

がん診療連携拠点病院研修会

①

コンセプト

エキスパートに学ぶ “がん治療最前線”

第13回
広島北キアンサーネット研修会



日時

平成24年
5月24日(木)
19:00~20:30

場所

広島市立安佐市民病院
南館3階講堂

対象者

当院医師、看護師、その他
地域医療機関医師、看護師、
その他

プログラム

講演Ⅰ

『肺がんの早期診断』

広島市立安佐市民病院 呼吸器内科部長 菅原 文博 先生

講演Ⅱ

『肺がんの外科治療』

広島大学病院 呼吸器外科・内分泌外科診療科長

教授 岡田 守人 先生

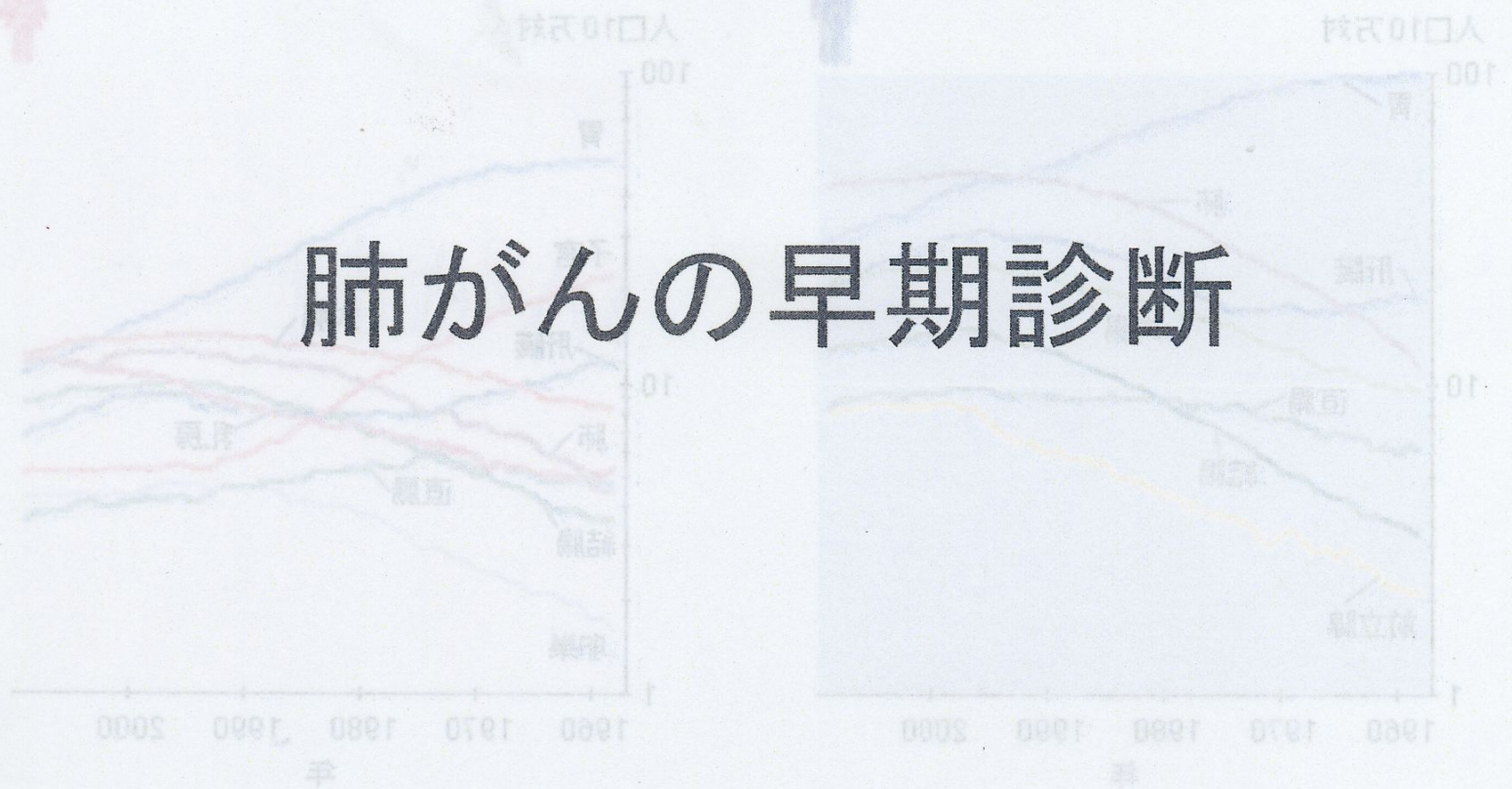
④

②

(眼立暗)率之死のい社



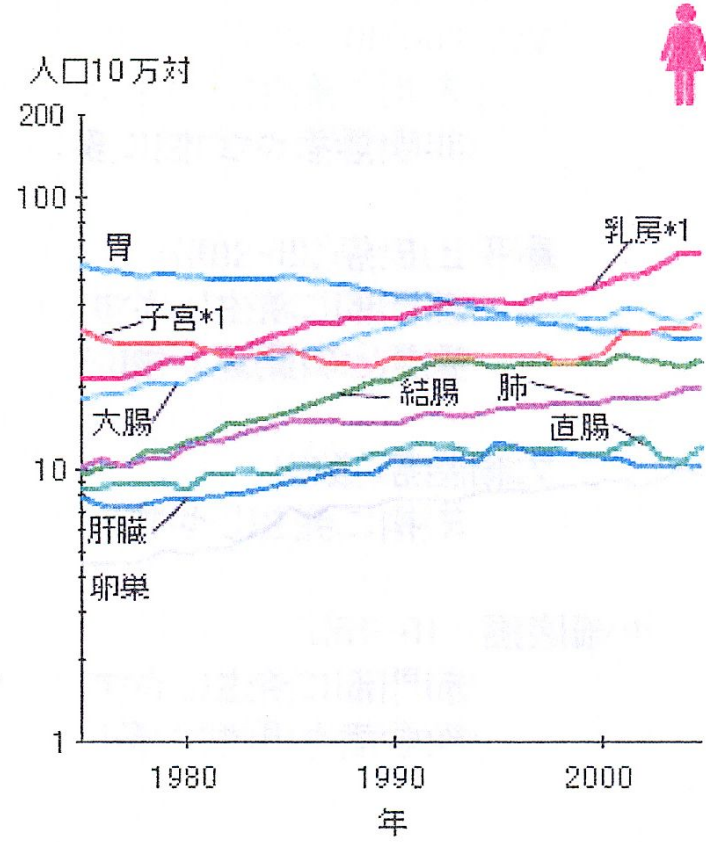
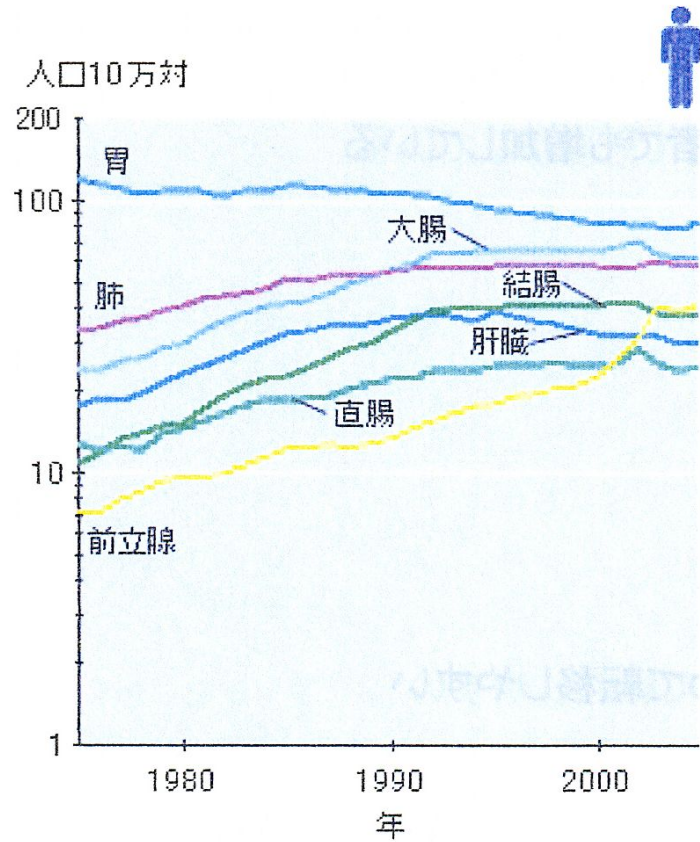
肺がんの早期診断



