Utilisation du Fast-Track dans la Réhabilitation Transplantation Pulmonaire

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Liens d'intérêt

Bourses ou Subventions
SFAR 2004
Vaincre la Mucoviscidose
Fondation Maréchal Foch
Clevmed/ NeuroSense
Aspen France

Prêts
Aspect Medical-Moniteurs
Alaris-Cardinal-Seringues
Datex/GE-moniteurs/électrodes

MedSteer Fondateur-Salarié
valorisation Brevets

Historique Transplantation Pulmonaire

Première transplantation pulmonaire: James Hardy, de l’université du Mississippi, en 1963, chez un homme qui a survécu 18 jours.

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FOCH et la Transplantation Pulmonaire

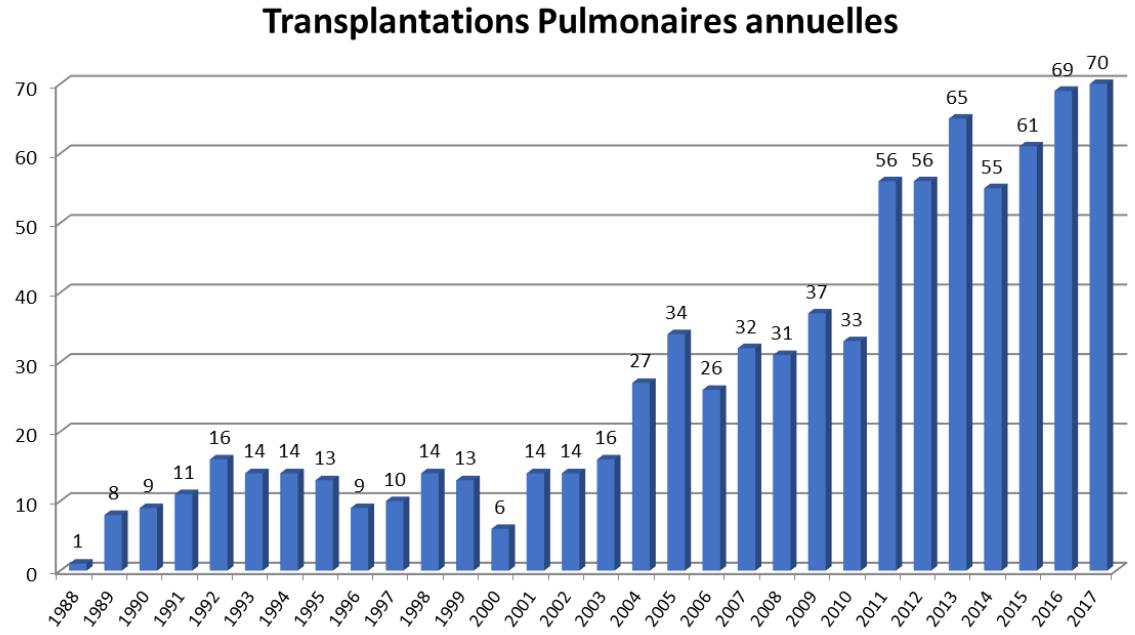
Première transplantation monopulmonaire à l'hôpital Foch: 1988 chez une patiente présentant une lymphangiomatose pulmonaire.

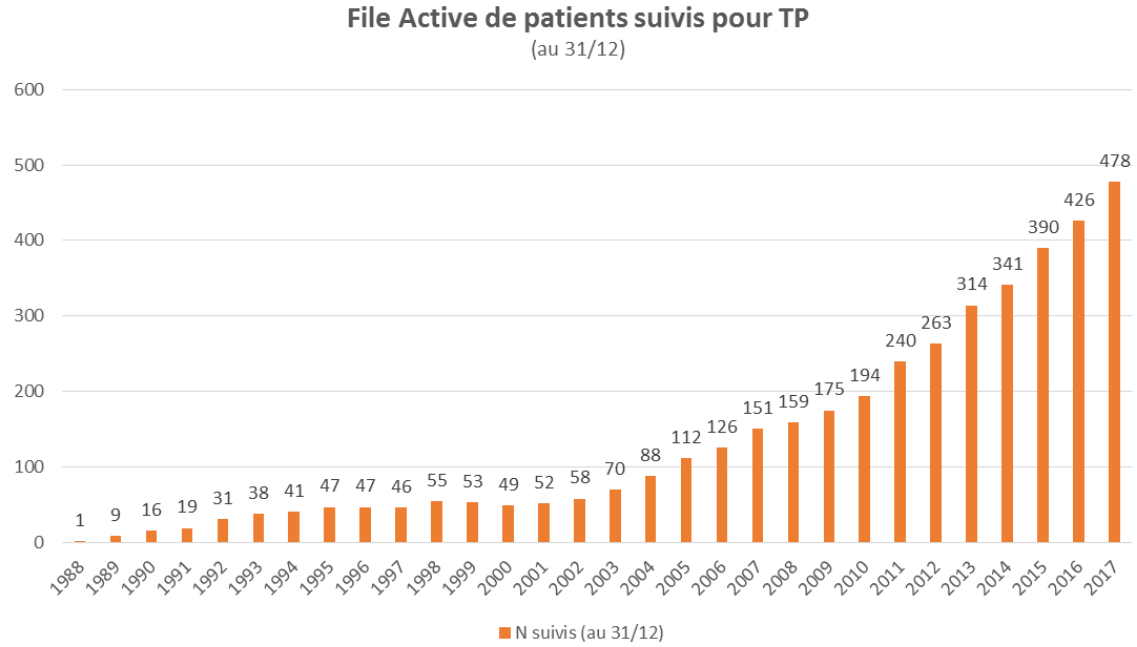
Puis développement de la technique de transplantation pulmonaire bilatérale séquentielle sans recours à la circulation extra-corporelle

Transplantation Pulmonaire Hôpital Foch 1988

970 Transplantations pulmonaires

50% Mucoviscidose
Emphysème-Fibrose



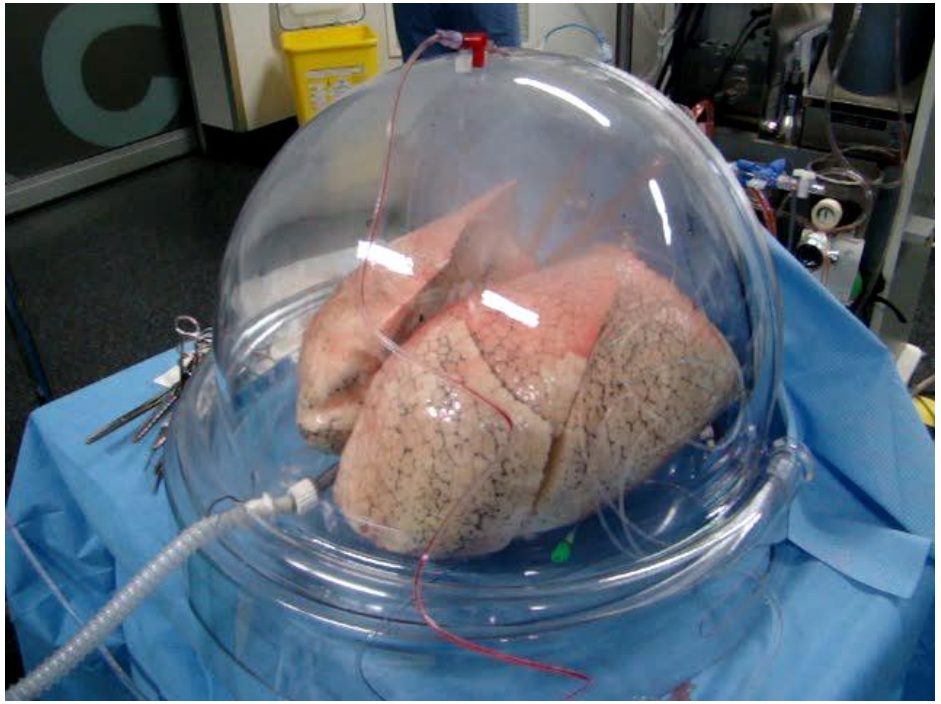


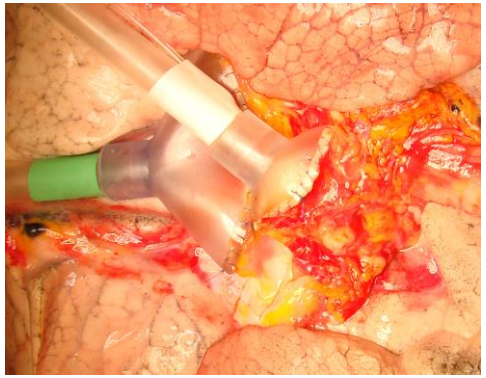
- Transplantations pulmonaires à partir de greffons refusés par l'ensemble des équipes, ou jugés impropre par l'ABM, dont les capacités d'oxygénation ont été améliorées par une réhabilitation ex-vivo

