this concept. In cancer patients, futile surgery could be defined as procedures that do not benefit the patient, including planned surgeries that cannot be performed due to unexpected intraoperative findings, surgeries with major postoperative complications (MC) causing the death of the patient, and surgeries with subsequent early recurrence of the disease followed by very short survival. In short, surgeries that have not provided what was expected.

The therapeutic ineffectiveness caused by not being able to perform the planned surgical procedure can be measured by determining the *aborted cancer surgery* (ACS) rate, a concept defined by Guo et al in 2023.[4] Aborted cancer surgery is defined as surgeries during which intraoperative findings lead to the decision to not continue with the planned surgery because it is impossible to perform treatment with curative intent. It is more frequent in oncological patients with esophagogastric and hepatobiliary-pancreatic tumors, ranging from 5% to 8% of the procedures performed.[4,5] Cancer surgery is aborted when, despite thorough preoperative studies, we find peritoneal dissemination or unresectable locoregional involvement that had not been identified preoperatively. Patients with ACS not only have minimal chances for a cure but also a significant emotional burden resulting from the postoperative recovery and terrible news of unresectability, together with the symptoms of the unresected disease.[3–5] The possibilities for improvement to reduce ACS focus on the creation of AI-guided radiomic models that are capable of increasing diagnostic accuracy in patients with cancer, centralization of procedures, and perhaps a greater use of exploratory laparoscopy.[4,6,7]

Postoperative therapeutic ineffectiveness occurs when the patient dies from MC. For this purpose, a very interesting tool is the *failure to rescue* (FR), defined as the percentage of patients who die after presenting MC divided by the number of patients who present MC.[8,9] Proposed in 1992 by Silber et al., it reflects the ability to rescue a patient with MC from dying.[8–11] In published studies, FR ranges from 5% to 25%, depending on the type of surgery performed.[8–13] The improvement measures to reduce the FR rate include a high volume of cases treated, early recognition and treatment of MC, and standardized multidisciplinary management of perioperative care.[8,9,11]

Trying to unify the previous concepts (aborted surgery and failure to rescue), and including recurrence or cancer-related death, 2 new relatively similar management tools have been created: *failure to cure* and *futility*.

Failure to cure (FC) is a concept initially defined by Clavien et al. in 1992 as a surgery that does not achieve its initial objective.[14,15] Recently, the Dutch Upper Gastrointestinal Cancer Institute redefined the concept of FC for esophagogastric oncologic surgery, turning it into a multiparameter tool that includes: surgery not performed due to distant metastases detected intraoperatively or tumor unresectability, incomplete resection (R1/R2) and/or in-hospital or 30-day

mortality. FC has been included as a quality measure in the mandatory databases of patients with gastric and esophageal cancer in the Netherlands.[14,15] In patients with gastric cancer, a FC rate of 22% has been observed, which decreases in patients receiving neoadjuvant chemotherapy.[14] In patients with esophageal cancer, the FC rate is 11% and related to advanced age, preoperative weight loss, ASA, lymph node involvement, no neoadjuvant therapy, open surgery, and resections prior to 2014. Similar to the textbook outcome, the main advantage of FC is the immediacy of the determinations, which allows for rapid detection and development of strategies for areas of improvement, as well as comparisons between hospitals.[14,15]

The last concept to be discussed is *futility*. Futility measures the findings discussed above, not performing the planned surgery or oncologically inappropriate surgery, postoperative mortality, and recurrence or early tumor-related death, which is associated with poor early management of the oncological disease.[16,17] Explained in a simple way, futility refers to all those patients who, given the surgical findings or the results obtained, should not have been operated on. These are patients selected with curative intent who should not have been part of this group. This concept, which integrates all the factors associated with the ineffectiveness of surgery, is probably the one with the most future as a measure of surgical utility. The number of manuscripts on futility is scarce, and most focus on hepatobiliary-pancreatic tumors.[16–18] In patients operated on for cholangiocarcinoma, the futility rate is 13% and occurs more frequently in patients with ASA $>$ 3, who present bilirubin $>$5 mmol/L, CA19-9 $>$ 100 IU/mL, preoperative cholangitis, portal infiltration, tumor larger than 3 cm, or left resection. In patients with pancreatic tumors, the rate rises to 19%, associated with ASA, elevated CA19-9 levels and tumor size.[16–18]

As previously occurred with the textbook outcome, the same parameters have not been used in studies on futility (measurement after 6 or 12 months, recurrence and/or death due to oncological causes, 30- and 90-day mortality), which makes it difficult to compare series, and international consensus must be established to define which parameters and timeframes should be used to measure futility.[16–20] Radiomics and the use of AI tools can allow us to identify patients at high risk of futility who should be considered for non-surgical therapeutic strategies, thereby avoiding ineffective surgeries,[17–20] improving healthcare costs and saving the patient suffering, which, although we cannot cure, we can help.

In the coming years and supported by classic tools such as clinical judgment, diagnostic tests, knowledge of tumor biology and technical quality, and supported by new tools based on artificial intelligence, we surgeons must be able to identify which patients will benefit from surgical treatment and which will not (especially in cancer surgery), thus improving the quality of the treatment we provide our patients.

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