—そくが肺がんは—そくが突発的な立国:典出

3

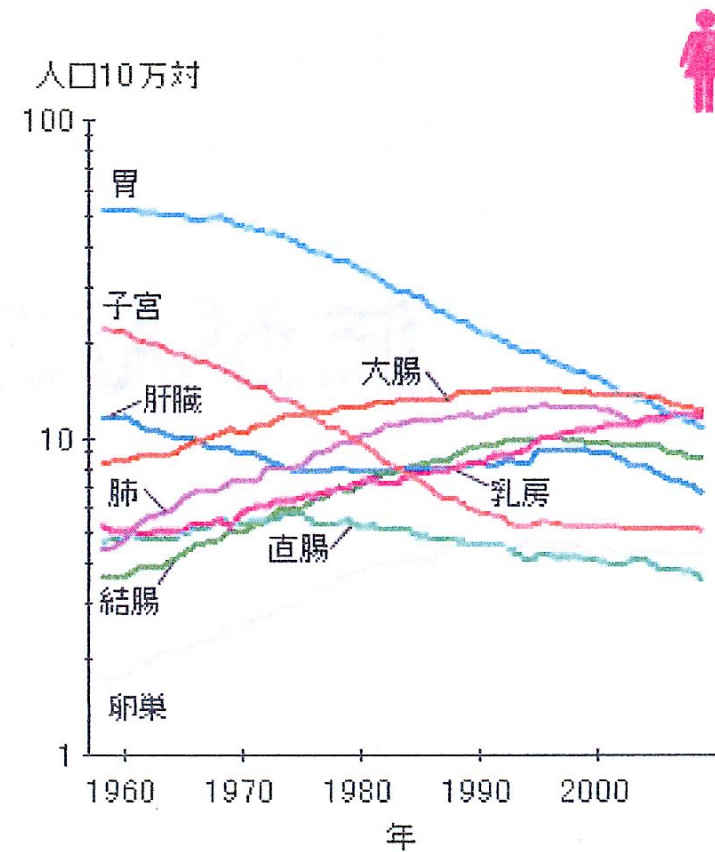
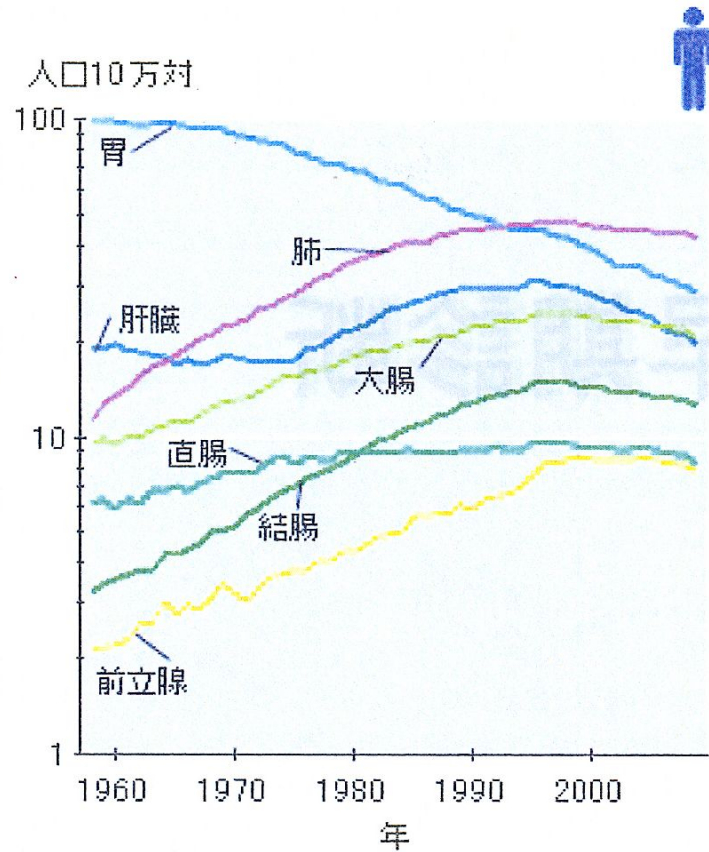
がんの罹患率(部位別)



出典: 国立がん研究センター がん対策情報センター

④

がんの死亡率(部位別)



出典: 国立がん研究センター がん対策情報センター

肺癌の組織分類

5

非小細胞肺癌(85-90%)

腺癌(50-60%)

末梢に発生しやすい

非喫煙者や女性に多い、喫煙者でも増加している

扁平上皮癌(25-30%)

肺門部に発生しやすい

喫煙との関連が強い

大細胞癌(数%)

末梢に発生しやすい

小細胞癌(10-15%)

