Les modalités chirurgicales de la TP, Techniques chirurgicales et différentes TP

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UNIVERSITÉ PARIS DESCARTES

Séminaire DES du 23 juin 2017:
Transplantation Pulmonaire

ASSISTANCE PUBLIQUE HÔPITAUX DE PARIS

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Hôpital européen Georges-Pompidou

Historique de la Transplantation pulmonaire (TxP) (1)

- Travaux expérimentaux modèle canin

  1950: Demikhov (Russe)

  1950-60: Métras (Marseille)

- Chez l'homme en **1963**: **Hardy** **1ère Tx Monopulmonaire Gauche**

  Faisabilité technique (Survie 18J)

De 1963 à 1978: plusieurs tentatives

Décès par : DPG; sepsis, rejet aigu, complications anastomoses bronchiques

1971: Derom (plus longue survie de 10 mois)

1982: Borel découvre la ciclosporique

1982: Equipe de Shumway (stanford) **TxCP** ➔ réussite

1986: Equipe de Toronto **Tx MonoPulmonaire** ➔ réussite

Hardy JAMA 1963;186:1065

Derom J Thorac Cardiovasc Surg 1971; 61: 835

Toronto Lung Transplant Group N Engl J Med 1986;314:1140

Historique de la Transplantation pulmonaire (TxP) (2)

1988: Pattersson : TxBipulmonaire en bloc (anastomose trachéale)

1990 Pasque / Bisson: **Tx bipulmonaire séquentielle** = double mono

Puis pénurie de greffons

1995: Starnes:

➔ **Tx Lobaire** cadavérique ou donneur vivant

1997: Couetil : **partition pulmonaire**

➔1 poumon= 1 lobe de chaque coté

Patterson Ann Thorac Surg 1988;45:626
Pasque Ann Thorac Surg 1990; 49: 785
Bisson J Thorac Cardiovasc Surg 1992;103: 40
Couetil J Thorac Cardiovasc Surg 1997;113:529

Historique de la Transplantation pulmonaire (TxP) (1)

- **2001** Steen 1ere **Tx MonoPulmonaire donneur cœur arrêté** non contrôlé
- **2004** Trulock 1ere **TxBiPulmonaire donneur cœur arrêté** non contrôlé

- **TxBiPulmonaire donneur cœur arrêté** contrôlé (Maastricht III)

Steen Lancet 2001; 357: 825
Trulock

ELSEVIER

The Journal of Heart and Lung Transplantation
http://www.jhltonline.org

International Society for Heart and Lung Transplantation Donation After Circulatory Death Registry Report

Marcelo Cypel, MD, Bronwyn Levvey, RN, Dirk Van Raemdonck, MD, Michiel Erasmus, MD, John Dark, MB, FRCS, Robert Love, MD, David Mason, MD, Allan R. Glanville, MD, Daniel Chambers, MD, Leah B. Edwards, PhD, Josef Stehlik, MD, Marshall Hertz, MD, Brian A. Whitson, MD, Roger D. Yusen, MD, Varun Puri, MD, Peter Hopkins, MD, Greg Snell, MD, and Shaf Keshavjee, MD; for the International Society for Heart and Lung Transplantation

J Heart Lung Transplant 2015;34:1278–1282

95% Catégorie Maastricht III

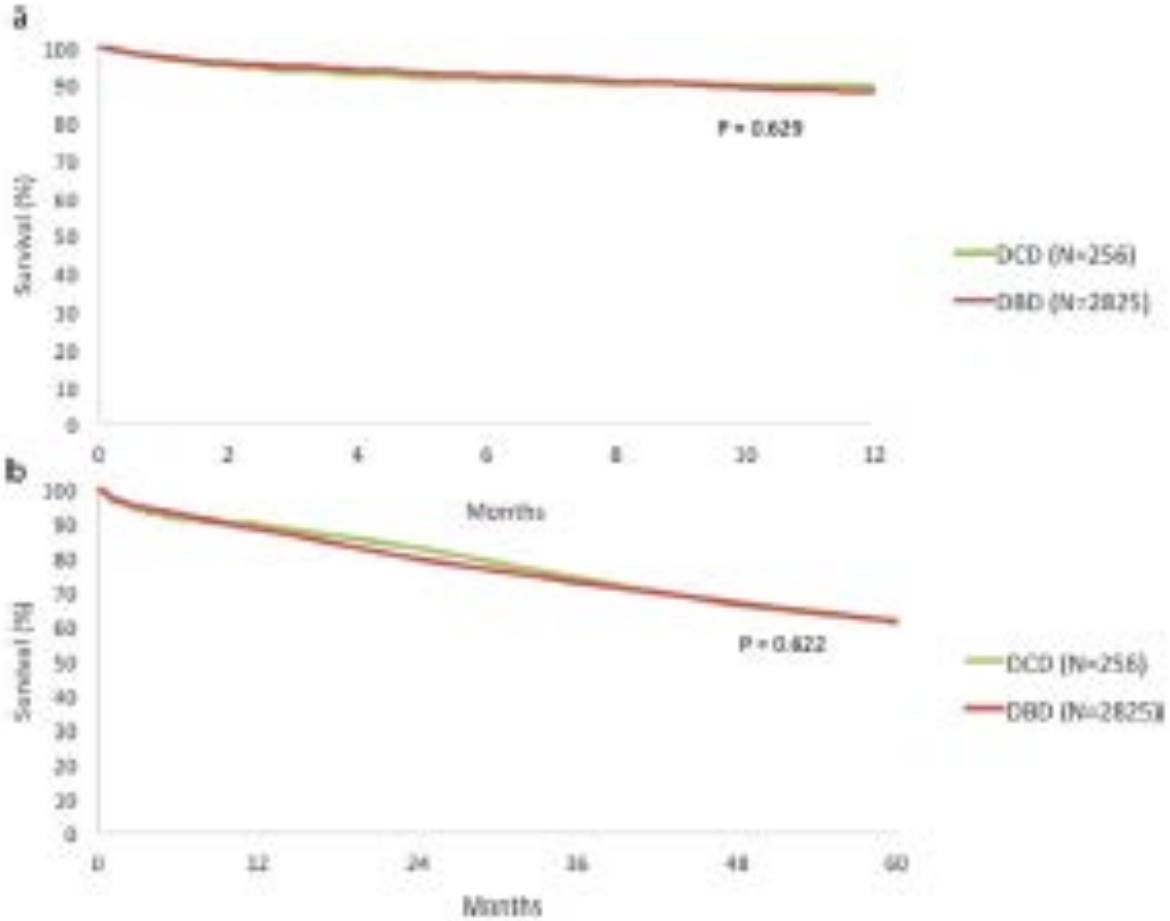
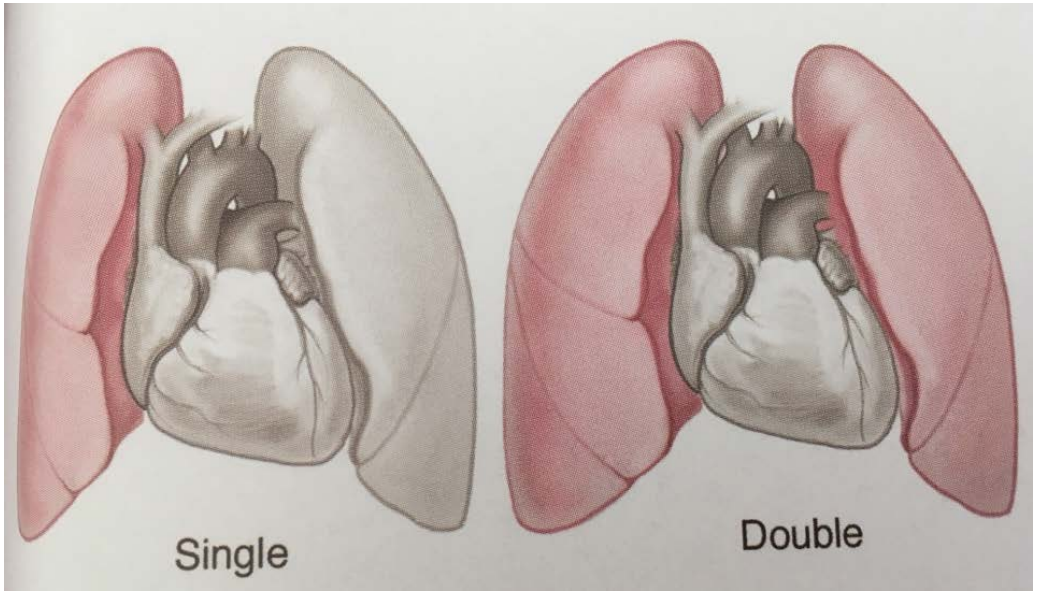
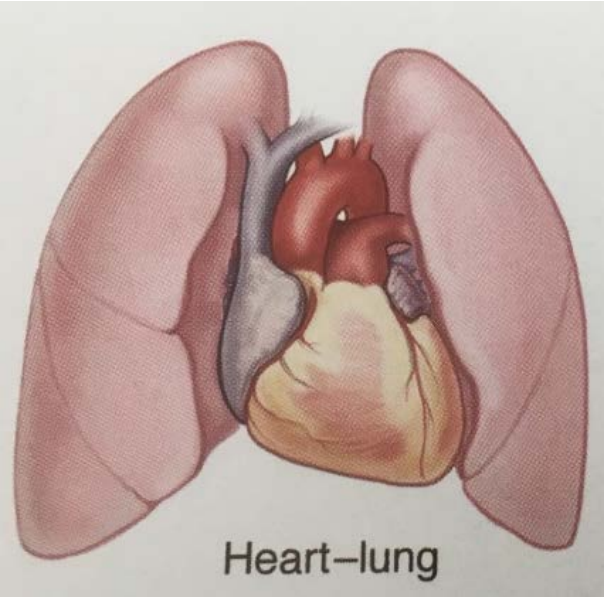
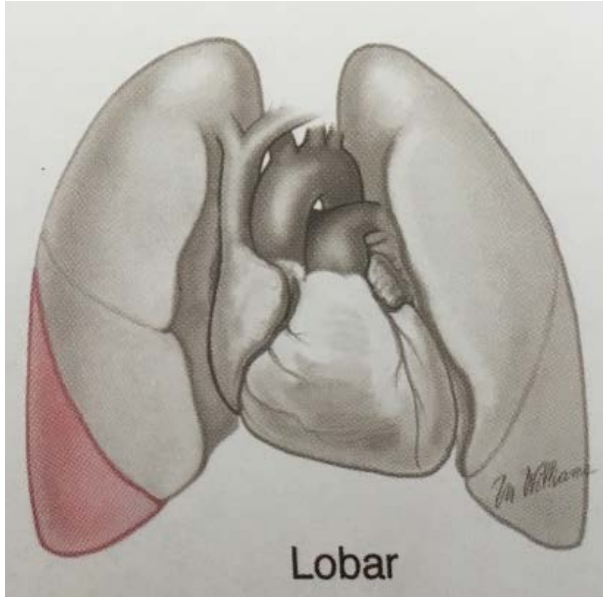


Figure 4 One-year (a) and 5-year (b) post-transplant survival in the DCD vs DBD groups. Asterisk indicates that only transplants performed between January 2006 and December 2012 used for survival calculations.

Types de Transplantation

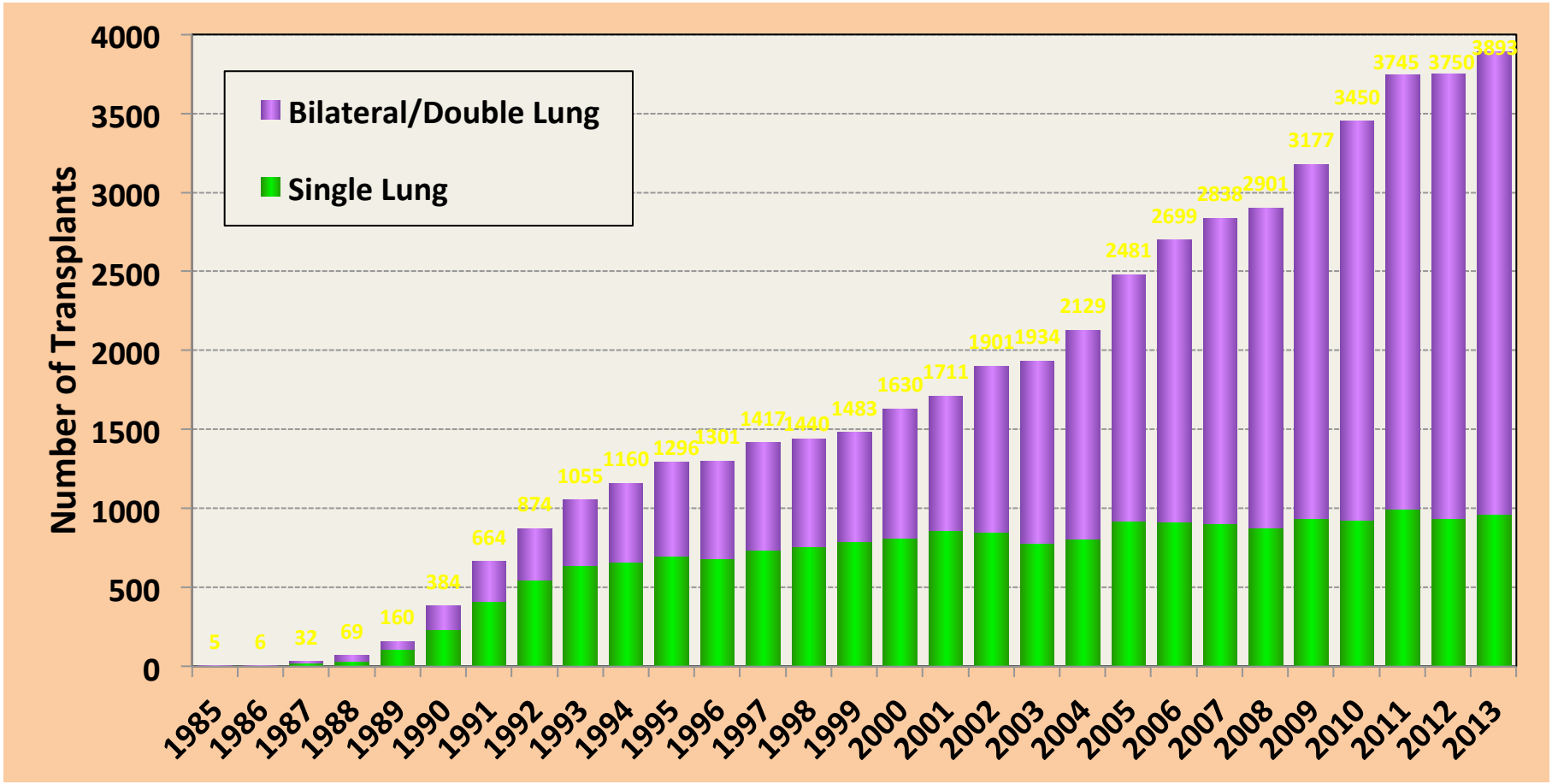






➔ **Tx Orthotopique**

Adult Lung Transplants Number of Transplants by Year and Procedure Type



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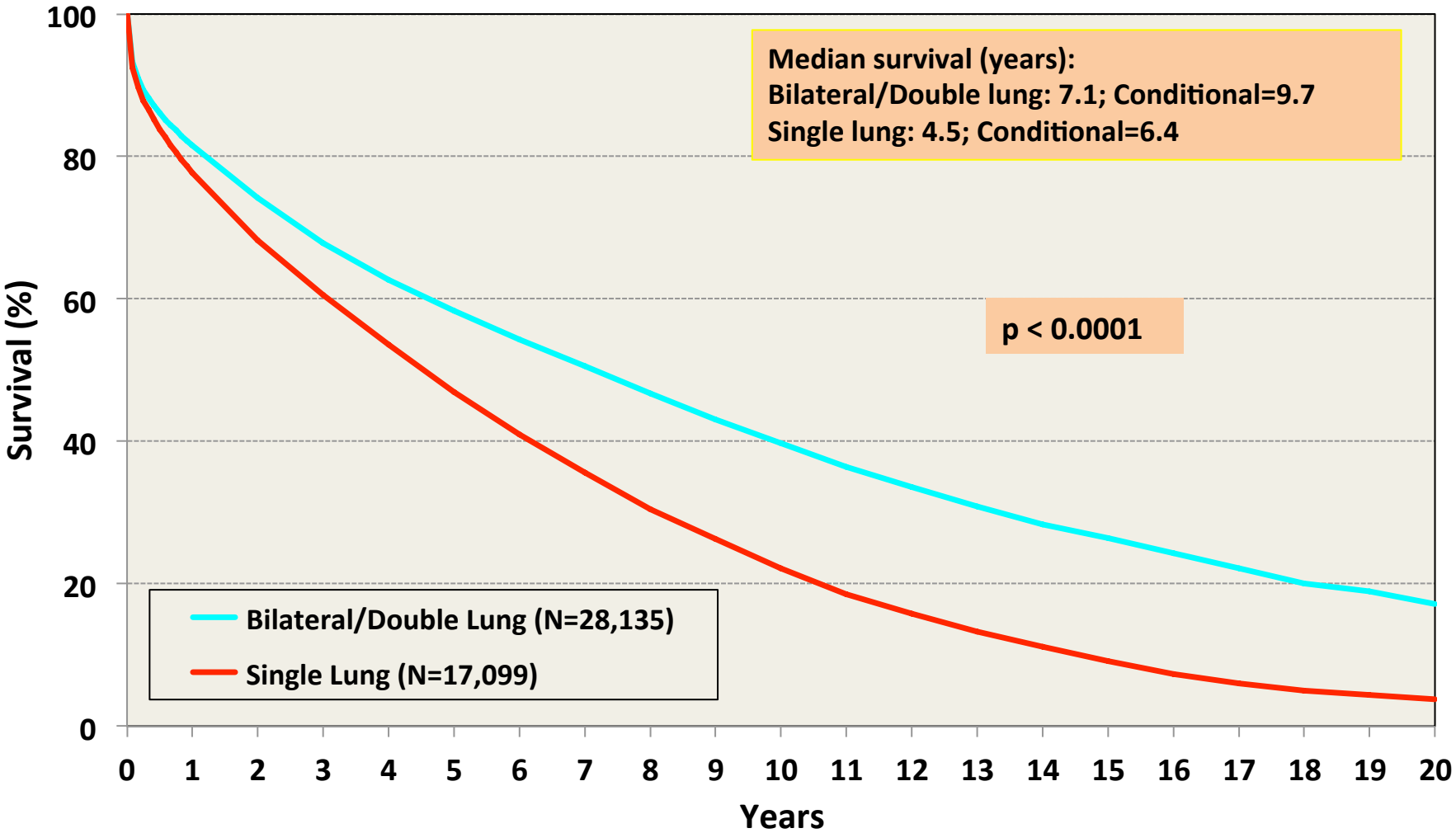
2015