Optimisation et Réhabilitation du greffon
M3
Préservation Dynamique

Programme Perfusion Pulmonaire EX-VIVO début 2011

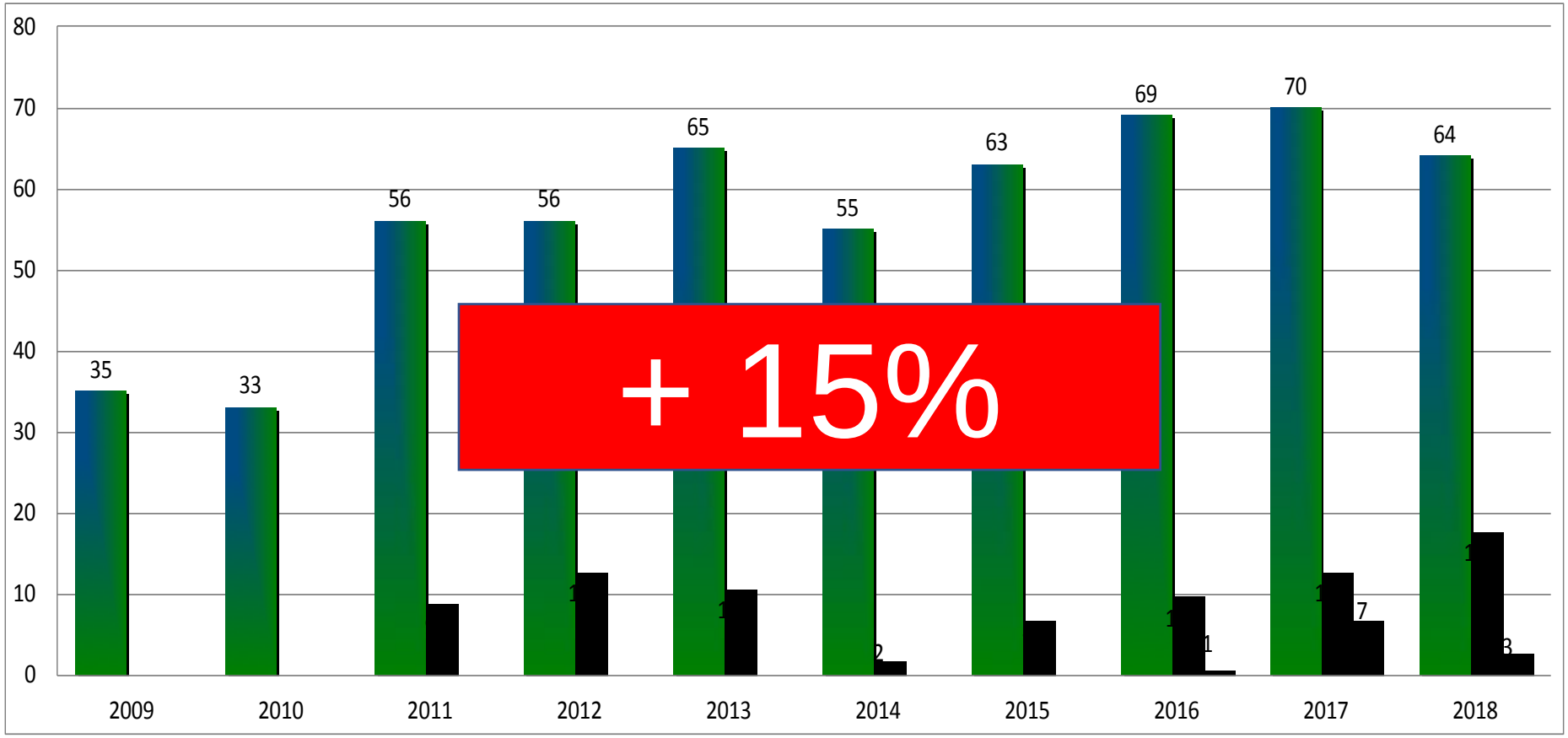
Toronto Box



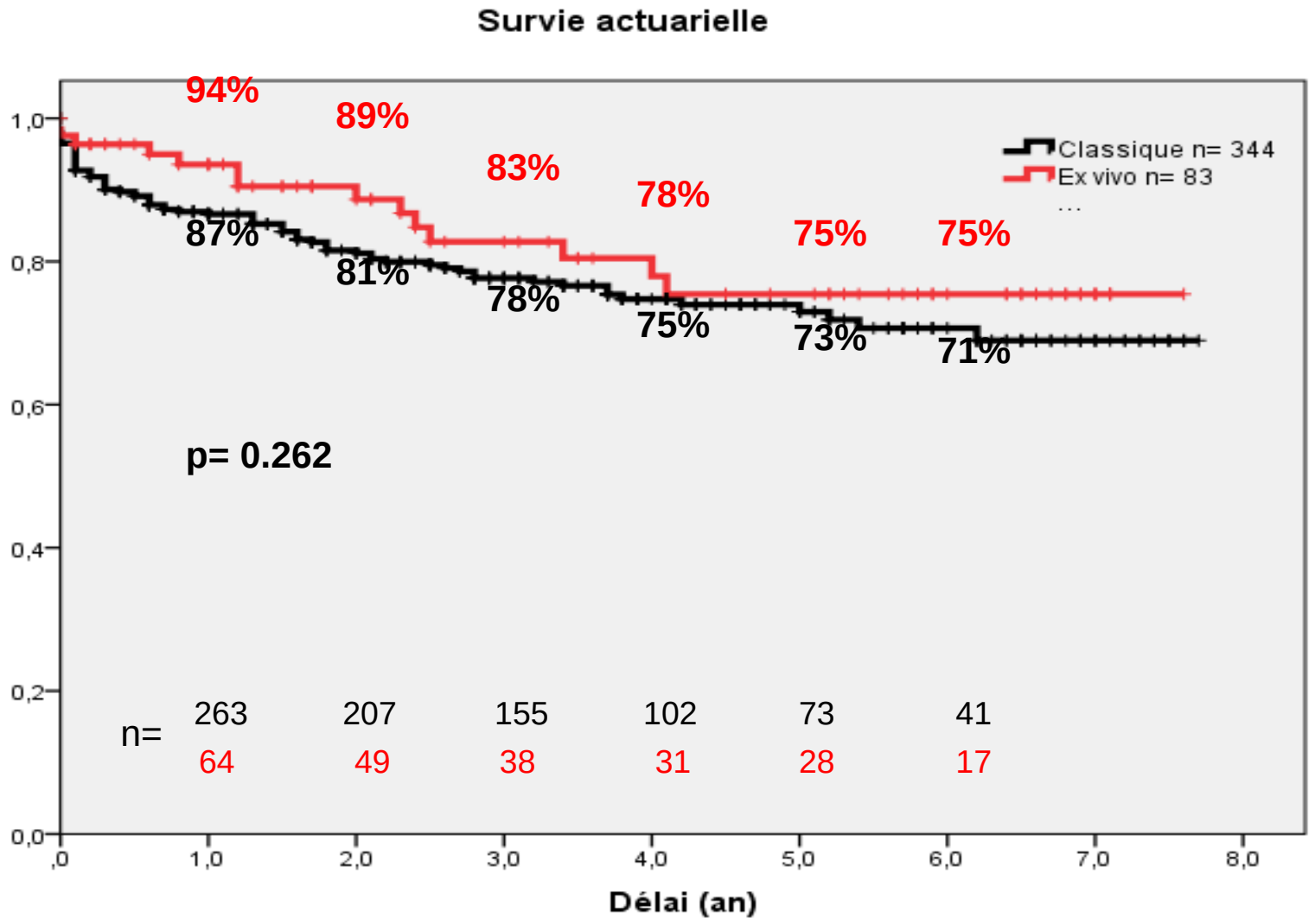


Cypel M, Yeung JC, Liu M, et al.: Normothermic ex vivo lung perfusion in clinical lung transplantation. N Engl J Med 2011;364:1431-40.

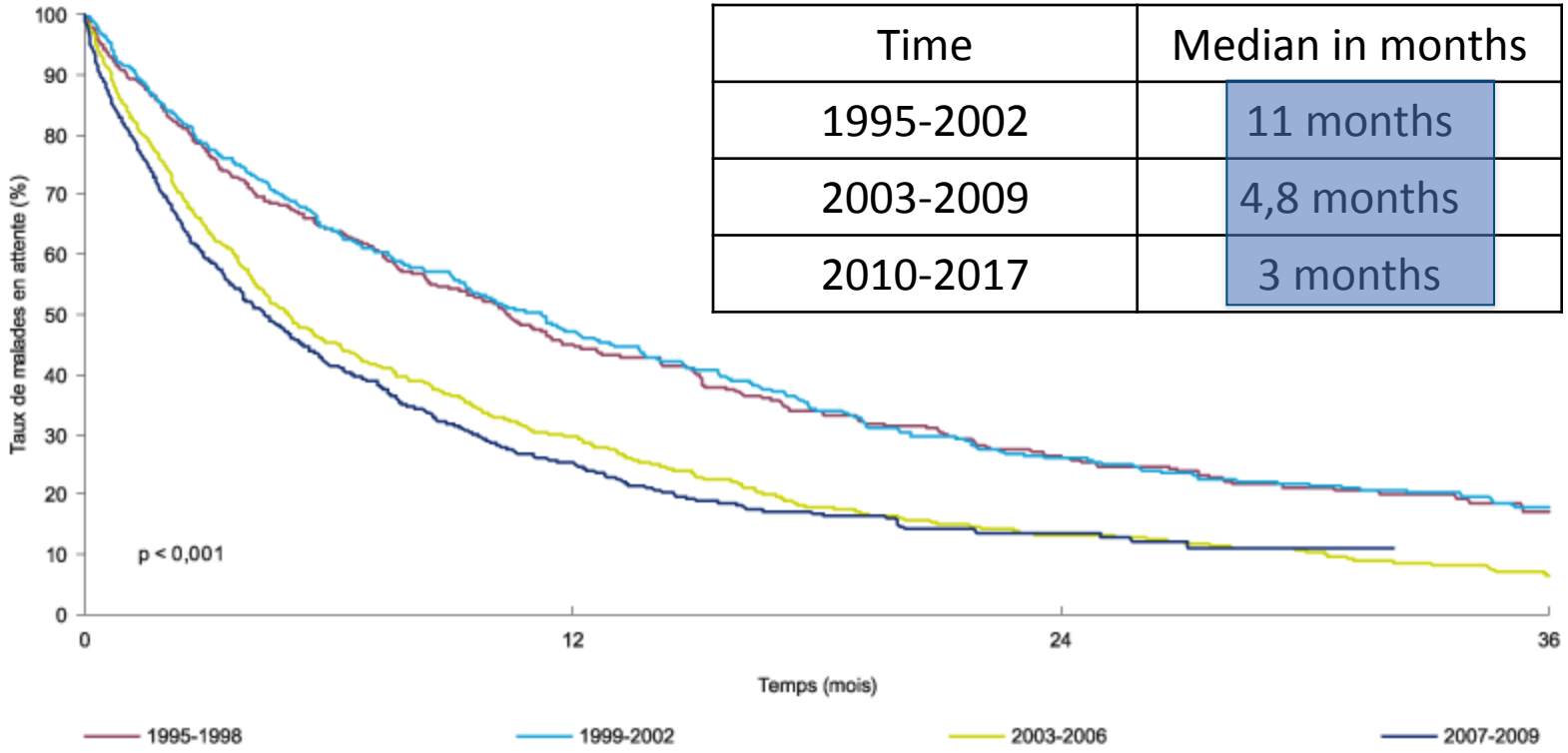
Transplantations Pulmonaires Annuelles Hôpital Foch



Transplantations pulmonaires
Hôpital Foch: Ex vivo (2011 – 2018) Survie comparée



Time and Death on Waiting List

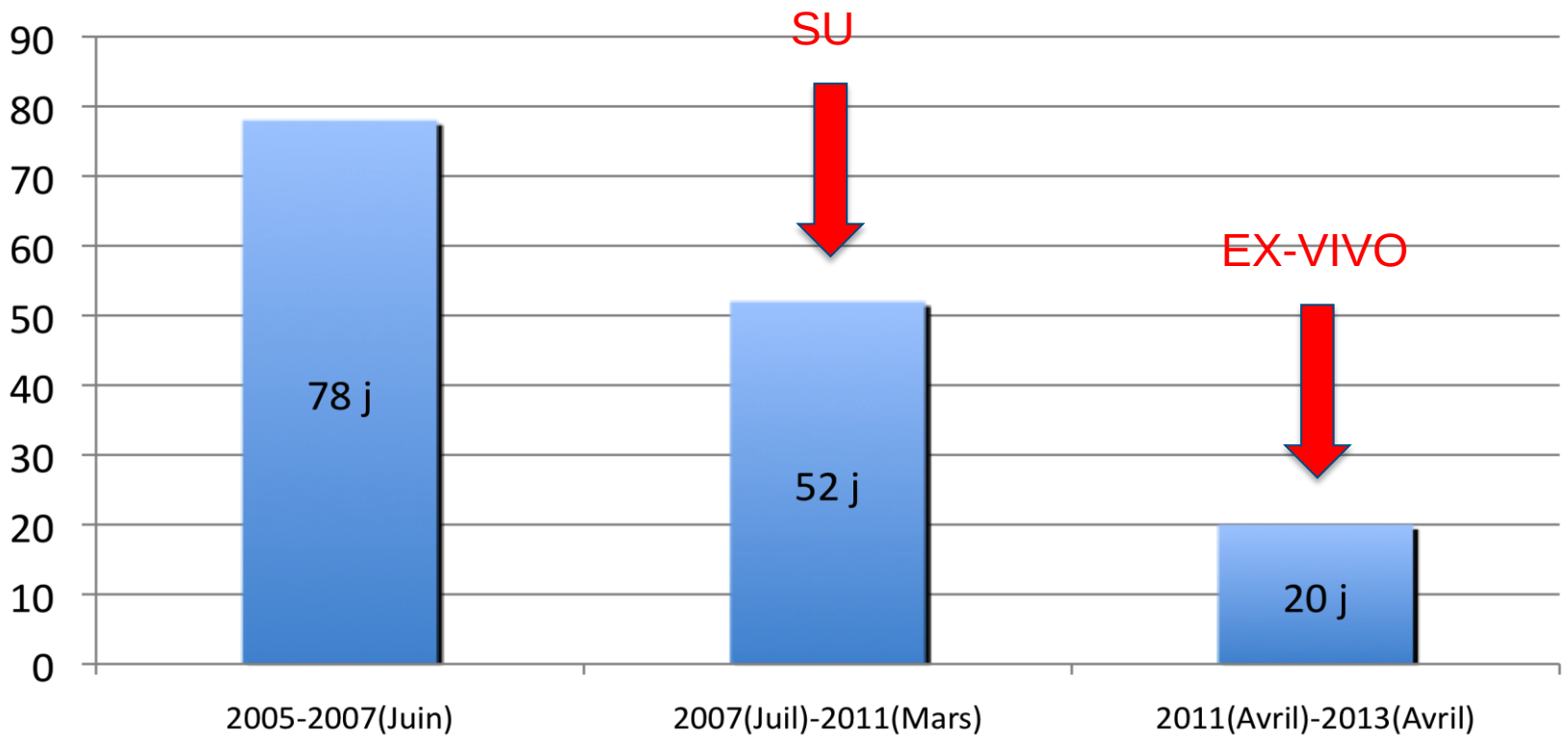


Time	Median in months
1995-2002	11 months
2003-2009	4,8 months
2010-2017	3 months

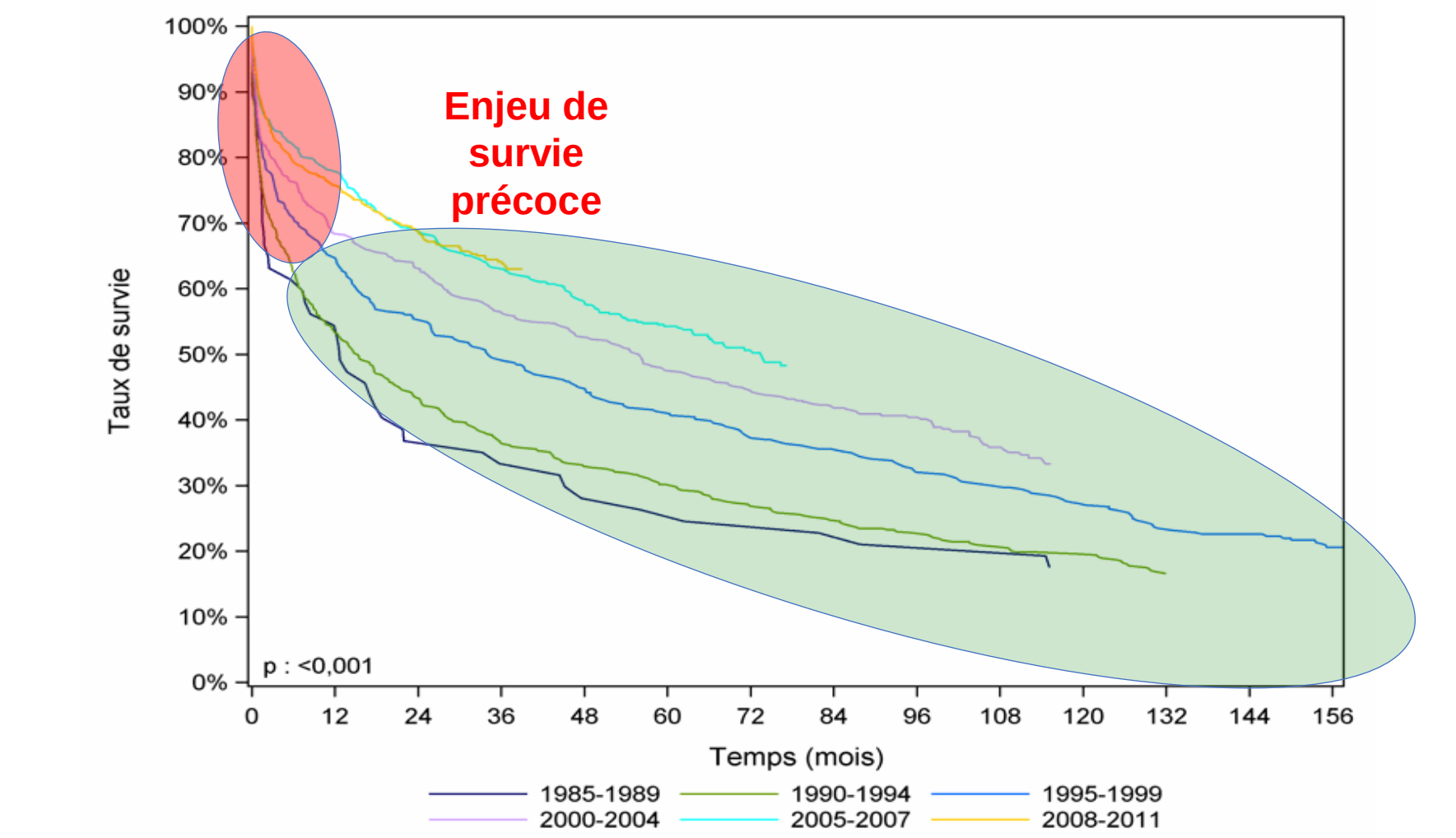
	2007	2008	2009	2010	2011
Death on list	32	30	28	21	17
N	387	416	446	448	489
%	8,30%	7,20%	6,30%	4,70%	3,4%

ABM 2012

Durée d'Attente sur liste de Transplantation



SURVIE DES TRANSPLANTES PULMONAIRES



Données de l'ABM 2013

Enjeux de prise en charge

- Stratégie pré-opératoire
  - Inscription et bilan pré-transplantation
  - Place de l'ECMO bridge
  - Echanges plasmatiques préopératoires
  - Organisation de la transplantation

- **Stratégie per-opératoire**
  - **Induction anesthésique**
  - **Principaux temps et risques inhérents**
  - **ECMO peropératoire**
  - **Extubation précoce bloc opératoire**

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  - **ECMO peropératoire**
  - **Extubation Précoce Bloc Opératoire?**

Extubation au Bloc Opératoire: Fast Track

Transplantation Pulmonaire = Chirurgie Majeure et complexe $\Rightarrow$ ventilation invasive = règle

Mais la ventilation invasive

- Patient Immuno-déprimé = ↗ Risque pneumopathie nosocomiale
- Délétère anastomose bronchiques
- Barotraumatisme - Majoration des fuites aériques, retentissement cardiaque
- Agents Sédatifs
  - Morphinomimétique: inhibition de la motilité intestinale
  - Hypnotique Instabilité HD: Remplissage-cathécolamines
  - Examen Neurologique tardif

Avantage potentiel de l'extubation Précoce

- Diminution de la durée de séjour en réanimation
- Reflet de la qualité de la prise en charge globale du patient transplanté

Extubation au Bloc Opératoire: Fast Track

Extubation Précoce en Réa?

