

OPTIMIZATION OF POSTOPERATIVE CARE IN THORACIC SURGERY: INNOVATIONS AND IMPACT ON PATIENT RECOVERY

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Abstract: Objective: To evaluate the relevance of postoperative care in thoracic surgery to optimize patient recovery and minimize complications. Methods: Using the PVO methodology, a search was carried out in the PubMed database, which initially identified 109 articles. After rigorous application of the inclusion and exclusion criteria, 1twoarticles were selected for detailed analysis. Revision: The review findings highlight the importance of innovative approaches to postoperative care, including the use of metal staples in sutures and various analgesia regimens to improve healing and pain management. There was also a growing preference for minimally invasive techniques, which reduce the need for chest drains and reduce the risk of related complications. Implementation of the Enhanced Recovery After Surgery (ERAS) protocol and a multidisciplinary approach were highlighted as crucial to ensuring an effective and efficient recovery. Final considerations: Improving post-operative care in thoracic surgery brings significant benefits not only to patients by improving clinical outcomes, but also increases the efficiency of healthcare systems. Such practices are essential to promote positive clinical results and a faster, safer recovery.

Keywords: Postoperative care; thoracic surgery; analgesia.

INTRODUCTION

Postoperative care in thoracic surgery is essential for the effective recovery of patients and the minimization of complications. The variability of interventions, ranging from extensive lung resections to less invasive procedures, requires a careful and patient-adapted approach to optimize clinical outcomes. The complexity of these surgeries, together with the need for intensive surveillance in the first hours after the procedure, highlights the importance of a

multidisciplinary team involving thoracic surgeons, anesthetists, pulmonologists and physiotherapists, working in a coordinated manner (Bertolaccini et al., 2023).

Within the spectrum of challenges associated with thoracic surgery, the prolonged duration of operations, the single-lung ventilation technique and the risk of nerve damage stand out, factors that increase the incidence of postoperative pulmonary complications (PPC). Risk factors such as advanced age, smoking history, and cardiovascular comorbidities are recognized as significant contributors to the development of these complications, often resulting in prolonged hospitalizations and surpassing complications seen in abdominal operations (Liu et al., 2022).

Furthermore, patients facing serious postoperative complications are at increased risk of rescue failure and subsequent mortality, which also negatively impacts long-term survival, even with significant advances in surgical techniques and postoperative care (Kalata et al., 2023).

Optimizing post-operative care is possible through an in-depth understanding of the etiology and timing of complications. Although the ERAS (Enhanced Recovery After Surgery) protocol is widely accepted and implemented, adapting these protocols to the epidemiological particularities of each complication still represents a challenge, indicating the need for specific adjustments for different types of thoracic surgeries (Kalata et al., 2023).

In this context, the objective of this research is to perform a comprehensive review of current scientific literature to identify and synthesize best practices for postoperative care in thoracic surgery. The focus will be on the prevention and management of complications, seeking to contribute to improving clinical results and quality of life for patients undergoing such procedures.

METHODOLOGY

This literature review was designed following the PVO methodology, which involves defining the Population or research problem, the Variables of interest and the expected Outcome. The research was guided by the guiding question: “What are the most current and effective practices in postoperative care in thoracic surgery and how are they related to the prevention and management of complications, as evidenced by recent scientific literature?”

To collect pertinent data, searches were carried out in the PubMed - MEDLINE (Medical Literature Analysis and Retrieval System Online) database. The search terms were combined with Boolean operators, resulting in the following search strategy: (“Thoracic surgery” AND (“Postoperative care” OR “Postoperative management”) AND (“Complications” OR “Surgical complications” OR “Postoperative complications”). This initial search identified 109 articles.

The inclusion criteria defined for this review were: articles in English, published between 2019 and 2024, that directly addressed the proposed themes and included review-type studies and observational studies, all available in full. The exclusion criteria eliminated duplicate articles, publications available only in abstract form, and those that did not directly address the research problem or that failed to meet the other inclusion criteria.

After rigorous application of the inclusion and exclusion criteria, 12 articles were selected from the PubMed database to compose the collection of this study. This meticulous selection allowed for a comprehensive and up-to-date review of post-operative care practices in thoracic surgery, highlighting the most effective approaches for preventing and managing complications.

DISCUSSION

INNOVATIVE APPROACHES TO POSTOPERATIVE CARE IN THORACIC SURGERY

In a context where medical technology advances rapidly, innovations in postoperative care in thoracic surgery are increasingly necessary. Traditional approaches are being reevaluated in light of new evidence and techniques. According to Ludwig (2020), comparative studies between different suturing techniques demonstrate variability in results, directly influencing the quality of healing. The analysis focused on materials such as silk thread, catgut thread and metal staples, finding that metal staples provide superior healing due to less formation of inflammatory tissue and greater tissue stability.

This finding underscores the importance of integrating innovations, even into common procedures, to improve postoperative care in thoracic patients (Ludwig, 2020).

