

## Evolution of the Fast Track Process in Oesophageal Surgery

Abdelkader Boukerrouche

Department of Digestive Surgery, Hospital of Beni-Messous, University of Algiers, Algiers, Algeria.  
aboukerrouche@yahoo.com

*\*Corresponding Author:* Abdelkader Boukerrouche, Department of Digestive Surgery, Hospital of Beni-Messous, University of Algiers, Algiers, Algeria.

### Abstract

The fast track process is a directed surgical care pathway with the goal to improve patient recovery following surgery. The implemented fast track protocols in oesophageal surgery were adopted from approved protocols of other surgical disciplines, resulting in large variation of the used protocols. The published studies have clearly demonstrated the consistent evolution in fast track protocols with showing variations in the protocol components across the published reports. However, an overall improvement in hospital stay length, anastomotic leak, pulmonary complications and mortality has been showed over time without influencing the surgical morbidity. Therefore, these positive results in outcomes demonstrated the feasibility of the fast track process without supplementary risk in oesophageal surgery. The variations in the fast track protocols and key components applied following oesophagectomy identify the real need to continually assessing and identifying the areas of improvement. The objective of the review work is to give an overview from the published reports on the evolution and benefits of the fast track process over time in oesophageal surgery.

**Keywords:** Fast track process; enhanced recovery components; oesophageal surgery.

### INTRODUCTION

First initiated and implemented in the colorectal surgery, the fast track approach has increasingly improved the patient outcomes. As a multimodal approach with key elements, the fast track aimed to reduce postoperative surgical stress response, improve patient recovery and return of functional status by optimizing the crucial components in the perioperative period. Several published studies have demonstrated the positive effects of fast track protocols implemented in colorectal surgery on the outcomes with reducing the hospital stay length and decreasing the incidence and severity of postoperative morbidity (1, 2, 3). This important progress in postoperative outcome improvement has led to the publication of the ERAS (enhanced recovery after surgery) guidelines for colorectal surgery by the ERAS society in 2005. Since then, the ERAS programs have been introduced in multiple surgical disciplines and the published results demonstrated the important benefits on patient outcomes (4, 5, 6, 7).

The surgery is the main treatment of the oesophageal cancer and the postoperative morbidity and mortality

remain higher (8,9). The complexity of the surgical procedure, the large variation in technique, and the important associated morbidity and mortality have limited the implementation of the fast track protocols after oesophagectomy. The fast track process has been first introduced in oesophageal surgery in 2004 (10) and the published reports showed a large variation in the applied protocols. Instead of other surgical specialties, till recently, the ERAS society has established and published guidelines for oesophageal surgery with aiming to standardize the protocol to be implemented and performing audit to improve patient outcomes (11). The objective of the review work is to give an overview from the published reports on the evolution and benefits of the fast track process over time in oesophageal surgery.

### EVOLUTION OF THE FAST TRACK ELEMENTS

Instead of several surgical disciplines, there are no published ERAS guidelines for oesophageal surgery. The fast track protocols applied in oesophageal surgery have been adopted from approved protocols of other surgical disciplines. The evolution of the fast track protocols in oesophageal surgery shows a

continuous commitment to assess the evolution of the adopted fast track protocols. In fact several studies have investigated the assessment of the fast track recovery components (10, 12-21). These previous studies showed the large variation in the protocol key components implemented following oesophagectomy. Regarding fluid management, the majority of studies did not show specific guidelines, however, the directed fluid management has been incorporated avoiding overload of fluids. Negative fluid balance has been aimed for the first postoperative days and obtainment of an even balance on subsequent days (18). The perioperative fluid restriction showed a reduction of morbidity in colorectal surgery. The fluid overload in the postoperative period increased morbidity specifically anastomotic leak and pneumonia (22). So, directed fluid therapy strategy is highly advocated in the perioperative setting of oesophagectomy. Also, goal directed fluid therapy enhanced postoperative gastrointestinal recovery and mobilization as well as postoperative nutritional status and protein synthesis (23). The early mobilization has been assessed in the most majority of studies and the results showed the improvement of cardiovascular and pulmonary functions with reducing the risk of thromboembolic complications (18, 19). Also, early mobilization is associated with improvement of patient function after discharge by rapid return to leisure activity and daily living activities (19, 20). The almost majority of studies showed the used naso-gastric tube (NG) during the surgical procedure and its removal within 5 days postoperatively. However few studies did not use the NG tube routinely (15). The current evidence suggests that NG tube increases the risk of postoperative respiratory infection (24). Additionally, NG tube led to significant higher rate of leak, longer stay length and an increase in pulmonary complications (25). The early enteral feeding is an important part of any fast track program. Early feeding led to significant reduction in major gastrointestinal complications specifically anastomotic leak (26). Early enteral feeding via jejunostomy tube on POD1 and as well as oral intake on POD4 have been demonstrated to be associated with no significant difference in anastomotic leak rate after oesophagectomy (15). In addition, enteral nutrition via jejunostomy has been shown to reduce leak, wound infection, pneumonia and mortality (27,28). Regarding the thoracic drainage, the early and late removal of chest drain was associated with no significant difference in anastomotic leak (15),

however, early chest drain removal was a factor that was associated with a short hospital stay length. Postoperative control pain is an important element of the fast track process. So, optimizing the pain control is an important factor for rapid postoperative recovery. The epidural analgesia was associated with significant reduce of pneumonia and leak (29, 30). The surgical technique (minimally invasive and open) is an important factor influencing the postoperative patient recovery. The impact of minimally invasive approach as an element of fast track protocol for recovery could not be evaluated because until to date there are no studies comparing MIO as an element of fast track program to conventional care with open oesophageal surgery, and minimally invasive oesophagectomies were included with open oesophagectomies in almost studies. As revealed by recent studies (31-33), the pulmonary complication and mortality rates were similar in both minimally invasive and open approaches. However, leaks and re-operations were more significant in minimally invasive surgery (31-33). Additionally, hospital stay length was shortened in minimally invasive group (33).

### OUTCOME ASSESSMENT

Multiple studies including prospective, retrospective, non comparative and randomized controlled studies have investigated and analyzed the fast track evolution (10, 12-21). Also, the patient outcomes specifically the hospital stay length, hospital mortality and postoperative complications specifically leak and pulmonary complications have been assessed. The benefit of fast track process on patient outcomes has been clearly demonstrated (10, 12-21). The anastomotics leak rate was lower in the fast track group, however, a higher rate has been reported and the augmentation has been attributed to the inclusion of clinically non-significant leaks (17). The pulmonary complications and stay length were reduced in the fast track group (17, 18), and the hospital stay length did not exceed 12 days in the fast track group (>19 days). In addition, the mortality rate was also reduced and the surgical complications have not been influenced (17, 18).

Over all, the implementation of fast track protocols adopted from other surgical procedures after oesophagectomy showed a large variation in practice due to the complexity of the surgical procedure and the absence of published official guidelines for oesophageal surgery. Despite the practice variation,

the fast track recovery process implementation has led to decrease hospital stay length, medical complications and mortality without influencing the surgical morbidity. These results demonstrated the feasibility of the fast track recovery process in oesophageal surgery without increasing the surgical morbidity. Recently, the ERAS society has published guidelines in order to standardize the fast track pathways following oesophagectomy, and allow assessment and auditing of the patient outcomes.

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