The Use of Continuous Positive Airway Pressure by Face Mask and Thoracic Epidural Analgesia After Lung Transplantation

Anne Westerlind, MD, PhD, Folke Nilsson, MD, PhD, Sven-Erik Ricksten, MD, PhD, and the Gothenburg Lung Transplant Group

Journal of Cardiothoracic and Vascular Anesthesia, Vol 13, No 3 (June), 1999: pp 249-252

Measurements and Main Results: In 99 patients, the length of ventilation (LOV) was a median of 4.3 hours (range, 1.0 to 312.0 hours). The median LOV was 8.0 hours (range, 1.5 to 41.0 hours) in the heart-lung recipients, 4.5 hours (range, 2.0 to 47.0 hours) in the bilateral-lung recipients, and 3.5 hours (range, 1.0 to 312.0 hours) in the single-lung recipients. Three transplant recipients, all with primary pulmonary hypertension, were prematurely extubated and reintubated because of pulmonary edema. Twelve hours after extubation, the median oxygenation index (PaO_2/F_IO_2, PaO_2 in kilopascal units) was greater than 35. The median ICU length of stay for all transplant recipients was 4 days (range, 2 to 270 days).

Conclusion: The postoperative use of CPAP and TEA is associated with early and safe tracheal extubation after LTx and may shorten ICU stay.

Anesthésie Péridurale Thoracique
CPAP

Extubation au Bloc Opératoire: Fast Track

Extubation au Bloc Transplantation Monopulmonaire?

Early Extubation After Single-Lung Transplantation: Analysis of the First 106 Cases

Lise Nørrekjær Hansen, MD, Jesper B. Ravn, MD, and Stig Yndgaard, MD

Journal of Cardiothoracic and Vascular Anesthesia, Vol 17, No 1 (February), 2003: pp 36-39

Measurements and Main Results: One hundred six patients were anesthetized for single-lung transplantation. The first 33 patients were moved to the intensive care unit for postoperative mechanical ventilation. After the change of anesthesia technique, 53 of 73 patients were extubated in the operating room. Eleven patients needed reintubation within the first 24 hours because of respiratory insufficiency, pulmonary edema, hemorrhage, or pneumothorax. The need for reintubation increased the length of stay in the intensive care unit by 1 day from 2 to 3 days (NS). The

Conclusion: This study has shown that it is possible to extubate patients in the operating room immediately after single-lung transplantation in the majority of cases.

Anesthésie IV
Propofol-Rémifentanil

Extubation au Bloc Opératoire: Fast Track

Is Very Early Extubation After Lung Transplantation Feasible?

Giorgio Della Rocca, MD,* Cecilia Coccia, MD,* Gabriella M. Costa, MD,* Livia Pompei, MD,* Pierangelo Di Marco, MD,† Federico Pierconti, MD,† Mila Cappa, MD,† Frederico Venuta, MD,‡ and Paolo Pietropaoli, MD,†

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Ventilation
Non-Invasive

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Ventilation
Non-Invasive

EDITORIAL

Early Extubation After Lung Transplantation

Paul S. Myles, MBBS, MPH, MD, FFARCSI, FANZCA
Department of Anaesthesia and Pain Management
Alfred Hospital
Melbourne, Australia

cardiac surgery. Early extubation requires the use of short-acting anesthetic drugs, restoration of normothermia, and effective analgesia (with minimal sedation and respiratory depression). It also relies on good surgical techniques that minimize tissue injury, bleeding, and postoperative complications. Certainly, early postoperative complications will delay tracheal extubation. The avoidance of excessive fluid administration may also assist early allograft gas exchange.[13] Successful allograft implantation and lung function can usually be assessed intraoperatively; the airway anastomoses can be checked with fiberoptic bronchoscopy, and there should be an extubation. Recent experience from many centers suggests that a successful early-extubation program requires adequate patient selection and cooperation among all staff (anesthetic, critical care, nursing) managing the cardiothoracic patient. Local audit and staff feedback can encourage desirable changes in practice. It is this cooperative, coordinated approach that leads to reduced duration of mechanical ventilation and, possibly, intensive care length of stay.

VOL 13, NO 3 JUNE 1999

EDITORIAL

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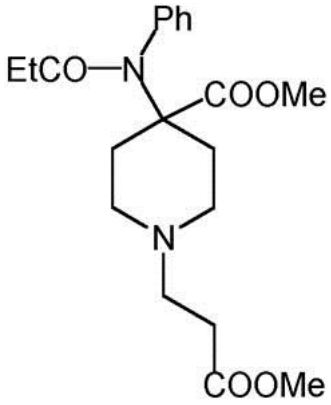
Stratégie Extubation au Bloc Opératoire en 2006 à Foch

Anesthésie IV: propofol –rémifentanil titré par l'EEG
Normothermie: Réchauffement des fluides et par convection pour le corps
Analgésie péridurale thoracique
Optimisation Pressions de remplissage: Swann-Ganz et ETO
Vasopresseurs précoces
Optimisation ventilation: PEP, recrutement et toilette bronchique/Fibro
Ventilation non-invasive

Titration des agents d’anesthésie IV guidé par l’EEG

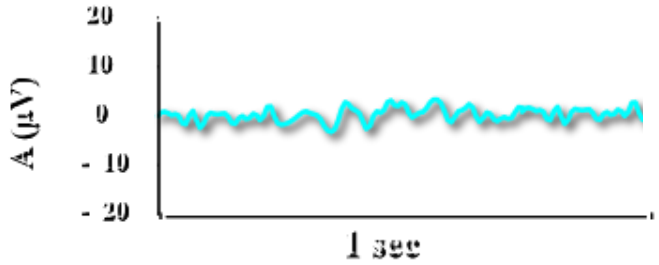
Propofol
Demi vie courte, effets hémodynamiques
Catabolisme hépatique

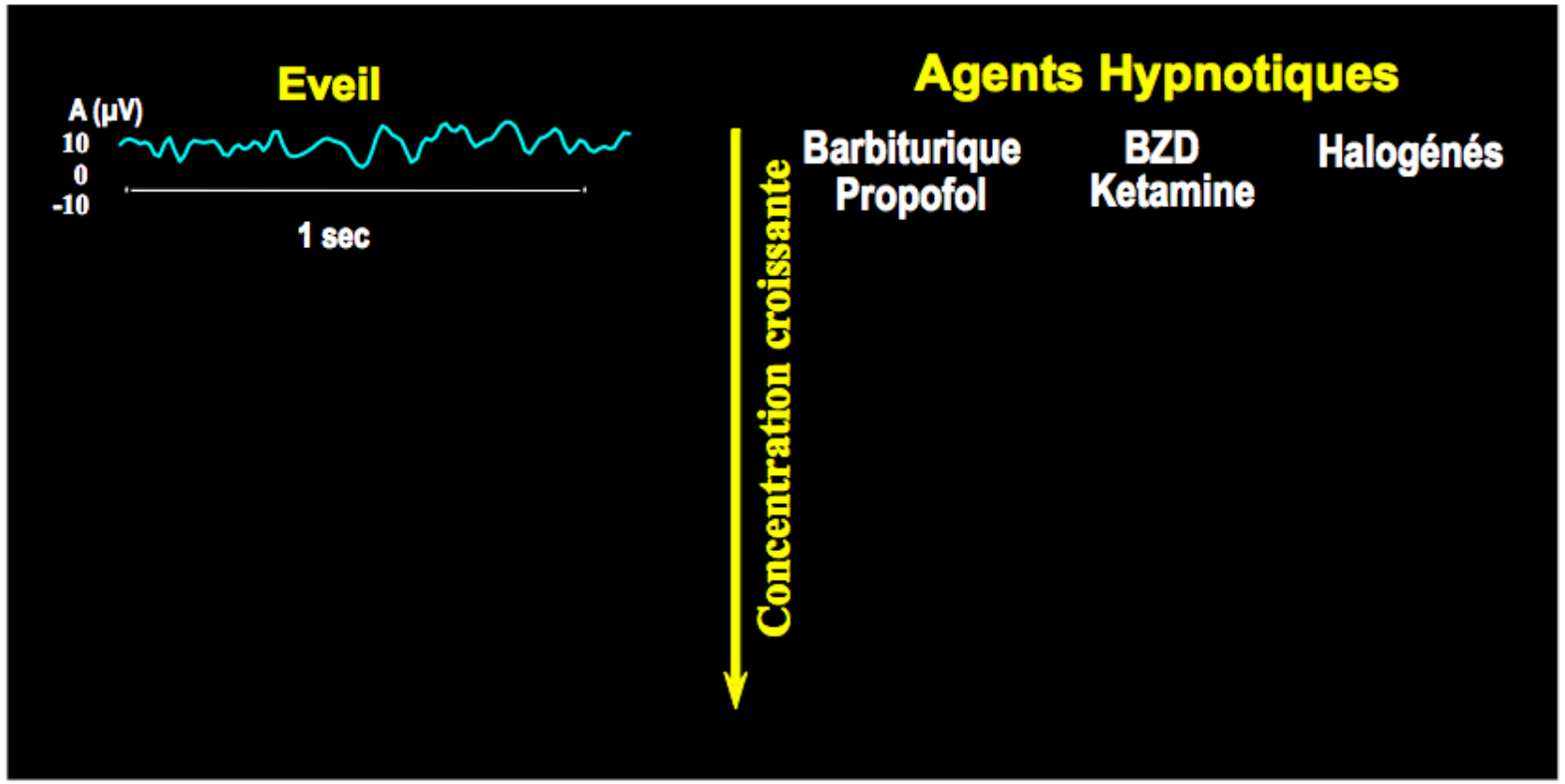


Rémifentanil
Elimination 6 min, estérases plasmatique

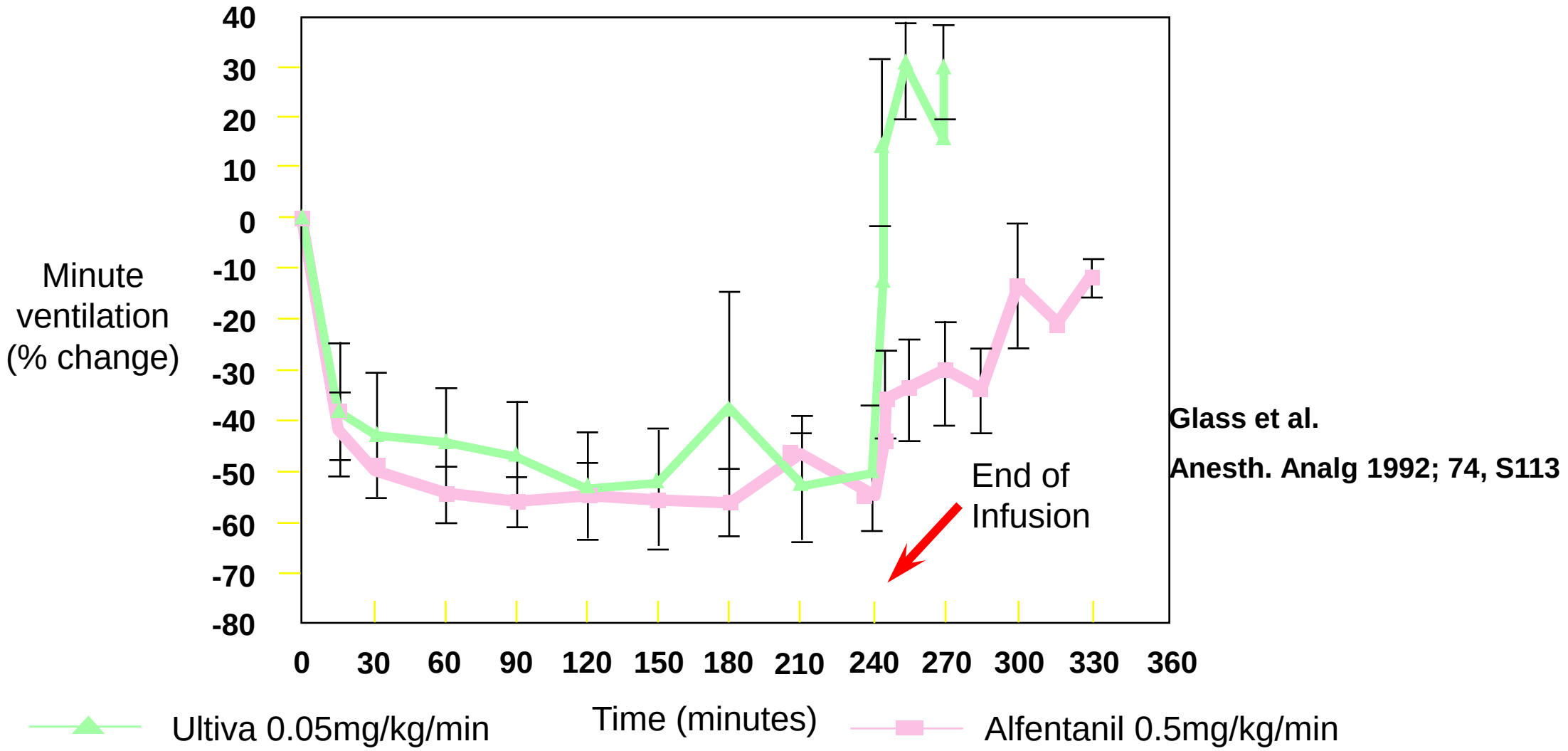
BIS
Analyse bispectral de l’EEG = profondeur de l’hypnose
Déficit en antinociception

EEG et Anesthésie





Remi Respiratory Effects



Glass et al.