3000 TBiP /1000 TxMP

Adult Lung Transplants
Kaplan-Meier Survival by Procedure Type for Primary Transplant Recipients (Transplants: January 1990 – June 2013)



2015

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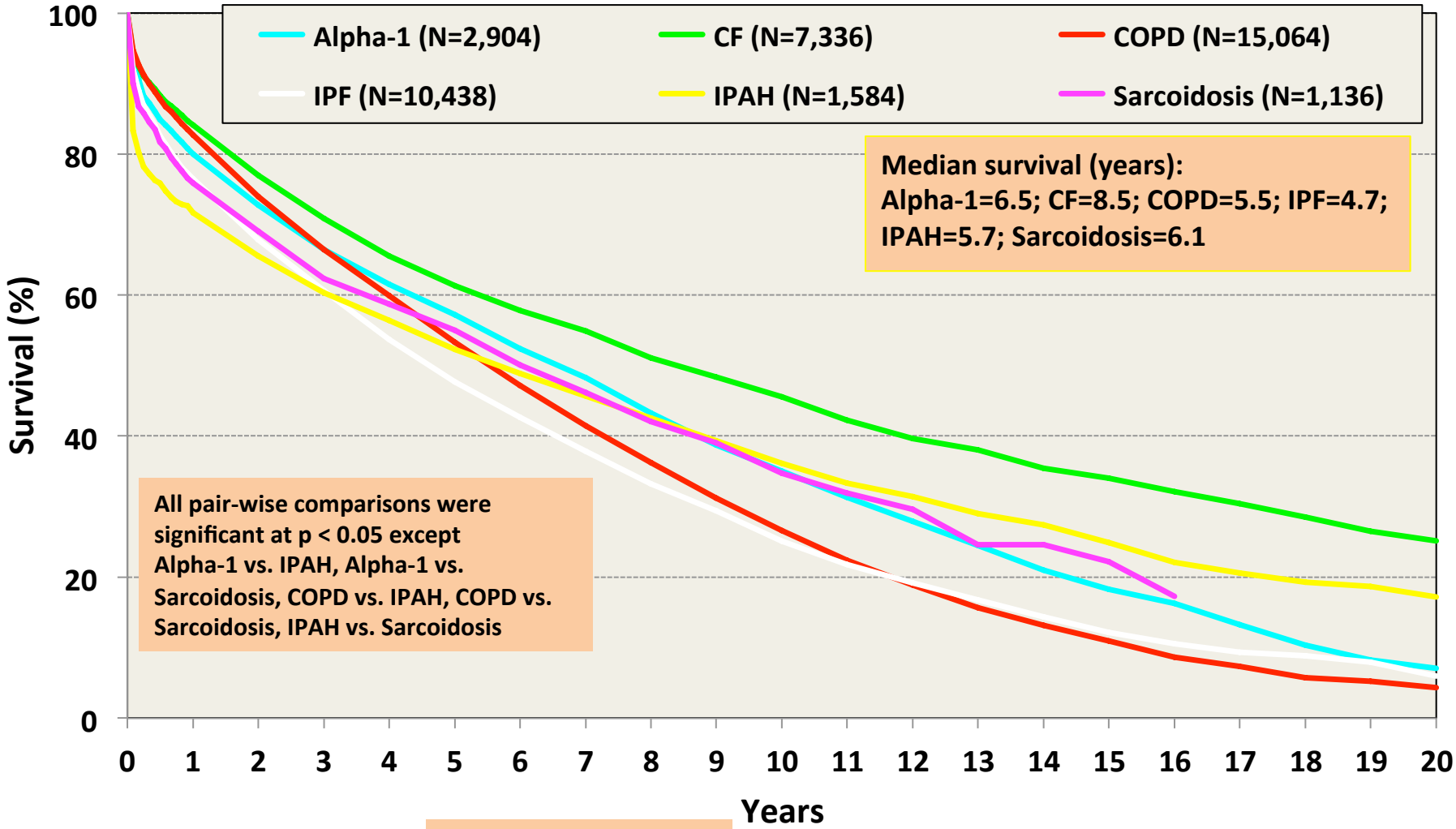
Adult Lung Transplants
Kaplan-Meier Survival by Diagnosis
(Transplants: January 1990 – June 2013)



2015

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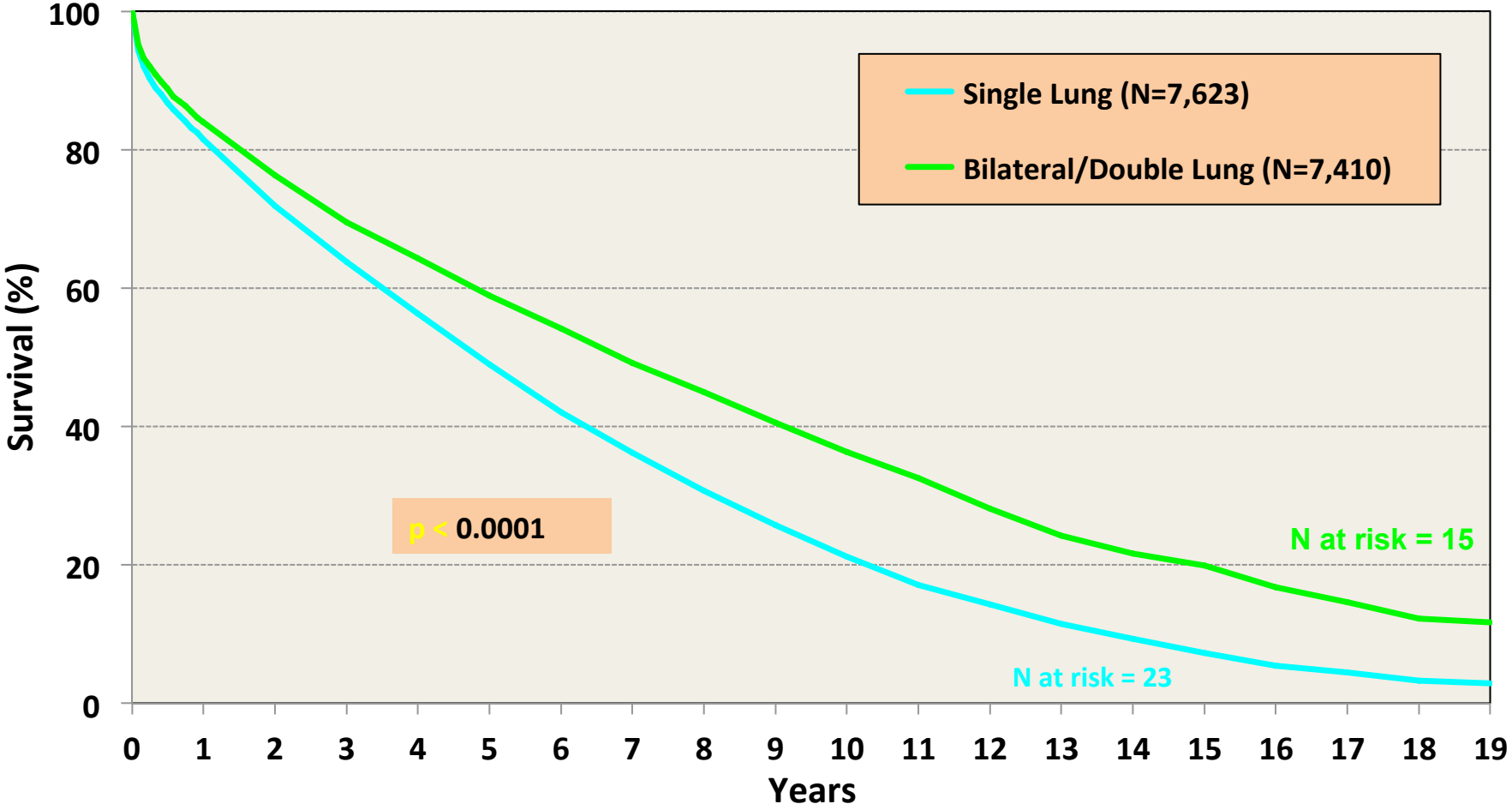
Adult Lung Transplants
Kaplan-Meier Survival by Procedure Type
(Transplants: January 1990 – June 2013)
Diagnosis: COPD/Emphysema



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Indications des TxBi et monopulmonaires

Indication des TxBipulmonaires:

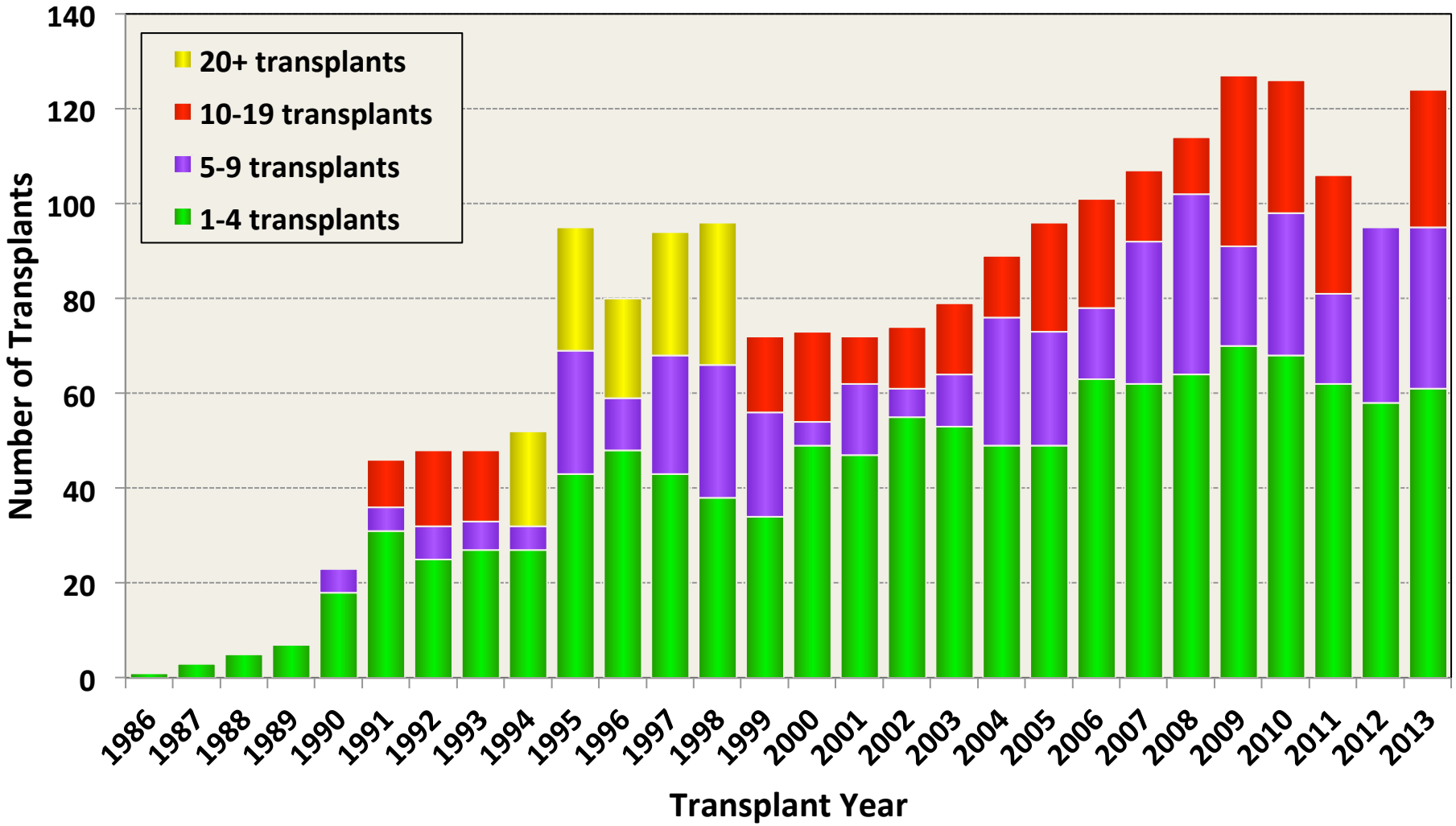
Pathologies pulmonaires suppuratives (ex: Mucoviscidose, bronchectasies, …), emphysème chez patients jeunes, Hypertension artérielle pulmonaire I^{ive} ou Ii^{aire}.

Indications des Tx monopulmonaires

Pathologie pulmonaire restrictive (fibrose pulmonaire)

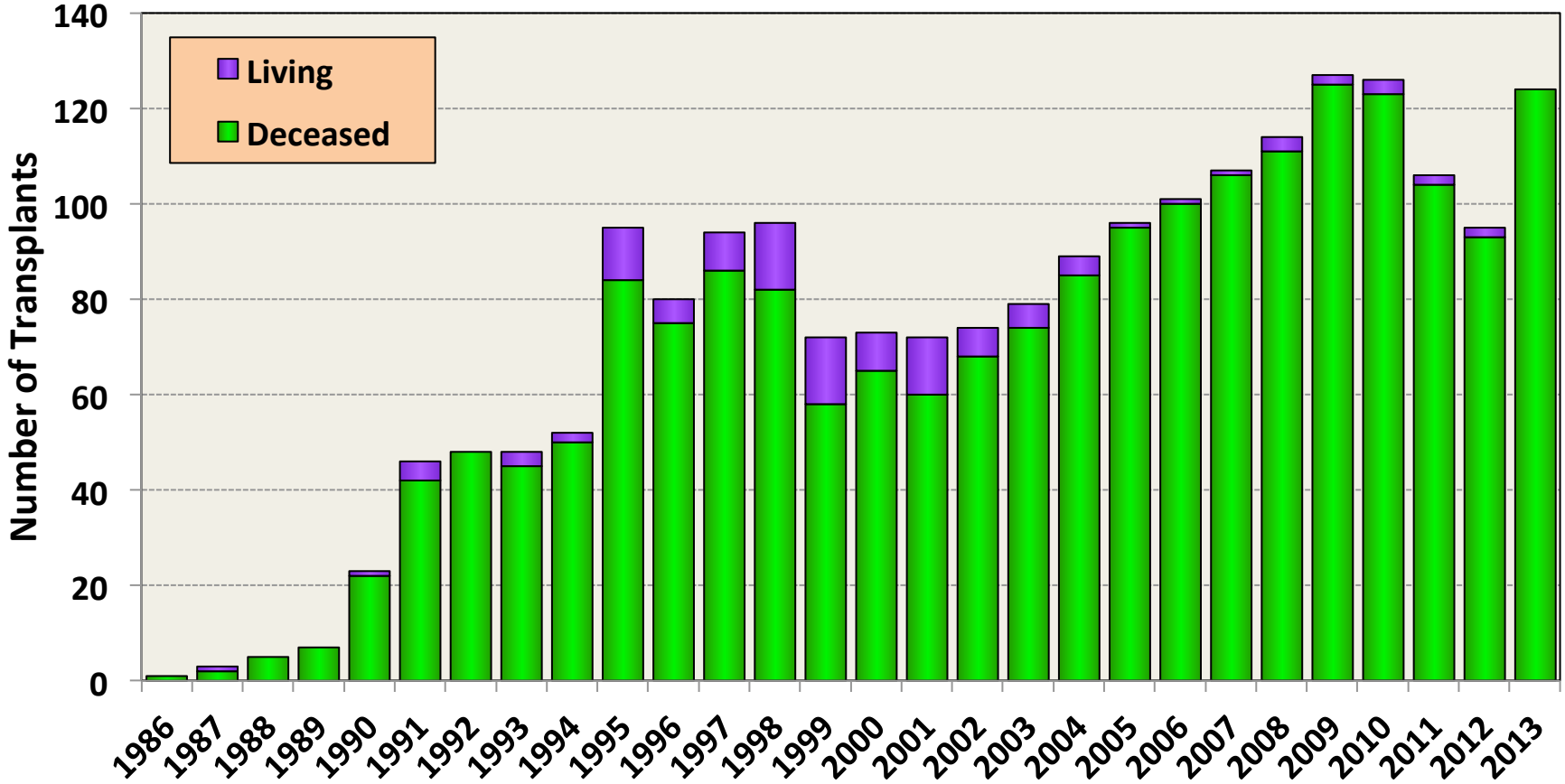
ou sujet âgé avec un emphysème

Pediatric Lung Transplants
Number of Transplants by Pediatric Center Volume



2015

Pediatric Lung Transplants
Donor Type Distribution by Transplant Year
(Transplants: January 1986 – December 2013)



