



Kde začít s ERAS na mé JIP

Ivo Hanke
KCH

Coulours of sepsis, 30. 1. 2019, Ostrava

www.fnhk.cz

ERAS v chirurgii

- Rozhodovací proces
- Přehled vývoje ERASu



ERAS v chirurgii – co to je?

- ERAS je multimodální terapeutická strategie s cílem minimalizovat pooperační morbiditu a mortalitu
- Profituje z ní
 - Nemocný
 - Personál
 - Management poskytovatele péče



ERAS v chirurgii

- Co vím o ERASu
- Chci tento přístup zavést
- Proč to chci
- Tým



ERAS v chirurgii

- Vytyčení oblasti zájmu
- Dokumentace současného stavu – nulový soubor
- Zajištění podpory - management – Co k uskutečnění potřebuji - materiální



ERAS v chirurgii - filozofie

- Získat lidi do týmu
- Co jim to přinese
- Motivace



ERAS v chirurgii – tým

- Vhodní členové
- Přijali úkol za svůj
- Hledají cestu ne důvod
- Soustředěnost



ERAS v chirurgii – realizace

- Plán
- Cíle – co chci dosáhnout -
- Plnit podle obtížnosti - přínosu
- Konsenzuální zavádění změn se spolupracovníky



ERAS v chirurgii – realizace

- Monitorace úspěšnosti jednotlivých kroků – zpětná vazba
- Modifikace plánu dle reálných možností
- Důslednost v postupech a metodice
- Informovat členy týmu



ERAS v chirurgii – realizace

- Sestavení protokolu nebo jeho převzetí
- Srozumitelnost
- Možnost sledování jeho dodržování
- Systematická, přehledná a dostupná dokumentace



ERAS v chirurgii

World Journal
of Surgery

World J Surg (2013) 37:285–305
DOI 10.1007/s00268-012-1787-6

Guidelines for Perioperative Care in Elective Rectal/Pelvic Surgery: Enhanced Recovery After Surgery (ERAS[®]) Society Recommendations

J. Nygren · J. Thacker · F. Carli · K. C. H. Fearon ·
S. Norderval · D. N. Lobo · O. Ljungqvist ·
M. Soop · J. Ramirez

© Enhanced Recovery After Surgery, The European Society for Clinical Nutrition and Metabolism, and International Association for Surgical Metabolism and Nutrition 2012

Abstract

Background This review aims to present a consensus for optimal perioperative care in rectal/pelvic surgery, and to provide graded recommendations for items for an evi-

perioperative treatment pathway, available English-language literature was examined, reviewed and graded. A consensus recommendation was reached after critical appraisal of the literature by the group.



ERAS v chirurgii

European Journal of Cardio-Thoracic Surgery 55 (2019) 91–115
doi:10.1093/ejcts/ezy301 Advance Access publication 9 October 2018

GUIDELINES

Cite this article as: Batchelor TJP, Rasburn NJ, Abdelnour-Berchtold E, Brunelli A, Cerfolio RJ, Gonzalez M et al. Guidelines for enhanced recovery after lung surgery: recommendations of the Enhanced Recovery After Surgery (ERAS[®]) Society and the European Society of Thoracic Surgeons (ESTS). *Eur J Cardiothorac Surg* 2019;55:91–115.

Guidelines for enhanced recovery after lung surgery: recommendations of the Enhanced Recovery After Surgery (ERAS[®]) Society and the European Society of Thoracic Surgeons (ESTS)

Timothy J.P. Batchelor^{a,*}, Neil J. Rasburn^b, Etienne Abdelnour-Berchtold^c, Alessandro Brunelli^d,
Robert J. Cerfolio^e, Michel Gonzalez^c, Olle Ljungqvist^f, René H. Petersen^g, Wanda M. Popescu^h,
Peter D. Slingerⁱ and Babu Naidu^j

^a Department of Thoracic Surgery, University Hospitals Bristol NHS Foundation Trust, Bristol, UK

^b Department of Anaesthesia, University Hospitals Bristol NHS Foundation Trust, Bristol, UK

^c Division of Thoracic Surgery, Centre Hospitalier Universitaire Vaudois, Lausanne, Switzerland