Anesth. Analg 1992; 74, S113


BIS XP
ASPECT
43
Silence
Review
Menu/Exit
Select

Boucle Fermée

Modifier/Effet

Contrôleur/Régulateur

- Médecin décide d’une modification de dose concentration / Effet

Boucle Fermée

Modifier/Effet

Contrôleur/Régulateur

Homme

- Médecin décide d'une modification de dose concentration / Effet

Machine= Automatique

- Ordinateur /programme modifie **automatiquement** la concentration / effet
  - Fréquentes
  - Régularité
  - Précision

Closed-Loop Control of Consciousness During Lung Transplantation: An Observational Study

Closed-Loop Control of Consciousness During Lung Transplantation: An Observational Study

Ngai Liu, MD, Thierry Chazot, MD, Bernard Trillat, MSc, Mireille Michel-Cherqui, MD, Jean Yves Marandon, MD, Jean-Dominique Law-Koune, MD, Bertrand Rives, MD, Marc Fischler, MD, and the Foch Lung Transplant Group

Journal of Cardiothoracic and Vascular Anesthesia, Vol 22, No 4 (August), 2008: pp 611-615

EMERGING TECHNOLOGY
Gerard R. Manecke, Jr, MD
Marco Ranucci, MD
Section Editors

This report describes a Closed-loop control of propofol guided by the BIS during

Lung Transplantation

Major Surgery
Patient presenting high anesthetic Risk

The goal of the controller was to maintain the BIS target between 40 and 60 during the maintenance.

Results

14 Bilateral Lung Transplantations (4 CPB)
6 single Lung Transplantations (1 CPB)

114 hours of Closed-loop anesthesia,
No manual intervention

2687 propofol target modifications were made automatically

Journal of Cardiothoracic and Vascular Anesthesia, Vol 22, No 4 (August), 2008: pp 611-615

Extubation in OR

11 Patients Extubated
1 patient Reintubated

50 % Extubated in Operating Room

7 Bilateral LTx (50 %) 3 Single LTx (66 %)

Mean duration of mechanical ventilation

28 h Myles J cardiothorac Vasc Anesth 97
4.3 h Westerlind J cardiothorac Vasc Anesth 99
28 % (Bilat) Della Rocca J cardiothorac Vasc Anesth 2003
40 % (Single) Hanssen J cardiothorac Vasc Anesth 2003

ICU Stay 7 $\pm$ 4 vs 22 $\pm$ 33 days, p = 0.01

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International Society for Anaesthetic Pharmacology

Anesthetic Pharmacology and Preclinical Pharmacology Section Editor: Marcel E. Durieux
Clinical Pharmacology Section Editor: Tony Gin

(Anesth Analg 2011;112:546–57)

CME

Closed-Loop Coadministration of Propofol and Remifentanil Guided by Bispectral Index: A Randomized Multicenter Study

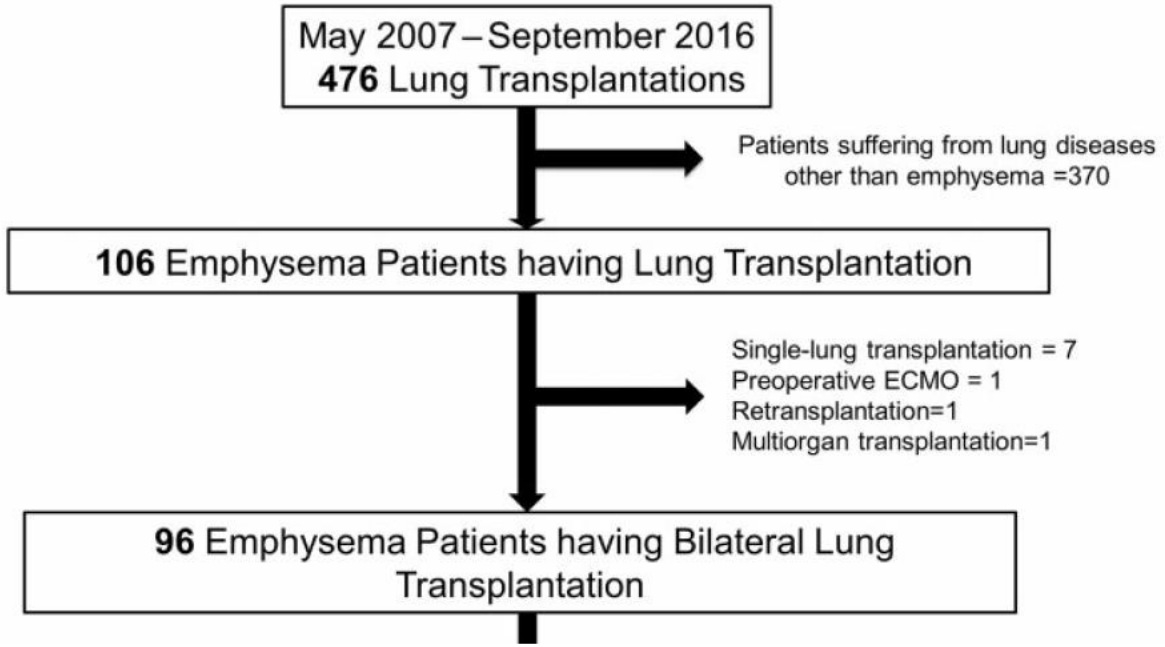
Ngai Liu, MD, PhD,* Thierry Chazot, MD,* Sophie Hamada, MD,* Alain Landais, MD,† Nathalie Boichut, MD,‡ Corinne Dussaussoy, MD,§ Bernard Trillat, MSc,‖ Laurent Beydon, MD,§ Emmanuel Samain, MD,‡ Daniel I. Sessler, MD,¶ and Marc Fischler, MD*

- Foch, Argenteuil, Angers, Besançon.
- 167 patients
- Manuel vs Dual-loop
- Critères de jugement
  - $BIS_{40\text{-}60}$, Global Score
  - BSR, Consommations
  - ASA IV

The feasibility of extubation in the operating room after bilateral lung transplantation in adult emphysema patients: an observational retrospective study

Eur J Cardiothorac Surg 2018; doi:10.1093/ejcts/ezy196.

Valentina Assenzo[a,b], Cristina Assenzo[c], Rosalinda Filippo[c], Morgan Le Guen[a], Edouard Sage[d], Antoine Roux[e], Marc Fischler[a,*] and Ngai Liu[a,b], The Foch Lung Transplant Group



Analgésie Per et Post opératoire Péridurale Thoracique

Intérêt de l'analgésie Péridurale Thoracique

Incision Chir : Bi-thoracotomie antérieur
⇒ Douleurs sévères en post-opératoire

Contrôler de la douleur:
Fonction Resp, évite les Atélectasies, Ambulation
Facilite : Kiné Respiratoire, ↘ Infections Pulmonaires

Respecter les CI: troubles de la crase sanguine

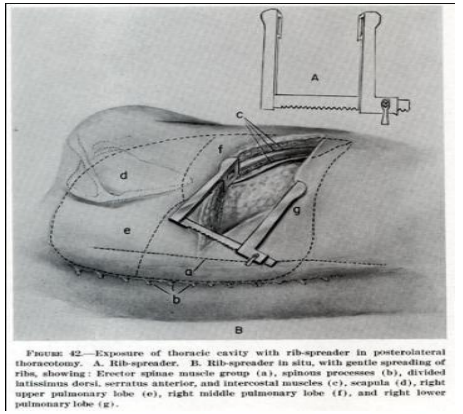
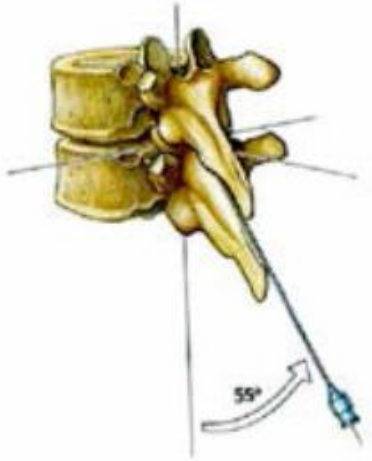
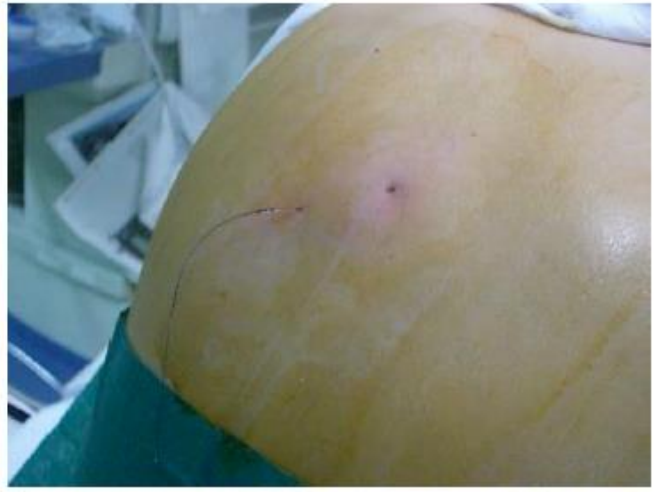


FIGURE 42.—Exposure of thoracic cavity with rib-spreader in posterolateral thoracotomy. A, Rib-spreader. B, Rib-spreader in situ, with gentle spreading of ribs, showing: Erector spinae muscle group (a), spinous processes (b), divided latissimus dorsi, serratus anterior, and intercostal muscles (c), scapula (d), right upper pulmonary lobe (e), right middle pulmonary lobe (f), and right lower pulmonary lobe (g).





Période Janvier 2012-décembre 2018:
410 patients Transplantés
Péridurale=362 patients soit **88%**

Ventilation Non Invasive (VNI)

Intraoperative protective ventilation strategies in lung transplantation

Genna L. Verbeek [a,b,*], Paul S. Myles [a,b]

[a] Department of Anaesthesia and Perioperative Medicine, The Alfred Hospital, Melbourne, Australia
[b] Academic Board of Anaesthesia and Perioperative Medicine, Faculty of Medicine, Nursing and Health Sciences, Monash University, Melbourne, Australia

Transplantation Reviews 27 (2013) 30–35

Intensive Care Med (2001) 27: 1622–1626
DOI 10.1007/s001340101063

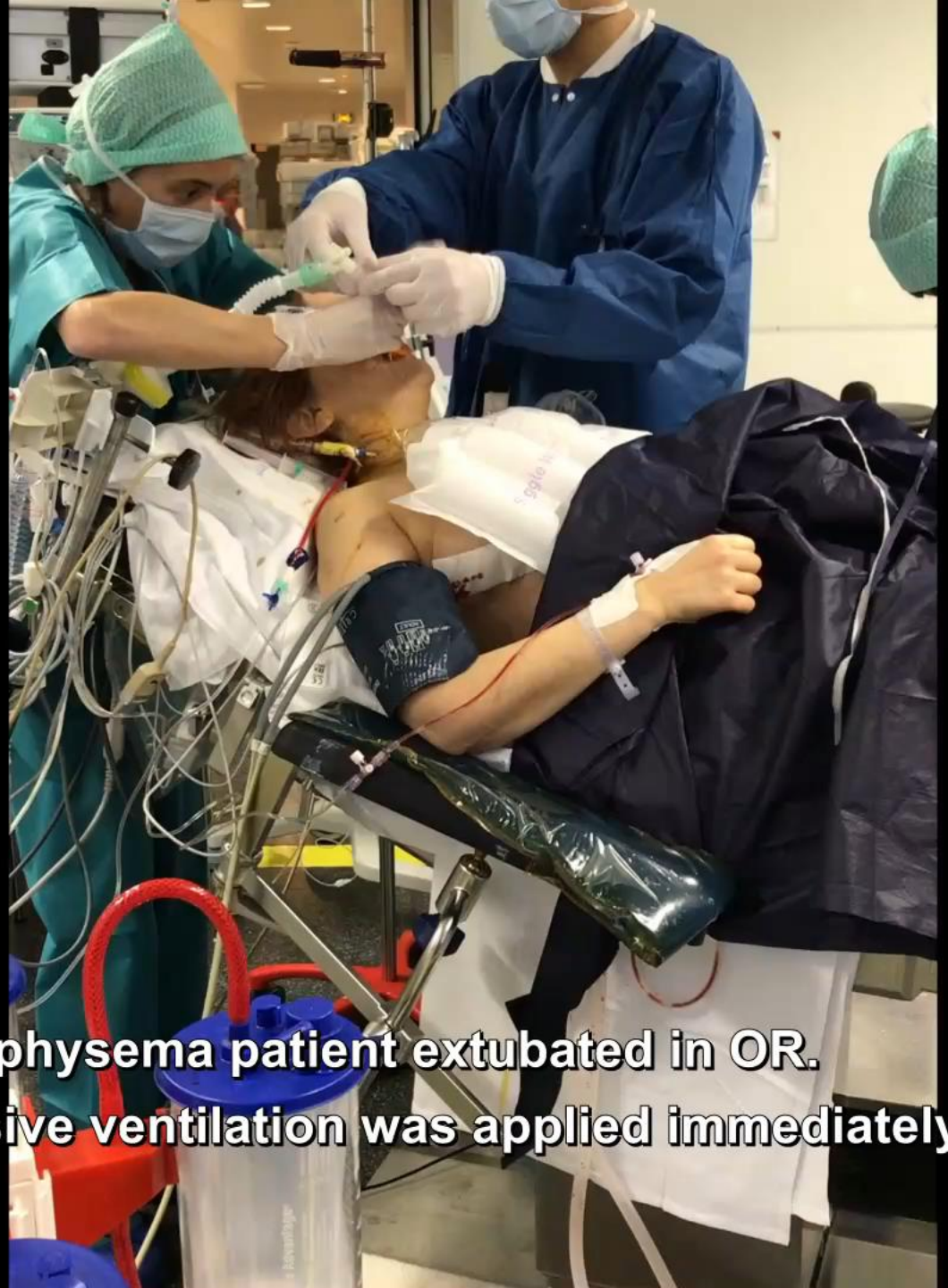
ORIGINAL

M. Rocco
G. Conti
M. Antonelli
M. Bufi
M. G. Costa
D. Alampi
F. Ruberto
G. V. Stazi
P. Pietropaoli

Non-invasive pressure support ventilation in patients with acute respiratory failure after bilateral lung transplantation