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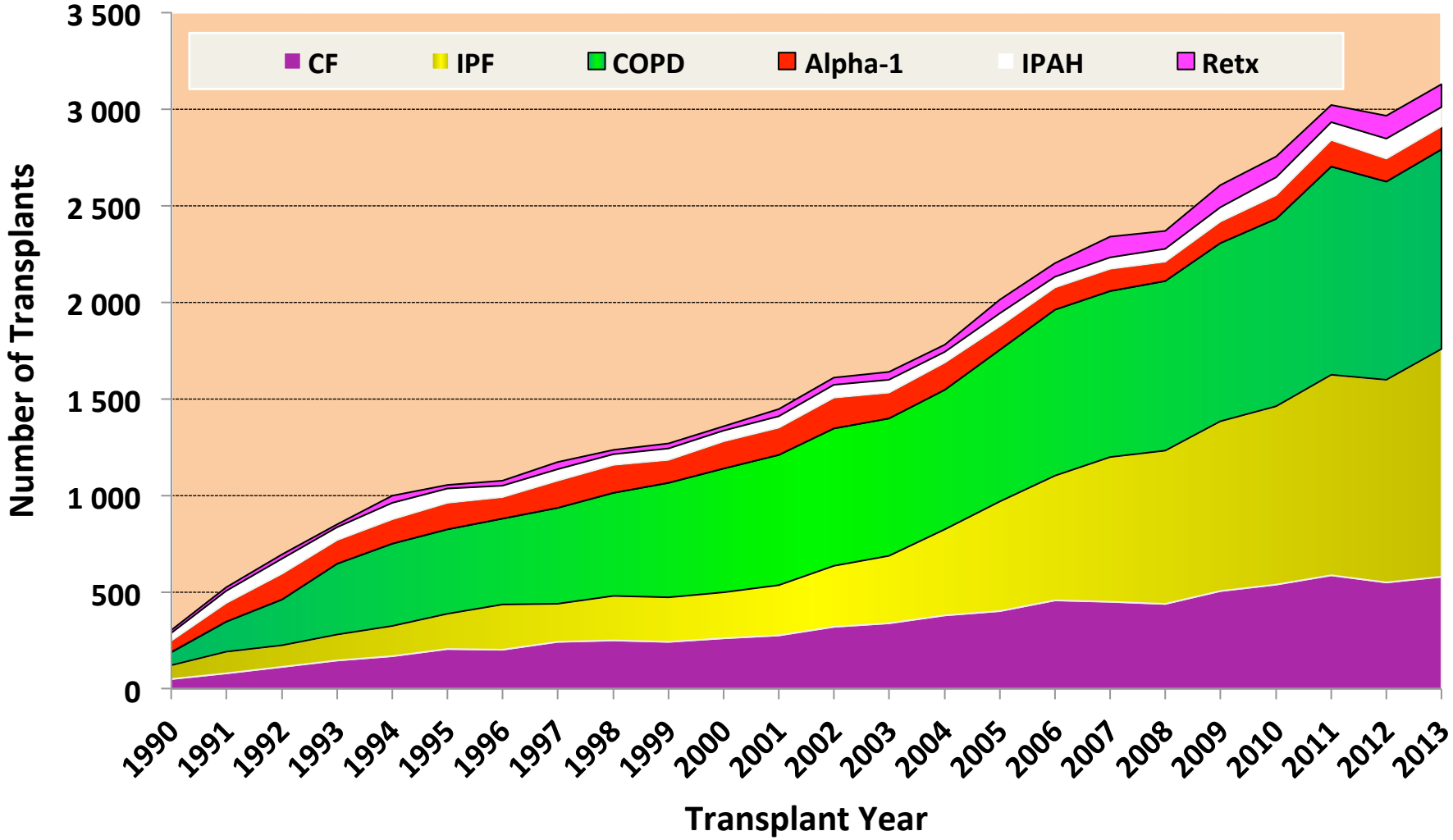
Adult Lung Transplants
Major Indications by Year (Number)



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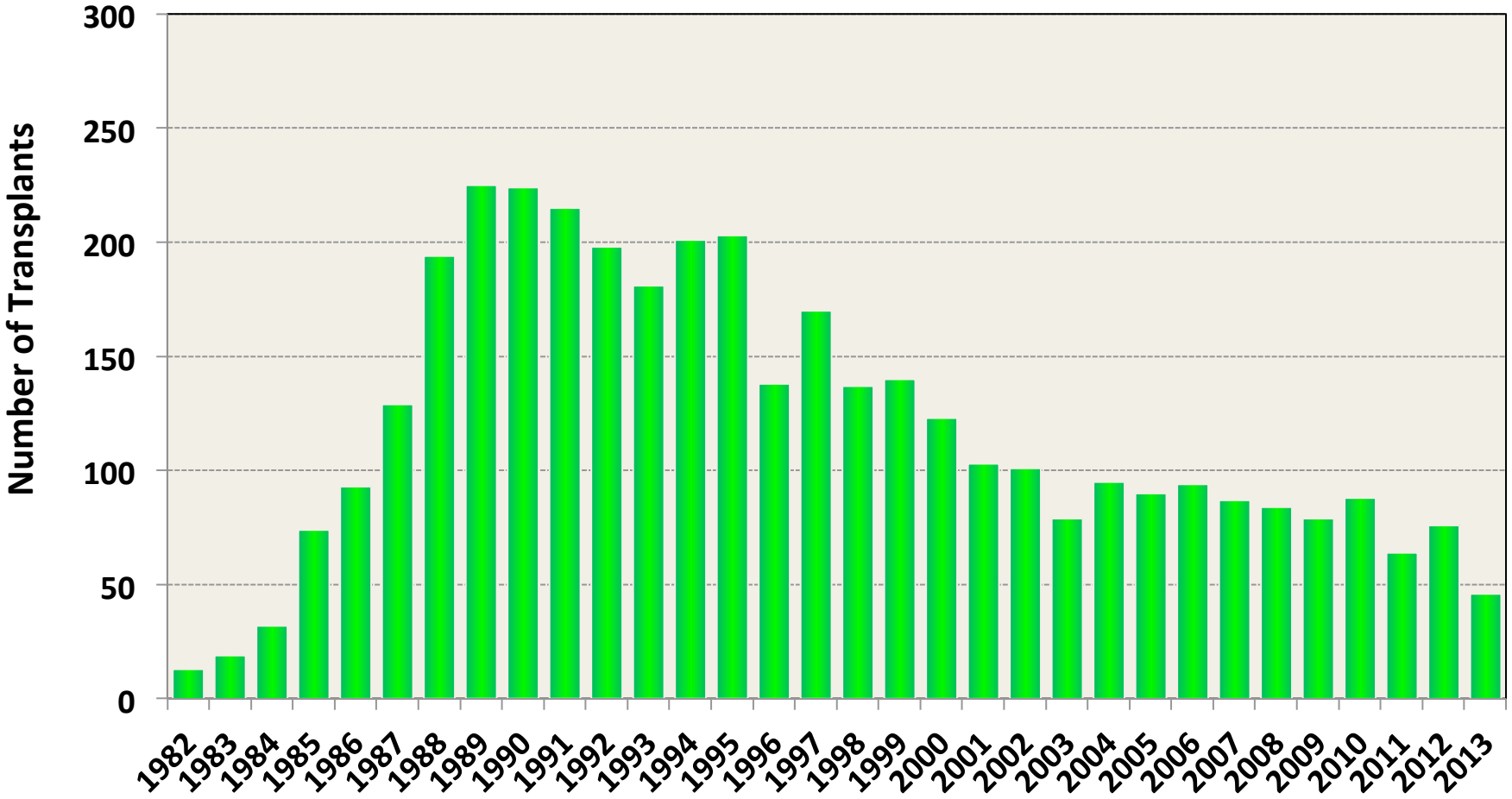
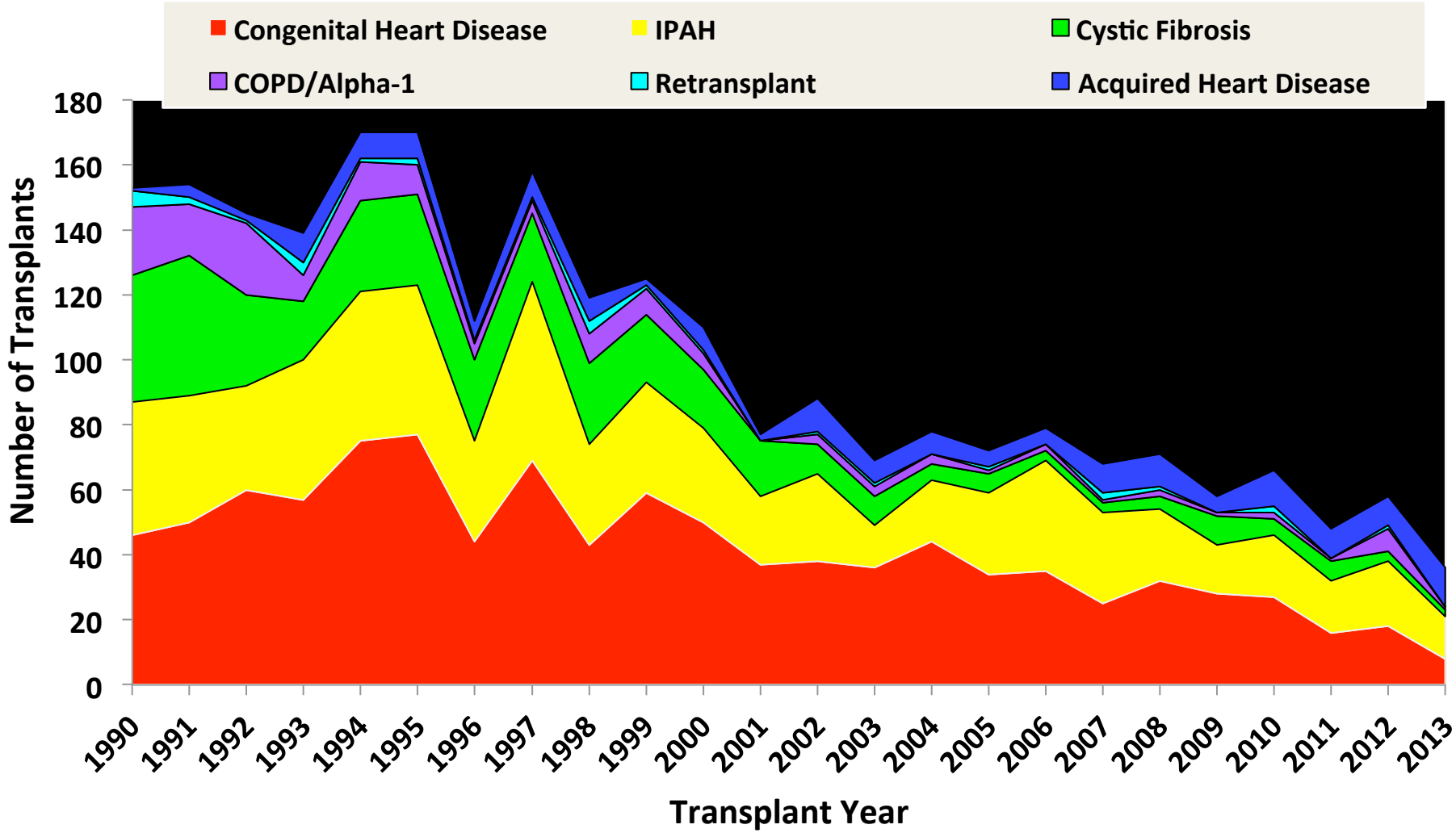
Adult Heart-Lung Transplants
Number of Transplants Reported by Year



2015

Adult Heart-Lung Transplants
Major Indications by Year (Number)



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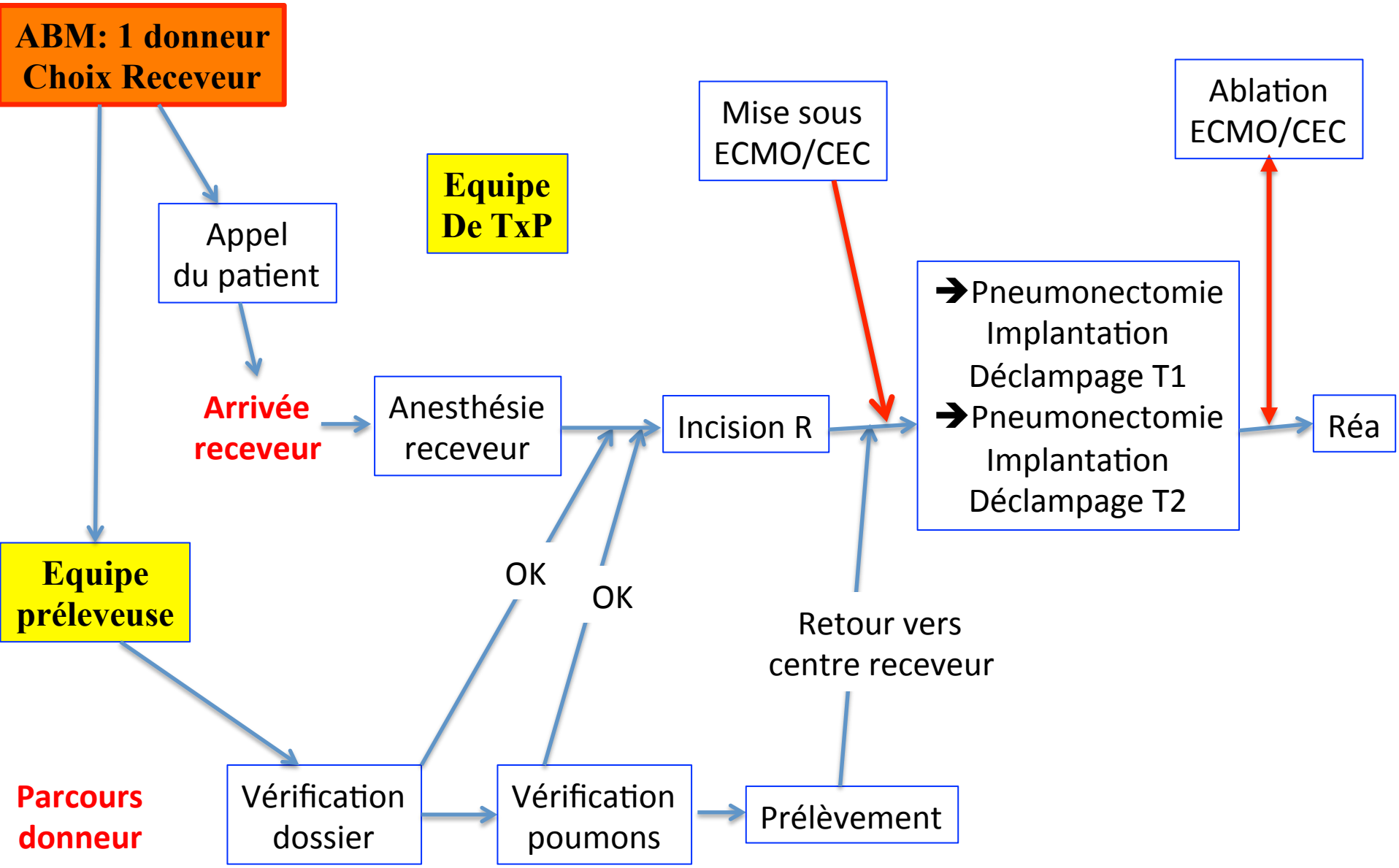
Circuit expliqué au patient et sa famille



Choix receveur sur liste
▶ 4 critères principaux

1er) ***Compatibilité de groupe ABO***

2ème) ***Gravité***

SU➜ priorité (IVA, ECMO, …)

3ème) ***Appariement de Taille*** : taille + type de pathologie

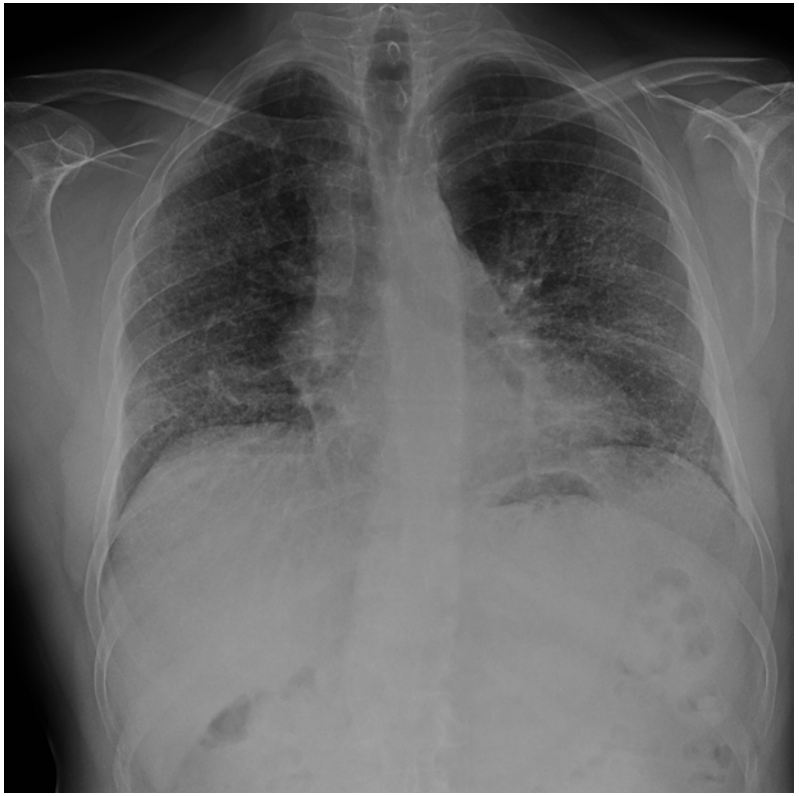
➜mais la Transplantation lobaire est possible ➔➔

