Chirurgie mini-invasive :
un nouveau standard en oncologie thoracique !

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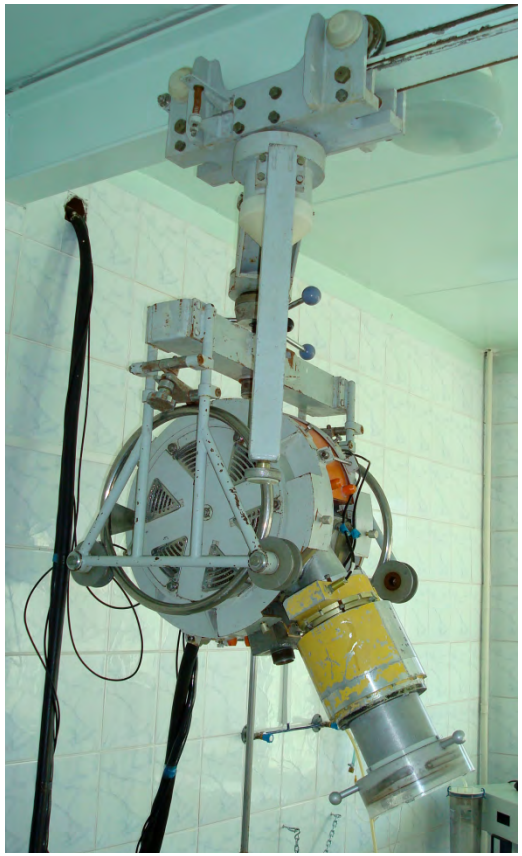
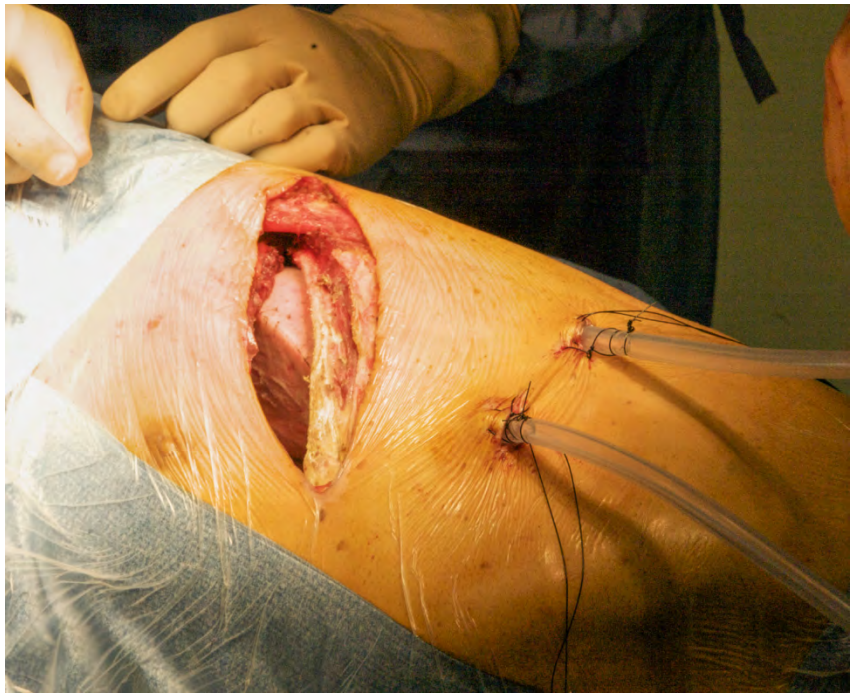


Tomothérapie

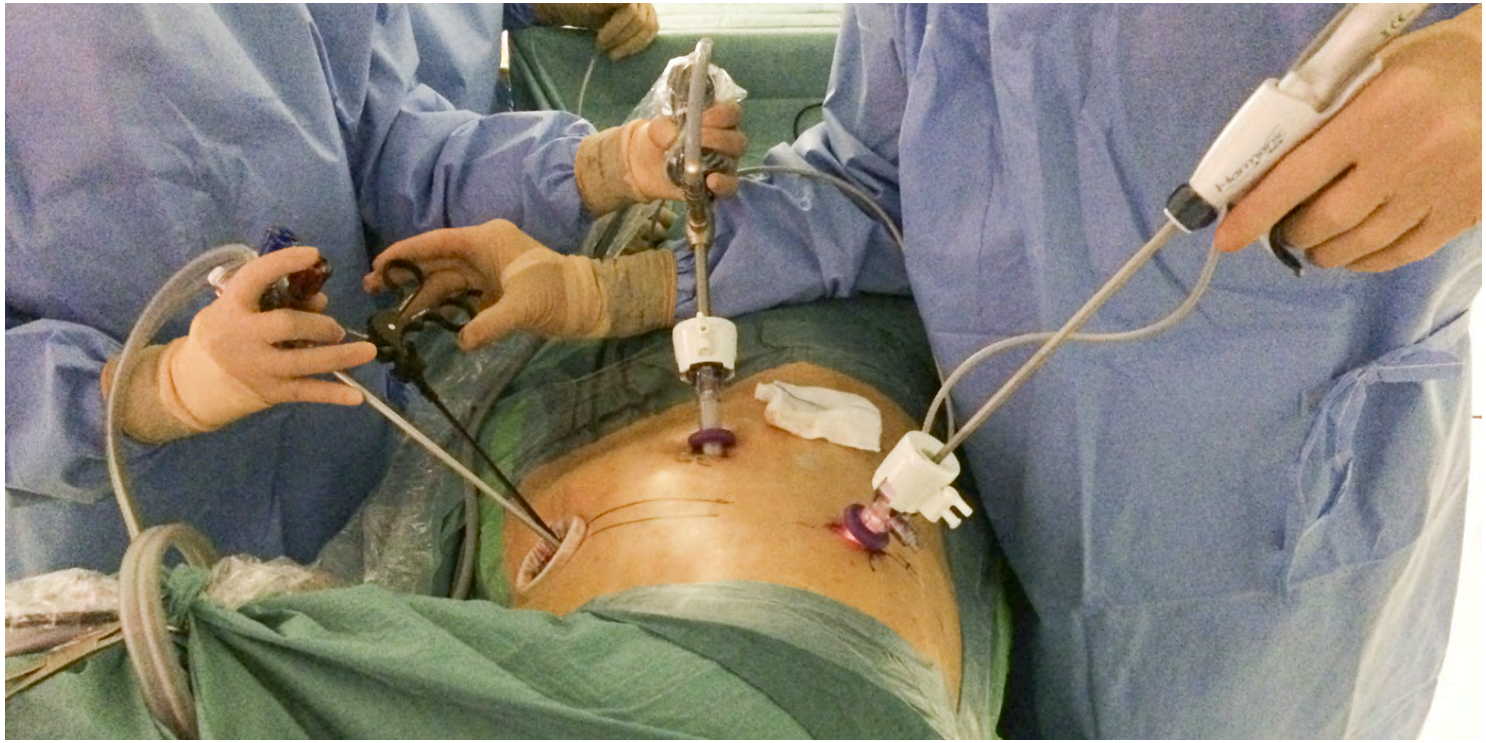
Stéréotaxie

Caractéristiques de la chir thor mini-invasive

- Abord par trocarts et/ou incision « utilitaire » sans écartement intercostal
- Vision indirecte par moniteurs
- Instrumentation dédiée
- Dissection et ligature élective des structures hilaires



Chirurgie par vidéothoracoscopie



Single port ??

Pas d’avantage factuel par rapport à l’abord par 3 voies !!

Indications potentielles

- Stade I clinique
  - TDM et TEP
  - médiastinoscopie ou EUS / EBUS préopératoire
- Taille inférieure à 5 cm
- Topographie périphérique (fibroscopie négative)
- Malade à risque (thoracoscore)
- Fonction pulmonaire altérée :
  - VEMS et DLCO/VA < 60% -
  - ppoVEMS et ppoDLCO/VA < 40%

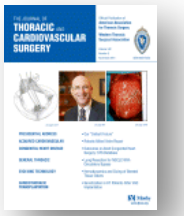
Lobectomie mini-invasive : les faits

- Est entrée dans les pratiques courantes
- Morbidité post-opératoire diminuée
- Résultats oncologiques identiques