肺門部に発生しやすい、きわめて転移しやすい

喫煙者や男性に多い

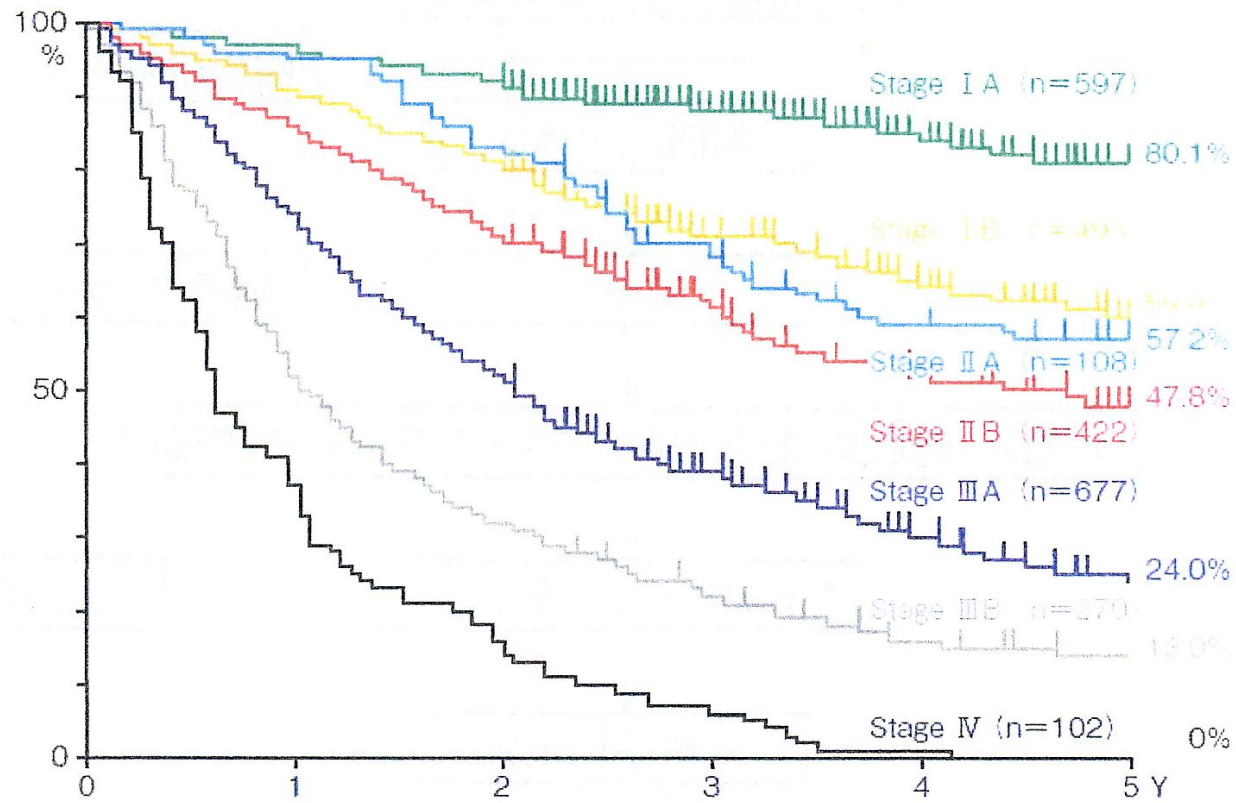
6

肺癌の病期分類

	T因子 原発巣	N因子 リンパ節	M因子 遠隔転移	
I A	T1	N0	M0	T1:
I B	T2a	N0	M0	T1a: 腫瘍径2cm以下
II A	T1a-2a	N1	M0	T1b: 腫瘍径2cm超3cm以下
	T2b	N0	M0	T2: 胸膜浸潤
II B	T2a	N1	M0	T2a: 腫瘍径3cm超5cm以下
	T3	N0	M0	T2b: 腫瘍径5cm超7cm以下
III A	T1-3	N2	M0	T3: 胸壁浸潤、腫瘍径7cm超
	T3	N1	M0	T4: 縦隔浸潤、同側肺内転移
	T4	N0	M0	N1: 同側気管支周囲、同側肺門
III B	T1-4	N3	M0	N2: 同側縦隔、気管分岐下
	T4	N2	M0	N3: 対側縦隔、対側肺門、鎖骨上窩
IV	T1-4	N0-3	M1	M1: 遠隔転移あり
				M1a: 対側肺内、悪性胸水
				M1b: 他臓器

非小細胞肺癌の病期別生存曲線

⑦



Goya T, et al: Lung Cancer. 2005.