^d Department of Thoracic Surgery, St James's University Hospital, Leeds, UK

^e Department of Cardiothoracic Surgery, New York University Langone Health, New York, NY, USA

^f Department of Surgery, Faculty of Medicine and Health, Örebro University, Örebro, Sweden

^g Department of Thoracic Surgery, Rigshospitalet, University of Copenhagen, Copenhagen, Denmark

^h Department of Anesthesiology, Yale University School of Medicine, New Haven, CT, USA

ⁱ Department of Anesthesia, University Health Network – Toronto General Hospital, Toronto, ON, Canada

^j Department of Thoracic Surgery, Heart of England NHS Foundation Trust, Birmingham, UK

* Corresponding author. Department of Thoracic Surgery, Bristol Royal Infirmary, Upper Maudlin Street, Bristol BS2 8HW, UK. Tel: +44-117-3423132; e-mail: tim.batchelor@uhbristol.nhs.uk (T.J.P. Batchelor).

Received 14 March 2018; received in revised form 29 July 2018; accepted 31 July 2018



ERAS v chirurgii

PREADMISSION INFORMATION, EDUCATION AND COUNSELLING
PERIOPERATIVE NUTRITION
SMOKING CESSATION
ALCOHOL DEPENDENCY MANAGEMENT
ANAEMIA MANAGEMENT
PULMONARY REHABILITATION AND PREHABILITATION
PREOPERATIVE FASTING AND CARBOHYDRATE TREATMENT
PREANAESTHETIC MEDICATION
VENOUS THROMBOEMBOLISM PROPHYLAXIS
ANTIBIOTIC PROPHYLAXIS AND SKIN PREPARATION
PREVENTING INTRAOPERATIVE HYPOTHERMIA
STANDARD ANAESTHETIC PROTOCOL
POSTOPERATIVE NAUSEA AND VOMITING CONTROL
REGIONAL ANAESTHESIA AND PAIN RELIEF
PERIOPERATIVE FLUID MANAGEMENT
ATRIAL FIBRILLATION PREVENTION
SURGICAL TECHNIQUE: THORACOTOMY
SURGICAL TECHNIQUE: MINIMALLY INVASIVE SURGERY
CHEST DRAIN MANAGEMENT
URINARY DRAINAGE
EARLY MOBILIZATION AND ADJUNCTS TO PHYSIOTHERAPY



Reduction of postoperative pulmonary complications after lung surgery using a fast track clinical pathway

Bernd M. Muehling^{a,*}, Gisela L. Halter^a, Hubert Schelzig^a, Rainer Meierhenrich^b, Peter Steffen^c, Ludger Sunder-Plassmann^a, Karl-Heinz Orend^a

^aDepartment of Thoracic and Vascular Surgery, University of Ulm, Steinhövelstrasse 9, 89075 Ulm, Germany

^bDepartment of Anesthesiology and Critical Care Medicine, University of Ulm, Ulm, Germany

^cSection of Pain Management, University of Ulm, Ulm, Germany

Received 30 November 2007; received in revised form 8 April 2008; accepted 14 April 2008; Available online 19 May 2008

Abstract

Background: Fast track programs, multimodal therapy strategies, have been introduced in many surgical fields to minimize postoperative morbidity and mortality. In terms of lung resections no randomized controlled trials exist to evaluate such patient care programs. **Methods:** In a prospective, randomized controlled pilot study a conservative and fast track treatment regimen in patients undergoing lung resections was compared. Main differences between the two groups consisted in preoperative fasting (6 h vs 2 h) and analgesia (patient controlled analgesia vs patient controlled epidural analgesia). Study endpoints were pulmonary complications (pneumonia, atelectasis, prolonged air leak), overall morbidity and mortality. Analysis was performed in an intention to treat. **Results:** Both study groups were similar in terms of age, sex, preoperative forced expiratory volume in one second (FEV₁), American Society of Anesthesiologists score and operations performed. The rate of postoperative pulmonary complications was 35% in the conservative and 6.6% in the fast track group ($p = 0.009$). A subgroup of patients with reduced preoperative FEV₁ (<75% of predicted value) experienced less pulmonary complications in the fast track group (55% vs 7%, $p = 0.023$). Overall morbidity was not significantly different (46% vs 26%, $p = 0.172$), mortality was comparable in both groups (4% vs 3%). **Conclusion:** We evaluated an optimized patient care program for patients undergoing lung resections in a prospective randomized pilot study. Using this fast track clinical pathway the rate of pulmonary complications could be significantly decreased as compared to a conservative treatment regimen; our results support the implementation of an optimized perioperative treatment in lung surgery in order to reduce pulmonary complications after major lung surgery.