La lobectomie par VATS est devenue une pratique courante

STS general thoracic database

40%



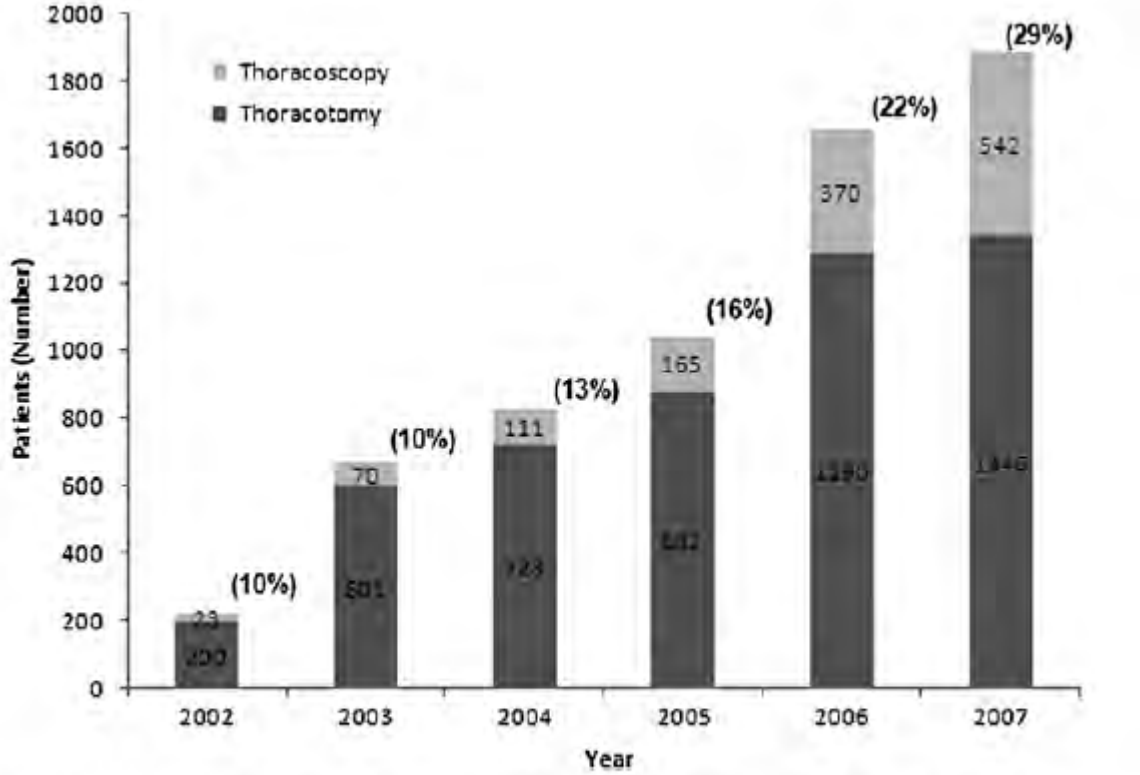
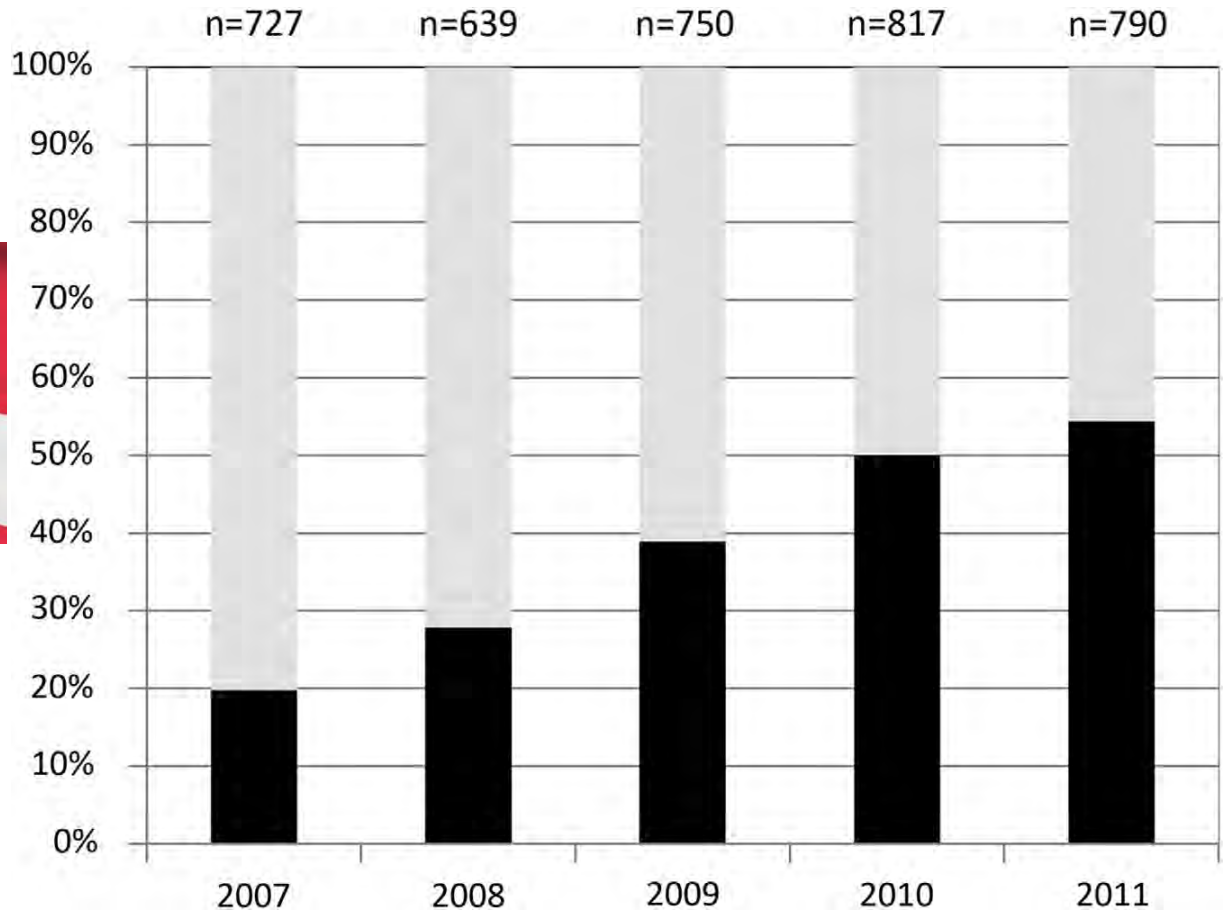


FIGURE 1. Lobectomy by thoracotomy or thoracoscopy by year in Society of Thoracic Surgeons (STS) general thoracic database.