広島北がんセンターネット2012/5/24



現時点

非小細胞肺癌において、明らかにStage I A (T1N0M0)の予後が良好

→リンパ節転移のない時点での発見および治療が必要

化学療法により生存期間は延長されつつある

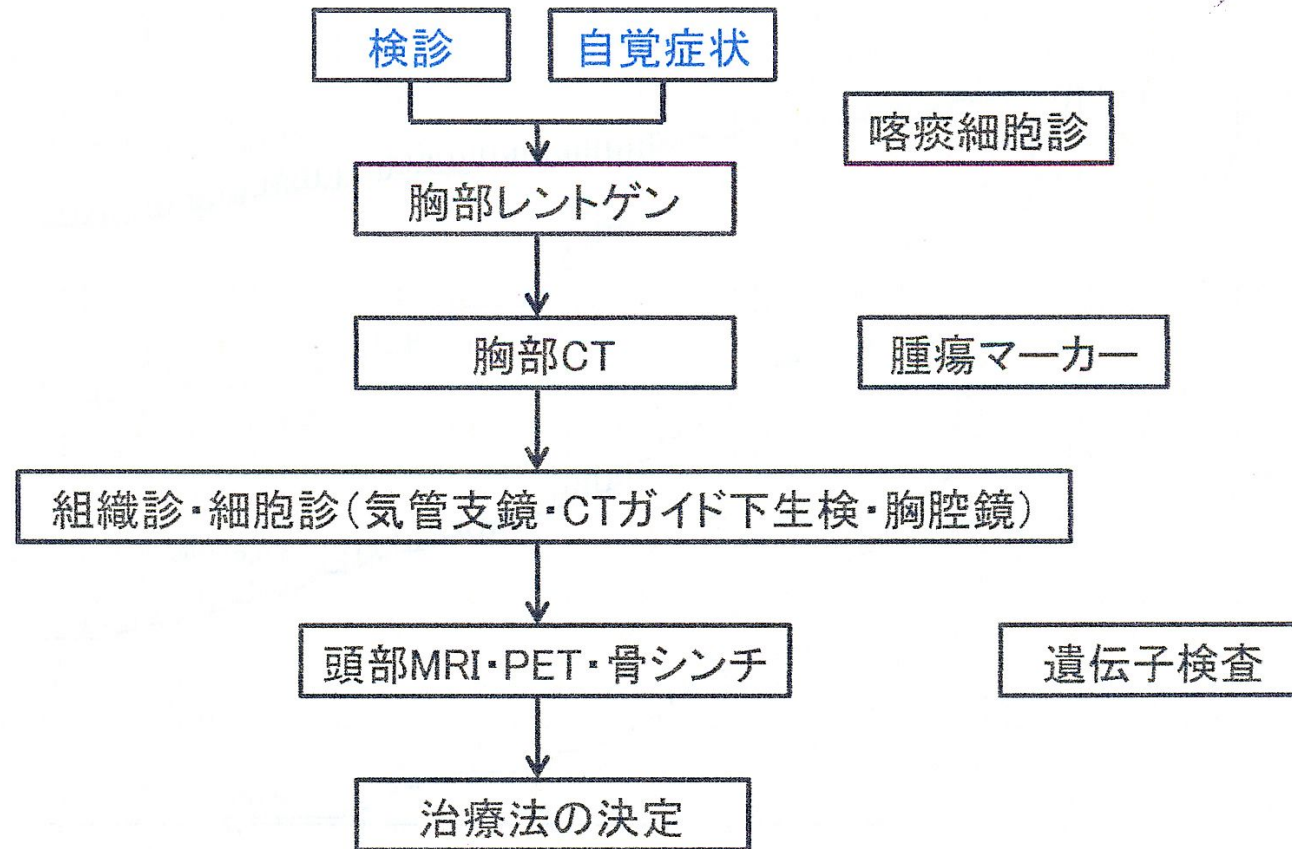
EGFR変異例に対してはEGFR-TKIの治療が良好であり、長期生存例がある

→治癒ではない

いかに肺癌を早期に診断し、完全切除を目指せるか

肺癌診断の流れ

9



10

肺癌の発見

発見動機

自覚症状	455例(52%)
集団検診	165例(19%)
自己検診	7例(1%)
他疾患follow	225例(25%)
不明	29例(3%)
累計	881例

発見動機と病期

病期	自覚症状	集団検診	他疾患follow
I期	49(11%)	94(57%)	117(52%)
II期	30(6.5%)	13(8%)	26(12%)
III A期	56(12%)	17(10%)	21(9%)
III B期	103(23%)	19(12%)	25(11%)
IV期	201(44%)	17(10%)	25(11%)
不明	16(3.5%)	5(3%)	11(5%)
累計	455	165	225

