Review Article

Enhanced recovery after thoracic surgery: patient information and care-plans

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Abstract: Many studies have confirmed that the implementation of enhanced recovery after surgery (ERAS) protocols has the advantages of reducing the potential complications after thoracic surgery and the length of hospital stay. The ERAS program involves a multidisciplinary team, aimed at integrating evidence-based knowledge into clinical practice in order to reduce the patient's stress response to the surgical procedure and improve the response to stress, guaranteeing a combination of better outcomes and cost savings. All this would not be possible without the improvement of minimally invasive surgical techniques, progression of anesthesia, pain control, and careful patient preparation. In this setting, a preoperative personal counselling may play a key role to reduce stress, fear or anxiety and improve the morbidity of patients, enabling them to achieve functional and psychological compensatory mechanisms more quickly. Preoperative patient counselling, performed using verbal, written or multimedia materials, is crucial in order to achieve the goal of the ERAS project: making the patient a potentially active participant and the main character of his recovery, able to positively impact himself throughout the surgical and healing process. This report is aimed at evaluating patient information and care-plans in thoracic surgery, reviewing the available evidence on ERAS pathways, and demonstrating our ideal program as discussed and shared among the Italian Thoracic Surgery Units accredited in the video-assisted thoracic surgery (VATS) group.

Keywords: Enhanced recovery after surgery (ERAS); thoracic surgery; patient information; care-plans; video-assisted thoracic surgery (VATS)

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Introduction

Lung cancer is the leading cause of cancer-related mortality worldwide, despite improvements in diagnosis, staging and treatment (1). However, an increasing number of studies have confirmed that the enhanced recovery after surgery (ERAS) protocol, introduced in the late 1990s by Kehlet (2), has the advantages of reducing the morbidity and mortality rates, emphasizing the quality, rather than speed of recovery (3). The concept of ERAS, first adopted in open colorectal surgery, has been established in many surgical disciplines, thus, also involving the thoracic surgical population that has undergone both the open and video-assisted thoracic surgery (VATS) approaches (4,5).

The ERAS program involves a multidisciplinary team and aims to integrate evidence-based knowledge into clinical practice in order to reduce the patient's stress response to the surgical procedure and improve the response to stress (6). In this way, as reported by many authors (3), all these

benefits may result in the twofold guarantee of better outcomes and cost savings.

Considering the multidisciplinary approach, many professional figures are needed: surgeons, anesthesiologists, nurses, dieticians and physiotherapists.

To date, there are several official guidelines published by the ERAS Society formed in 2010; however, the studies documenting the feasibility and potential benefits of ERAS in general thoracic surgery are still limited. Therefore, the Italian Thoracic Surgery Units accredited by the VATS Group, including our center, started focusing their attention on this field, discussing and sharing operative protocols and goals during periodic meetings.

Although we previously reported that the clinical pathway of care adopted in our center was able to reduce the hospital stay and improve quality (7), the introduction of new evidence based medicine and clinical guidelines has led us to change our protocols of care, which are actually in continuous evolution.

This report aims to evaluate patient information and care-plans in thoracic surgery, reviewing the available evidence on ERAS pathways and identifying the ideal program potentially adoptable in clinical practice.

Patient information

Numerous studies have suggested that a more anxious patient has a poorer outcome in terms of length of hospital stay and complications (8), demonstrating a correlation with prolonged convalescence and postsurgical fatigue (PSF), defined as "unpleasant and distressing symptoms associated with a major impact on the patient's quality of life" (9).

In this setting, a preoperative personal counselling session may play a key role to reduce stress, fear or anxiety and improve the morbidity of patients, enabling them to achieve cardiovascular, respiratory, metabolic and psychological compensatory mechanisms more quickly.

Indeed, the clarification of the unknown and the detailed explanations of surgical and anesthetic procedures allow the patient to be a potentially active participant in his recovery, enhancing postoperative recovery and discharge.

Many studies (10-13) reported that not only the verbal instructions of procedures but also relaxation or preoperative education programs may impact on physiologic recovery, reducing the morbidity and PSF, and improving the wound healing response in surgical patients.

However, considering that not all patients desire to receive a full explanation of their recovery plan, the multidisciplinary team needs to balance the pros and cons of each aspect in order to not foster fear and anxiety (14).

Our program of counselling

In 2012 our Thoracic Surgery Unit (AOU Ospedali Riuniti, Ancona, Italy) began the process of creating a minimally invasive thoracic surgery program. We performed biportal VATS major resections according to D'Amico's technique until 2014, and successively we started to constantly adopt Rivas' technique (uniportal approach) to perform both major and minor surgery (15). As previously published (7), preoperative, intraoperative and postoperative standardized protocols were implemented aimed at fast tracking patients submitted to major lung resections.