Paul S et al. J Thorac Cardiovasc Surg 2010;139:366-378

Danish Lung Cancer Registry

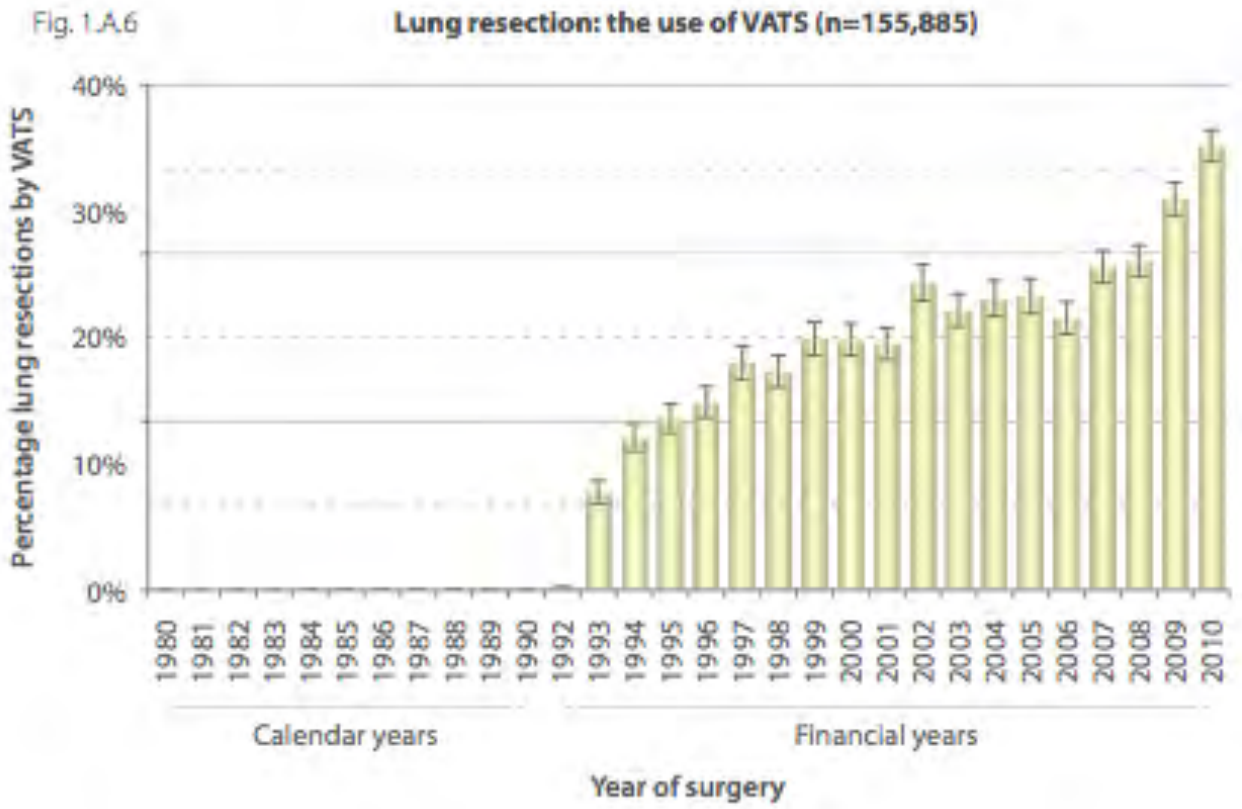
53%



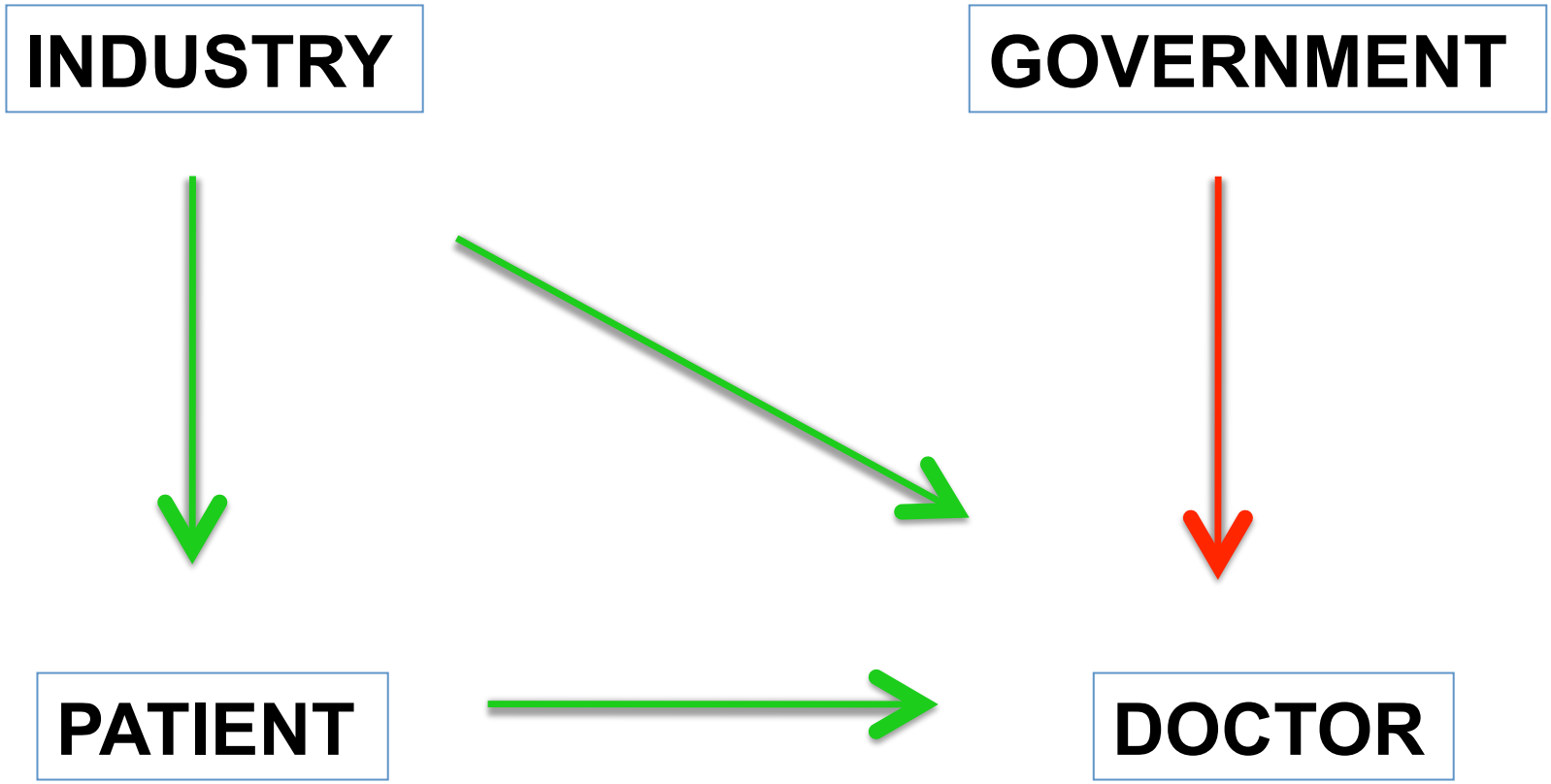
United Kingdom

Open *versus* **VATS lung resection**

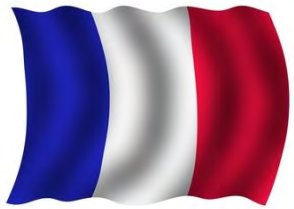
36%



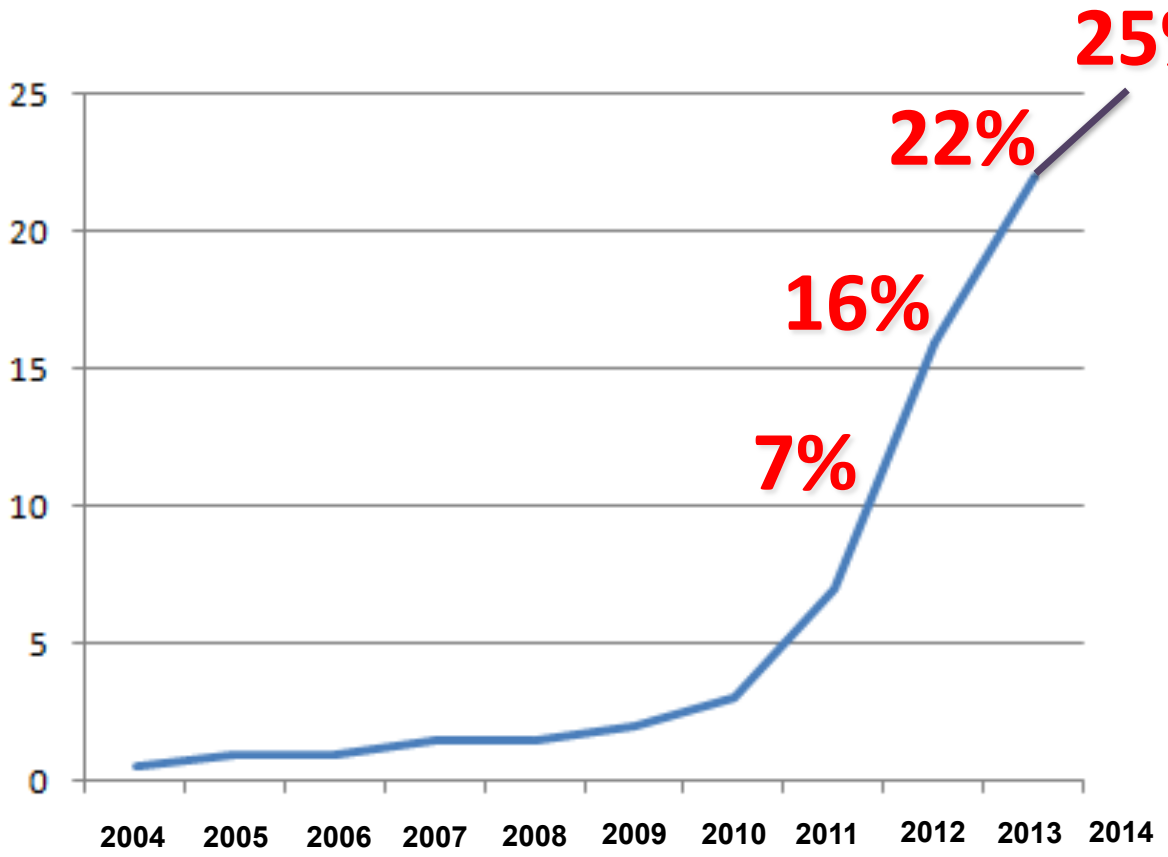
New technology :
COI and direction of pressure