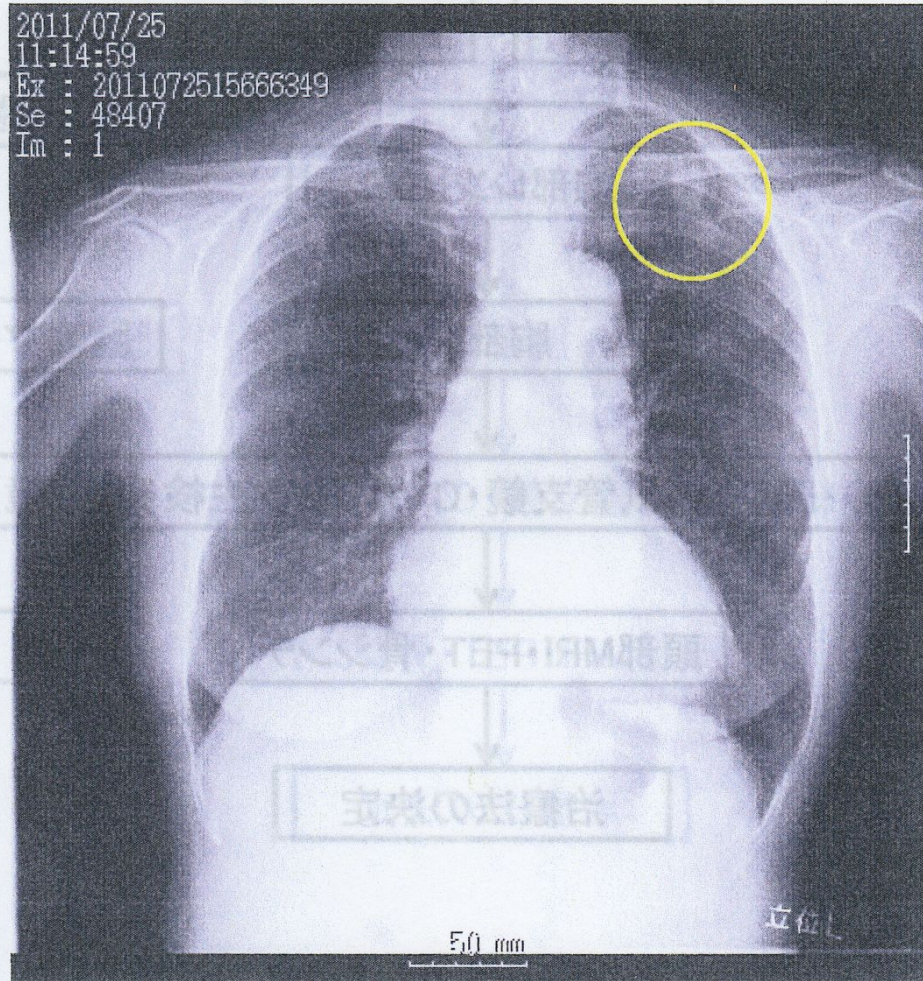
出典: 栃木県立がんセンター

広島北がんセンターネット2012/5/24

①

①

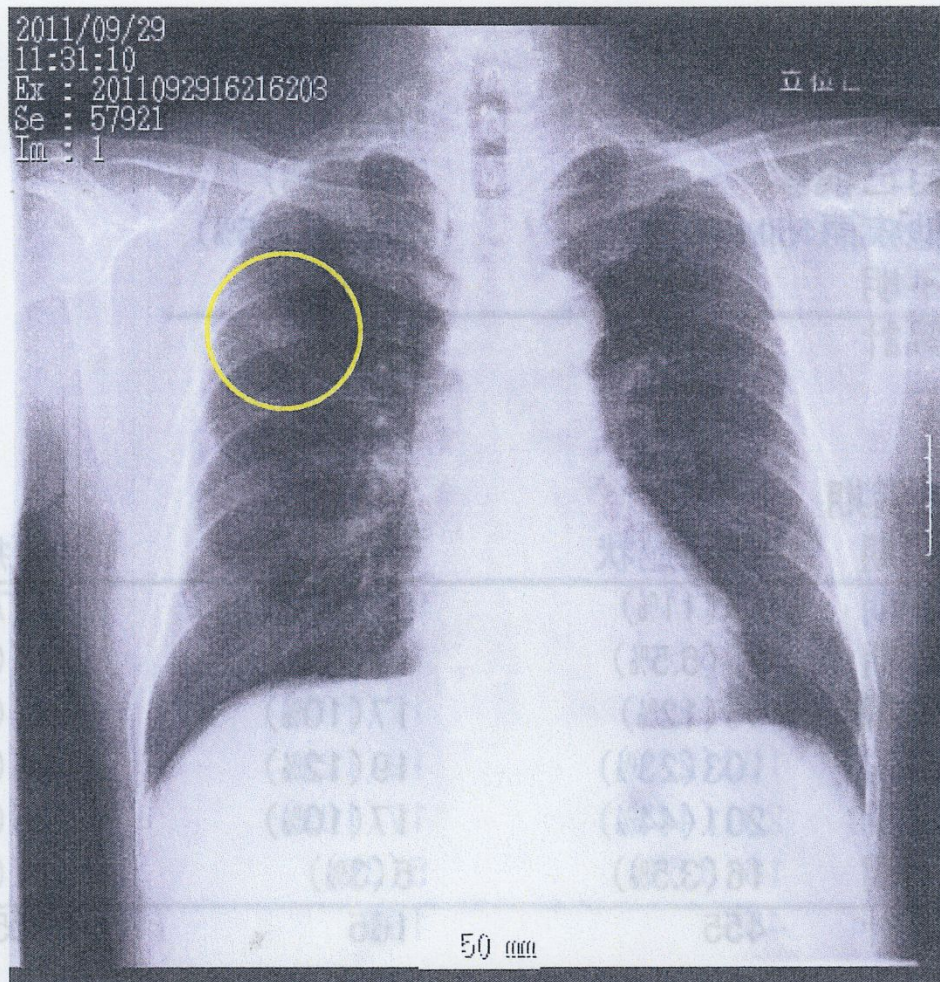
胸部レントゲン



01