ICU; 3 patients required intubation: 1 of them survived while 2 developed septic shock and died. *Conclusions:* NIV administration was well tolerated and avoided intubation in the large majority of patients (86 %); in NIV responders the

Education Pré-opératoire
Utilisation VNI


Emphysema patient extubated in OR.
Non-invasive ventilation was applied immediately

Critères d'Extubation

Table 1 Anaesthesia technique and local extubation guidelines. ECMO, extracorporeal membrane oxygenation; $F_{I_{O_2}}$, fraction of inspired oxygen; ICU, intensive care unit; iNO, inhaled nitric oxide; OR, operating room; Pa_{CO_2}, arterial partial pressure of carbon dioxide; Pa_{O_2}, arterial partial pressure of oxygen

Anaesthesia technique	Evaluation at the end of surgery	Evaluation at the end of the non-invasive ventilation attempt
Hot air warming blanket	Double-lumen tube changed to a single-lumen tube; fibreoptic bronchoscopy	Success of the non-invasive ventilation attempt if the patient is well orientated, pain free, and with no clinical sign of acute respiratory distress, and if $Pa_{O_2}/F_{I_{O_2}}$ ratio >26.6 kPa and Pa_{CO_2}<6.7 kPa (arterial blood gas checked after 20 min)→patients transferred to ICU on a high-concentration oxygen face mask (E-OR group)
Epidural catheter: levobupivacaine 0.125% and sufentanil 0.25 μg ml^{-1} infusion at 5 ml h^{-1}	Tidal volume of 6–8 ml kg^{-1}; rate of ventilation according to Pa_{CO_2}; $F_{I_{O_2}}$ between 60 and 100% according to Arterial oxygen saturation (Sa_{O_2})	
Norepinephrine 0.2 μg kg^{-1} min^{-1}	Ar	
Propofol and remifentanil according to the bispectral index (target range 40–60); atracurium for neuromuscular block		
Bilateral and selective lung ventilation with a left-sided double-lumen tube positioned under bronchoscopic guidance	$Pa_{O_2}/F_{I_{O_2}}$>40→extubation protocol if other requirements are fulfilled (no visible pulmonary oedema; no need for iNO; Pa_{CO_2}<6.7 kPa; lactate <3 mmol $litre^{-1}$; Sv_{O_2}>65%; haemoglobin >10 g dl^{-1}; temperature >36°C; haemodynamic stability; low vasoactive drug needs; no coagulation issues; no significant bleeding seen in the chest tubes)	Failure of the non-invasive ventilation attempt: reintubation and transfer to ICU (E-ICU group)
Tidal volume of 6–8 ml kg^{-1} during double-lung ventilation and 4 ml kg^{-1} during one-lung ventilation; 15–20 breaths min^{-1}; $F_{I_{O_2}}$ adjusted to arterial blood gas results; systematic iNO	No extubation in the OR in event of unfavourable evaluation (E-ICU group)	
Broad-spectrum antibiotics according to the recipient cultures; immunosuppression	Extubation protocol in event of favourable evaluation: antagonism of neuromuscular block; end of propofol and remifentanil; semi-sitting position; extubation; non-invasive ventilation in the operating room for 20 min using a face mask and a Respironics ventilator (Philips Healthcare, The Netherlands) with bi-level positive airway pressures: inspiratory and expiratory airway pressures of 8 and 4 cm H_2O, respectively, with an $F_{I_{O_2}}$ of 1	
Routine monitors, arterial catheter, oximetric pulmonary arterial catheter (Swan–Ganz CCO/Mixed venous oxygen saturation (Sv_{O_2}) catheter; Edwards Lifesciences Corp., Irvine, CA, USA), bispectral index monitoring (Aspect A-2000 XP, version 3.11; Aspect Medical Systems, Newton, MA, USA), transoesophageal echocardiography (Vivid 7; GE Healthcare, Fairfield, CT, USA)		

British Journal of Anaesthesia, 116 (6): 847–54 (2016)

Critères d'Extubation

Fin d'Intervention

Optimisation Pulmonaire: Changement de la sonde d'intubation, Toilette Bronchique Fibroscopie bronchique, évaluation des anastomoses bronchiques, manœuvres de recrutement…
Antagonisation des curares

Evaluation Possibilité d'Extubation au Bloc

Absence de saignement actif-Vasopresseurs-Remplissage: Stabilité Hémodynamique
Normothermie
Evaluation Neurologique après arrêt des agents Anesthésiques: Bien orienté, non algique

PaO_2/FiO_2 >200
Lactacte < 3 mmole/l
Absence œdème Fibro ou Rx
Normothermie (>36°)

Extubation semi Assis et VNI

European Journal of Cardio-Thoracic Surgery 0 (2018) 1–6
doi:10.1093/ejcts/ezy196

British Journal of Anaesthesia, 116 (6): 847–54 (2016)

Résultats

- Janvier 2012-Décembre 2018
- 442 Transplantations Pulmonaires ⇒ **410 analysés**
  - **142 Patients Extubés au bloc Opératoire 35%**

Tableau 4 Facteurs prédictifs d'extubation au bloc opératoire – Analyse multivariée

	OR [IC95]	*P*
PaO2/FiO2 fin de la chirurgie > 245.5	9.26 [5.39 - 16.47]	<0.001
BPCO/ Emphysème	2.66 [1.25 - 5.79]	0.012
Mucoviscidose	2.24 [1.11 - 4.66]	0.027
Culot globulaire per-opératoire	0.79 [0.70 – 0.89]	<0.001
Tabagisme du donneur	0.55 [0.32 - 0.92]	0.026
ECMO durant l'intervention	0.51 [0.28 - 0.91]	0.023

OR : *Odds Ratio* ; IC95 : Intervalle de confiance à 95% ; PaO2/FiO2 : rapport pression partielle artérielle en oxygène/fraction inspirée en oxygène ; BPCO : bronchopneumopathie chronique obstructive ; ECMO : oxygénation par membrane extra-corporelle.

Immediate postoperative extubation in bilateral lung transplantation: predictive factors and outcomes†

M.-L. Felten[1,6], J.-D. Moyer[1,6], J.-F. Dreyfus[2], J.-Y. Marandon[1,6], E. Sage[3,6], A. Roux[4,6], F. Parquin[3,6], C. Cerf[5], B. Zuber[7], M. Le Guen[1,6] and M. Fischler[1,6,*], the Foch Lung Transplant Group

BJA

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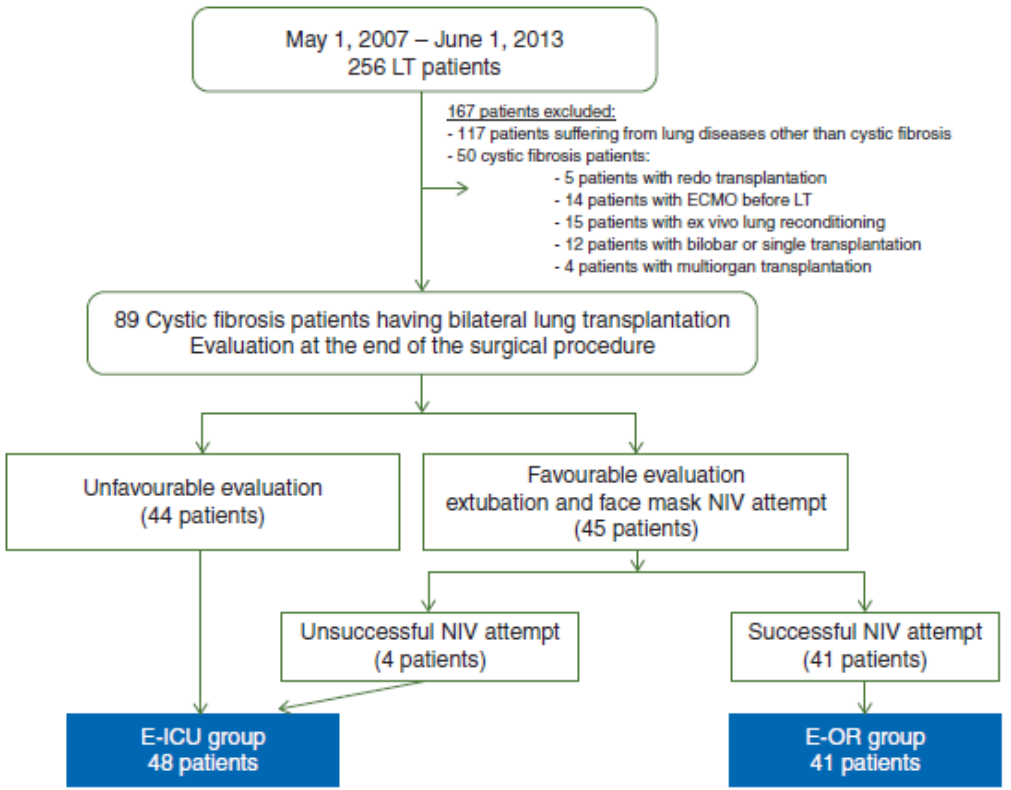

Fig 1 Flow chart. ECMO, extracorporeal membrane oxygenation; E-ICU group, extubation in the intensive care unit; E-OR group, extubation in the operating room; LT, lung transplantation; NIV, non-invasive ventilation.

Editor's key points

- Mechanical ventilation immediately after lung transplantation is commonly used, although successful use of early extubation might improve outcome.
- A single-centre retrospective database analysis was used to analyse predictive factors and outcomes for immediate tracheal extubation after bilateral lung transplantation for cystic fibrosis.
- Application of an enhanced recovery protocol facilitated immediate extubation in 46% of patients, with improved graft function and shorter intensive care unit and hospital stays.

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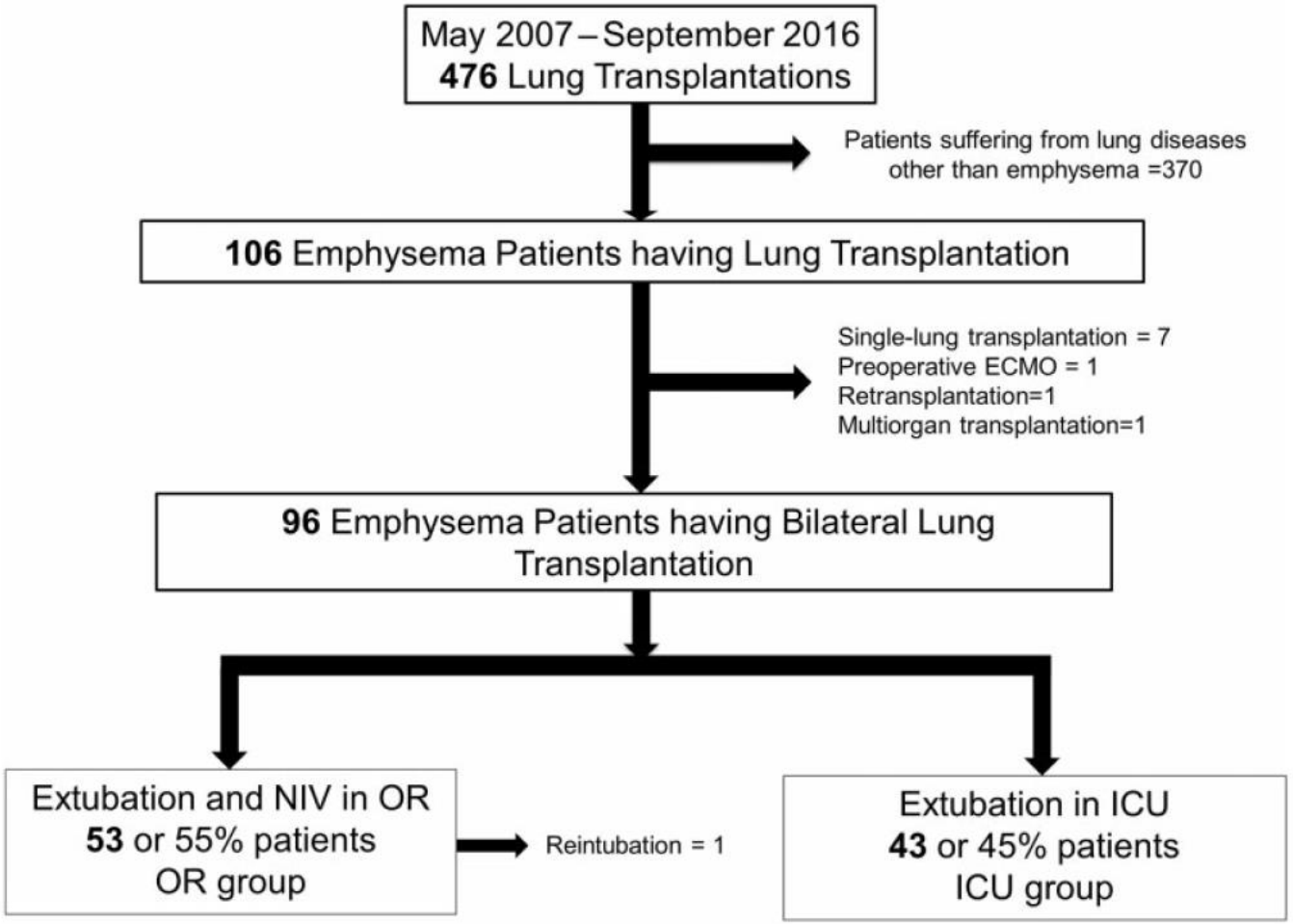
Table 4 Postoperative course. Data are expressed as numbers (percentages) or medians [25th–75th percentiles] and are compared using Fisher's exact test or the Mann–Whitney *U*-test. CT, computed tomography; ECMO, extracorporeal membrane oxygenation; E-ICU, extubation in the intensive care unit; E-OR, extubation in the operating room; ICU, intensive care unit; OR, operating room