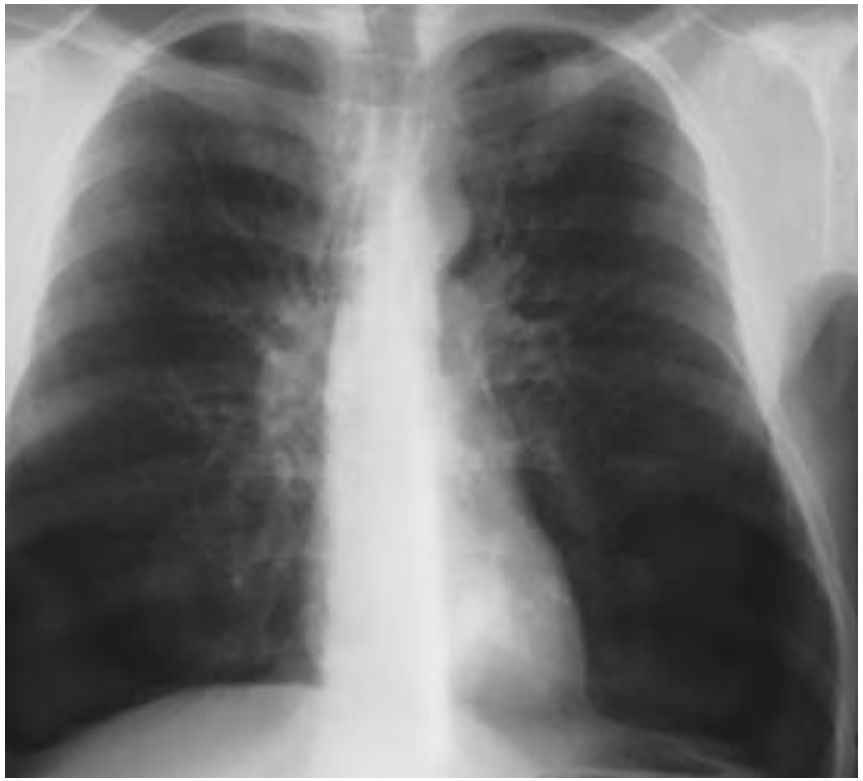
4ème) ***Sérologie CMV*** : dCMV + ➜ rCMV +

dCMV - ➜➜ rCMV –

or +

Appariement de taille: selon la pathologie du receveur





Fibrose: ↘ 15-20%
Petite cavité pleurale

Emphysème: ↗ 15-20%
Grande cavité pleurale

Appariement de taille: selon la pathologie du receveur

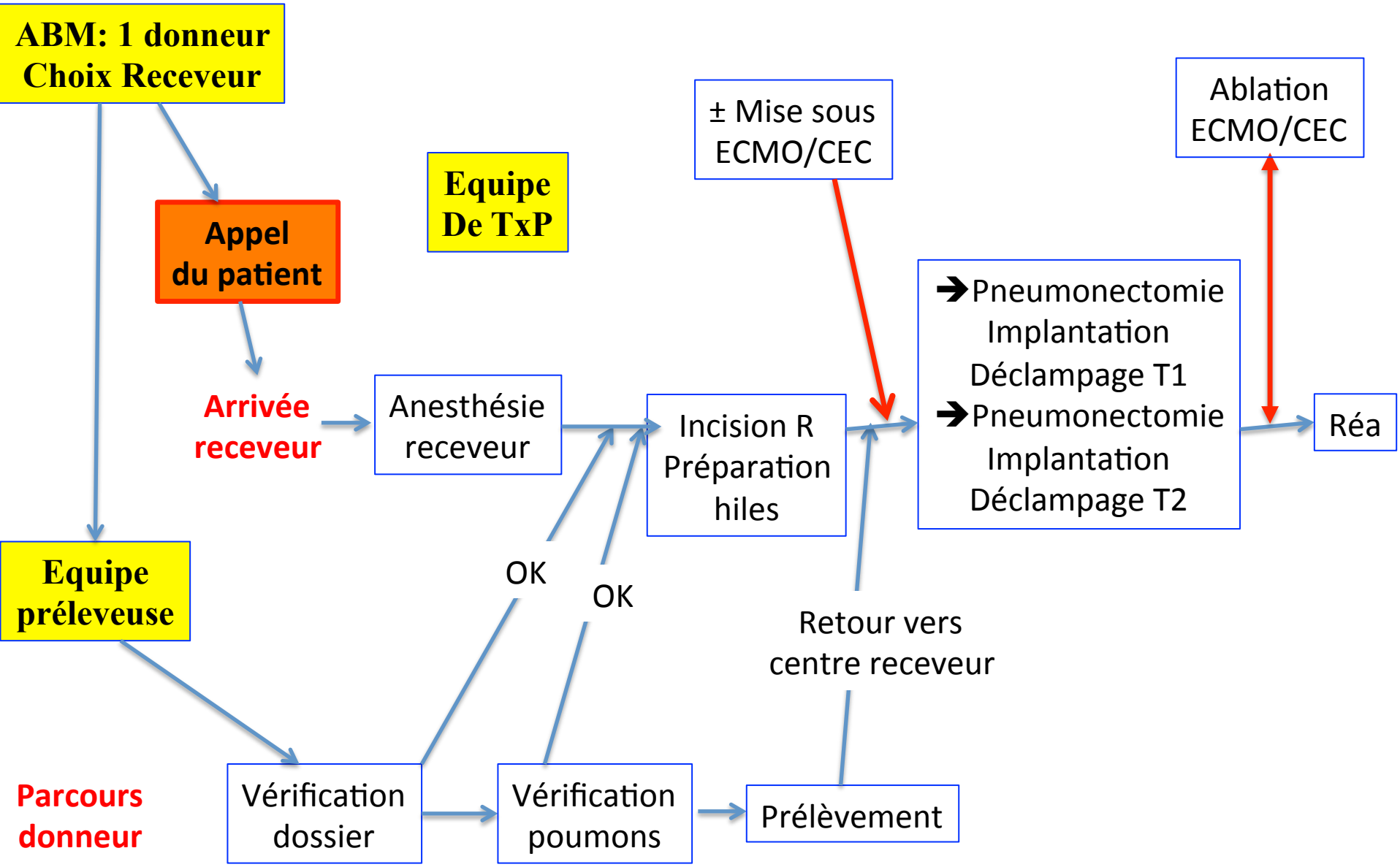
<u>Taille poumon</u> :

Acceptation 75 à 125%

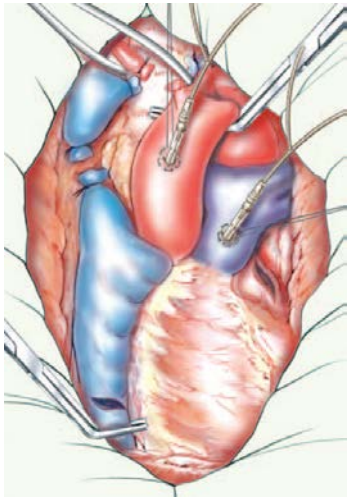
<u>Taille bronche/artère</u>

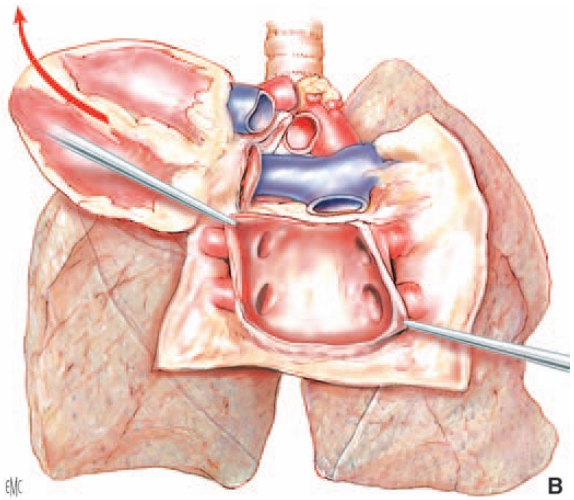
Vues macro des poumons (R- D)

Circuit expliqué au patient et sa famille



Equipe préleveuse: Validation greffon, prélèvement et transport





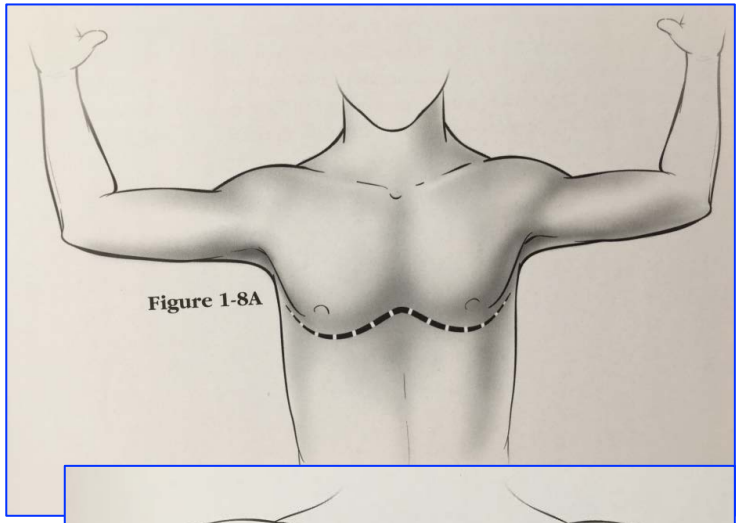
Equipe du receveur: Déroulement de la Transplantation

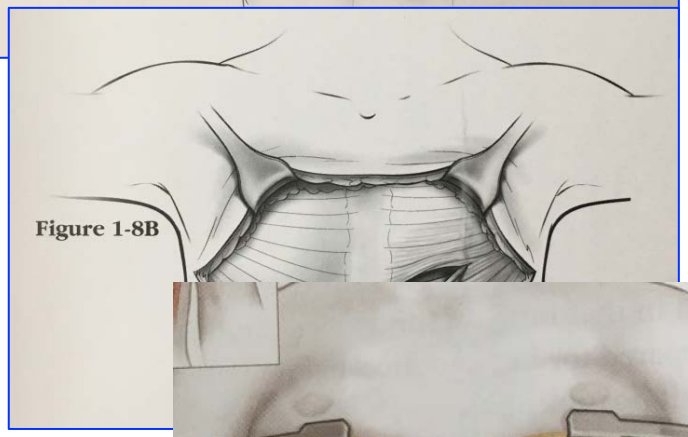
Anesthésie → **Chirurgie**

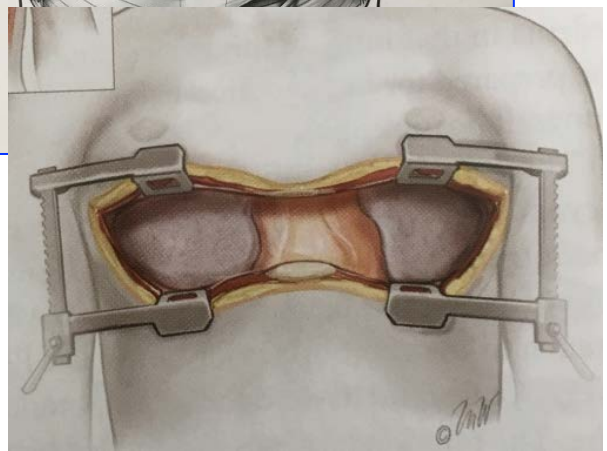
1h30 à 2h avant Acceptation définitive des greffons
= Anesthésie et Préparation du receveur

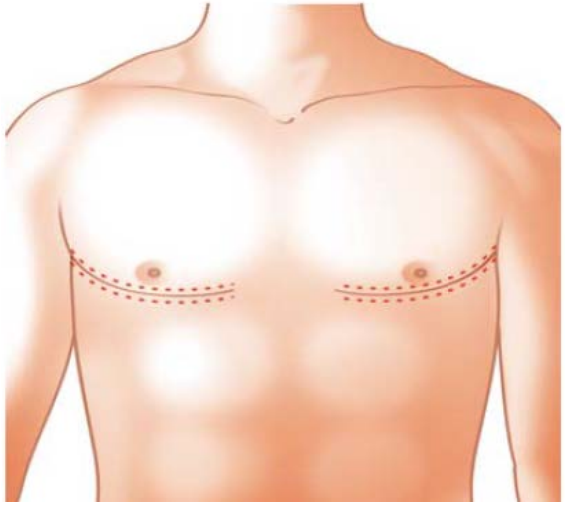
Acceptation définitive des greffons
= Début d'intervention

Dès l'acceptation: Voie d'abord pour une Tx bi-Pulmonaire: Clamshell ou bi thoracotomie antérieure



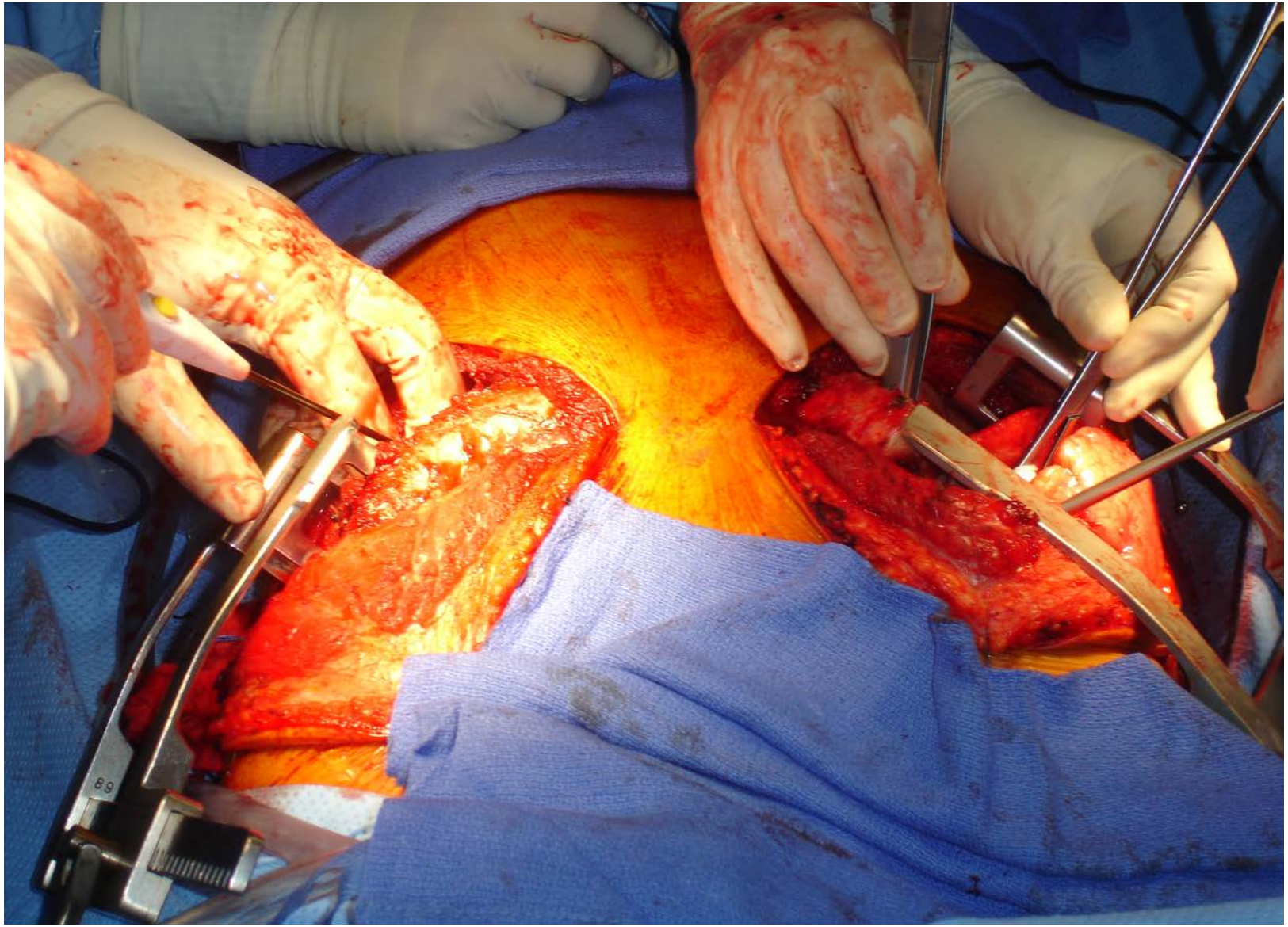






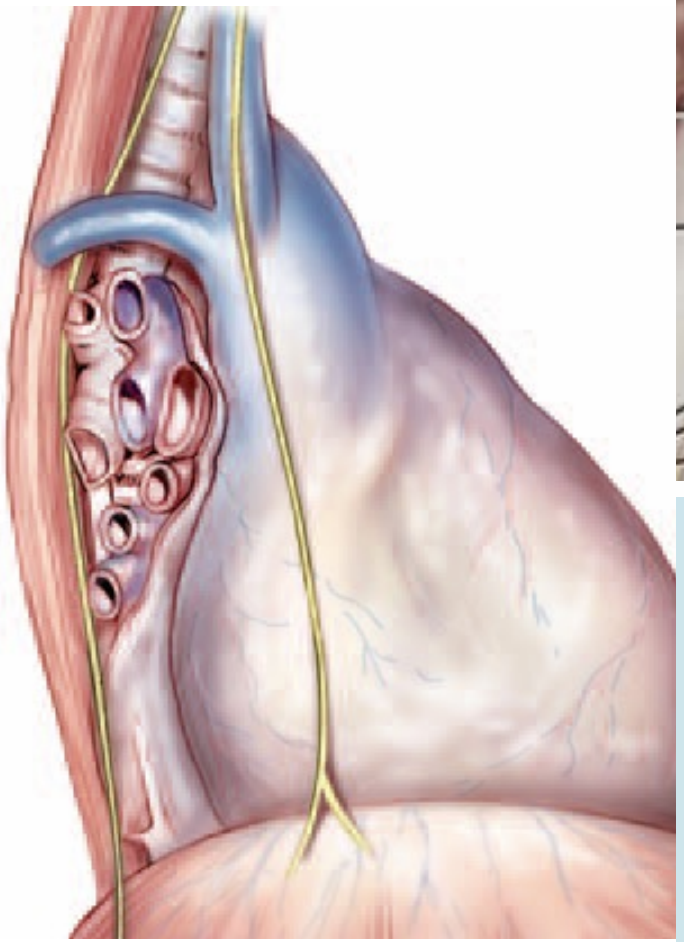
Selon difficulté technique: pneumolyse ..