Ideally patient counselling may be performed two weeks prior to surgery. At the first appointment, the whole team (surgeon, anesthesiologist, dedicated nurse practitioner and physiotherapist) informs the patient of all aspects of ERAS protocols, including surgical procedure, multimodal analgesia, nursing care, management of the perioperative period and planned discharge.

Considering that the success of any program depends on the education of the participants, we recommend providing information about the care-plans from the initial outpatient visit to the inpatient discharge using multiple modalities: verbal instruction, written materials (booklet) and web-based materials with audiovisual instructions.

Surgical care-plan—general education

The surgeon provides an explanation of the operation performed with minimally invasive techniques, its risks, benefits, morbidity, mortality, and potential alternatives. Patients are informed that due to their active participation in the healing process, the return to their preoperative functional status may be quicker.

Informed consent is obtained not only to absolve a law but also to establish the initial component of the physician-patient relationship. Indeed, for most patients who have undergone pulmonary resection, surgery is the first step in the process of having to face the disease, therefore their emotional state must be taken into account. Furthermore, the information transfer may be impaired by the patient's intellectual level, language barriers, learning disabilities, and cultural barriers. Considering all these factors, questions and discussions with the surgeon should be encouraged as an additional tool provided to the patients (along with

written and web-based material, drawings).

Procedure-specific teaching (segmentectomy/lobectomy)

Patients are informed about the specific details of the surgical procedure, starting by position (lateral decubitus), incision length and tools used. After that, the surgeon provides some concept of the operative technique and potential postoperative complications (surgical and cardiopulmonary) or conversion to thoracotomy.

Patients are informed that the chest tube probably will be removed in the postoperative day (POD) 2 if no air-leak and <400 mL/day of pleural effusion are recorded by the electronic chest drainage system and the discharge will be scheduled in the POD3, if no complications have occurred (7). However, in rare cases, patients may be discharged home with the chest drain still in place and periodic ambulatory visits are needed until the chest drain removal. So, patients are taught to manage the chest tube at home during the perioperative period.

After discharge, we suggest a follow-up visit to perform chest X-ray 10 days later.

Chest physiotherapy care-plan

The incidence of pulmonary complications after thoracic surgery ranges from 15% to 37%, and several independent risk factors have been identified (16,17). However, the rate of many of the common complications (pneumonia, atelectasis) may be reduced adopting, just in the perioperative period, a physiotherapy care-plan with active patient involvement, allowing an improvement in pulmonary hygiene. Therefore, at the first appointment, physiotherapists should teach and educate the patients to perform the respiratory exercises (deep breathing, walking, coughing exercises and use of an inspirometer) in order to be more fit for the operation and to avoid alveolar and segmental collapse in the postoperative recovery. Uncomplicated patients should be treated by a physiotherapist once a day and followed-up until discharge; while patients with postoperative pulmonary complications (pneumonia, atelectasis) should be treated more than once a day. Both groups of patients are encouraged to continue the respiratory exercises during their hospital stay and for at least one month after discharge.

In addition, a physiotherapy care-plan facilitates early mobilization, allowing pulmonary hygiene and lung expansion. However, although the early ambulation is desirable for a prompt functional recovery, it often may result in difficulties due to the multiple attachment. Therefore, our team proposes displaying, in the ward's corridor, some instructional posters that indicate the walking distance in meters in order to motivate the patient to meet his daily walking goal. Although there is no specific scientific evidence on the minimum distance of patient walk required, a measurable distance may increase the patients' functional recovery and ease the way towards a successful surgical outcome.

If patients are current smokers, they are counseled to stop immediately. To date, the optimal time for smoking cessation has not been established and some authors even suggested an increase of pulmonary complications if cessation occurred just before surgery (18,19). However, we think that every effort should be made to encourage the patient to stop smoking.

Nursing care-plan

A dedicated nurse practitioner describes in detail what to do or not, what the observations are, nursing duties, wound care, early oral intake, postoperative pain management and hydric balance.

The nurse communicates to the patient if and when to stop anticoagulation/antiplatelet therapy before the surgery according to the medical decision.

Furthermore, patients at high risk for venous thromboembolism are informed that until discharge or full mobilization, they will wear a graduated compression stocking in association with anticoagulation, as suggested by the American College of Chest Physicians guide-lines (20).