Východiska - Fast track v hrudní chirurgii

- **What is Fast Track Thoracic Surgery?**
- POSTED BY [K ECKLAND](#) · APRIL 26, 2011 ·
- **FILED UNDER** [AMBULATION](#), [EARLY EXTUBATION](#), [EARLY MOBILIZATION](#), [PATIENT EDUCATION](#), [PREVENTING POSTOPERATIVE COMPLICATIONS AFTER SURGERY](#), [THORACIC SURGERY](#)
- [current standard of treatment](#)
- - VATS procedures versus open surgery,
 - early extubation in the operating room,
- - Perioperative pain management
- - Small muscle-sparing thoracotomies
 - **early mobilization**
- **Early chest tube extraction**
- early feeding and ambulation



Východiska - Fast track v hrudní chirurgii

clinical practice guidelines

Annals of Oncology 21 (Supplement 5): v103-v115, 2010
doi:10.1093/annonc/mdq207

Early stage and locally advanced (non-metastatic) non-small-cell lung cancer: ESMO Clinical Practice Guidelines for diagnosis, treatment and follow-up

L. Crinò¹, W. Weder², J. van Meerbeeck³ & E. Felip⁴
On behalf of the ESMO Guidelines Working Group*

¹Dept of Medical Oncology, University Hospital, Perugia, Italy; ²Div of Thoracic Surgery, University Hospital, Zurich, Switzerland; ³Unit of Thoracic Oncology, Ghent University, Belgium; ⁴Medical Oncology Service, Vall d'Hebron University Hospital, Barcelona, Spain

Surgery for stage I and II

VATS lobectomy is associated with lower morbidity, shorter hospital stay and facilitates the delivery of adjuvant chemotherapy



Uniportální lobektomie



Nowadays open-chest surgery in the era of fast-track management

Ricardo Navarro, Rodrigo Benavidez

Thoracic Surgery Service, Sanatorio Allende, Cordoba, Argentina

Contributions: (I) Conception and design: R Navarro; (II) Administrative support: None; (III) Provision of study materials or patients: Administrative data taken from our Service Records; (IV) Collection and assembly of data: R Benavidez; (V) Data analysis and interpretation: R Navarro; (VI) Manuscript writing: All authors; (VII) Final approval of manuscript: All authors.

Correspondence to: Ricardo Navarro, Thoracic Surgery Service, Sanatorio Allende, Cordoba, Argentina. Email: ricnavarro64@gmail.com.

Table 1 Minimally-invasive open chest lobectomy for stage I to IIIA lung cancer (n=100)

Postoperative events	Number	Percent (%)
Mean operative time (min)	130	n/a*
Mean ICU stay (days)	1.3	n/a
Mean length of stay (days)	4.8	n/a
Discharged with Heimlich valve	4	4
Reoperation	0	0
30 days readmission	2	
Surgery-related	0	0
Surgery-unrelated	2	2

Fast-Track Recovery of the Coronary Bypass Patient

Richard M. Engelman, MD, John A. Rousou, MD, Joseph E. Flack III, MD,
David W. Deaton, MD, Chester B. Humphrey, MD, Lee H. Ellison, MD,
Philip D. Allmendinger, MD, Susannah G. Owen, AB, and Penelope S. Pekow, PhD

Departments of Surgery, Baystate Medical Center, Springfield, Massachusetts, Hartford Hospital, Hartford, Connecticut, and the University of Connecticut School of Medicine, Farmington, Connecticut, and the School of Public Health, University of Massachusetts, Amherst, Massachusetts