Postoperative pain management is another critical aspect that requires meticulous attention. Rallis et al. (2019) highlight the need for a highly vigilant and effective approach to postoperative analgesia for major thoracic surgeries. The main objective is to improve postoperative lung function and minimize complications such as nausea, vomiting, hypotension, tremors, bradycardia and respiratory failure.

In the study by Rallis et al. (2019), three analgesia regimens were compared in terms of postoperative efficacy. The first regimen, used by 32% of patients, involved the administration of opioids via an epidural catheter. The second regimen, adopted by 29% of patients, combined epidural administration of opioids with local intramuscular injections of Ropivacaine. The third and final regimen, used by 39% of patients, consisted of the combined intravenous administration of Tramadol and a non-steroidal

anti-inflammatory drug. The results indicated that the differences in the evolution of pain in the immediate postoperative period and in the following months were minimal, suggesting that the choice of analgesic technique must be personalized according to the specific surgical approach and the patient's individual needs (Rallis et al., 2019).

These findings reinforce the importance of innovative and personalized approaches to postoperative care in thoracic surgery, aiming not only for immediate recovery, but also for patients' long-term quality of life.

Chest drains have traditionally been used in the postoperative period of thoracic surgeries to prevent complications such as hemothorax, tension pneumothorax and pleural effusion. However, the use of drains can be associated with significant adverse effects, including pain, immobilization, increased risk of infection, decreased ventilatory capacity, difficulty in postoperative management and prolonged hospital stay. Faced with these challenges, preference has grown for minimally invasive surgery techniques, which are more efficient and less traumatic, reducing the need for chest drainage and the rates of associated postoperative complications (Bertolaccini; Brunelli, 2019; Cheng et al., 2019).

A retrospective review of medical records by Cheng et al. (2019) at the West China Hospital of Sichuan University from 2014 to 2018 revealed a significant change in clinical practice, with an increasing trend towards the adoption of minimally invasive surgeries. This approach allowed the elimination of the use of postoperative chest drainage. The study followed 246 children who underwent thoracoscopic lobectomy without the use of chest tubes for 90 days postoperatively, observing that only 2 patients (0.81%) presented pneumothorax after surgery, and no patient developed serious complications or required intervention with chest drainage,

demonstrating that thoracoscopic lobectomy in children, without the use of postoperative drains, is safe and has a low incidence of complications.

Furthermore, pain control after thoracotomies represents a significant challenge in the postoperative management of thoracic surgeries, given the high level of pain associated with this procedure and the dependence on high dosages of opioids. In this context, several approaches for pain control in the first days after thoracic surgeries have been studied (Bertolaccini; Brunelli, 2019; Nemoyer et al., 2020).

A study carried out by Nemoyer et al. (2020) evaluated the effects of intercostal nerve block with long-acting liposomal bupivacaine on pain control in patients undergoing thoracic surgery. Of the patients involved in the study, 32 underwent thoracotomy with block using liposomal bupivacaine injections, while another 50 received the same treatment in minimally invasive procedures (VATS-LB) and 53 received blocks with bupivacaine associated with 0.25% epinephrine (VATS-BE). Results indicated a significant improvement in pain scores in patients who underwent thoracotomy and VATS-LB compared to those who received VATS-BE.

Notably, for patients undergoing thoracotomy, there was a significant reduction in the need for intravenous opioids in the first two days post-surgery, highlighting that paravertebral blocks with liposomal bupivacaine can significantly improve postoperative pain and facilitate faster recovery, in addition to reduce opioid dependence and its associated complications.

The Enhanced Recovery After Surgery (ERAS) protocol was developed in the late 1990s, incorporating a series of preoperative, intraoperative and postoperative techniques and interventions that aim to minimize physiological and metabolic stress resulting

from surgical trauma. The main objective of ERAS is to improve patient recovery, reduce the duration of hospitalization and postoperative complications, thus reducing unnecessary risks and costs associated with surgical intervention.

According to Bertolaccini and Brunelli (2019), the implementation of minimally invasive techniques constitutes one of the fundamental pillars of the ERAS protocol. In fact, the use of video-assisted thoracoscopic surgery (VATS) over open thoracotomy is considered one of the most critical aspects that contributed to the beneficial effects of ERAS, potentially overshadowing the influence of other factors. This methodological change is often cited as one of the main reasons for the lack of additional benefits observed in pre- and post-ERAS comparative studies that focused exclusively on VATS lobectomies.

The integration of the ERAS protocol as a multimodal system is relatively recent in thoracic surgery. Scientific evidence has demonstrated that ERAS-guided care is superior to conventional care, and its implementation has shown significantly better clinical results. For the effective application of the ERAS protocol, the involvement of a multidisciplinary team made up of surgeons, anesthetists, physiotherapists, nurses and nursing technicians, all properly trained, is essential. The collaboration and adherence of these professionals are crucial for the productive and correct implementation of the protocol (Bertolaccini; Brunelli, 2019).