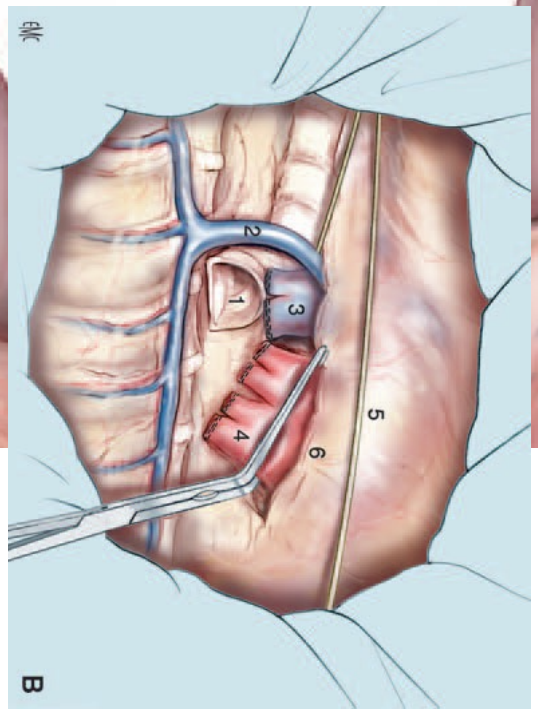
Voie d’abord

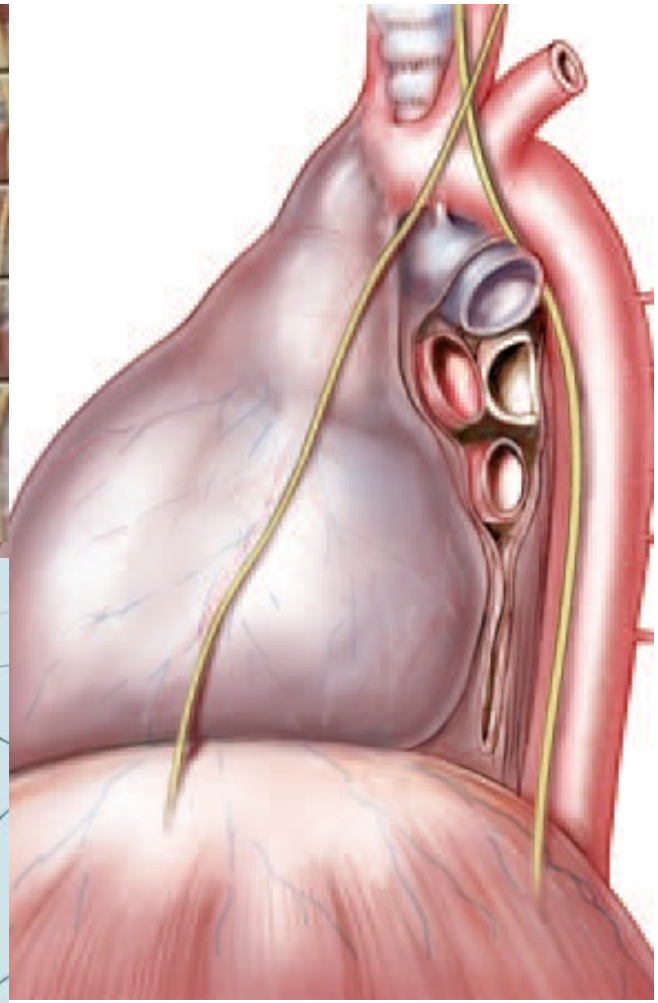


Voie d’abord pour une Tbi-Pulmonaire

Dissection des hiles et test d'exclusion d'un poumon







Arrivée des greffons
Rétroperfusion et séparation

En même temps que l'Arrivée des greffons

<u>Si mauvaise tolérance du clampage:</u>

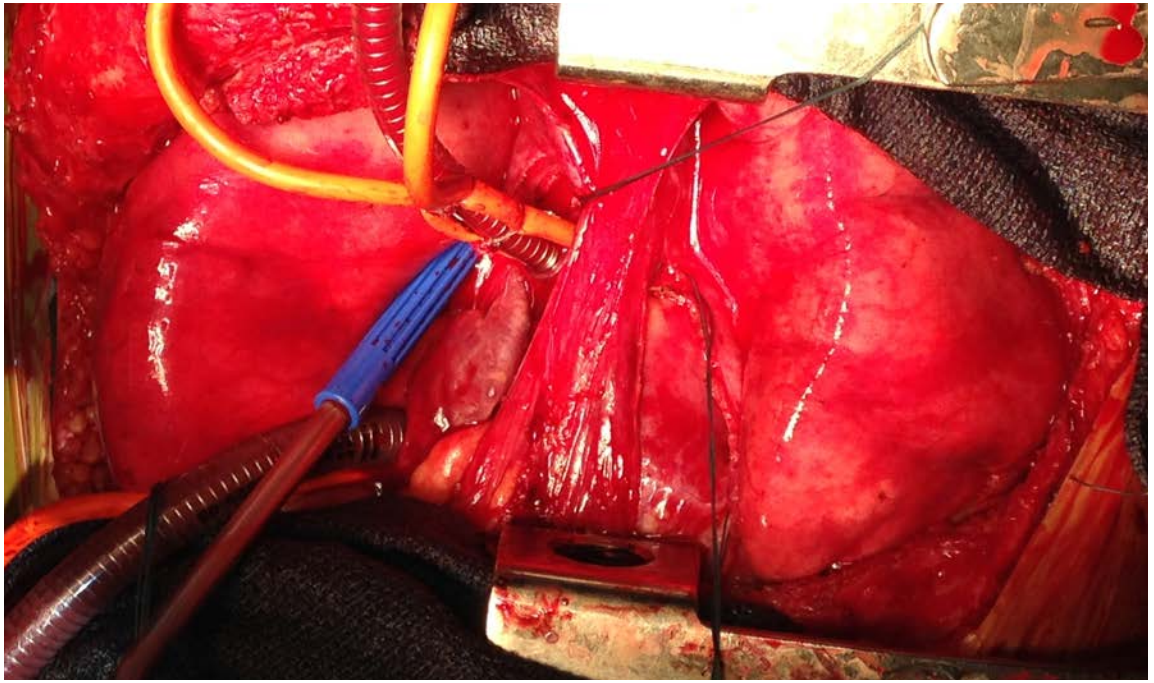
mise d'une assistance circulatoire

Assistance normothermique sans arrêt circulatoire

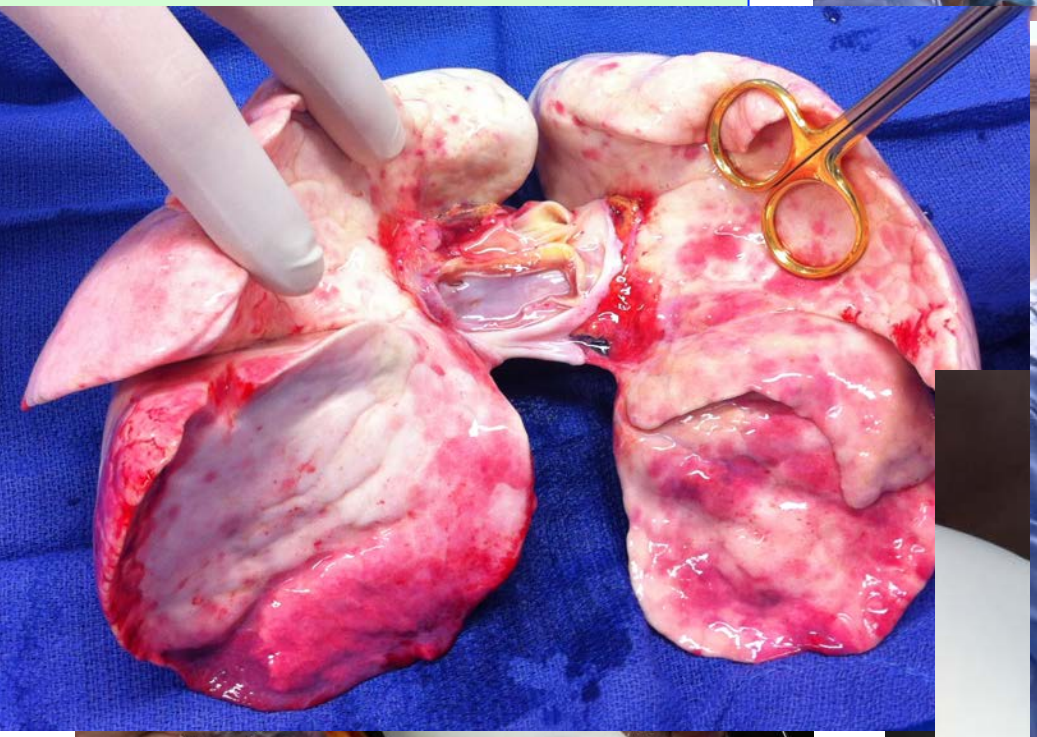
canulation centrale ou périphérique

Assistance Veno-veineuse: avant TxP si défaillance respiratoire: mise sous SU

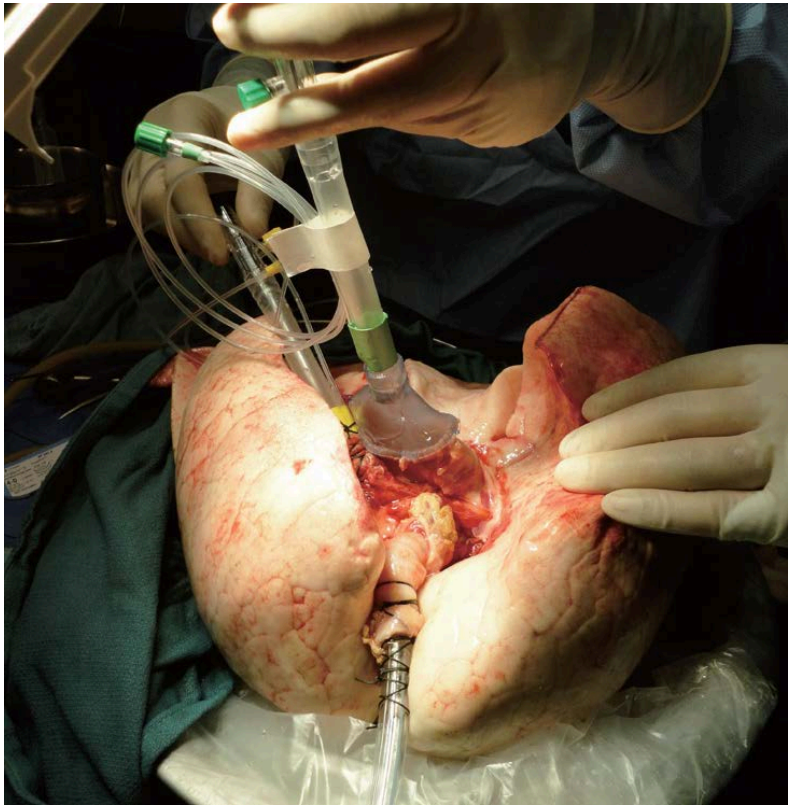
après TxP si SDRA/

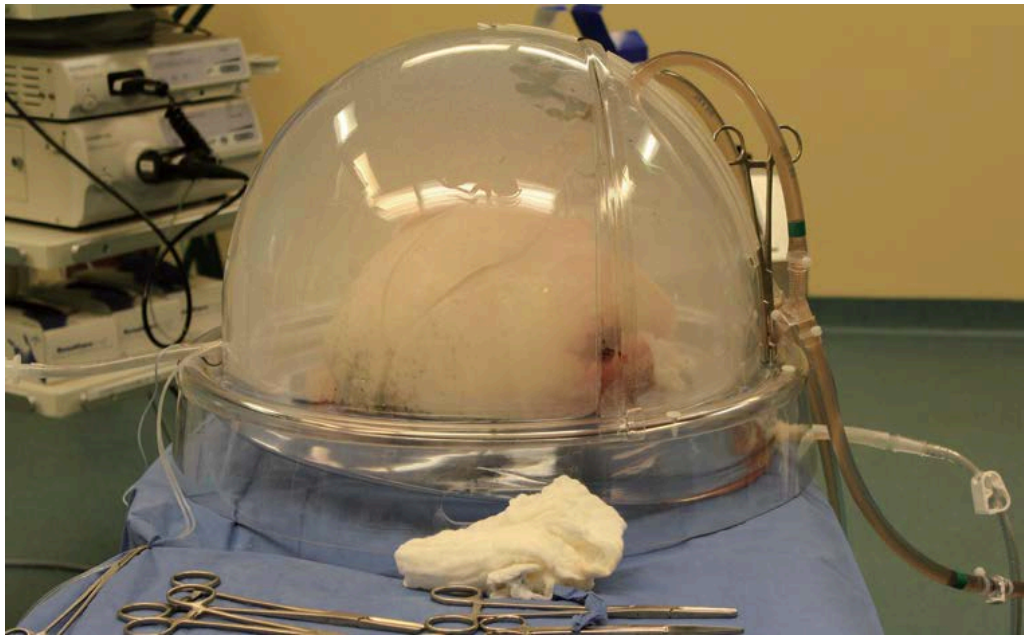


Bons Greffons => préparation avant implantation



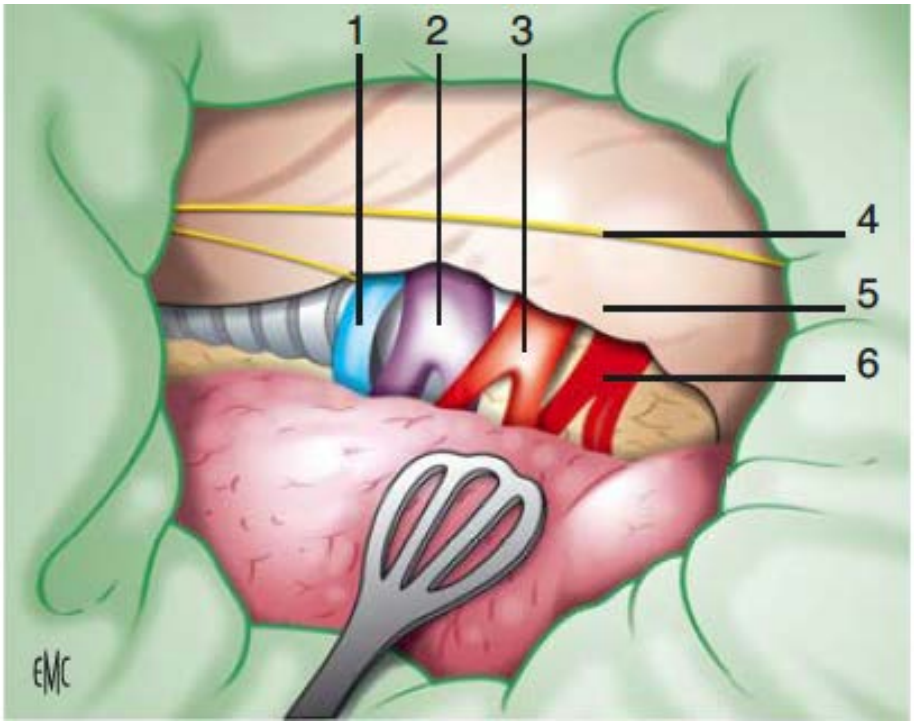
Greffons douteux =>
Reconditionnement Ex Vivo



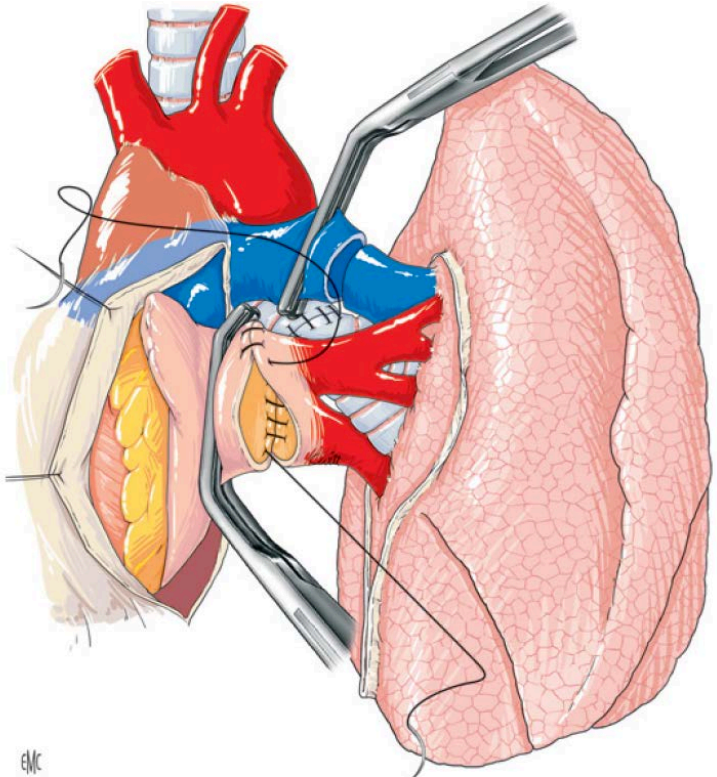


Cypel M. N Engl J Med 2011;364:1431

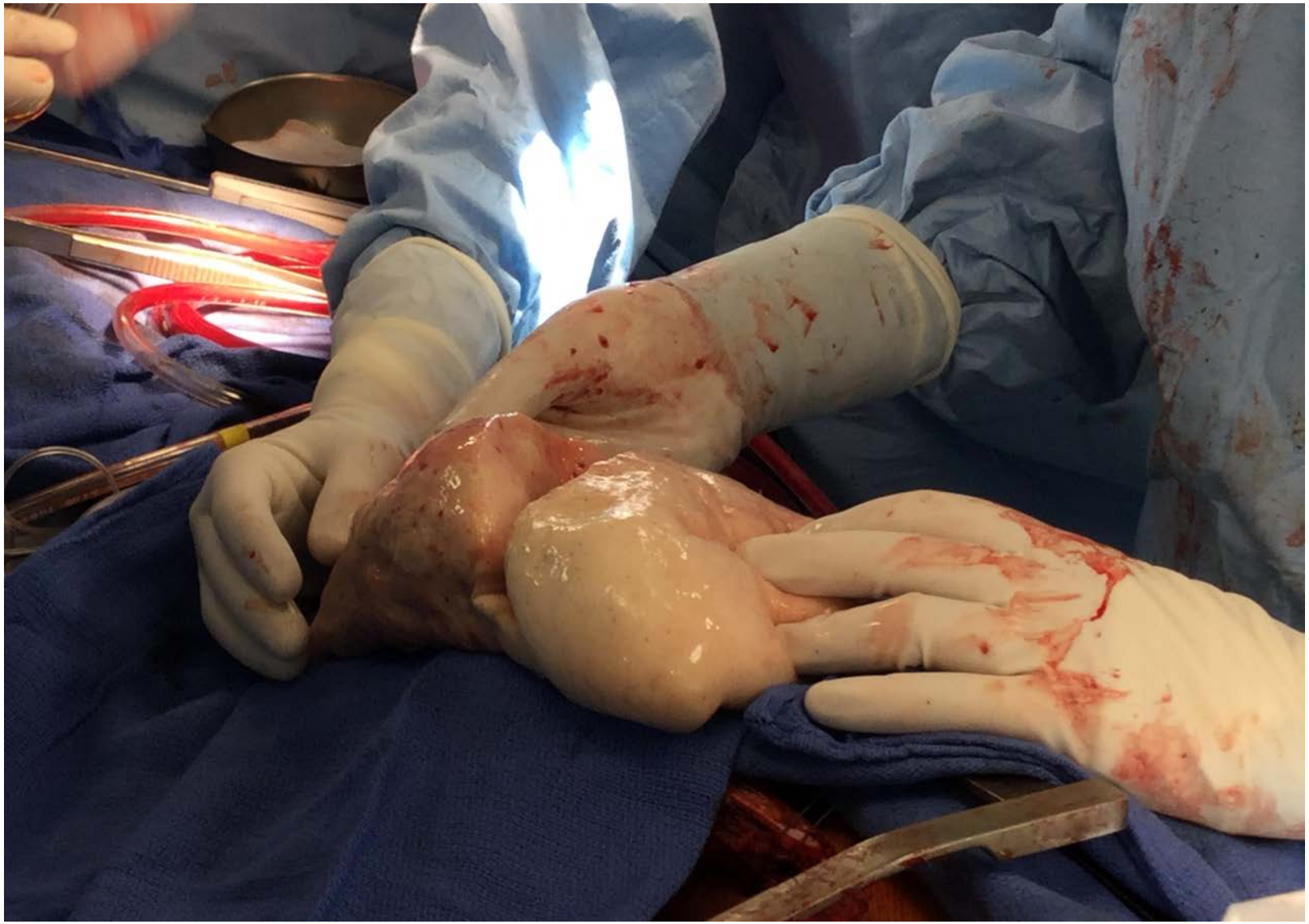
Pneumonectomie :
dès que les greffons sont en salle d'opération !