A new approach termed "fast-track recovery" was undertaken at both the Baystate Medical Center and Hartford Hospital. The fast-track protocol involves the following principles: (1) preoperative education; (2) early extubation; (3) methylprednisolone sodium succinate before bypass followed by dexamethasone for 24 hours postoperatively; (4) prophylactic digitalization, metoclopramide HCl, docusate sodium, and ranitidine HCl; (5) accelerated rehabilitation; (6) early discharge; (7) a dedicated fast-track coordinator to perform both daily telephone contact and a 1-week postoperative examination; and (8) a routine 1-month postoperative visit with a PA or MD. To evaluate the effects of this approach on patient care, a retrospective 1-year analysis was undertaken in both institutions with all coronary artery bypass grafting patients compared in a consecutive manner before the origin of the fast-track protocol and subsequent to its beginning. There were 280 patients in the fast-track and

282 in the non-fast-track group. The two groups were not significantly different except inexplicably there was a lower ejection fraction in the fast-track group and a longer cross-clamp time. Postoperatively, the mean time to extubation decreased from 22.1 to 15.4 hours, and peak weight gain decreased from 2.8 to 1.6 kg from the non-fast-track to the fast-track group ($p < 0.01$). This was accompanied by significant ($p < 0.001$) decreases in intensive care unit duration from 2.4 to 1.9 days and in postoperative length of stay from 8.3 to 6.8 days from the non-fast-track to the fast-track group. There was no increase in morbidity or mortality associated with the fast-track protocol either early or late. Thirty-day hospital readmission was not significantly different between the two groups. Fast-track methodology is effective, and we routinely employ this approach for all patients undergoing cardiopulmonary bypass.

(Ann Thorac Surg 1994;58:1742-6)

Cardiovascular Thoracic Surgery Multidisciplinary Team Collaboration For The Fast Track Open Heart Patient

M. Richardson¹

¹Geisinger Medical Center, Danville, PA

Corresponding author's email: mjrichardson@geisinger.edu

Purpose

To improve multidisciplinary team collaboration and communication leading to a decrease in the post-operative ventilation hours for the cardio thoracic open heart patients.

History

For 2013 28% of open heart patients were extubated within 6 hours, in 2014 the percentage increased to 38%. The multidisciplinary team initiative for a new fast track open heart protocol was initiated in March 2015. N=220 fast track eligible open hearts patients were observed post operatively and 78% were extubated within 6 hours. Disqualification from the fast track protocol includes: Excessive post-operative bleeding as defined as 400 mls the 1st hr. 200 mls/hr. for the initial 2 hours, or 100 mls/hour for the initial 4 hours; high dose inotropic/vasopressor support as defined as Levophed & Epinephrine infusion rates each over 10 mcg/kg; or current need of 4 or more inotropic/vasopressor infusions; prolonged OR pump time as defined as more than 4 hours (240 minutes); Open chest/Ventricular Assist Device/ECMO Patients who required intubation pre op.

Objective

This multidisciplinary protocol is designed to allow for the expedient removal of post-operative mechanical ventilation for patients undergoing cardiac surgery. The protocol starts in the operating room and extends to the CT ICU. It is designed to achieve the most rapid time to extubation possible while the patient meets all other relevant hemodynamic, cardiac, respiratory & hematologic postoperative milestones

Results

In 2016, N= 142 Fast Track Eligible Open Hearts were observed for a 6 month period from January to June 2016. 87% of these fast track open hearts were extubated within 6 hours. The total number of heart surgeries performed, (fast track and non-fast track) during the 6 month period was 167 open hearts. 25 open hearts, or 15% of the sample were not fast track eligible due pre and post-operative complications.

Ultra fast-track minimally invasive aortic valve replacement: going beyond reduced incisions

M. Di Eusanio et al. / European Journal of Cardio-Thoracic Surgery

Aortic valve replacement (AVR) via a median sternotomy approach has been largely reported to be safe and long-term efficacious, and currently represents the 'gold standard' approach for aortic stenosis treatment. However, aortic valve surgery has undergone continuous development over the last years, involving less invasive techniques and new technologies to reduce the traumatic impact of the intervention and extend the operability toward increasingly high-risk patients. Indeed, minimally invasive AVR and transcatheter aortic valve replacement caseload have steadily increased leading to a paradigm shift in the treatment of aortic valve disease. In this setting, we have established a multidisciplinary minimally invasive programme to treat patients who require AVR. Herein, we present our approach including (i) reduced chest incision (through a J ministernotomy), aiming to reduce the traumatic impact of the surgical procedure, to decrease blood loss, postoperative pain and wound complications and to increase patient's satisfaction; (ii) rapid-deployment AVR, to reduce operative times, to facilitate minimally invasive approach and to improve haemodynamic outcomes; (iii) minimal invasive extracorporeal circulationsystem, to improve end-organ protection, to decrease systemic inflammatory response and to promote fast-track anaesthesia and (iv) ultra fast-track anaesthesia, to decrease the rate of postoperative complications and assure better and earlier recovery.