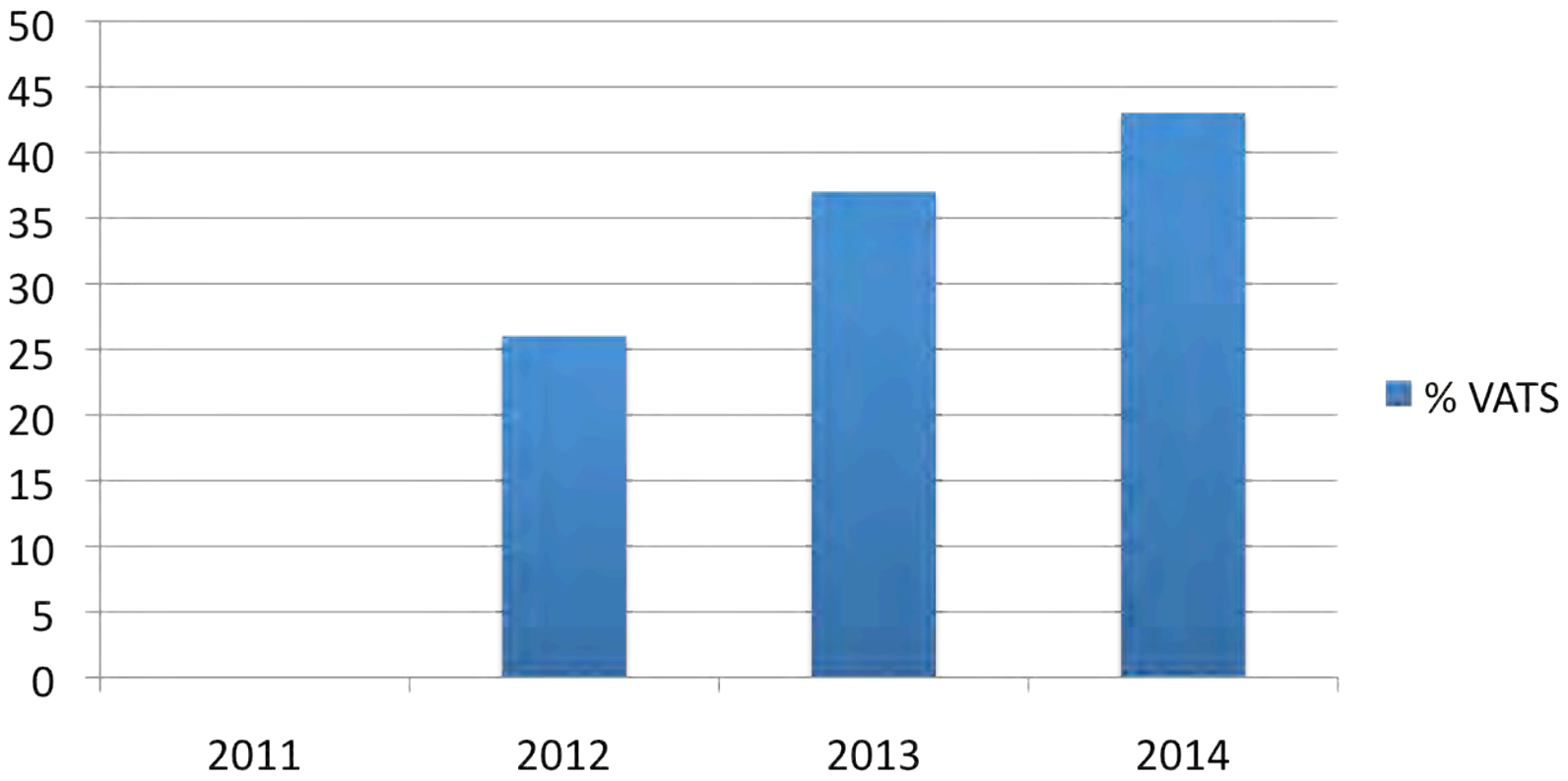
Epithor - France



25%



…et à Strasbourg ?



La VATS diminue la

morbidité post-op.

Avantages escomtés

Diminution de paramètres suivants

- Mortalité opératoire
- Morbidité post-opératoire
- Durée d'hospitalisation
- Consommation d'antalgiques
- Durée d'inaptitude

Contrôle des paramètres suivants

- Coût
- Risque oncologique

3 larges études disponibles

- Whitson et al « systematic review »
- Paul et al « propensity matched »
- Cao et al « meta-analysis »

Whitson et al, Ann Thorac Surg 2008;86:2008-18
Paul et al, J Thorac Cardiovasc Surg 2012;139:366-78
Cao et al, Interact Cardiovasc Thorac Surg 2012;10:1-6

Morbi-mortalité

- Mortalité identique à la chirurgie ouverte
- Morbidité diminuée !

Morbidité %

	VATS	Thoracotomie	p
Whitson	16,4	31.2	0.018
Paul	26,2	34.7	< 0.0001
Cao	20,2	24,9	< 0.0001

Complications spécifiques (%)

	Thoraco	VATS	P
Respiratoires (tot)	12.2	7.5	0.001
Cardiovasc. (tot)	13.0	8.3	0.002
Réintubation	3.1	1.4	0.004
TACFA	11.5	7.2	0.0004
Transfusion	4.7	2.4	0.028

Paul et al. J Thorac Cardiovasc Surg 2010;139:366-378

Durée d'hospitalisation

Hospitalisation (jours)

	VATS	Thoracotomie	p
Whitson	8.3	13.3	0.016
Paul	4	6	< 0.0001
Cao	6.3	8.8	< 0.0001

Coût de l'opération

- Durée opératoire augmente d'environ 30 min
- Coût matériel plus important

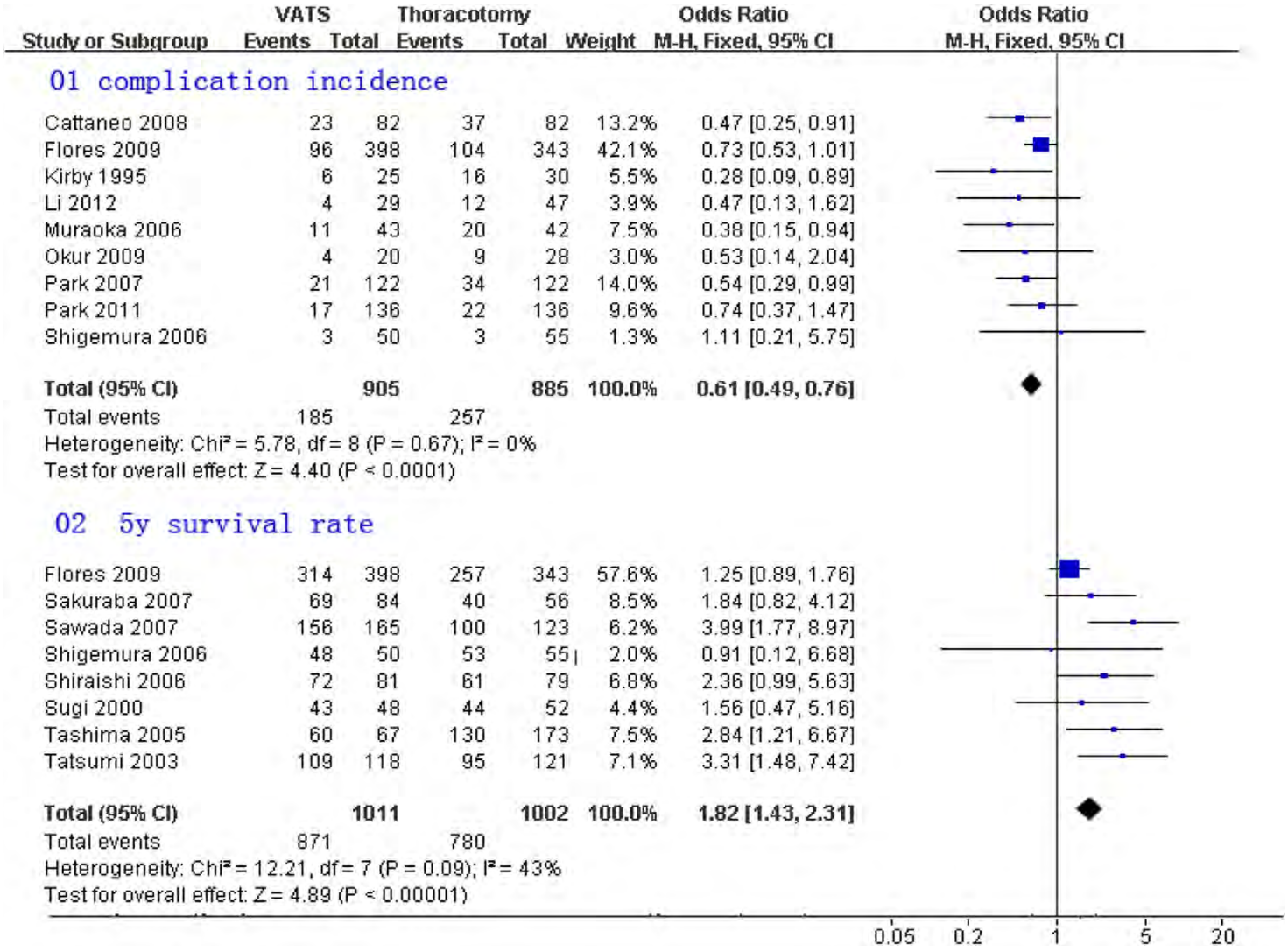
- Gain en durée d'hospitalisation
- Gain en gestion de complications

