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Textbook Outcome: Simple and Helpful Tool for Measuring your Surgical Results. A Narrative Review

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Special Invited Article

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Abstract

The textbook outcome (TO) is a tool for measuring postoperative results. First described in 2013, it includes four parameters: readmissions, mortality, hospital stay, and complications. It is an all-or-nothing measure, so to achieve it, your patient would have no mortality, no complication, hospital stay below percentile 75, and no readmission. After the first description, several specific procedures or diseases have been published, mainly for oncological procedures. The main criticism is the absence of internationally accepted parameters for each TO, but some international consensus tried to solve this problem. TO advantages are its easy measurement and understandability. We have written a narrative review about TO and its applicability in several areas of surgery.

Key words: textbook, outcomes, surgery, benchmarking

Improving the quality of care is an absolute priority for health systems to provide better care and reduce costs while maintaining efficiency [1–3]. Patients, healthcare providers, and professionals need to know the care results and compare them with those obtained at other centers[4]. At present, however, assessments of optimal postoperative outcomes are speculative since we lack standardized outcome measures that enable us to compare our results[3,5,6].

The way to achieve this is by systematically analyzing results using multiple tools[2,7]. The most used methods for auditing have been the measurement of postoperative complications (morbidity and mortality), hospital stay, and readmission rate[7–11]. Other tools, such as failure to rescue or benchmarking, have also been gradually incorporated[12,13].

In 2013, Kolfschoten et al.[14] used the concept of "Textbook Outcome" (TO) for the first time to measure the quality of care in the context of colorectal oncological surgery.

TO is a single composite indicator obtained from several traditional surgical variables: the absence of postoperative complications, no prolonged hospital stays (<75th percentile), no mortality, and no readmission. Thus, patients who achieve all these parameters met TO. Resuming achieving TO means that the surgical process has gone perfectly.

The TO allows us to identify and review those surgical procedures that obtain a non-optimal result. Therefore, it can be used as an internal audit to identify and improve our weaknesses, but we can also compare with other surgical services[1]. After the initial TO in 2013 devoted to colon surgery, TOs have been published for certain specific surgeries, usually oncological, which include the general characteristics and specific indicators of each type of surgery (hepatobiliary and pancreatic, esophagogastric or peritoneal carcinomatosis, etc.) [12,13,15]. For patients and healthcare providers, procedure-specific parameters are less comprehensive but are very useful for surgeons. Its use in benign pathology is less frequent, but there are some studies on obesity and biliary pathology [16,17].

The acceptance of the concept of TO was quick because of its ease of interpretation, but there has also been a series of criticisms:

1. TO is an all/nothing indicator not focused on the patient, and the weight may not be the same for each parameter.
2. TO does not include patient perspectives like PROMs and PREMs [18–20].
3. TO levels in complex procedures (pancreaticoduodenectomy, esophagectomy) are low because any minimal deviation from a 'perfect' postoperative course, which is frequent in these patients, means that a TO cannot be achieved, resulting in TO rates of 25%-35% for these procedures, which could be interpreted as unsatisfactory results [13,18–20]reoperation, grade ≥2 complications, hospital-stay >50th percentile, or 90-day readmission or mortality. Univariate and multivariable analyses were performed. Results: Among 627 patients, 56.1% were female and the median age was 59 years. A minority of patients achieved a TO (34.9%.
4. The absence of an internationally agreed definition of the parameters in each TO makes comparing series difficult [18–20]. An example of this lack of consensus is that in the systematic review by Carbonell et al. on gastric surgery and Sweigert et al. on liver surgery, it is found that each published series about the studied topic uses different parameters and prevents comparisons [21,22]. In this sense, international consensuses have been published about TO parameters on liver surgery and pancreatic surgery that will allow the homogenization of results in these areas [19,23].
5. An open debate exists about which parameters should be included. The inclusion of hospital stays in the TO can be affected by social and local healthcare factors; furthermore, not all studies have used the same percentile of the TO stay. Inclusion of readmissions in the TO, which may depend on the early discharge policy in place, and an evitable overlap among TO parameters [6].

Now, we present a narrative review of the data published about TO in the different types of surgeries:

COLON SURGERY

Originally, Kolfschoten et al.[14] described the concept of "textbook outcome" (TO) in patients undergoing resection for colon cancer. There is a wide variation in the variables included in the definition of TO in colon cancer. The variables included in the different definitions of TO were oncological; R0 resections, number of lymph nodes isolated or adequate adjuvant treatment; diagnostic variables; pre- or postoperative colonoscopy, surgery < 6 weeks after diagnosis, and morbidity and mortality related; no ostomy, complications, or readmission. The TO rate reported ranged from 49% to 66.9% [11,14,20,24–26]. The likelihood of obtaining a TO has been described to be multifactorial: patient-dependent factors such as comorbidity and frailty and other factors such as the type of hospital and the surgical team's experience should also be borne in mind [11,26]. When the relationship between TO and survival was assessed, patients who achieved TO had higher overall survival than those who did not; however, about disease-free survival, no statistically significant differences were found[27].