Ultra fast-track minimally invasive aortic valve replacement: going beyond reduced incisions

M. Di Eusanio et al. / European Journal of Cardio-Thoracic Surgery



Figure 3: Early rehabilitation therapy. Our protocol aims to improve the overall patient's functional capacity by timely re-establishing the respiratory and physical independence and reducing the risk of bed-rest-related complications. (A) Breathing exercises + active upper and lower limb movements (4–12 h after surgery). (B) Bed and chair sitting (12–24 h after surgery). (C) Standing and ambulation (36–48 h after surgery).

Východiska - Fast track v hrudní chirurgii

The enhanced recovery after surgery (ERAS) protocol compliance on morbidity from resection for primary lung cancer.

Rogers LJ¹, Bleetman L², Messenger ct of DE³, Joshi NA⁴, Wood L⁵, Rasburn NJ⁴, Batchelor TJP⁶.

This prospective cohort study collected data on consecutive patients undergoing lung resection for primary lung cancer between April 2012 and June 2014 at a regional referral center in the United Kingdom. All patients followed a standardized, 15-element Enhanced Recovery After Surgery protocol

RESULTS:

A total of 422 consecutive patients underwent lung resection over a 2-year period, of whom 302 (71.6%) underwent video-assisted thoracoscopic surgery. Lobectomy was performed in 297 patients (70.4%). Complications were experienced by 159 patients (37.6%). The median length of stay was 5 days (range, 1-67), and 6 patients (1.4%) died within 30 days of surgery. There was a significant inverse relationship between protocol compliance and morbidity after adjustment for confounding factors (odds ratio, 0.72; 95% confidence interval, 0.57-0.91; $P < .01$). Age, lobectomy or pneumonectomy, more than 1 resection, and delayed mobilization were independent predictors of morbidity. Age, lack of preoperative carbohydrate drinks, planned high dependency unit/intensive therapy unit admission, delayed mobilization, and open approach were independent predictors of delayed discharge (length of stay >5 days)



Fast track pediatric thoracic surgery: Toward day-case surgery?

[Pauline Clermidi](#) , [Myriam Bellon](#) , [Alia Skhiri](#) , [Olivier Jat](#) 
[Arnaud Bonnard](#)  

Abstract

Purpose

Thoracoscopic lung resection for congenital pulmonary airway malformation (CPAM) is a safe technique for children. Our purpose was to evaluate the feasibility of a fast-track protocol in such cases.

Methods

From September 2007 to May 2016, 101 patients underwent a thoracoscopic pulmonary resection of which 83 for CPAM (lobectomy, wedge resection or sequestrectomy). We retrospectively reviewed the characteristics of surgical procedure, postoperative management and complications through three time periods (September 2007–December 2009: n = 14, January 2010–March 2013: n = 30, April 2013–May 2016: n = 39) corresponding to management protocols modifications introducing fast-track pathways.

Results

Through the 3 time periods, median postoperative hospital stay decreases (4, 3, 2 days successively, $P = 0.02$). In the third time period, 4 patients underwent surgery in day-case surgery.

The overall and surgical complication rates, mainly related to air leakage, remain stable through the 3 time periods (14%, $P = 0.41$ and 10%, $P = 0.52$ respectively). Among the 13 patients without postoperative pleural drainage, one required secondary drainage after a partial resection of an emphysema.

Conclusion

Fast-track protocol for children undergoing uncomplicated thoracic surgery for CPAM seems feasible without extra morbidity.

Selected patient undergoing thoracoscopic resection of the lung may benefit from the absence of pleural drainage and can be operated on in day-case surgery.