- Bénéfice net : 1000 – 2000 $

La VATS n’altère pas le

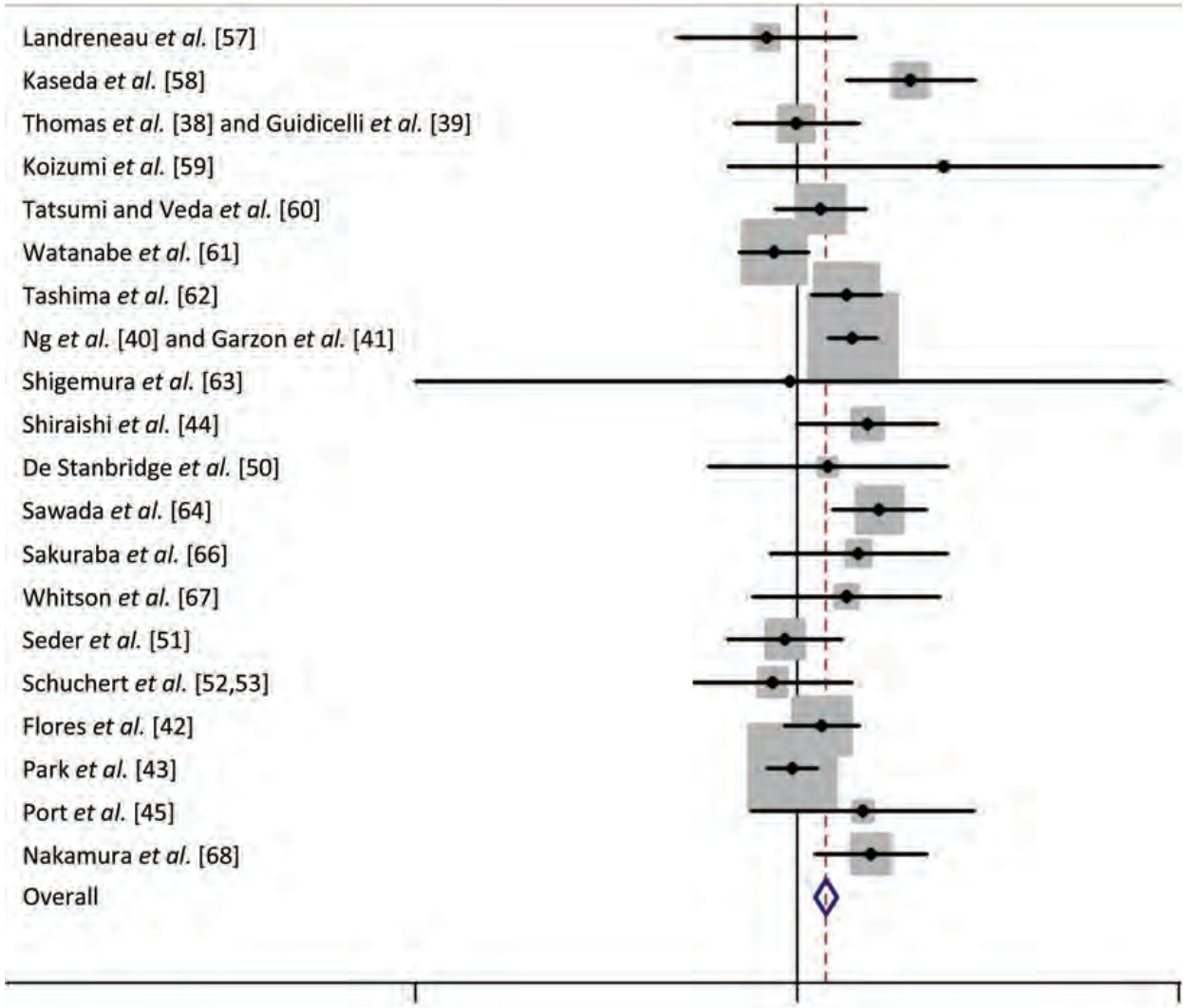
résultat oncologique à terme

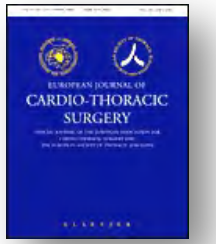
Méta-analyse 1



Chen FF et al. Video-assisted thoracoscopic surgery lobectomy versus open lobectomy in patients with clinical stage I non-small cell lung cancer: A meta-analysis. EJSO 2013; 39: 957-963

Méta-analyse 2





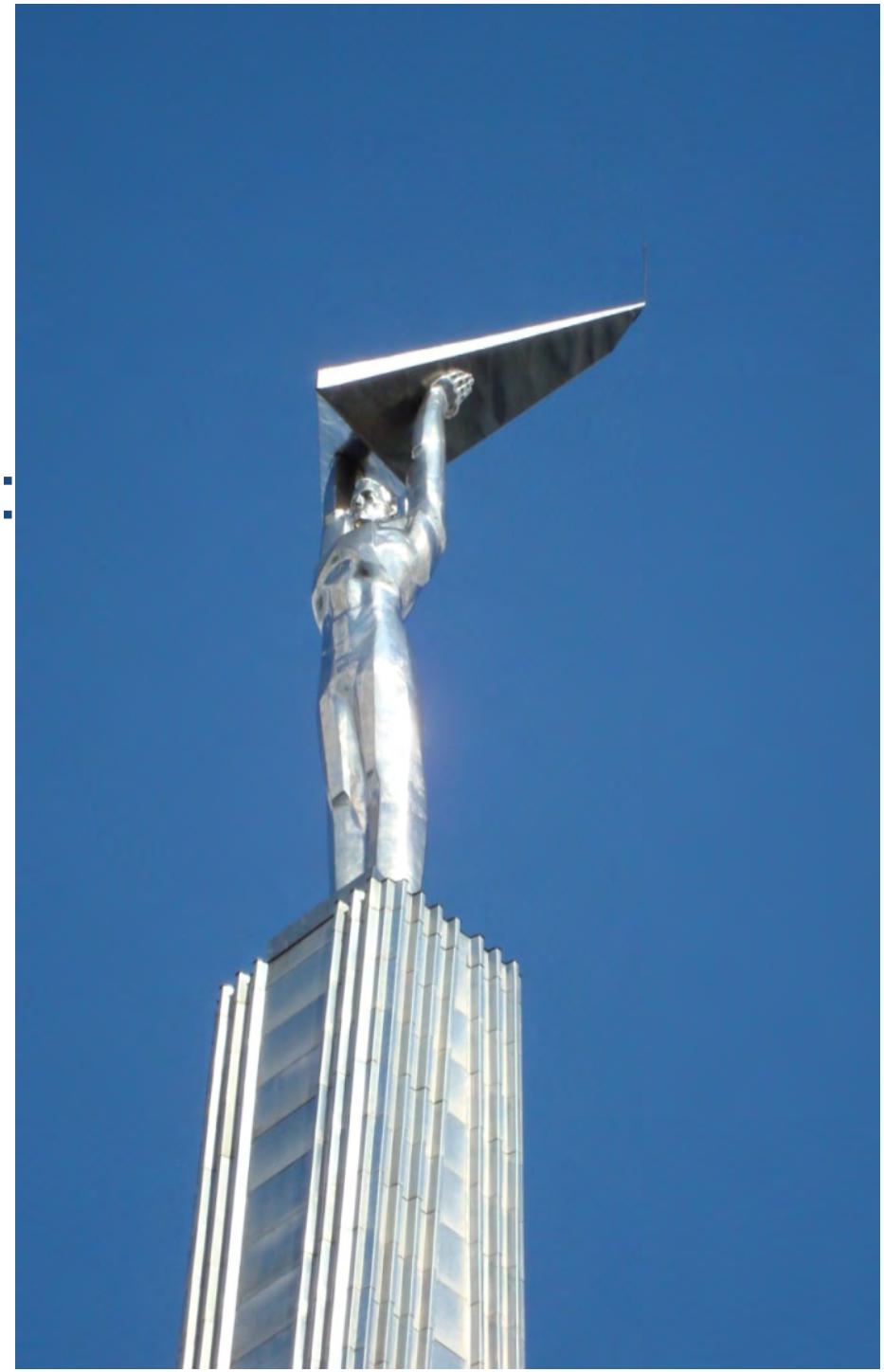
Taioli E et al. Long-term survival in video-assisted thoracoscopic lobectomy vs open lobectomy in lung-cancer patients: a meta-analysis. Eur J Cardio-Thorac Surg 2013; 44: 591–597

Lobectomie mini-invasive : les questions

- Quid des résections infralobaires ?
- Quid du curage ganglionaire ?
- Quid de la robotique
- Peut-on pousser les indications ?

Résections infralobaires :

Oui pour T < 2 cm



Pourquoi faire des résections infra-lobaires

- Patients à haut risque :
  - Réduire morbi-mortalité
- Petites tumeurs périphériques :
  - Economiser de la fonction respiratoire
  - Économiser du parenchyme (risque de Ca metachrone)
- Carcinome in situ ou à faible risque évolutif
  - Le futur grâce aux « screening program »?

Influence de la taille de la tumeur sur la survie : rôle de la segmentectomie

Survie à 5 ans

Taille	lobectomie	segmentectomie	wedge
< 2 cm	92.2 %	96.7 %	85.7 %
2-3 cm	87.4 %	84.6 %	39.4 %
> 3 cm	81.3 %	62.9 %	0

Okada M et al, J Thorac Cardiovasc Surg 2005;129:87-93

Bao F, et al. Eur J Cardio-Thorac Surg 2014;46:1-7.