	E-OR group (*n*=41)	E-ICU group (*n*=48)	P-value
Pulmonary graft dysfunction grade 3 [*n* (%)]	0 (0)	19 (39.6)	<0.0001
Mechanical ventilation duration (days)	0.0 [0.0–0.0]	6.0 [3.0–12.0]	<0.001
Reintubation in the ICU (if extubated in OR) [*n* (%)]	3 (6.2)	0 (0)	0.09
Tracheostomy [*n* (%)]	2 (4.2)	17 (35.4)	0.0005
Haemodialysis [*n* (%)]	1 (2.1)	6 (12.5)	0.12
Postoperative ECMO [*n* (%)]	0 (0)	11 (22.9)	0.0007
ICU stay duration (days)	5.0 [3.7–7.2]	11.5 [7.0–15.5]	<0.001
Hospital stay duration (days)	22.0 [18.0–25.5]	33.0 [25.0–56.5]	<0.001
Postoperative chest X-rays [*n* (%)]	19.0 [16.0–25.2]	29.0 [22.0–49.5]	<0.001
Postoperative CT scans [*n* (%)]	1.0 [1.0–2.0]	2.0 [1.0–4.0]	0.003
1 yr survival [*n* (%)]	39 (95.1)	47 (97.9)	0.59

The feasibility of extubation in the operating room after bilateral lung transplantation in adult emphysema patients: an observational retrospective study

Eur J Cardiothorac Surg 2018; doi:10.1093/ejcts/ezy196.

Valentina Assenzo[a,b], Cristina Assenzo[c], Rosalinda Filippo[c], Morgan Le Guen[a], Edouard Sage[d], Antoine Roux[e], Marc Fischler[a,*] and Ngai Liu[a,b], The Foch Lung Transplant Group



The feasibility of extubation in the operating room after bilateral lung transplantation in adult emphysema patients: an observational retrospective study

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Table 1: Patient and donor characteristics

	OR group ($n = 53$)	ICU group ($n = 43$)	*P*-value
Patient characteristics			
Age (years)	56 (49–59)	52 (45–57)	0.17
Male gender	30 (57)	22 (51)	0.68
Height (cm)	169 (163–176)	165 (160–172)	0.25
Weight (kg)	61 (52–75)	59 (51–70)	0.93
BMI ($kg \cdot m^{-2}$)	22 (19–25)	22 (19–26)	0.93
Preoperative pulmonary artery hypertension	16 (30)	22 (51)	0.04
Preoperative plasmapheresis	14 (26)	8 (19)	0.40
History of thoracic surgery	7 (13)	5 (12)	0.92
Diabetes	2 (4)	2 (5)	1
Preoperative tracheotomy	1(2)	2 (5)	0.69
Waiting list duration (days)	33 (12–71)	40 (13–87)	0.60
Donor characteristics			
Age (years)	49 (35–61)	50 (38–59)	0.40
Smoking history (pack-years)	0 (0–5)	5 (0–18)	0.14
Secretions (points)	0 (0–2)	2 (0–3)	0.18
Chest X-ray (points)	2 (0–3)	1 (0–2)	0.38
PaO_2/FiO_2 ratio	400 (330–453)	348 (260–432)	0.06
Oto score	6 (4–7)	6 (4–8)	0.15
Ex vivo lung reconditioning	3 (6)	10 (23)	0.017
First graft ischaemic duration (min)	256 (216–301)	245 (217–349)	0.96
Second graft ischaemic duration (min)	363 (327–425)	383 (327–480)	0.26

The results are expressed as median (25th–75th percentiles) or number (%). Secretion: none = 0, minor = 1, moderate = 2, major = 3; Chest X-ray: clear = 0, minor change = 1, opacity ≤1 lobe = 2, opacity >1 lobe = 3. All comparisons were performed without correction for multiple testing.

BMI: body mass index; FiO_2: fraction of inspired oxygen; ICU group: extubation in the intensive care unit; OR group: extubation in the operating room; PaO_2: arterial partial pressure oxygen; pulmonary hypertension: pulmonary mean pressure >25 mmHg.

Table 2: Intraoperative data

	OR group ($n = 53$)	ICU group ($n = 43$)	*P*-value
Thoracic epidural catheter	49 (92)	34 (79)	0.07
Major anaesthetic induction complications	3 (6)	6 (14)	0.22
Cardiopulmonary bypass	2 (4)	4 (9)	0.40
Intraoperative ECMO	3 (6)	19 (44)	<0.0001
Intraoperative ECMO duration	253 (191–284)	229 (175–320)	1
Procedure duration (min)	560 (480–639)	571 (460–596)	0.83
Total bleeding (ml)	800 (500–1500)	1150 (700–2000)	0.01
Red blood cells (unit)	4 (2–5)	4 (2–6)	0.14
Fresh frozen plasma (unit)	3 (2–5)	4 (2–6)	0.07
Crystalloids ($ml \cdot kg^{-1} \cdot h^{-1}$)	2 (2–3)	2 (1–3)	0.89
Colloids ($ml \cdot kg^{-1} \cdot h^{-1}$)	2 (2–3)	3 (2–4)	0.10
Patients receiving platelets	5 (10)	9 (21)	0.14
Lactataemia ($mmol \cdot l^{-1}$)	1.6 (1.3–2.6)	2.6 (1.9–5.0)	<0.0001
PaO_2/FiO_2 ratio	358 (290–437)	206 (144–357)	<0.0001

The results are expressed as median (25th–75th percentiles) or number (%). All comparisons were performed without correction for multiple testing.

ECMO: extracorporeal membrane oxygenation; FiO_2: fraction of inspired oxygen; ICU group: extubation in the intensive care unit; major anaesthetic induction complication: major hypotension (use of epinephrine), difficult tracheal intubation or pneumothorax; OR group: extubation in the operating room; PaO_2: arterial partial pressure oxygen; procedure duration: entry of the patient into the OR until the transfer to the ICU.

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Table 3: Postoperative data

	OR group ($n = 53$)	ICU group ($n = 43$)	*P*-value
Length of stay in the ICU (days)	5 (4–7)	12 (8–20)	<0.0001
Reintubation in the OR or the ICU	1 (2)	NA	
Postoperative ECMO	0 (0)	9 (21)	<0.0001
Mechanical ventilation duration (days)	0 (0–1)	8 (3–14)	<0.0001
Tracheotomy	3 (6)	16 (37)	<0.0001
Grade 3 primary graft dysfunction at 72 h	1 (2)	10 (24)	0.001
1-Month survival	52 (98)	36 (84)	
1-Year survival	48 (91)	32 (74)	0.014[a]

The results are expressed as median (25th–75th percentiles) or number (%). All comparisons were performed without correction for multiple testing.

[a]*P*-value was calculated using the log-rank test.

ECMO: extracorporeal membrane oxygenation; Grade 3 primary graft dysfunction at 72 h: PaO_2/FiO_2 ratio <200 and bilateral infiltrates on chest X-ray at 72 h, the use of ECMO or inhaled pulmonary vasodilatator >48 h; ICU group: extubation in the intensive care unit; OR group: extubation in the operating room.

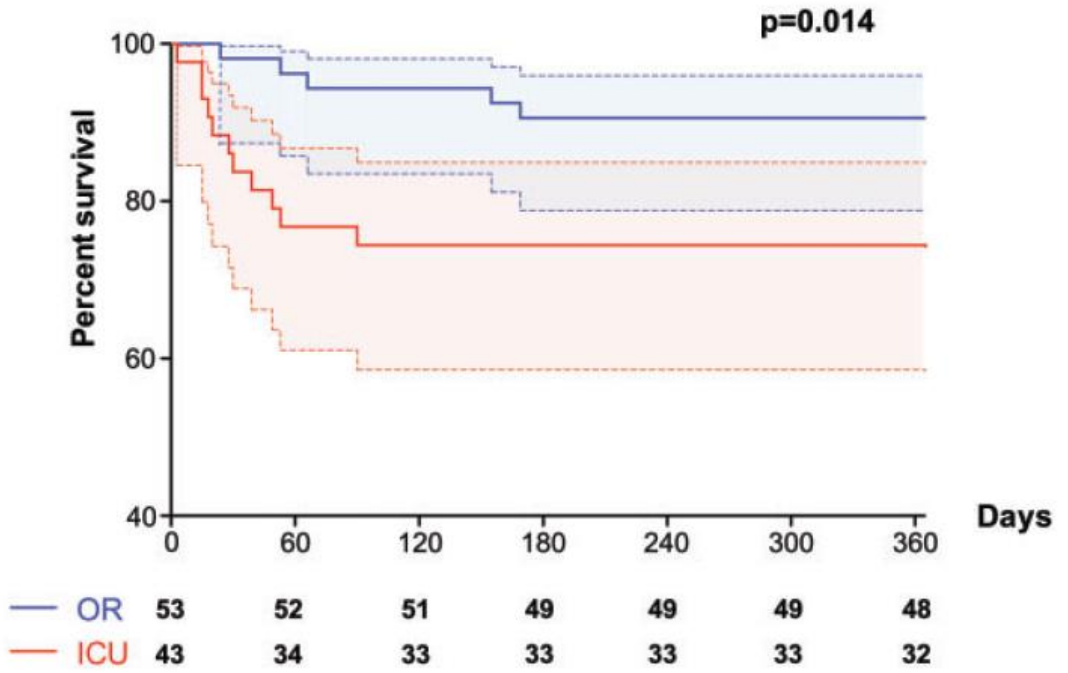

Figure 2: One-year overall survival using the Kaplan–Meier method. The solid blue line indicates survival of patients extubated in the OR group. The solid red line indicates survival of patients extubated in the ICU group after bilateral lung transplantation. Dotted lines indicate confidence limits (95%). ICU: intensive care unit; OR: operating room.

doi:10.1510/icvts.2010.241489

INTERACTIVE CARDIOVASCULAR AND THORACIC SURGERY

Interactive CardioVascular and Thoracic Surgery 12 (2011) 51-53

www.icvts.org

Best evidence topic - Transplantation

Does thoracic epidural analgesia improve outcome after lung transplantation?

Julien Pottecher[a], Pierre-Emmanuel Falcoz[b,*], Gilbert Massard[b], Jean-Pierre Dupeyron[a]

[a]*Department of Anesthesiology and Critical Care Medicine, University Hospital, Strasbourg, France*
[b]*Department of Thoracic Surgery, University Hospital, Strasbourg, France*

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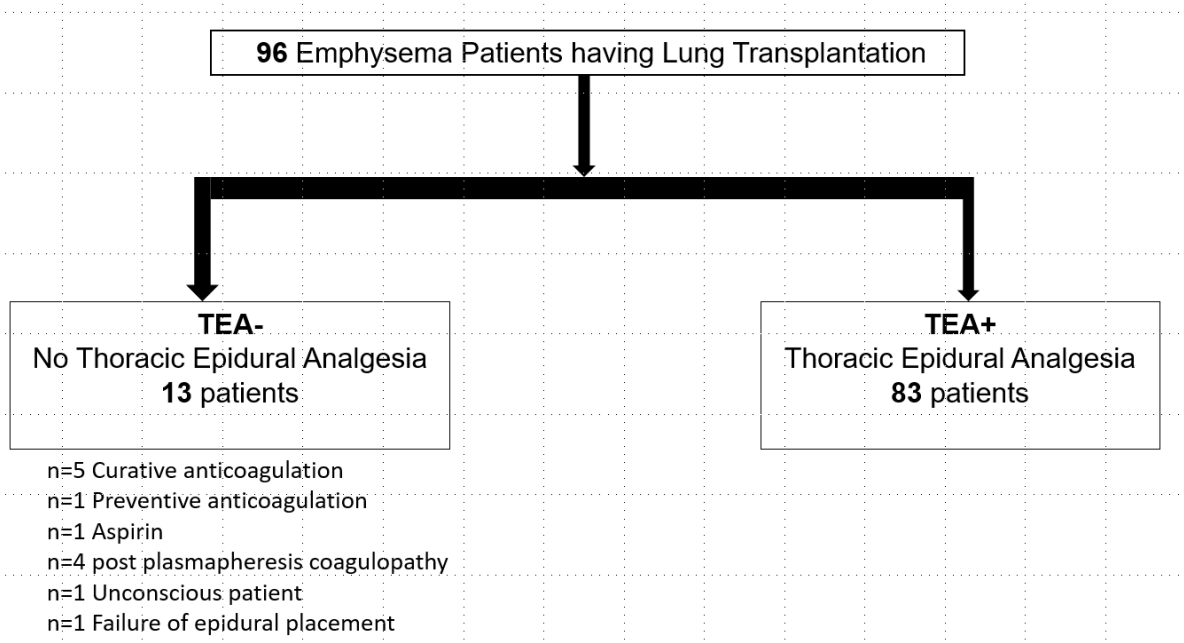