Anesthesia and fast-track in video-assisted thoracic surgery (VATS): from evidence to practice

Authors: Marzia Umari, Stefano Falini, Matteo Segat, Michele Zuliani, Marco Crisman, Lucia Comuzzi, Francesco Pagos, Stefano Lovadina, Umberto Lucangelo

Abstract

In thoracic surgery, the introduction of video-assisted thoracoscopic techniques has allowed the development of fast-track protocols, with shorter hospital lengths of stay and improved outcomes. The perioperative management needs to be optimized accordingly, with the goal of reducing postoperative complications and speeding recovery times. Premedication performed in the operative room should be wisely administered because often linked to late discharge from the post-anesthesia care unit (PACU). Inhalatory anesthesia, when possible, should be preferred based on protective effects on postoperative lung inflammation. Deep neuromuscular blockade should be pursued and carefully monitored, and an appropriate reversal administered before extubation. Management of one-lung ventilation (OLV) needs to be optimized to prevent not only intraoperative hypoxemia but also postoperative acute lung injury (ALI): protective ventilation strategies are therefore to be implemented. Locoregional techniques should be favored over intravenous analgesia: the thoracic epidural, the paravertebral block (PVB), the intercostal nerve block (ICNB), and the serratus anterior plane block (SAPB) are thoroughly reviewed and the most common dosages are reported. Fluid therapy needs to be administered critically, to avoid both overload and cardiovascular compromise. All these practices are analyzed singularly with the aid of the most recent evidences aimed at the best patient care. Finally, a few notes on some of the latest trends in research are presented, such as non-intubated video-assisted thoracoscopic surgery (VATS) and intravenous lidocaine.

Tubeless single-port thoracoscopic sublobar resection: indication and safety

Chao-Yu Liu,^{1,2} Po-Kuei Hsu,^{1,3} Hung-Che Chien,^{1,4} Chih-Cheng Hsieh,^{1,3} Chien-Kun Ting,^{1,3} and Mei-Yung Tsou^{1,3}

[Author information](#) ► [Article notes](#) ► [Copyright and License information](#) ► [Disclaimer](#)

Abstract

[Go to:](#) 

Background

The tubeless technique, defined as non-intubated general anesthesia with omission of chest drainage after video-assisted thoracoscopic surgery (VATS), is a new concept to further minimize surgical trauma. However, there has been little investigation into the associated feasibility and safety. Minimization of postoperative pneumothorax is challenging. We set up a “tubeless protocol” to select patients for tubeless single-port VATS with monitoring of a digital drainage system (DDS).

Methods

From November 2016 to September 2017, 50 consecutive non-intubated single-port VATS for pulmonary resection were performed. In our study, patients with small and peripheral pulmonary lesions indicated for sublobar resections, as diagnostic or curative intent, were included. After excluding patients having tumors >2 cm, or intrapleural adhesions noted during operation, or forced expiratory volume in the 1 second <1.5 L, 36 patients were selected for tubeless protocol. The clinical characteristics and perioperative outcomes of these patients are presented.

Results

Among 36 cases, 5 patients had minor air leaks detected using the DDS and required intercostal drainage after wound closure. Among the remaining 31 patients in whom the DDS showed no air leak, the chest drainage was removed immediately after wound closure. A postoperative chest roentgenogram on the surgery day showed full expansion in all patients without pneumothorax. Only 7 (19.4%) patients developed minor subclinical pneumothorax on the first postoperative day without the need for chest drainage. All patients were discharged uneventfully without the need for intervention.

Conclusions

Our tubeless protocol utilizes DDS to select patients who can have intercostal drainage omitted after non-intubated single-port VATS for pulmonary resection. Using objective DDS parameters, we believe that this is an effective way to reduce the rate of pneumothorax after tubeless single-port VATS in selected patients.

Závěr - I

- Zřetelný rozvoj celého managementu perioperační péče v chirurgii
- Široce se uplatňují Minimálně invazivní přístupy
- Vedení anestezie patří mezi nezbytné součásti konceptu
- Zavedení ERAS protokolu zvyšuje úspěšnost konceptu
- Lokoregionální analgetizace, tekutinový management, časná mobilizace a výživa jsou nejvýznamnější faktory.



Závěr - II

- ERAS přístup je aplikovatelný ve všech zdravotnických zařízeních, kde je o něj zájem - na všech typech JIP