Table 2: Summary of comparison results

Series	Survival	Comparison of survival			Egger's test	
		HR	95% CI	*P*-value	Bias	*P*-value
I	OS/CSS	1.20	1.04–1.38	0.011	0.12	0.770
IA	OS/CSS	1.24	1.08–1.42	0.002	−0.41	0.265
IA (2–3 cm)	OS/CSS	1.41	1.14–1.71	0.001	0.35	0.678
IA (≤2 cm)	OS/CSS	1.05	0.89–1.24	0.550	−0.15	0.802

« Segmentectomy provides survival inferior to that following lobectomy for Stage I NSCLC patients, Stage IA patients and Stage IA patients with tumours larger than 2 cm but smaller than 3 cm »

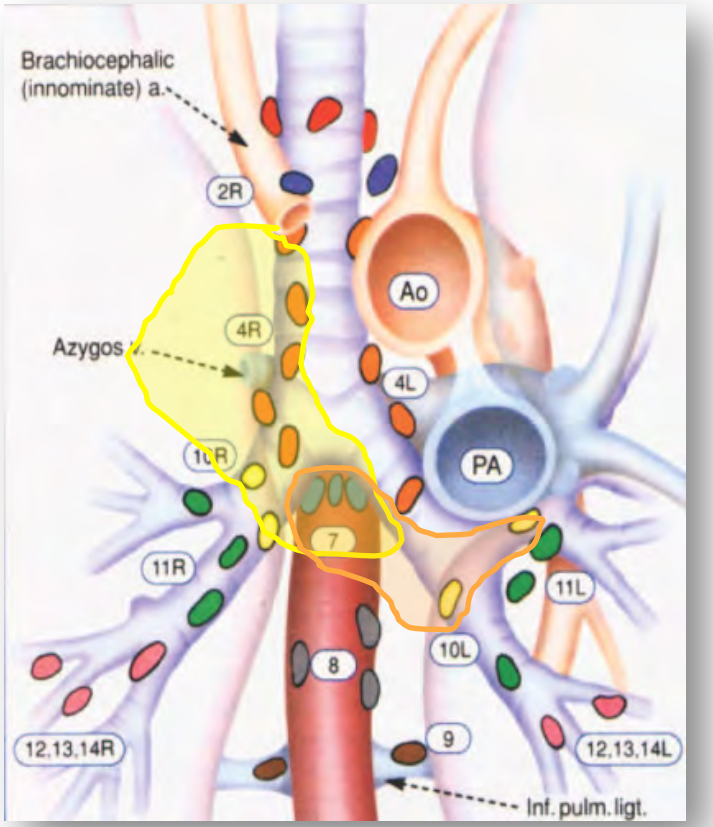
Recommandations résections infralobaires

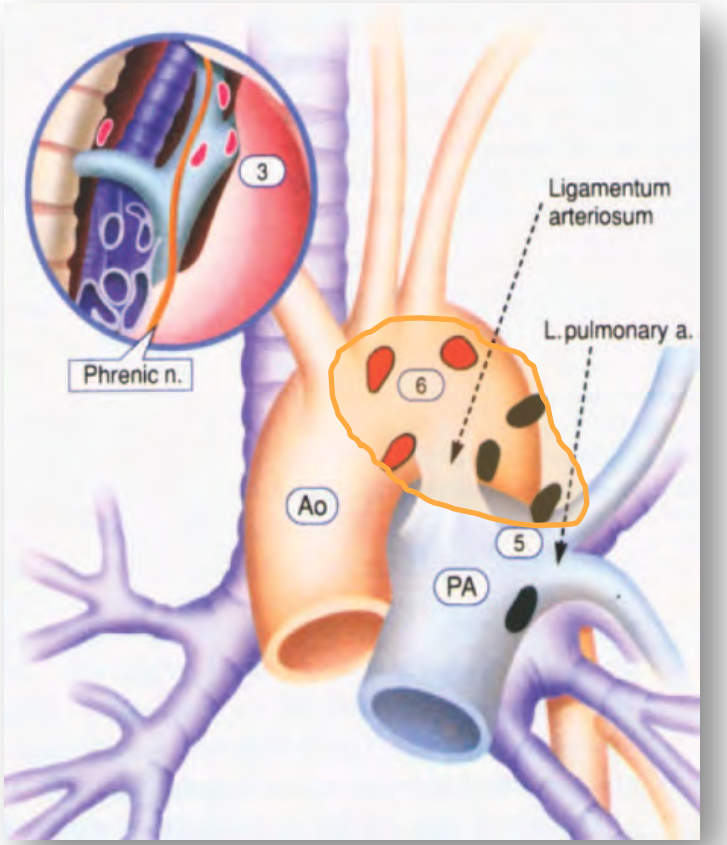
recommandation	niveau	grade
Si la lobectomie est tolérée fonctionnellement, la RIL doit être évitée	Ib	A
Si haut risque, la RIL peut donner un pronostic similaire	III	B
Segmentectomie > wedge	III	B
Taille: segmentectomie < 2 cm ; lobectomie > 2 cm	III	B
Age : wedge > 71 ans ; lobectomie < 71 ans	III	B
Marge de résection wedge et segmentectomie : > 1 cm	III	B
RIL sans curage acceptable pour adénoCa in situ	III	B

R. Rami-Porta and M. Tsuboi. Eur Respir J 2009; 33: 426–435*

Le curage reste

d’actualité !





Darling G et al. J Thorac Cardiovasc Surg 2011;141:662-70

La recommendation classique : est-elle d'actualité dans le cT1N0 ?

- *Curage scissural et hilaire identique en VATS*
- *Curage médiastinal plus compliqué ?*

- Amélioration des outils : PET-CT
- Histologies moins agressives
- ACOSOG

PET - : valeur prédictive négative !

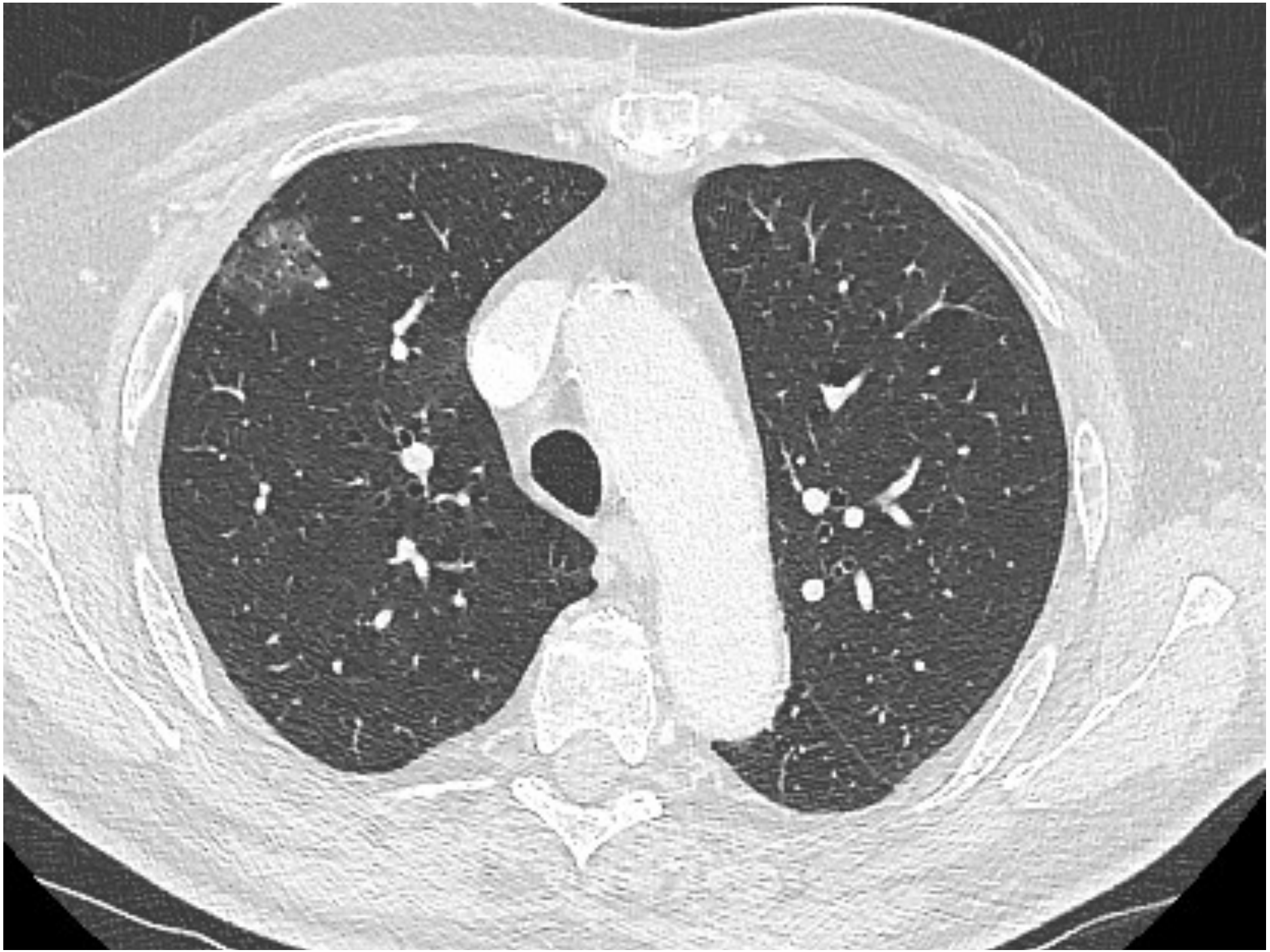
Table 7. Comparison of Our Findings With Other Larger, Recent Reports