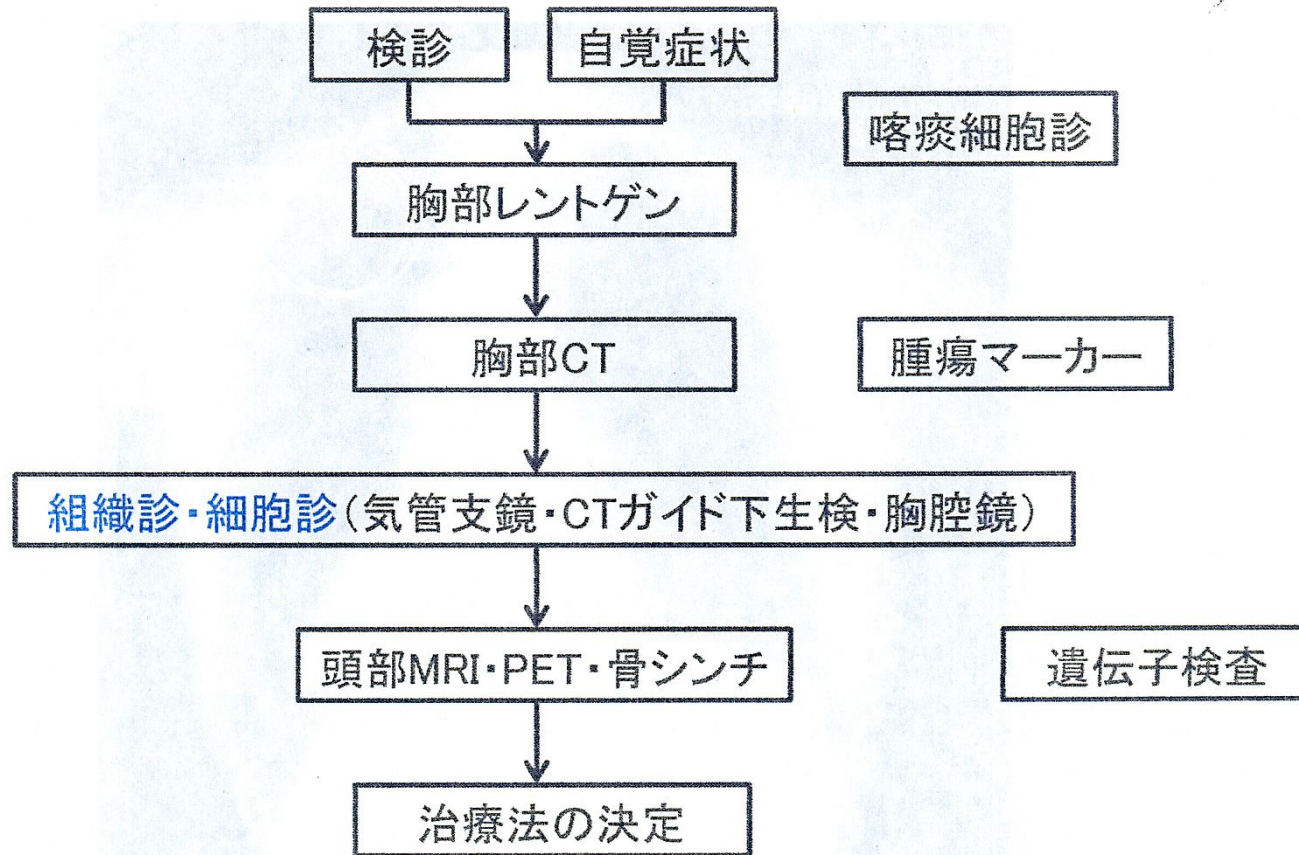
12

胸部レントゲン



肺癌診断の流れ

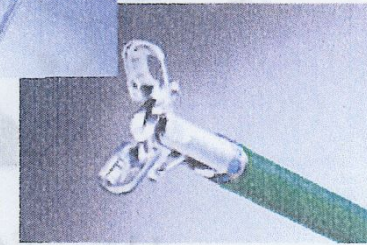
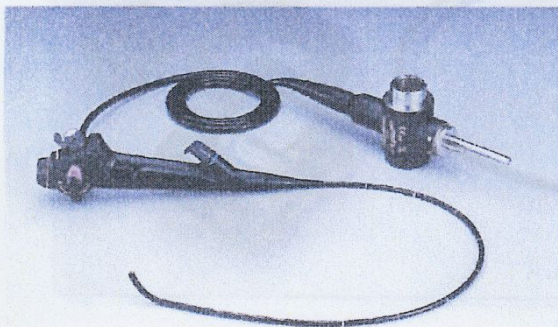