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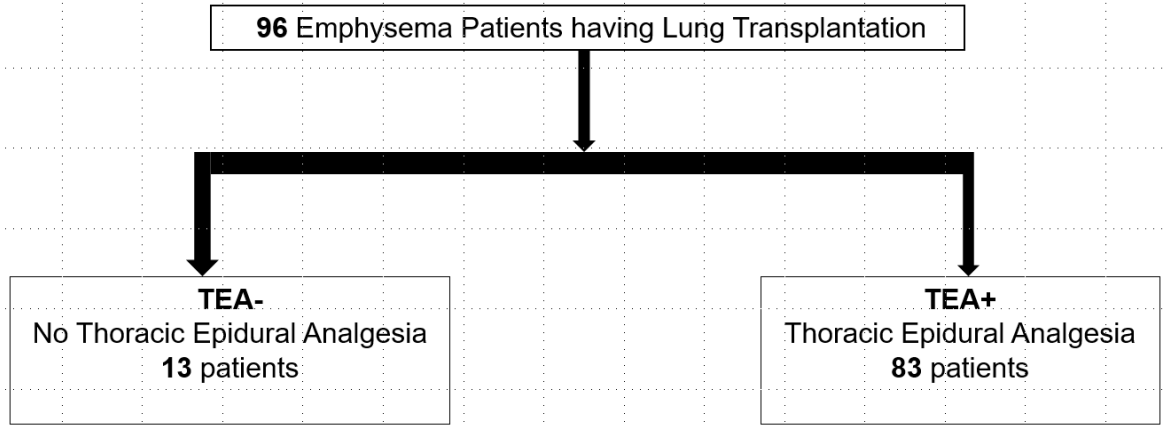
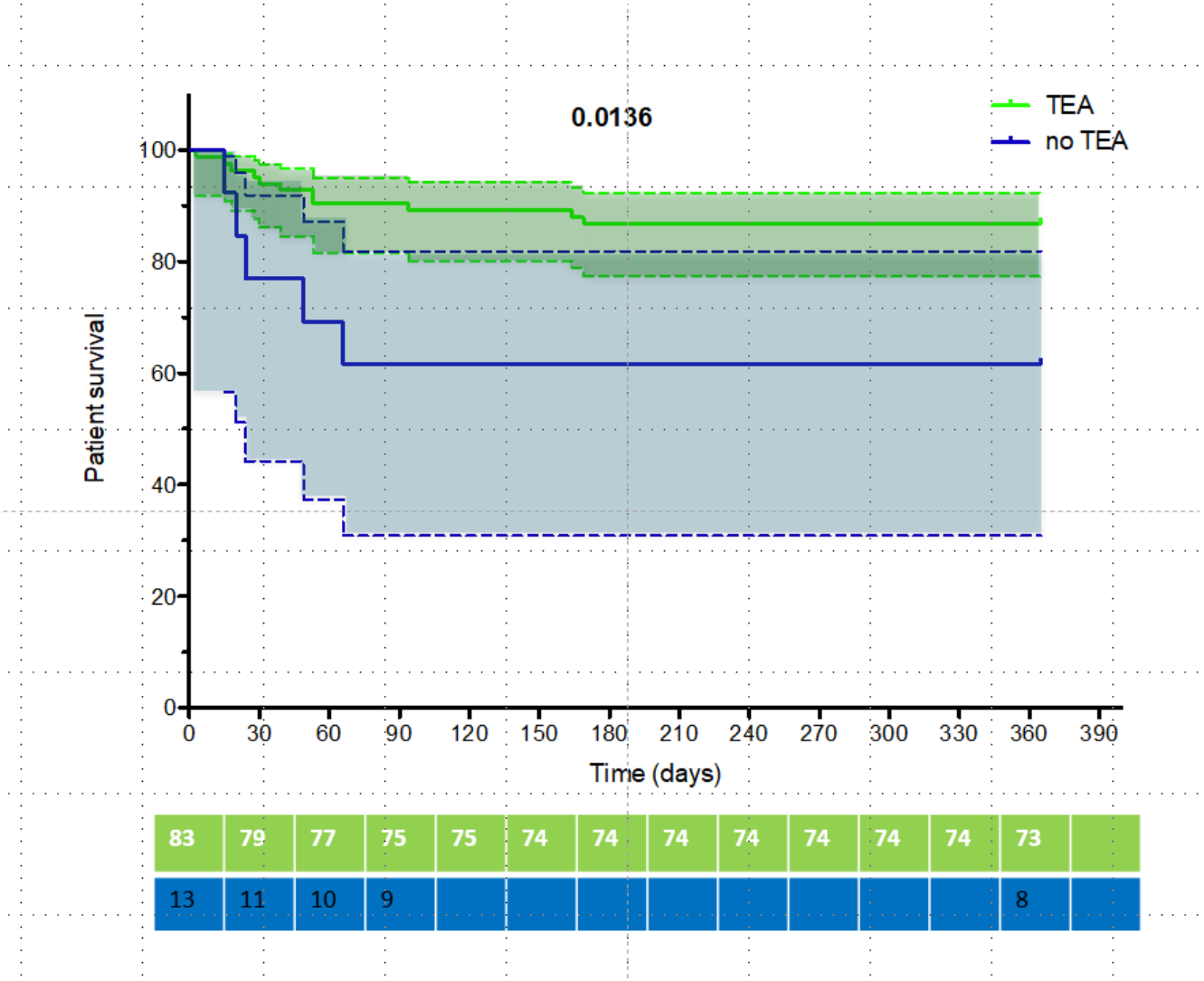


n=5 Curative anticoagulation
n=1 Preventive anticoagulation
n=1 Aspirin
n=4 post plasmapheresis coagulopathy
n=1 Unconscious patient
n=1 Failure of epidural placement



Male, 30 years, 63kg, 180 cm

Cystic fibrosis, Bronchial dilatation, esophageal varices, Portal Hypertension

Combined Lung and liver transplantation

Prothrombin Time 52% platelet 83000

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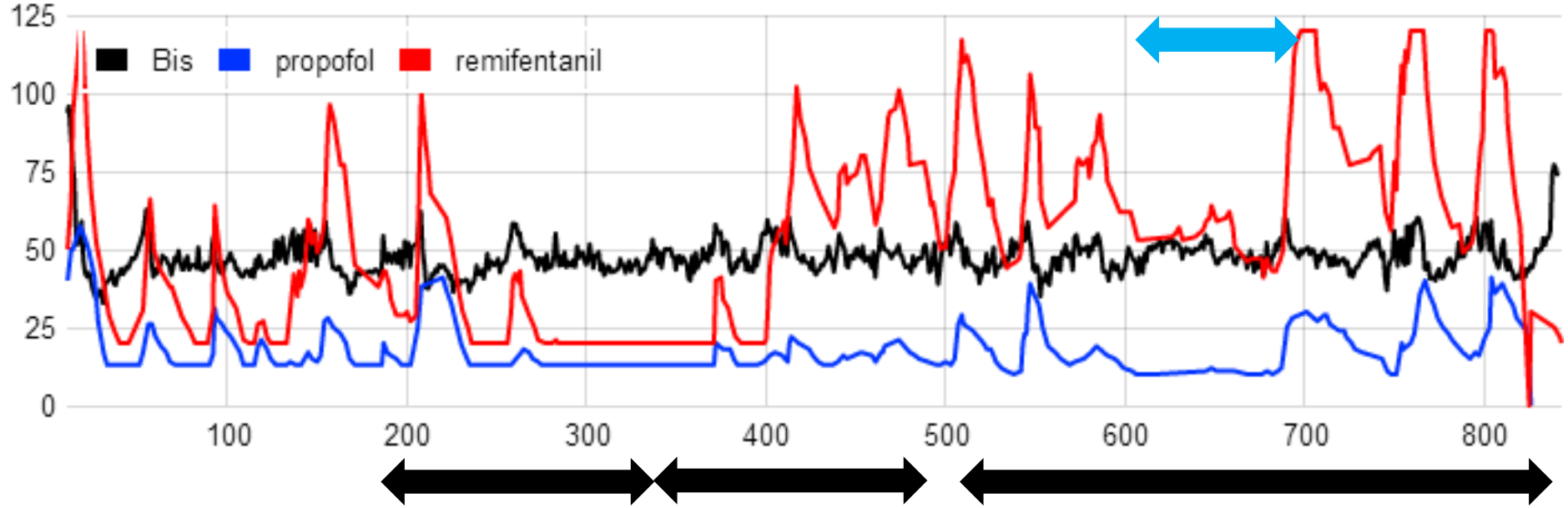

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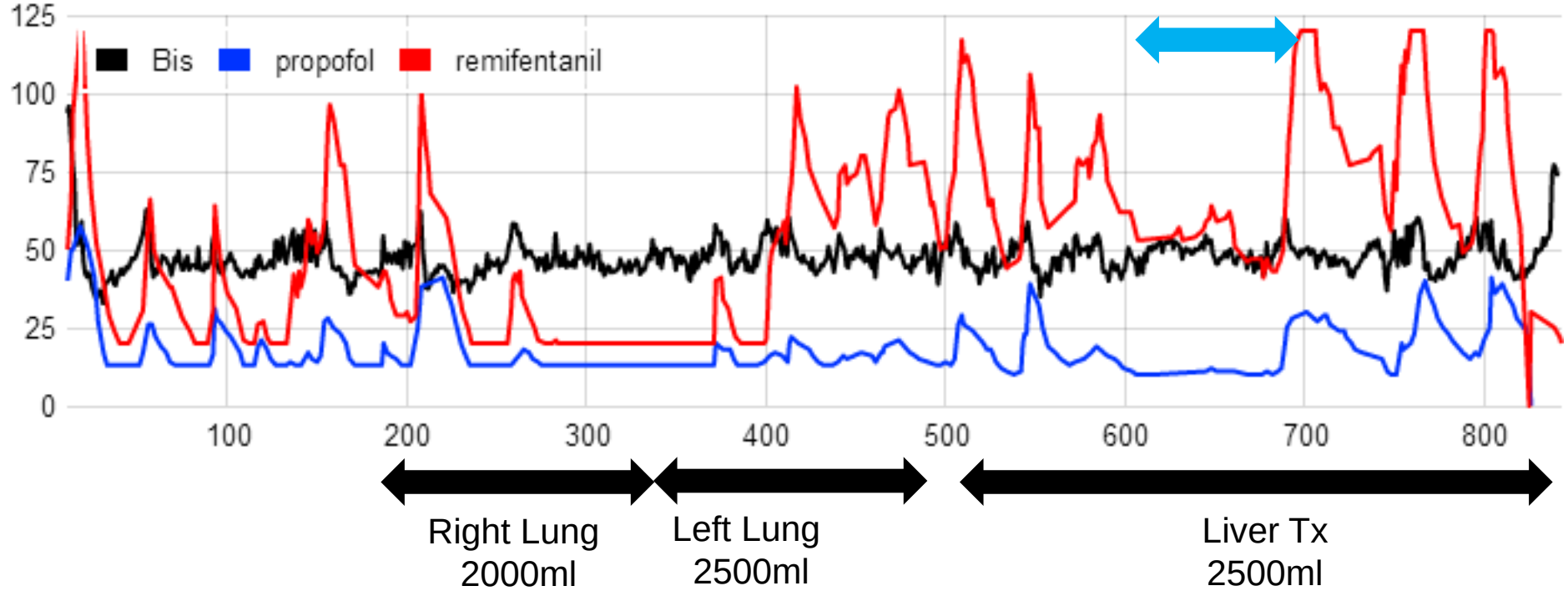

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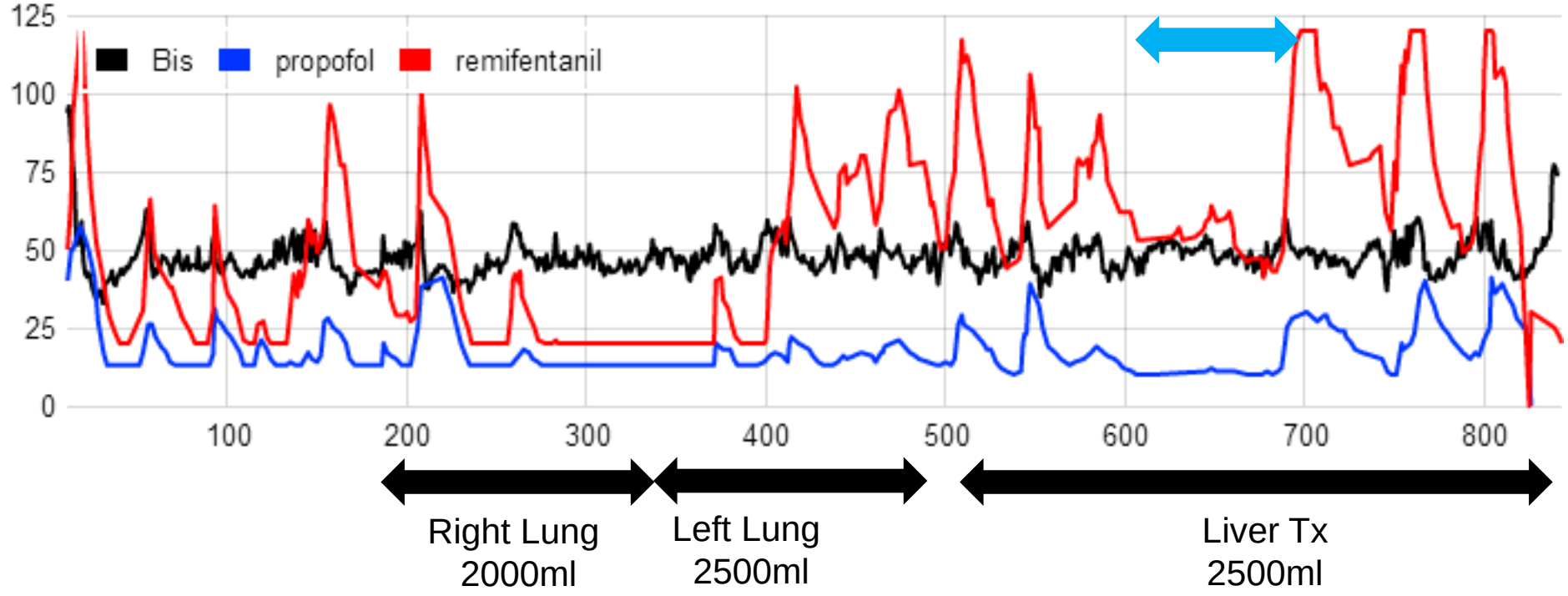