During the initial visit, patients are instructed about preoperative fasting. As reported by the American Society of Anesthesiologist Task Force (15), clear liquids (such as water, fruit juice, clear tea, black coffee, etc.) and a light meal may be ingested for up 2 and 6 hours, respectively, before general or local anesthesia, procedural sedation and analgesia.

Patients are also informed that the removal of the urinary catheter is scheduled on POD1 if no complications have occurred and the peripheral venous catheter will be removed as soon as intravenous drugs are not needed.

Anesthesiologist care-plan—pain control

During the first appointment, the patient is informed about pain management both in the intraoperative and postoperative periods.

Indeed, the anxiety and the fear derived by the

expectation of pain, is one of the most alarming problems for a patient facing surgery. Counselling on the common technique of analgesia (narcotic/non-narcotic analgesics, paracetamol, non-steroidal anti-inflammatory drugs) should be provided, and the potential side effects (nausea, gastrointestinal dysfunction, headedness) should be discussed with the patient and his family members in order to reach the goal of the postoperative analgesia: pain control and prompt functional recovery.

In our VATS program, standardized analgesic and anesthetic regimens are used. Intraoperative pain control is guaranteed by infiltrating three intercostal spaces (IV, V and VI intercostal spaces) with ropivacaine 0.75% at the end of the operation under thoracoscopic vision.

Postoperative pain control is managed with intravenous (iv) paracetamol 1g (three times/day until POD2) and ketorolac 30 mg iv, if needed.

Postoperative pain control is monitored by the nursing personnel employing a 0 to 10 numeric pain rating scale where 0 and 10 indicate no pain and the worst pain, respectively.

Fluid control

Immediately following pulmonary resection, several conditions are known to enhance extravascular lung water (EVLW) expansion including fluid infusion in the intraoperative period. EVLW expansion can generate the impairment of gas exchanges that can lead to postoperative acute lung injury which is associated to mortality ranging from 20% up to 100% (21). Therefore, in our program, we suggest avoiding fluid overload, keeping fluid administration to a minimum and monitoring hydric balance with urinary drainage catheters positioned in the operating room.

Considering the critical role of the multidisciplinary team in patient engagement, we have developed and planned an educational program designed to train all ERAS members in order to enhance their professional ability to adopt the most effective measures in routine clinical practice. During this program of team education, different competences were shared and discussed, and a consensus on the best clinical practice was achieved.

Indeed, as previously reported (22), learning programs that teach nurses about patient engagement may be crucial to achieve positive impact on patient motivation.

The patient's booklet

To improve a patient's understanding of the various aspects of the protocol and to integrate along with the verbal instruction, we propose to provide the patient with written material, in the form of a booklet, illustrating all the care-plans that they are about to experience during the preoperative, intraoperative and postoperative period. The patients and family are asked to read well the booklet. Patients are asked to complete the checklist daily in order to monitor their progress and help them to control pain and improve performance. Patients feedback is requested at the end of the booklet to highlight features of the ERAS program that need improvement and verify the extent of involvement of the patients in decisions about their care.

The future: digital platform and applications for smartphones

In recent years, there has been a growing interest in digital platforms and applications for smartphones, containing specific information tailored to the patient. Indeed, the use of these technologies, the spread of tutorial videos and the prompt interaction between the different and numerous professional figures, may be much more effective than only the verbal or written information, allowing the patient to be much more compliant to the protocols.

Our project should be to create a digital platform where the information described in this article is made available.

Thus, considering that the correct understanding of the several protocols and care-plans, and that full adherence to them by the patient is crucial, we think that the use of tutorial audiovisual material, pictures and other multimedia format materials may be a valid option to make the patient an active participant of his recovery and be of benefit to him by positively impacting the outcome of his surgery and treatment.

Furthermore, the use of a mobile application, in addition to the previous information, may help the patient to continue keeping in touch with the different professional figures even in the postoperative period.

Conclusions

Discussion and sharing of operative protocols and goals among the Italian Thoracic Surgery Units accredited in the VATS Group has been crucial for identifying the ideal ERAS program to apply in our clinical practice.

Preoperative patient counselling, performed using verbal, written or multimedia materials, is essential to achieving the goal of the ERAS project: making the patient the main

character of his recovery, able to impact himself in the surgical and healing process.

A multidisciplinary team composed of a surgeon, anesthesiologist, dedicated nurse practitioner and physiotherapist, is required to give the patient a complete understanding of each aspect of his disease process and hospital stay.

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Footnote

Conflicts of Interest: The authors have no conflicts of interest to declare.

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