ADRENAL SURGERY

Only one study published applies the TO management tool to patients undergoing adrenal surgery. The definition of Textbook Outcomes in adrenalectomy was: R0 resection, no Clavien-Dindo (CD) ≥IIIa complications, no prolonged stay (<P75), no readmissions, and no mortality in the first 30 days. This analysis of the achievement of textbook outcomes found a rate of over 70%. The laparoscopic approach and shorter surgical time were associated with a higher rate of obtaining TO, demonstrating again the benefits of laparoscopy from the point of view of the quality of care[28].

HPB SURGERY.

Hepatic, biliary, and pancreatic (HPB) surgery has evolved significantly in recent decades, and performing pancreatic and liver procedures at high-volume centers has dramatically reduced rates of adverse outcomes[29]. As in other surgeries, the main problem is that several definitions of TO have been used in HPB surgeries.

In the first definition of TO in liver and pancreas surgery, Merath et al.[8] proposed four requirements: no postoperative complications, no readmission in the first 90 days, no mortality at 90 days, and no prolonged postoperative stay. The study analyzed patients with all HPB surgical indications.

Focusing on liver surgery, Merath et al.[9] published another study that assessed the incidence of TO following the resection of intrahepatic cholangiocarcinoma. In this study, the authors included negative microscopic margins (R0 resection), no perioperative transfusion, no postoperative complications, no prolonged LOS, no 30-day readmission, and no 30-day mortality [9] . Another study examined TO after curative-intent resection of hepatocellular carcinoma[30], TO was defined as R0 resection, no reoperation, no severe postoperative complications (CD ≥ III), no prolonged LOS, no 90-day readmission, and no 90-day mortality. Ramia et al. reported an analysis of TO rates in the prospective Spanish National Registry of the Liver-First Approach (LFA) (RENACI Project) including an LFA-specific TO, which includes seven liver-surgery-specific items measured at 90 days: negative margins, no perioperative transfusion, no postoperative major surgical complications, no prolonged LOS, no readmissions, no mortality, and complete treatment completion (chemotherapy, liver surgery, chemotherapy/ radiotherapy, and colon surgery)[4].

In 2023, to establish a universal definition of TO in minimally invasive and open liver resection, an International Expert Delphi Consensus on Defining Textbook Outcome in Liver Surgery (TOLS) was made[23]. The TOLS definition derived from the consensus process included the absence of intraoperative grade ≥ 2 incidents, postoperative bile leakage grade B/C, postoperative liver failure grade B/C, 90-day major postoperative complications (CD>II), 90-day readmission due to surgery-related major complications, 90-day in-hospital mortality, and the presence of R0 resection margin. This new definition is a crucial step toward avoiding the problem of using several definitions of TO for liver surgery.

Heidsma et al.[31] redefine TO in pancreatic surgery, adding negative microscopic margins (R0 resection) to the four classical parameters. On the other hand, the Dutch Pancreatic Cancer Group (DPCG) published a specific TO for pancreatic surgery in 2020[19]. Their definition included six parameters: absence of bile leak, post pancreatectomy hemorrhage, and postoperative pancreatic fistula, no CD complication Grade ≥3, no in-hospital mortality, and no readmission within 30 days. This definition is the most internationally accepted. Villodre et al.[32] published a retrospective multicenter study of distal pancreatectomy (DP). They defined a specific TO-DP: hospital stay P < 75, CD complication grade III- V, in-hospital mortality, readmission within 90 days, and clinically relevant pancreatic fistula (grade B or C).

The next step in TO for HPB surgeries is integrating TO into the field of surgical oncology, so TO may evolve to incorporate other variables of multidisciplinary care delivery (i.e., negative margin resection, adequate lymph node sampling, chemotherapy) to create an oncologic composite outcome measure (TOO)[33]. Sweigert et al.[34] use a TOO after pancreaticoduodenectomy for resectable pancreatic adenocarcinoma defined as a patient was treated with R0 resection, an American Joint Committee on Cancer (AJCC) compliant lymphadenectomy, no prolonged duration of stay, no 30-day readmission, no 30-day mortality, and initiation of adjuvant chemotherapy within 12 weeks of surgery.