BIS_{40-60}=92%, BIS<40=5%, BIS>60=3%,

Propofol=3.3 mg/kg/h-Remifentanil=0.23µg/kg/min

Number of modifications

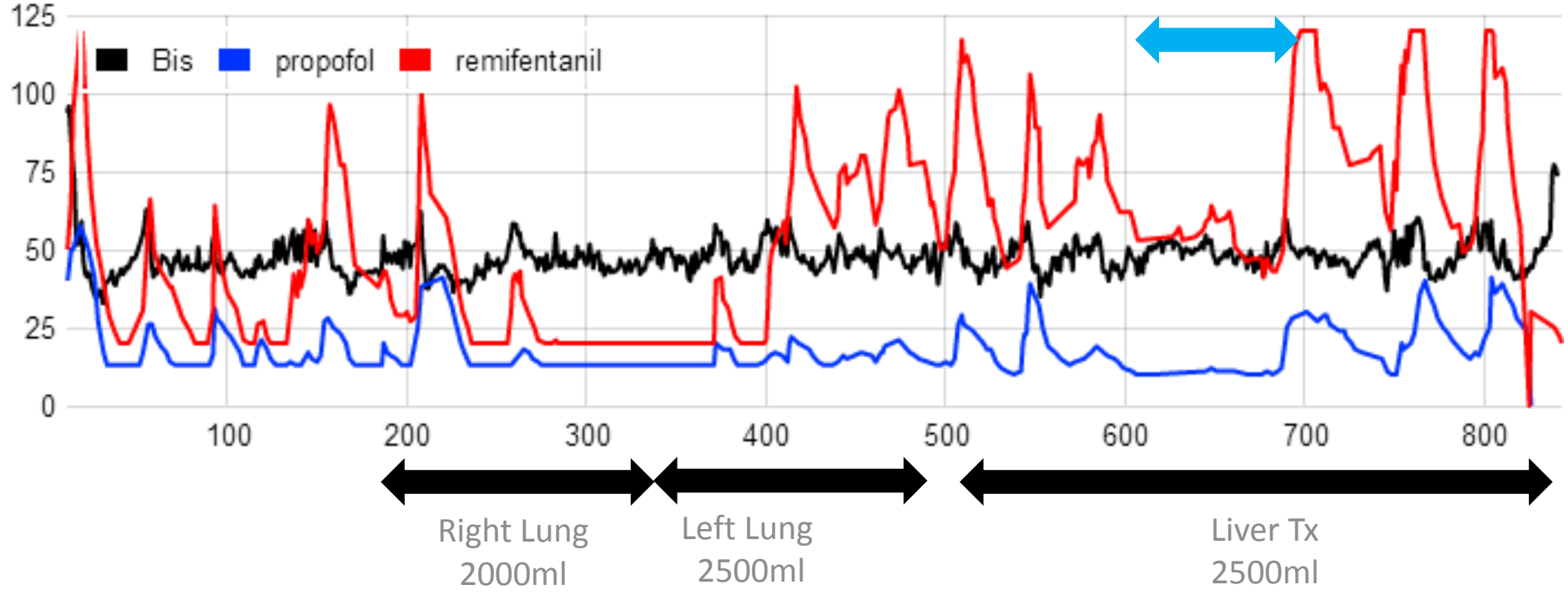
327-529

Male, 30 years, 63kg, 180 cm

Cystic fibrosis, Bronchial dilatation, esophageal varices, Portal hypertension

Combined Lung and liver transplantation

Prothrombin Time 52% platelet 83000



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Propofol=3.3 mg/kg/h-Remifentanil=0.23µg/kg/min

Number of modifications

327-529

Duration 14h30, Blood loss 7l, 12 RC, 12 Plasma, Platelets,

Fibri 3g, Crystalloids 1500ml, Alb 200ml, Gelatin1500ml, Norepinephrin (3-8 mg/h)

Male, 30 years, 63kg, 180 cm


Medsteer

Doctors at the Military Hospital 108 perform the first lung transplant from a brain-dead donor in Vietnam.

Nhân Dân ONLINE
THE CENTRAL ORGAN OF THE COMMUNIST PARTY OF VIETNAM
THE VOICE OF THE PARTY, STATE AND PEOPLE OF VIETNAM

Military hospital successfully performs first lung transplant in Vietnam

Doctors at the Military Hospital 108 perform the first lung transplant from a brain-dead donor in Vietnam.

Conclusion

Extubation au bloc opératoire: **35% à Foch**

Muco et Emphysème 50% après transplantation Bipulmonaire

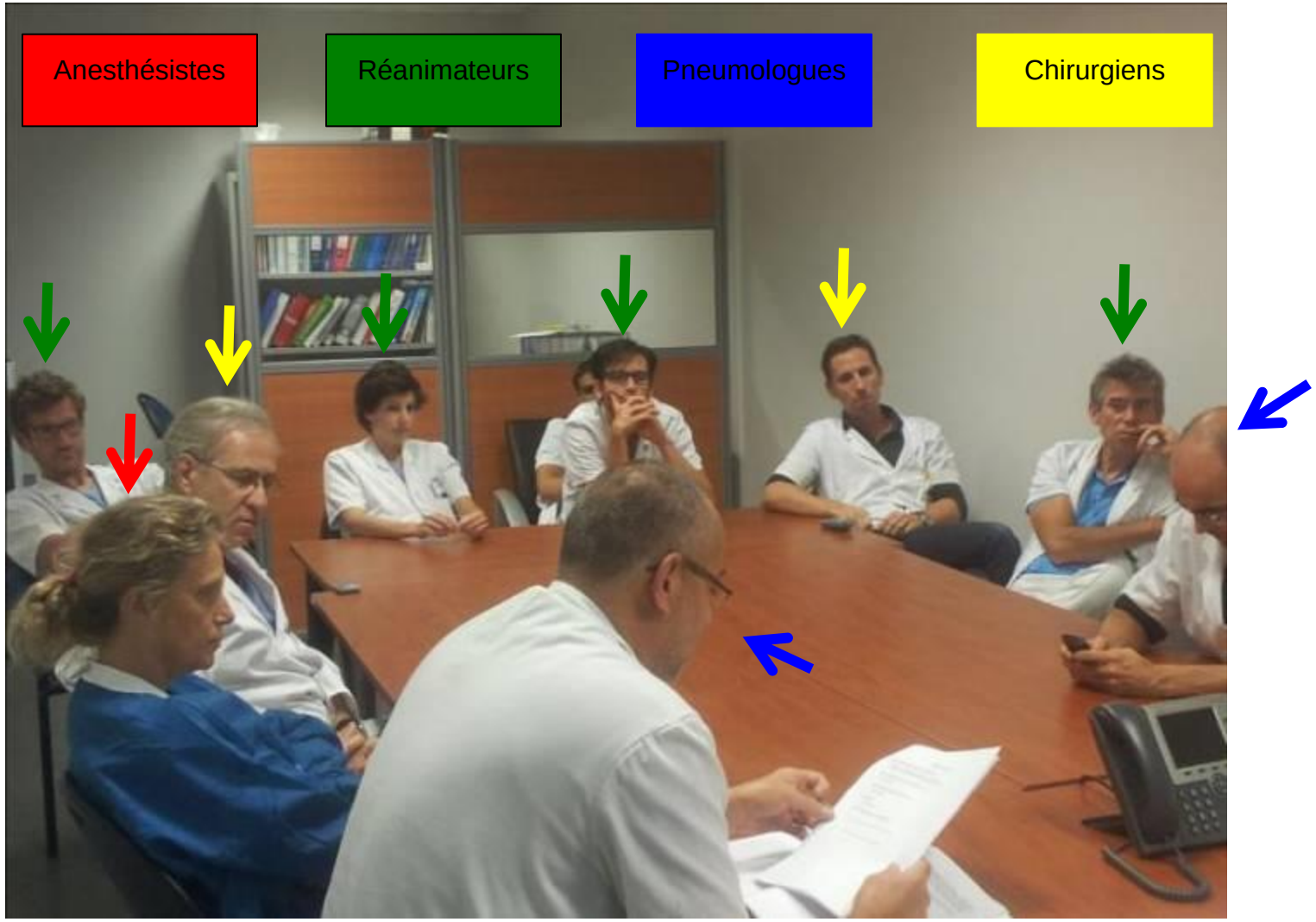
Meilleures utilisation des ressources

Travail d'équipe

Préparation dynamique: Diététique, Kiné, VNI…
Sélection des candidats: le bon moment…
Sélection du Greffon: Réhabilitation Ex-Vivo

Qualité de la prise en charge Chirurgicale
Optimisation de l' Anesthésie

Staff de Transplantation



Recommandation de la SFCTCV

- Optimisation et réhabilitation des greffons à haut risque
- Evaluation des greffons DDAC M3
- Préservation dynamique

Recommandations SFCTCV
sur l'utilisation de la perfusion pulmonaire ex vivo

Olaf Mercier, Gilbert Massard, Edouard Sage, Pascal-Alexandre Thomas

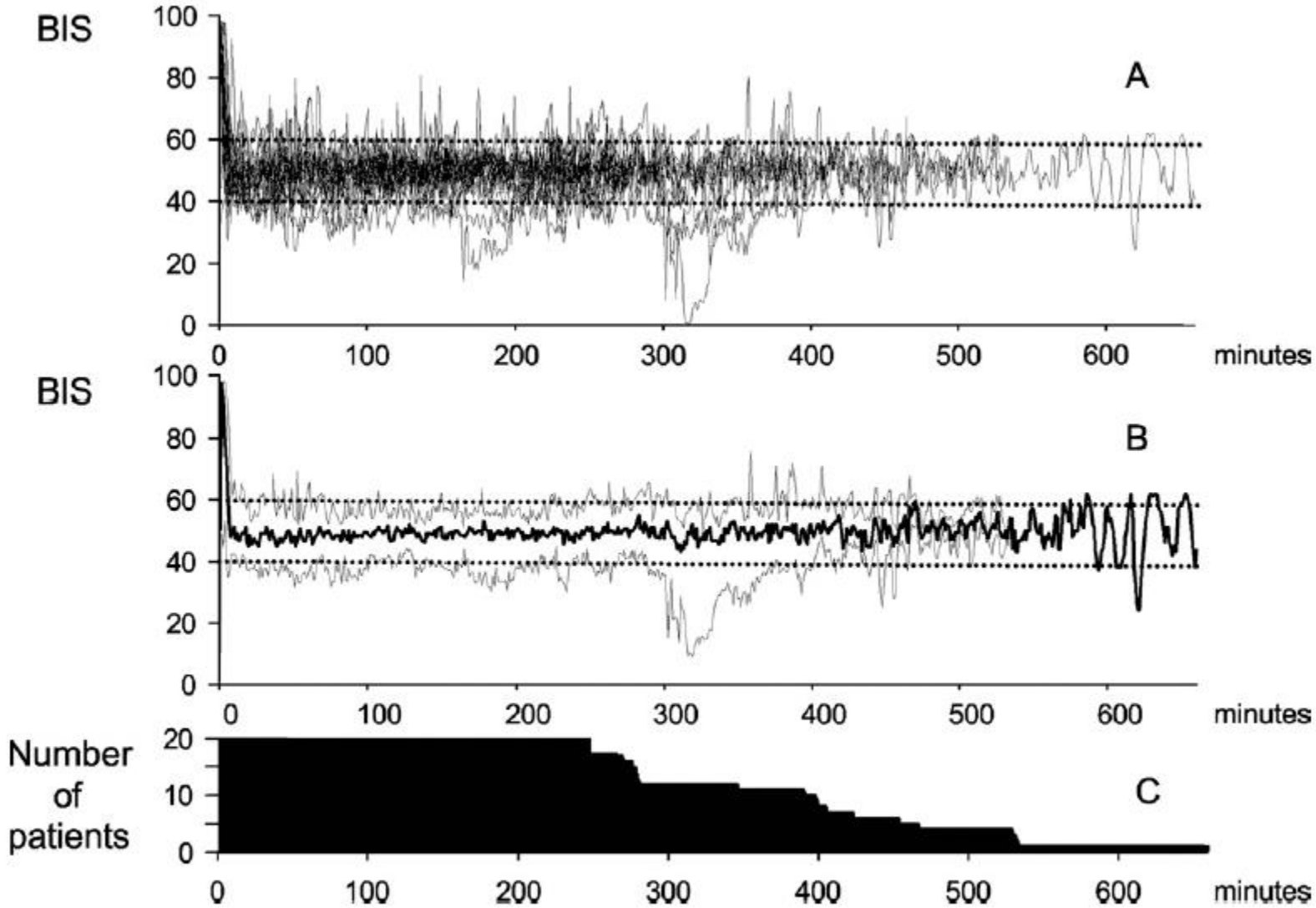


Fig 1. BIS values from induction to end of surgery. (A) All individuals are shown; data are averaged for graphical representation with a moving average filter of 1-minute duration. (B) Median BIS values (thick line) are presented with 10th and 90th percentiles (fine lines). (C) The number of cases still anesthetized at each time.