Avec ou sans ECMO

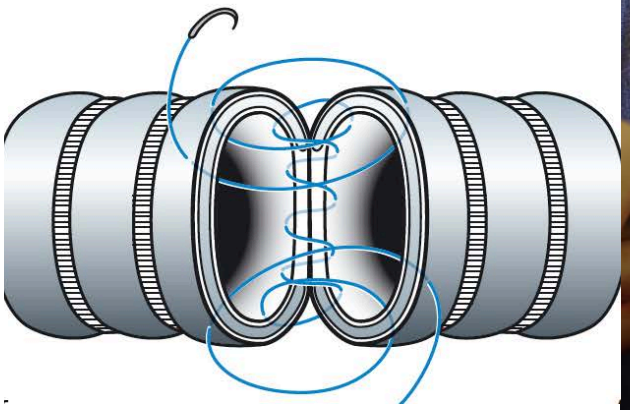


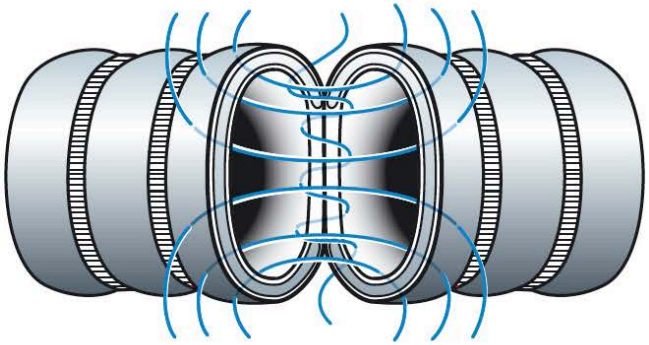
Implantation: Greffon reperfusé puis section bronchique

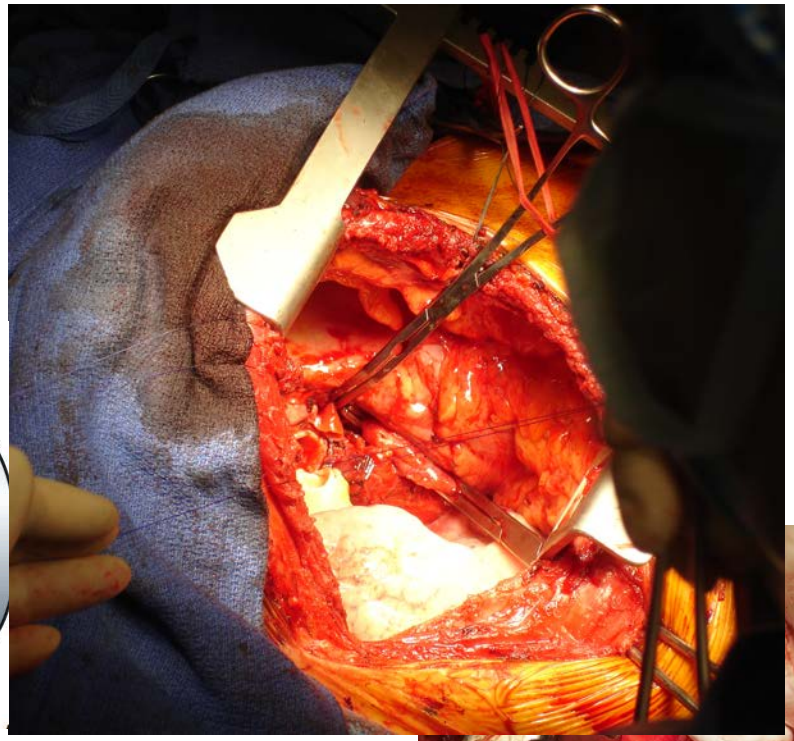


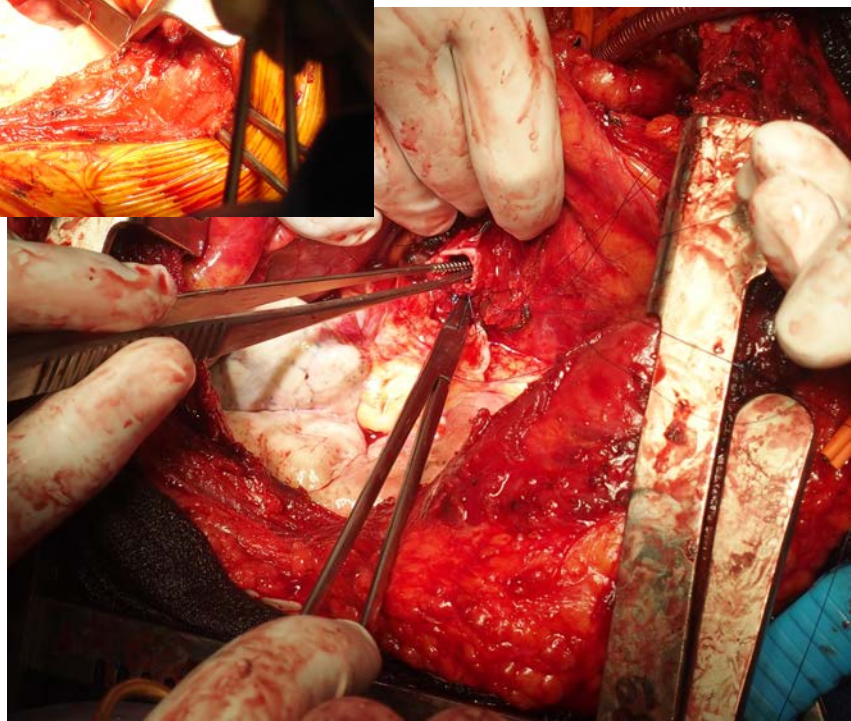
1er temps anastomose bronchique

Glace dans la cavité
Pleurale puis

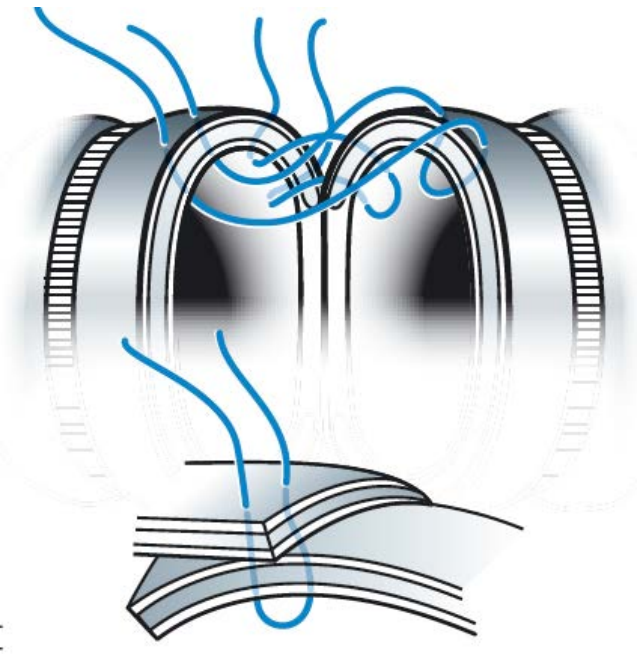


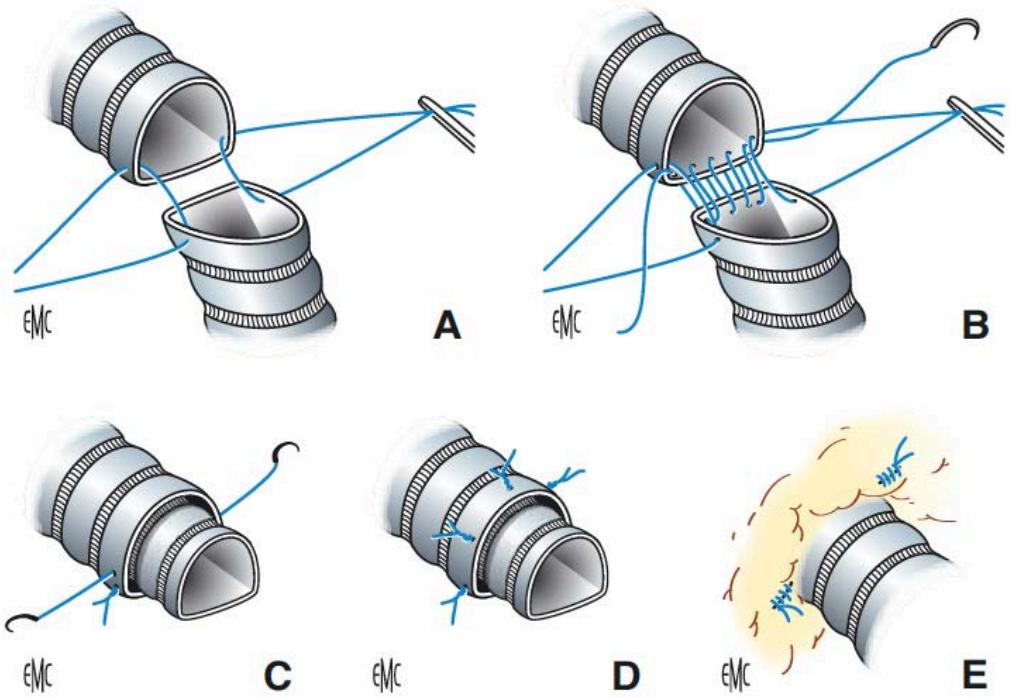




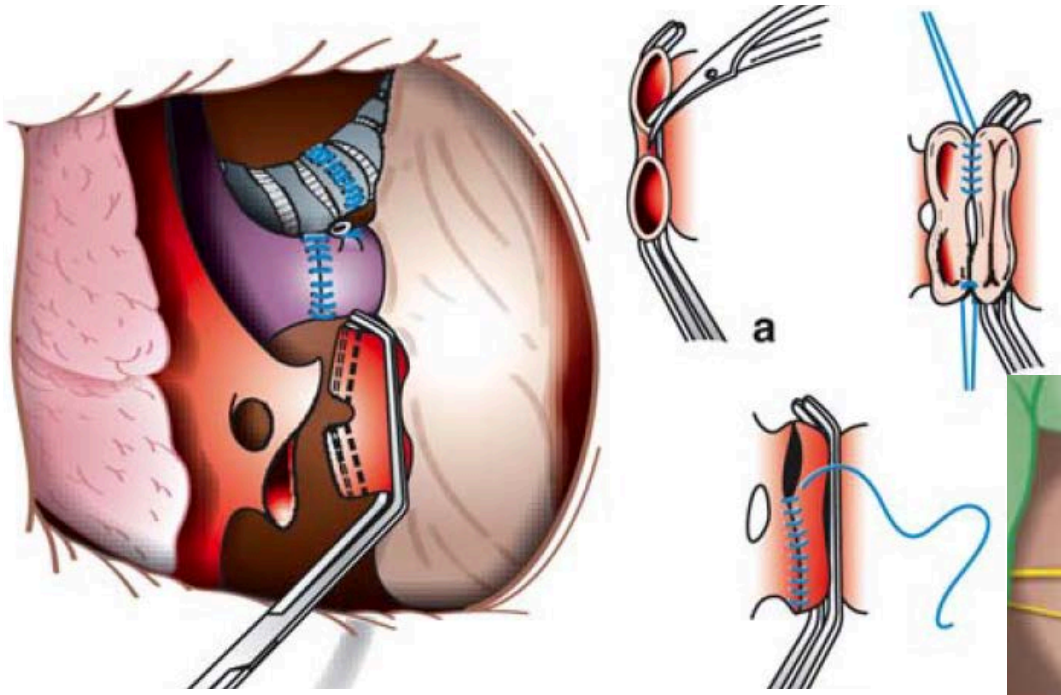


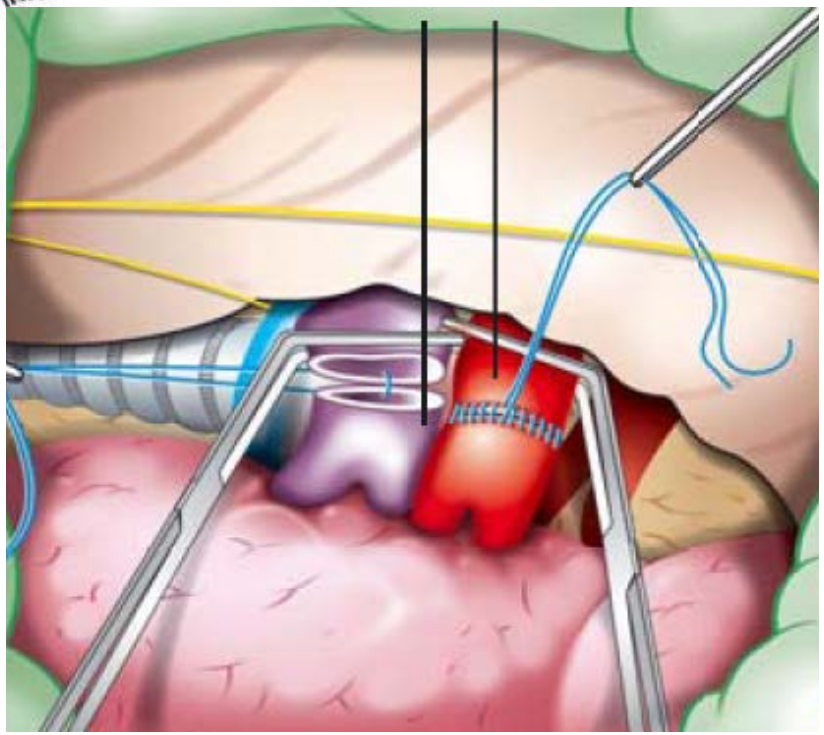
Si incongruence majeur: technique d'intussusception