The overall analysis of the achievement of TO in liver surgery found a rate of 44,2% (46,8% in minor hepatic resection and 33,3% in major hepatic resection)[34]. Ramia et al.[4] included in their study 149 patients classic and LFA-TO rates were 71.8% (107 patients) and 46% (69 patients), respectively. The overall analysis of the achievement of TO in pancreas surgery found a rate of 60,3% (58,3% in pancreaticoduodenectomy and 67.4% in distal pancreatectomy). Heidsma et al. [31] reported an incidence of TO that was 49.3% among patients undergoing resection for pancreatic neuroendocrine tumors. Villodre et al.[32] reported a TO-DP-specific rate of 58.2% for DP. Sweigert et al. measured TOO[34]. Only 25% of patients achieved TOO, without differences among patients who underwent a minimally invasive approach compared with open pancreaticoduodenectomy.

LIVER TRANSPLANTATION

Liver transplantation (LT) is one of the most complex surgical procedures. Three definitions of TO for LT have been published. Moris et al.[35] defined TO for LT for the first time. The included parameters were patients free from

mortality within 90 days, primary allograft non-function, early allograft dysfunction, rejection within 30 days, readmission within 30 days, readmission to the ICU during index hospitalization, hospital length of stay (75th percentile), red blood cell (RBC) transfusion (75th percentile), CD Grade III complication (re-intervention), and major intraoperative complication.

Lim et al. [36] made a brief definition of TO for LT with only five items: no 90-day or in-hospital death; no major 90-day postoperative complications (comprehensive complication index less than 26.2 which means less than Clavien-Dindo grade III); no 90-day reintervention (liver graft biopsy, radiological, endoscopic or surgical interventions, or re-transplantation); no prolonged intensive care unit (ICU) stay (defined as 50th percentile of the total cohort); and no prolonged hospital stay [defined as 50th percentile of the total cohort).

Finally, Melgar et al.[37] defined eight parameters TO for LT, including intraoperative packed red blood cells transfusion, postoperative renal replacement therapy, prolonged length of hospital stays (a length of hospital stays ≥75th percentile of the total cohort), 30-day readmission, 90-day hepatic artery thrombosis, 90-day biliary complications, 90-day Clavien-Dindo grade ≥ III complications, and 90-day mortality.

In Moris et al series[35] of 231 liver transplants 31% achieved a TO. Lim´s TO [36] included 530 patients, and TO was 33%. Melgar (181 patients) applied an ERAS protocol and obtained a TO of 32,6%. So, 30% seems to be the usual TO rate for LT, even when using several definitions.

ESOPHAGEAL AND GASTRIC SURGERY

The first publication of the TO in esophagogastric surgery was in 2017. Busweiler et al. defined TO patient in esophagogastric surgery by ten parameters [12]. It is, without a doubt, the most demanding TO of all to date. In addition to the classic parameters of TO (stay, mortality, major complications, readmission), it includes other parameters of oncological quality (R0, >15 nodes in the surgical specimen, no readmission to the ICU, etc). This is why the percentages obtained for TO in esophagogastric surgery are relatively low, depending on the series between 23% and 50%[15,38–40]. A recent review on TO in gastric surgery showed only two publications with >50% TO[22].

The achievement of TO in esophagogastric surgery has tremendous implications: on the one hand, economic, since they are surgeries with high morbidity and mortality, and the TO patient is less expensive for the healthcare system[41]. On the other hand, and probably the most relevant, a direct relationship has been observed in terms of survival such that those patients who reach TO live longer than those patients who are not TO[22,42–44].

PERITONEAL CARCINOMATOSIS

In the field of peritoneal carcinomatosis, TO has been less explored than in other surgeries. When performing a search in PubMed, only two articles were published on this topic, with different criteria for defining TO, one made in cytoreduction patients alone and the other with cytoreduction plus HIPEC. One only refers to advanced ovarian cancer, and in the other one, surgeons performed a cytoreduction and HIPEC analyzing several types of tumors [45,46]. Due to the variability of pathologies in peritoneal carcinomatosis (ovary, colon, appendix, pseudomyxoma, etc.), obtaining homogeneous criteria to describe the most appropriate parameters to evaluate would be difficult. It seems that could be a suitable tool to compare results between center[46]. Likewise, it has not been possible to correlate the achievement of TO with an increase in survival in this pathology[45].

In conclusion, measuring and comparing our results with other centers is the only way to optimize our clinical practice. TO is an excellent tool for doing this measurement because is easy and comprehensive but has limitations and strengths compared with similar tools like benchmarking or failure to rescue. TO should be improved, including patients' or healthcare perspectives.

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