Bertolaccini et al. (2023) highlight that this team must act promptly and efficiently in all stages of the protocol. The adoption of specific prophylactic measures, such as antibiotic therapy for perioperative skin infections, beta-adrenergic blockers for cardiac arrhythmias, early mobilization, anticoagulation to prevent deep vein thrombosis and rapid and effective pain control, are examples of positive

interventions proven to be beneficial for the patient, as widely reported in the medical literature.

CHALLENGES AND SOLUTIONS IN THE MANAGEMENT OF POSTOPERATIVE COMPLICATIONS IN THORACIC SURGERY

Thoracic surgeries, known for their complexity, have higher rates of postoperative complications compared to procedures in other specialties, such as abdominal surgeries. This requires a comprehensive multidisciplinary approach in the management of postoperative complications, involving not only the medical team, but also patients, families and professionals from different areas of healthcare, with the aim of optimizing recovery, reducing hospitalization time and minimizing visits to the emergency room after discharge (Çınar et al., 2020).

The importance of the nursing team in the ongoing care of patients undergoing thoracic surgery is indisputable. Liu et al. (2022) conducted a systematic review and meta-analysis that demonstrated improvements in lung function in patients who received personalized rehabilitation by nursing teams. This multifactorial care included family and psychological approaches, both before and after the procedure, reinforcing the positive impact of holistic care on the postoperative outcome.

Ahmadi et al. (2021) described this program, which includes a diverse team made up of specialized nurses, physiotherapists, occupational therapists, nutritionists, speech therapists, and social workers. This integrated approach ensured a smooth transition from hospital to home, with home visits and ongoing telephone support, resulting in a significant reduction in length of hospital stay, emergency room visits, readmissions, and mortality within 60 days post-hospitalization. high.

Physiotherapy in the postoperative period of thoracic surgeries is crucial for the patient's rehabilitation, treatment and prevention of complications. The main objective is to alleviate the reduction in lung volume caused by the procedure, optimize expectoration and improve the patient's mobility. Agostini et al. (2020) and Çınar et al. (2020) defend the routine use of physiotherapy in this context, highlighting its significant benefits.

A study by Çınar et al. (2020), a retrospective cohort, analyzed 90 patients who underwent thoracotomy lobectomy due to lung cancer. Of this group, 50 received standard postoperative care, while the other 40 participated in an intensive daily physical therapy program from the fourth postoperative day until discharge. The results showed that the group that received physiotherapy had a lower incidence of pulmonary complications (10% vs 38%, $p=0.002$), shorter hospital stay (average of 6 days vs 7 days, $p=0.001$) and significantly lower hospital costs. smaller ($p=0.001$), highlighting the reduction in pneumonia, atelectasis and dead space.

Additionally, physical therapy is recommended after videothoroscopic procedures. The study "Video-assisted thoracoscopic lobectomy: which patients require postoperative physiotherapy?" by Agostini et al. (2020), analyzed 285 patients who underwent videothoroscopic lobectomy for the treatment of lung cancer. Of these, 73% required postoperative physiotherapy due to conditions such as reduced mobility, desaturation on exertion, symptomatic atelectasis and sputum retention. The research also identified that conditions such as COPD, high Body Mass Index, reduced pre-operative mobility and advanced age were factors associated with complications treatable with physiotherapy.

Lung ultrasound is a useful tool for early detection of postoperative pulmonary complications. A prospective study carried out by Zieleskiewicz et al. (2021) in a high-risk cohort involving 327 patients undergoing major surgery analyzed the usefulness of lung ultrasound performed up to two hours after extubation. Ultrasound analysis revealed that 19% of patients developed postoperative pulmonary complications. The presence of alveolar consolidation was associated with an increased risk of pulmonary complications and the need for mechanical ventilation. Furthermore, patients with pleural effusion had higher rates of pulmonary complications and higher in-hospital mortality.

FINAL CONSIDERATIONS

The study emphasizes the importance of postoperative care in thoracic surgery, essential to prevent complications such as acute cholecystitis and improve clinical results. Detailed post-operative attention and the use of advanced techniques are crucial for a safe and effective recovery. Management of post-thoracotomy pain, problematic due to the risk of opioid dependence, requires a vigilant approach. A multidisciplinary strategy is vital for comprehensive and personalized post-operative care, integrating monitoring and effective rehabilitation. The adoption of the ERAS protocol aims to reduce hospitalization time and complications, optimizing recovery. Physiotherapy is also highlighted as a key component in post-operative recovery, helping to prevent additional complications. Future research is suggested to evaluate specific interventions and innovate care strategies, aiming to improve the quality and safety of care in thoracic surgery.

These practices not only benefit individual patients, but also contribute to the efficiency of the healthcare system and promote positive long-term clinical outcomes.

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