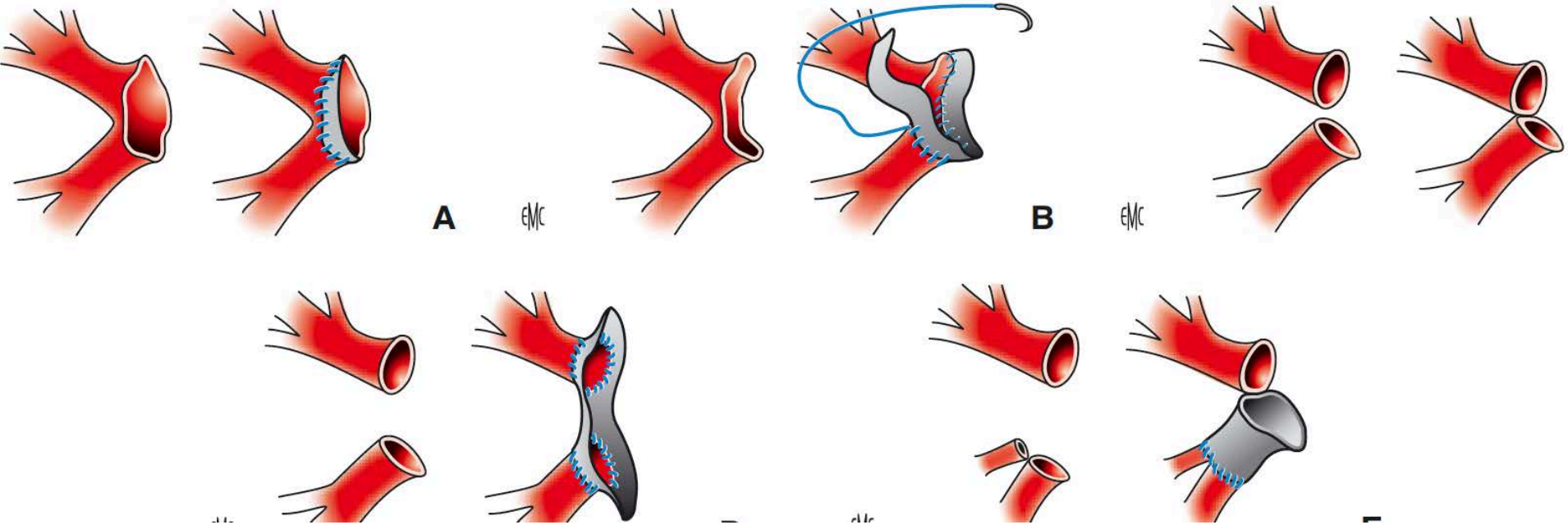
Puis Suture Veineuse : prévision purge



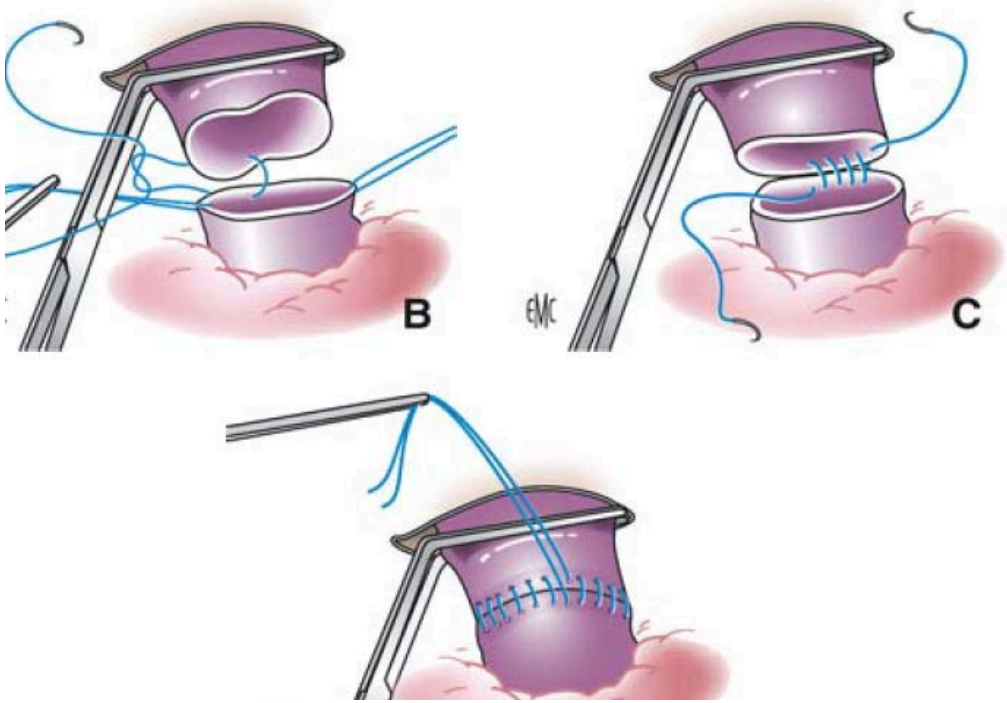


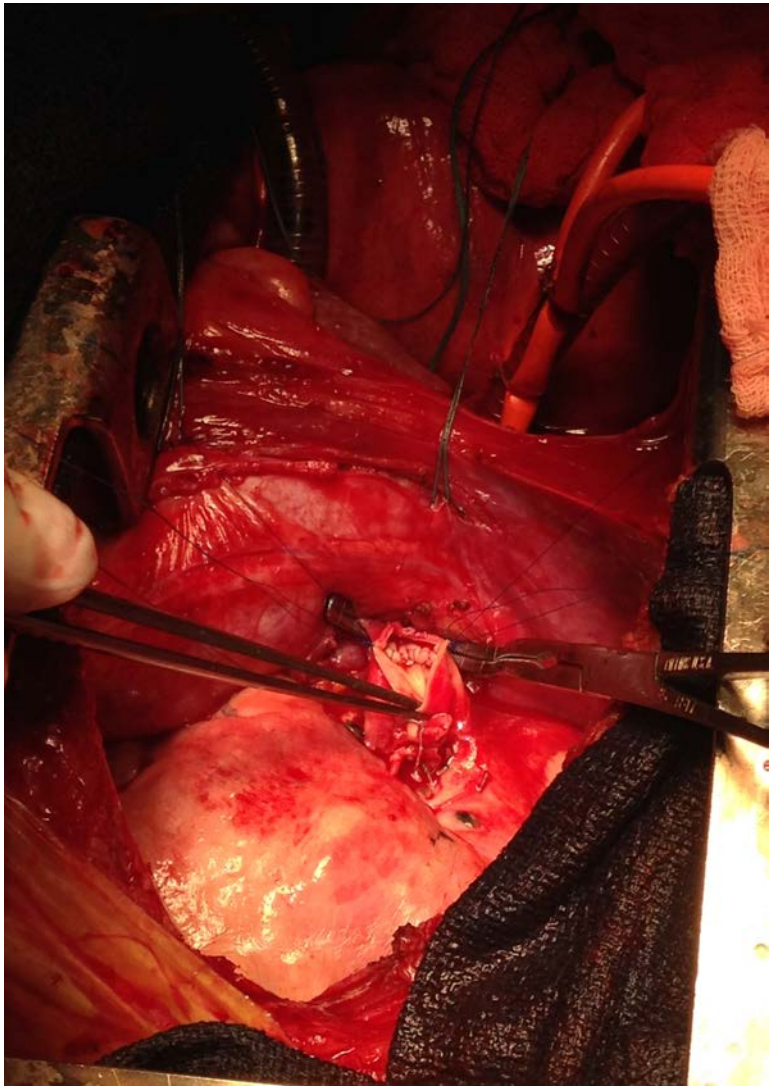
D'Journo EMC technique chirurgicale

Techniques de Reconstructions veineuses

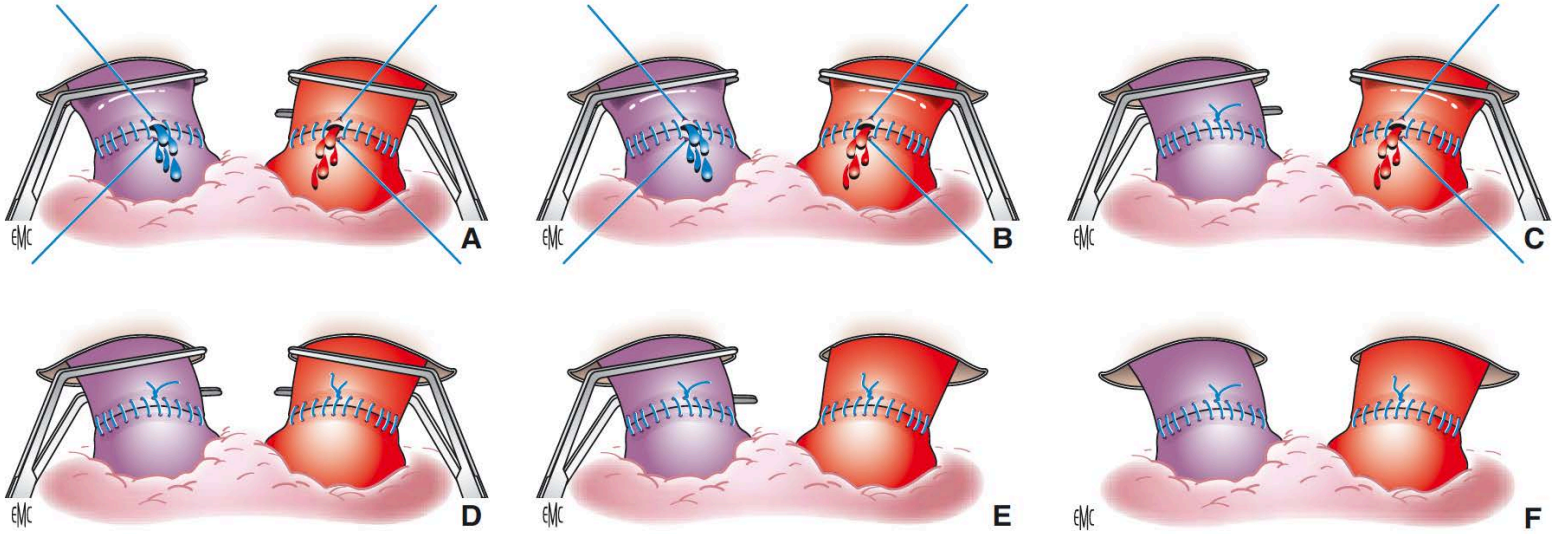


Puis Suture artérielle: prévoir purge !

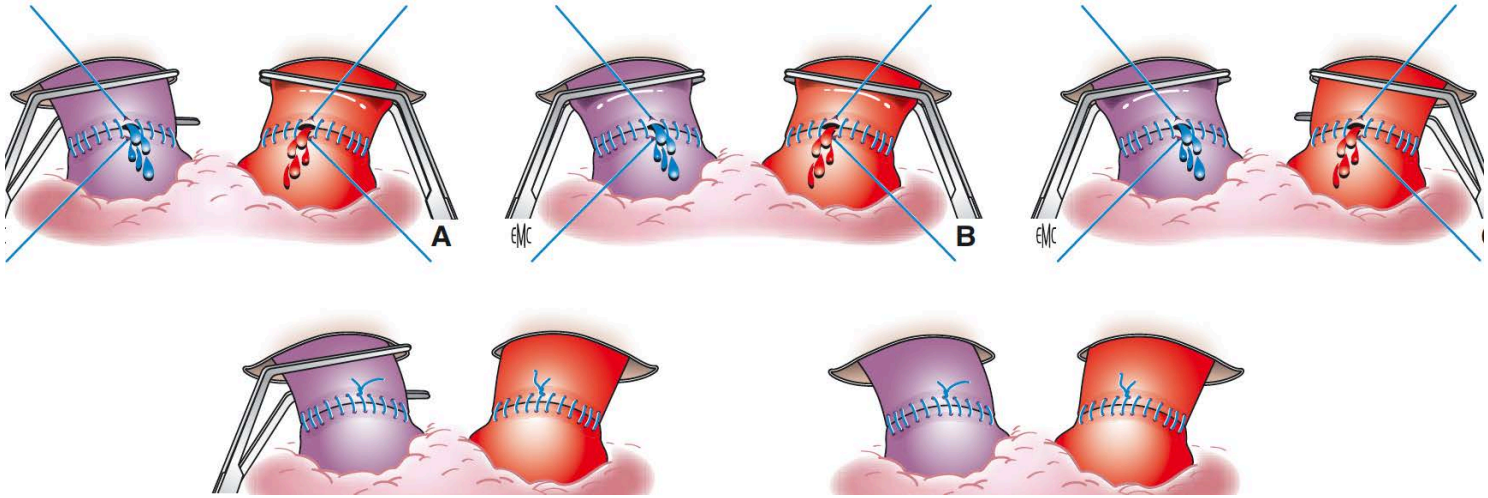




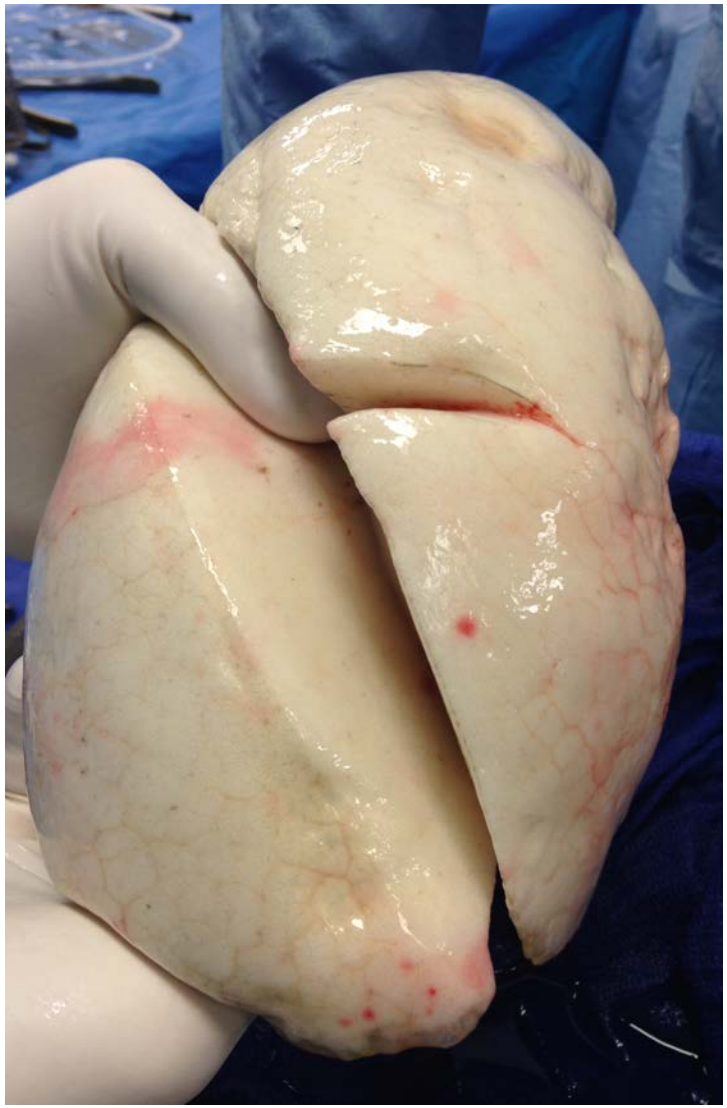
Purge rétrograde

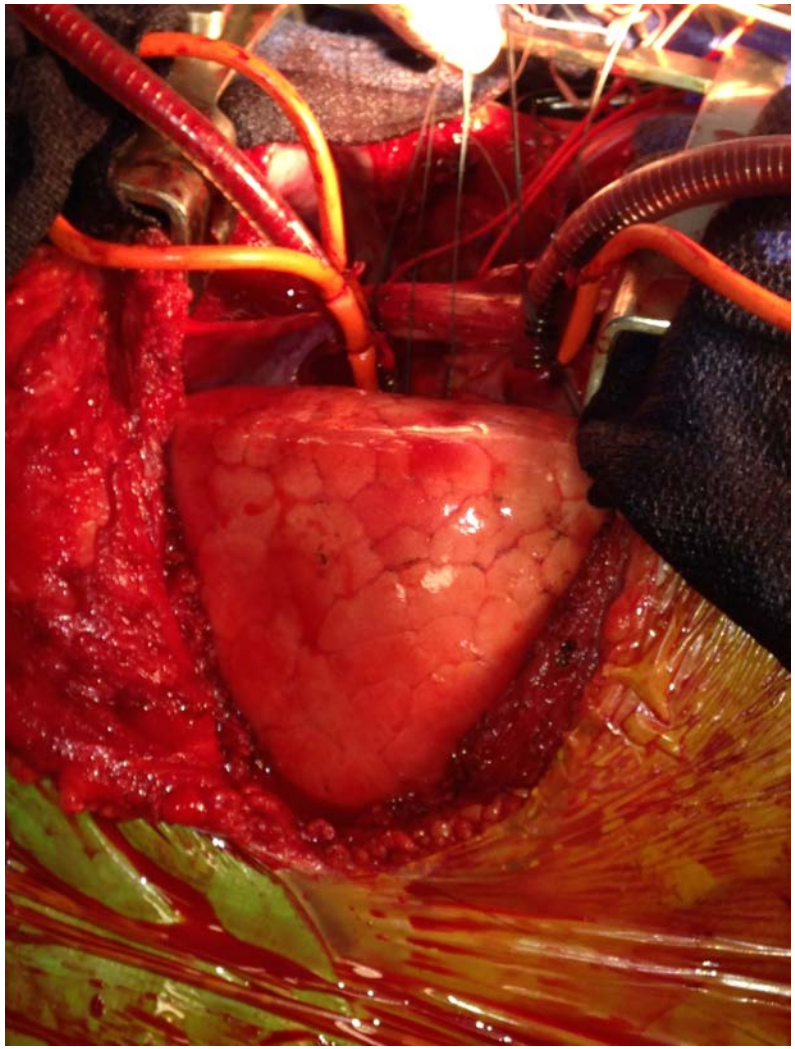


Purge antérograde



Evolution après déclampage





implantation monopulmonaire
L'une après l'autre

Fin d'implantation
Sevrage ECMO ou CEC si bonne gazométrie

Ablation ECMO
Hémostase soigneuse (Risque ↗ sous ECMO ou CEC)

Si mauvaise tolérance : maintien de l'ECMO périphérique

Double Drainage et fermeture pariétale

Cicatrice Clamshell (à distance)

Transplantation monopulmonaire

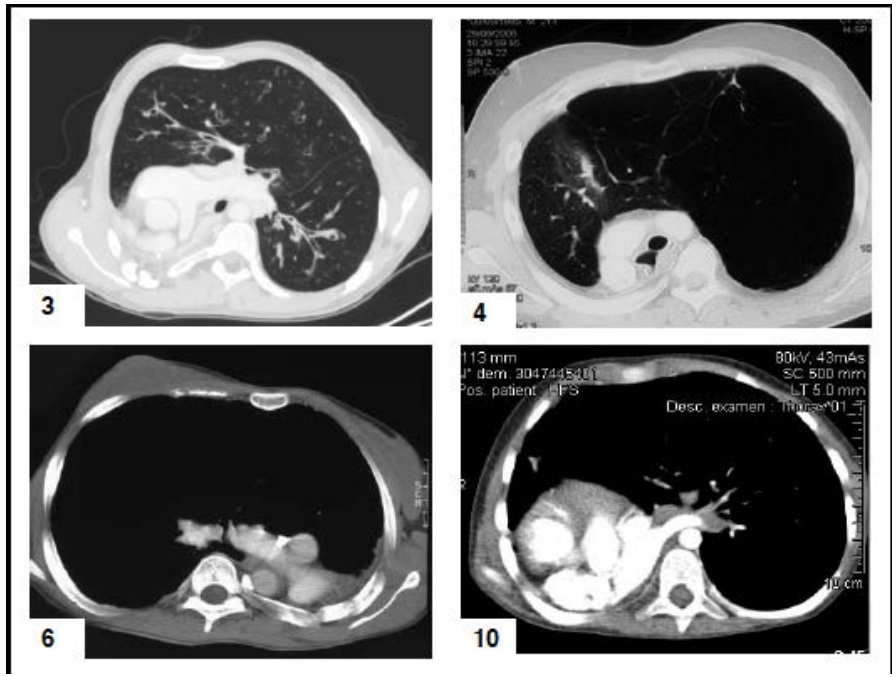
<u>Décubitus semi latéral</u> ;