Author	Analysis Type	Year Published	Nodes Sampled	Number of Patients or Nodes	Sensitivity	Specificity	PPV	NPV	Accuracy
Cerfolio [23]	Patient	In press	N1 only	400 pts	67%	78%	25%	96%	78%
			N2 only		71%	77%	44%	91%	76%
	Nodal		N1 only	1460 nodes	75%	96%	18%	99%	96%
			N2 only	1972 nodes	60%	95%	37%	98%	92%
Graeter [22]	Patient	2003	N2 or N3 only	102 pts	100%	56%	62%	100%	75%
	Nodal		N0, N1, N2, N3	469 nodes	94%	79%	49%	98%	82%
Vesselle [18]	Patient	2002	N2 only	142 pts	81%	96%	92%	90%	91%
Kernstine	Patient	2002	N2 only	237 pts	80%	81%	46%	95%	81%
			N1, N2, N3		82%	82%	51%	95%	82%
Gupta [5]	Nodal	2000	N1, N2, N3	77 pts	87%	91%	—	—	82%
Roberts [8]	Patient	2000	any med node	100 pts	88%	91%	—	96%	—
Farrell	Patient	2000	regional lymph nodes	84 pts	82%	86%	47%	97%	86%
			N2 or N3 only		100%	92%	40%	100%	—
			N1 only		71%	96%	62%	97%	—
Dwamena [21]	Meta-analysis	2002	any med node	514 pts	79%	89%	—	—	—
Steinert	Nodal	1997	N1, N2, N3	62 pts	88%	98%	—	—	—
Vansteenkiste	Patient	1997	any med node	50 pts	66%	96%	—	—	—

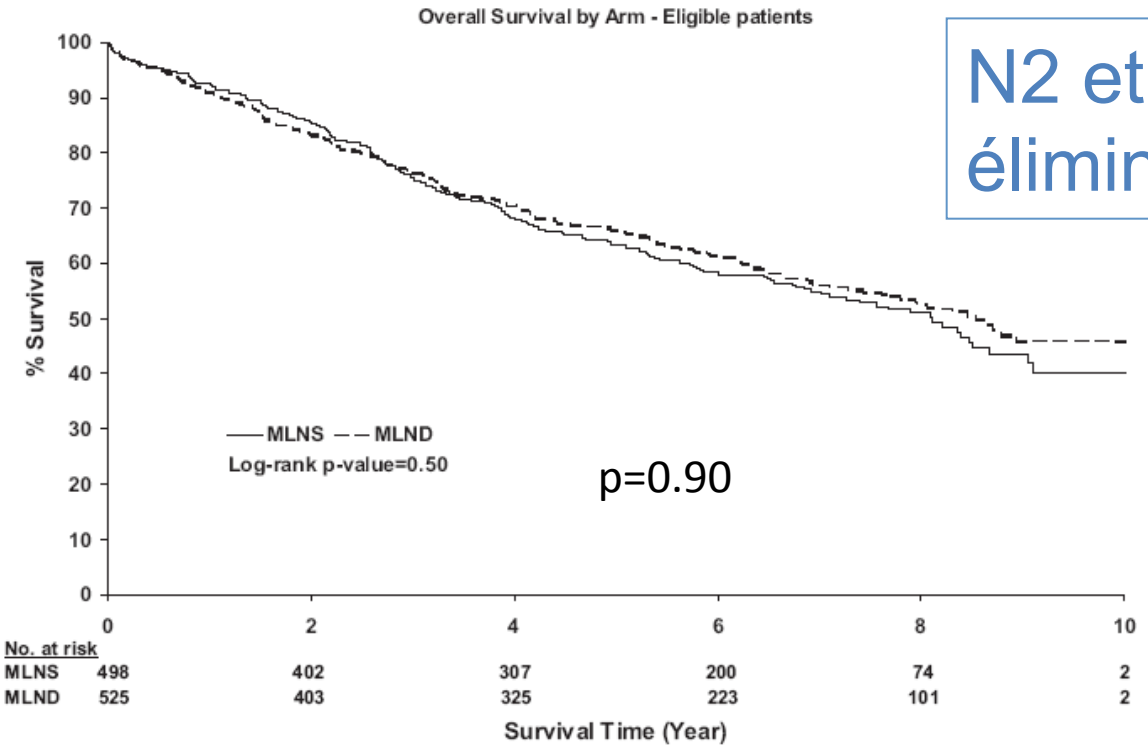
NPV = negative predictive value; PPV = positive predictive value.

Ann Thorac Surg
2003;76:861–6

CERFOLIO ET AL
FDG-PET SCAN FOR STAGING PATIENTS WITH NSCLC



ACOSOG Z0030



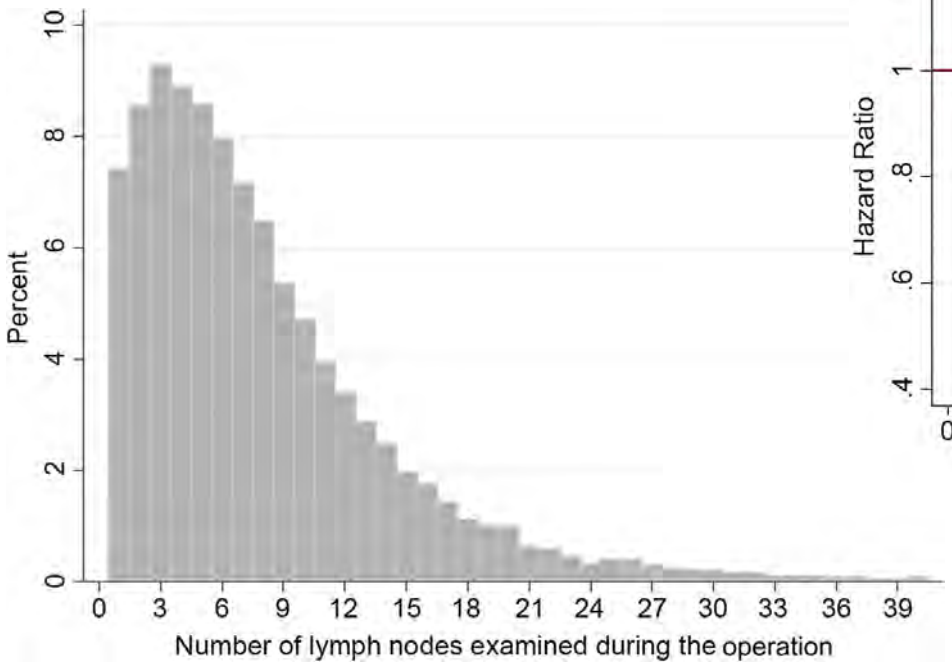
N2 et N1 hilaire ont été éliminés au préalable !

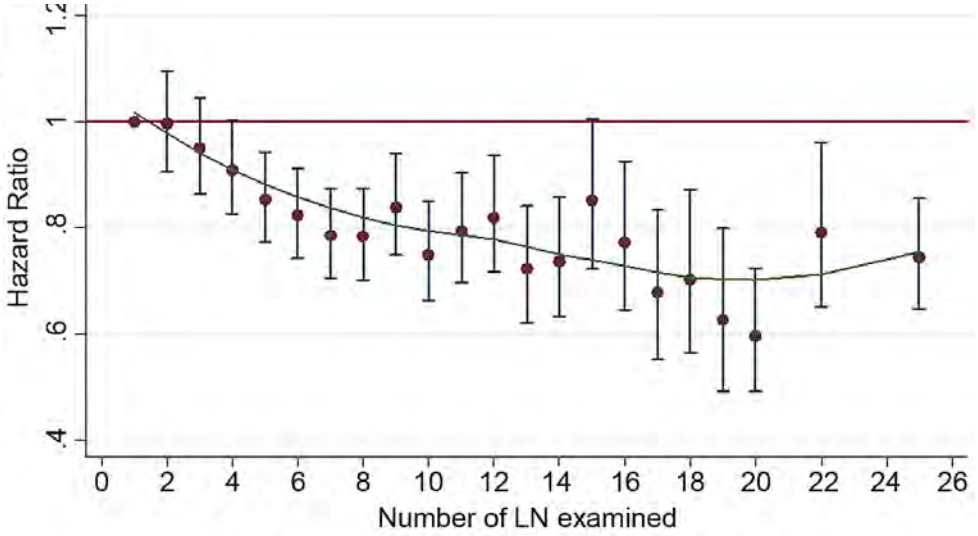
FIGURE 2. Overall survival. *MLNS,* Mediastinal lymph node sampling; *MLND,* mediastinal lymph node dissection.