Thoracotomie 4ème ou 5ème EIC
Test d'exclusion et clampage ➔soit pas l'ECMO ou CEC
➔soit nécessité d'ECMO ou CEC

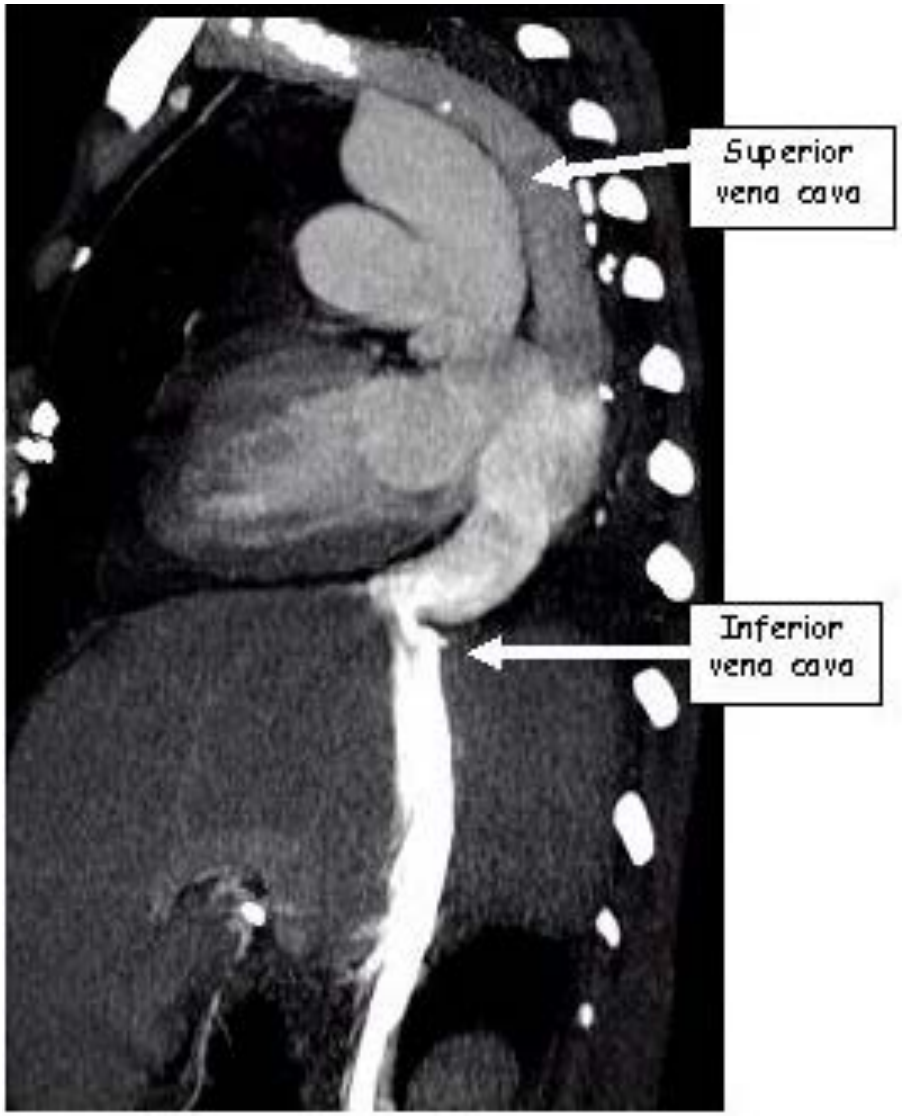
<u>Technique habituelle</u> : Bronche➔Veine➔Artère

<u>Situations particulières</u> :

TxMonopulm Post pneumonectomie



Transplantation monopulmonaire particulière

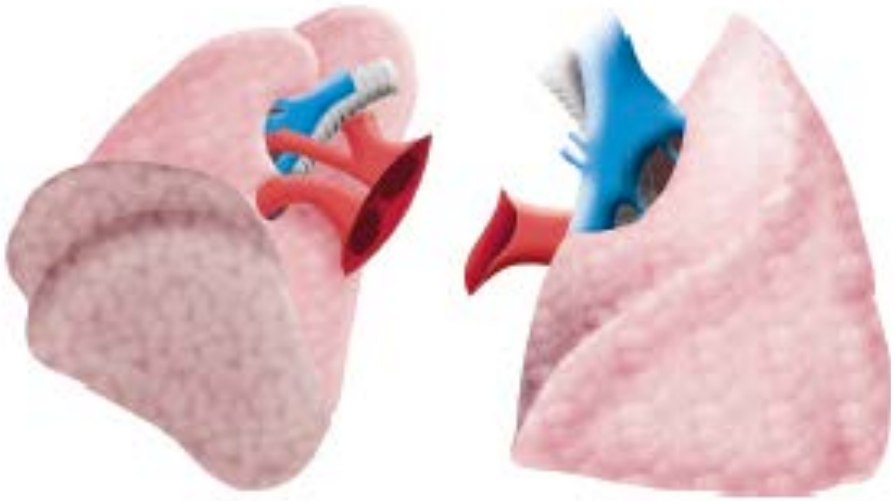


Transplantation lobaire donneur cadavérique

Prévue d'emblée lors acceptation greffon ++++
Décidée en per-opératoire

Préparation sur « Back Table ++++
Lobectomie in situ

Les scissures +++
TDM Thoracique



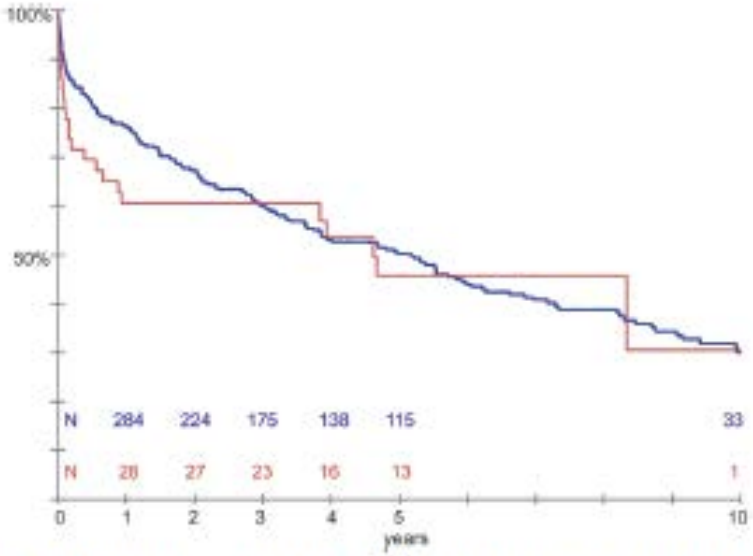
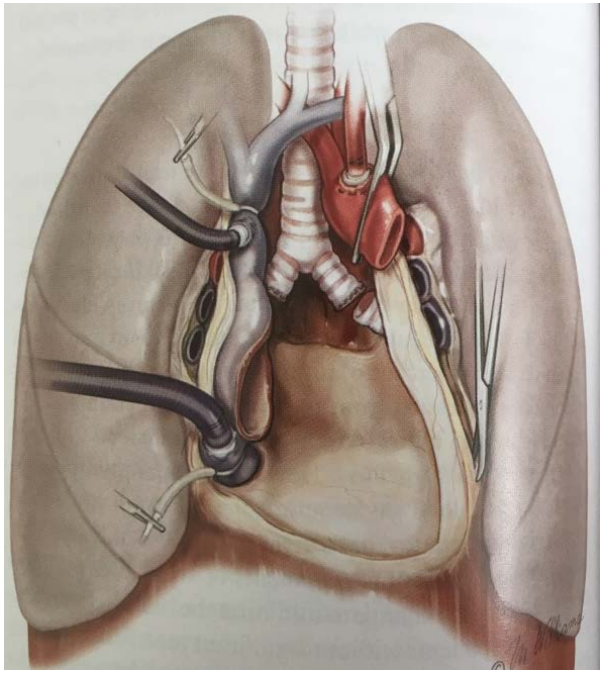


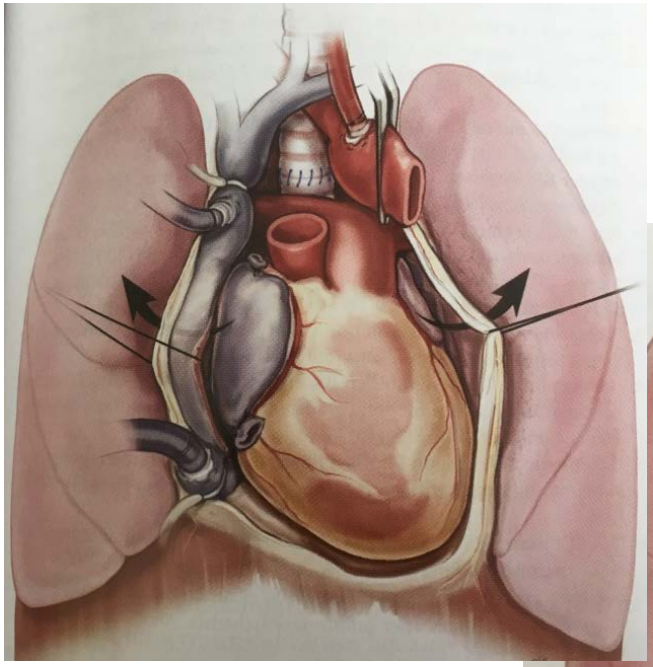
Figure 5: Overall survival established with the Kaplan–Meier method. In red, survival of the LLT group; in blue, survival of the cohort of all other LT. *N*: number of patients at risk.

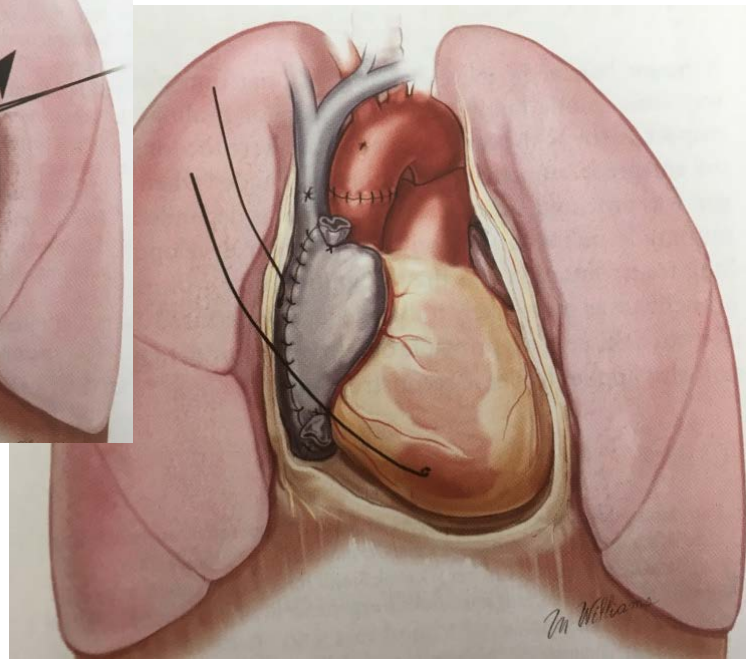
Mitilian Eur J CardioThor Surg 2013: 1

Transplantation lobaire donneur vivant

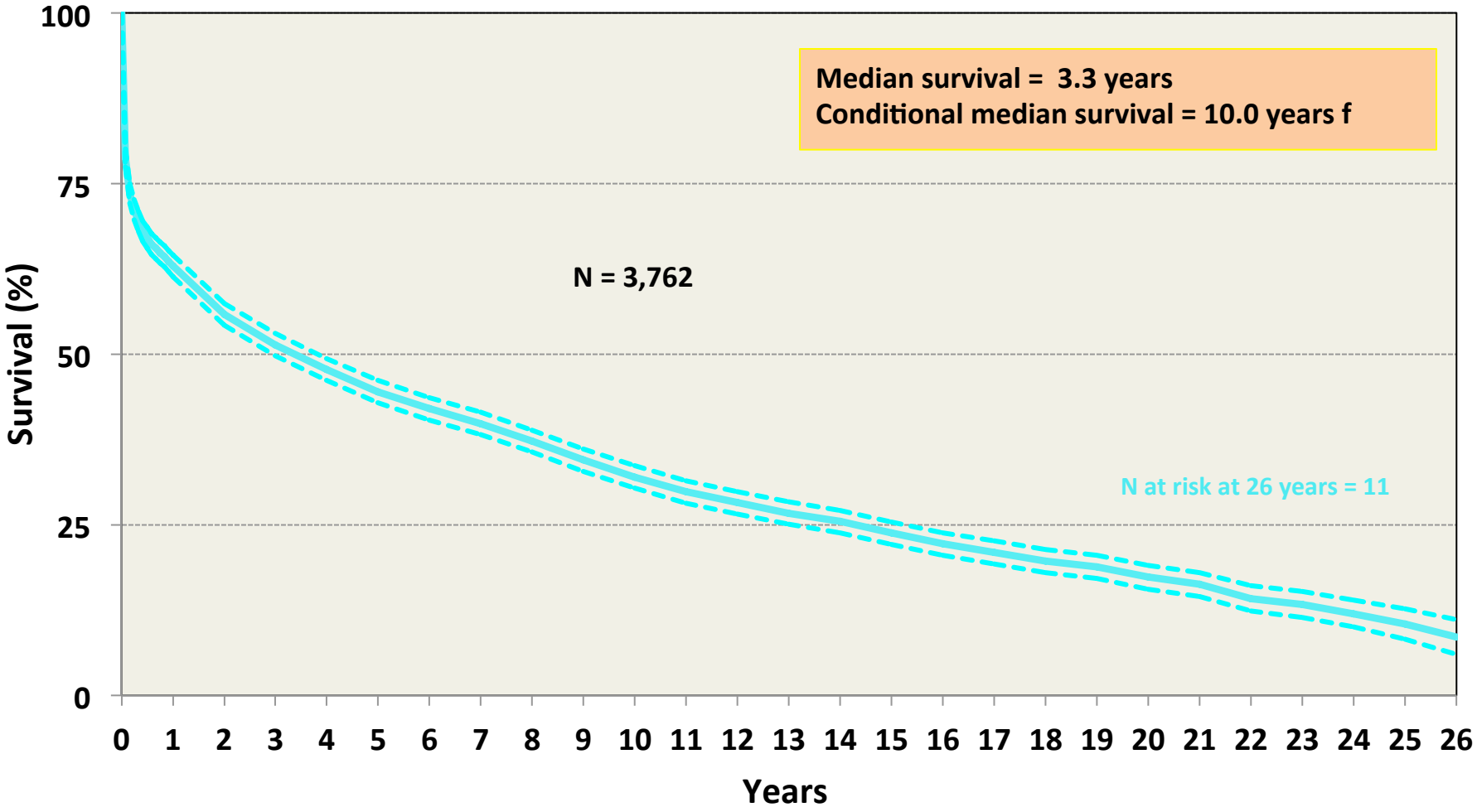
Transplantation Cœur poumon







Adult Heart-Lung Transplants
Kaplan-Meier Survival
(Transplants: January 1982 – June 2013)



2015

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Complications chirurgicales

Saignement postopératoire:

Surtout si CEC, pneumolyse, Hypervascularisation bronchique (mucoviscidose, maladie cardiaque congénitale) ou ganglions lymphatiques hypervascularisés)

TT PFC, Transfusion plaquettaire, ….. Reprise chirurgicale (si médiastin post: thoracotomie postérieure)

Complications bronchiques: 12 à 15%

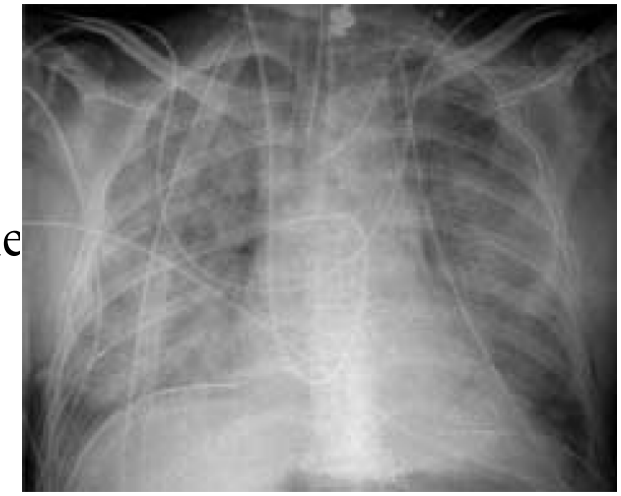
mortalité 2 à 3%

Ischémie muqueuse au delà anastomose

Évolutivité variable

TT Toilette ouvrant les bronches, déhiscence partielle

Si borgne ou drainée



Complications chirurgicales (2)

Complications des anastomoses:

Plicature par excès de longueur; twist de l'anastomose, Sténose, caillots, thrombose aigue et perte du greffon,

TT : si doute réexploration (dilatation ?)

Complications des nerfs du thorax:

paralysie phrénique habituellement transitoire

30% de Tx Bilatérales

45% TxCPulm

Paralysie des pneumogastriques : ralentissement vidange gastrique, RGO … risque de BO: pensez au Nissen si RGO

Oedème de reperfusion : par ischémie – reperfusion (dans les 24 à 72h)

mortalité de 2 à 5%

Conclusions: TxP = activité d'équipe

Bonne collaboration Anesthésiste/perfusionnistes et chirurgiens ++++

Techniques implantations standardisées au sein des équipes

ECMO perop : TxP en toute sécurité (saignement)

Symphyses pleurales et ATCD chir :

Compliquent et rallonge le geste
↗ morbidité

Suivi post op en réa : les chirurgiens doivent être impliqués
Suites assez habituelle de chir thoracique programmée