Darling GE et al. Randomized trial of mediastinal lymph node sampling versus complete lymphadenectomy during pulmonary resection in the patient with N0 or N1 (less than hilar) non–small cell carcinoma: Results of the American College of Surgery Oncology Group Z0030 Trial. J Thorac Cardiovasc Surg 2011;141:662-670

Bases de données

SEER Database 1998-2009





Study Cohort: at least 1 lymph node examined, pathologic “node-negative” non-small cell lung cancer n = 24,650

Osarogiagbon RU et al. Ann Thorac Surg 2014; 97:385-93

Echantillonnage ganglionnaire

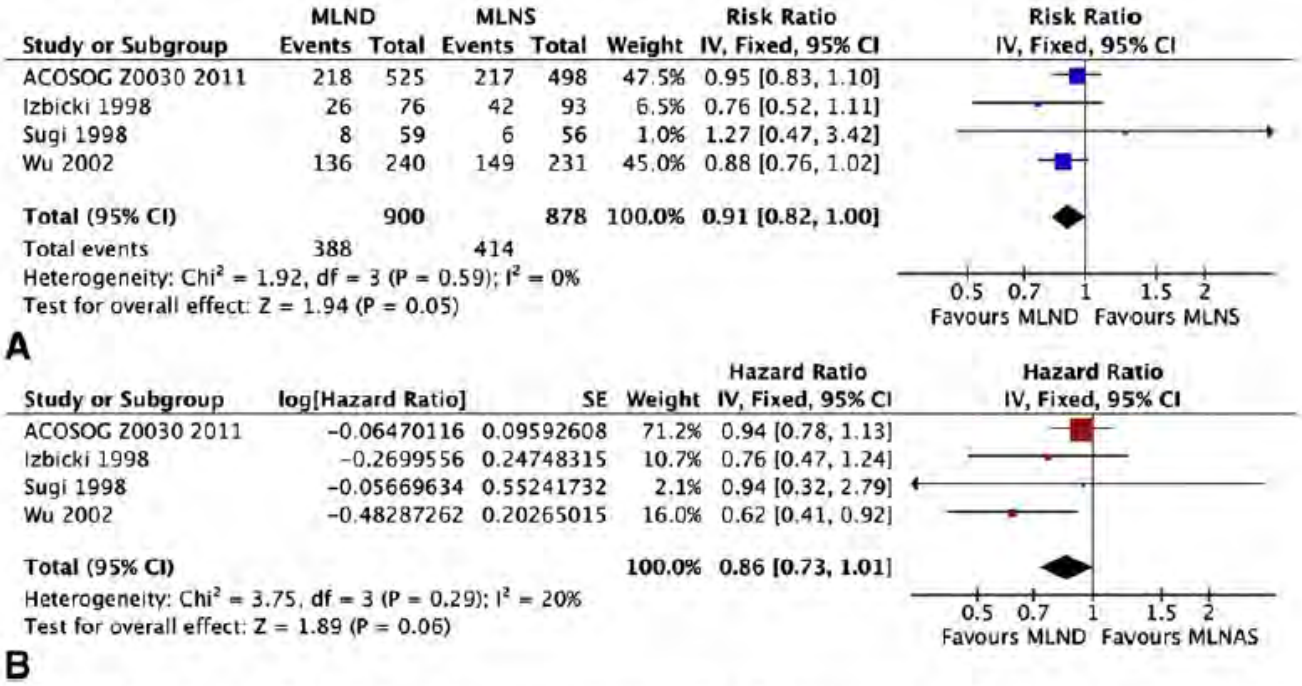
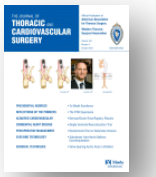


FIGURE 1. All cause mortality (*A*, risk ratio; *B*, hazard ratio) among patients with early-stage non-small cell lung cancer randomized to mediastinal lymph node dissection (*MLND*) versus sampling (*MLNS*) during pulmonary resection. *IV*, Inverse variance; *CI*, confidence interval; *ACOSOG*, American College of Surgery Oncology Group; *SE*, standard error.



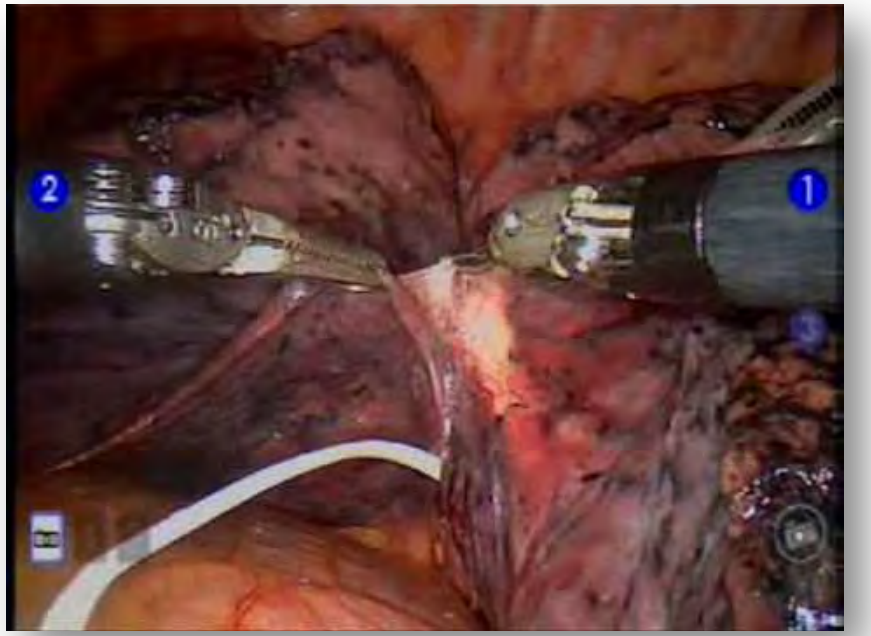
Tagaki Het al. J Thorac Cardiovasc Surg 2011; 142:477-8

La robotique

augmente le coût

sans valeur ajoutée

Robot-Assisted Thoracic Surgery



Comparing robot-assisted thoracic surgical lobectomy with conventional video-assisted thoracic surgical lobectomy and wedge resection: Results from a multihospital database (Premier)

Scott J. Swanson, MD,[a] Daniel L. Miller, MD,[b] Robert Joseph McKenna, Jr, MD,[c] John Howington, MD,[d] M. Blair Marshall, MD,[e] Andrew C. Yoo, MD,[f] Matthew Moore, MHA,[g] Candace L. Gunnarsson, EdD,[h] and Bryan F. Meyers, MD[i]

Background: Video-assisted thoracic surgical (VATS) lobectomies and wedge resections result in less morbidity and shorter length of stay than resections via thoracotomy. The impact of robot-assisted thoracic surgical (RATS) lobectomy on clinical and economic outcomes has not been examined. This study compared hospital costs and clinical outcomes for VATS lobectomies and wedge resections versus RATS.

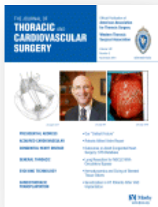
Methods: Using the Premier hospital database, patients aged $\geq$18 years with a record of thoracoscopic

Conclusions: RATS lobectomy and wedge resection seem to have higher hospital costs and longer operating times, without any differences in adverse events. (J Thorac Cardiovasc Surg 2014;147:929-37)

record indicated that the robot was used. Using a propensity score and based on severity and comorbidities, certain demographics and hospital characteristics were matched. The association between VATS or RATS and adverse events, hospital costs, surgery time, and length of stay was examined.

Results: Of 15,502 patient records analyzed, 96% (n = 14,837) were performed without robotic assistance. Using robotic assistance was associated with higher average hospital costs per patient. The average cost of inpatient procedures with RATS was $25,040.70 versus $20,476.60 for VATS ($P$ = .0001) for lobectomies and $19,592.40 versus $16,600.10 ($P$ = .0001) for wedge resections, respectively. Inpatient operating times were longer for RATS lobectomy than VATS lobectomy (4.49 hours vs 4.23 hours; P = .0959) and wedge resection (3.26 vs 2.86 hours; P = .0003). Length of stay was similar with no differences in adverse events.

Conclusions: RATS lobectomy and wedge resection seem to have higher hospital costs and longer operating times, without any differences in adverse events. (J Thorac Cardiovasc Surg 2014;147:929-37)



Quid de l’extension

des indications ?

Champs d'investigation !

- Chirurgie après chimio d'induction
- Exérèses élargies à la paroi
- Lobectomie avec broncho- ou angioplastie

- Thymomes < 5 cm
- *Pathologies bénignes*

Exérèses mini-invasives en oncologie:

Que conclure ??

Une évolution des pratiques est en cours

- Avantages immédiats de la chirurgie mini-invasive
- Résultat oncologique à terme similaire
- Place des résections infra-lobaires : T1aN0
- Curage indispensable

Le dépistage par TDM « low dose » augmentera le nombre d'indications pour tumeur de petite taille et/ou de faible agressivité

Exérèse (infra)lobaire par VATS :
solution de choix face aux différentes « ablathérapies »

- Résection respectant les principes oncologiques
- Certitude de l'ablation complète
- Histologie exhaustive
  - Tumeur
  - Environnement ganglionnaire
- Risque acceptable

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EDITORIAL COMMENT

What is most important in improving outcomes after pulmonary lobectomy: the surgeon or the approach?

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Keywords: Lobectomy • Thoracoscopy • Video-assisted thoracic surgery • Lung cancer • Nationwide inpatient sample • Comparative effectiveness

Many thanks to my team !!