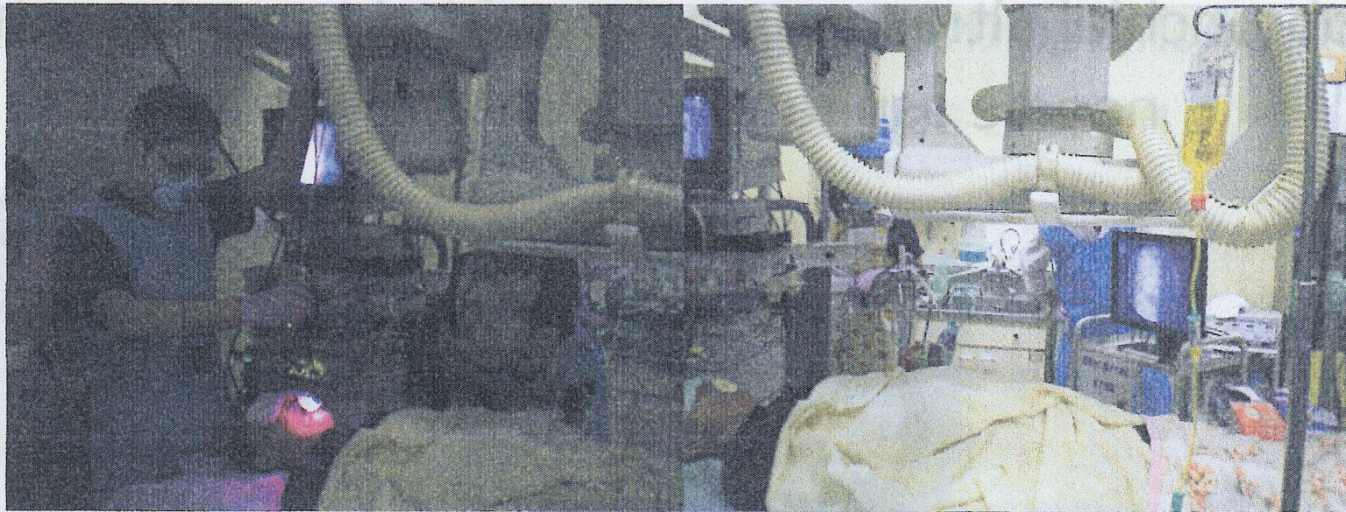
13



13

14

気管支鏡検査



診断感度

中心型76-100%

末梢型40-80%

広島北キヤンサーネット2012/5/24

11

15

CTガイド下肺生検

(20-2083:用掛スービット代)

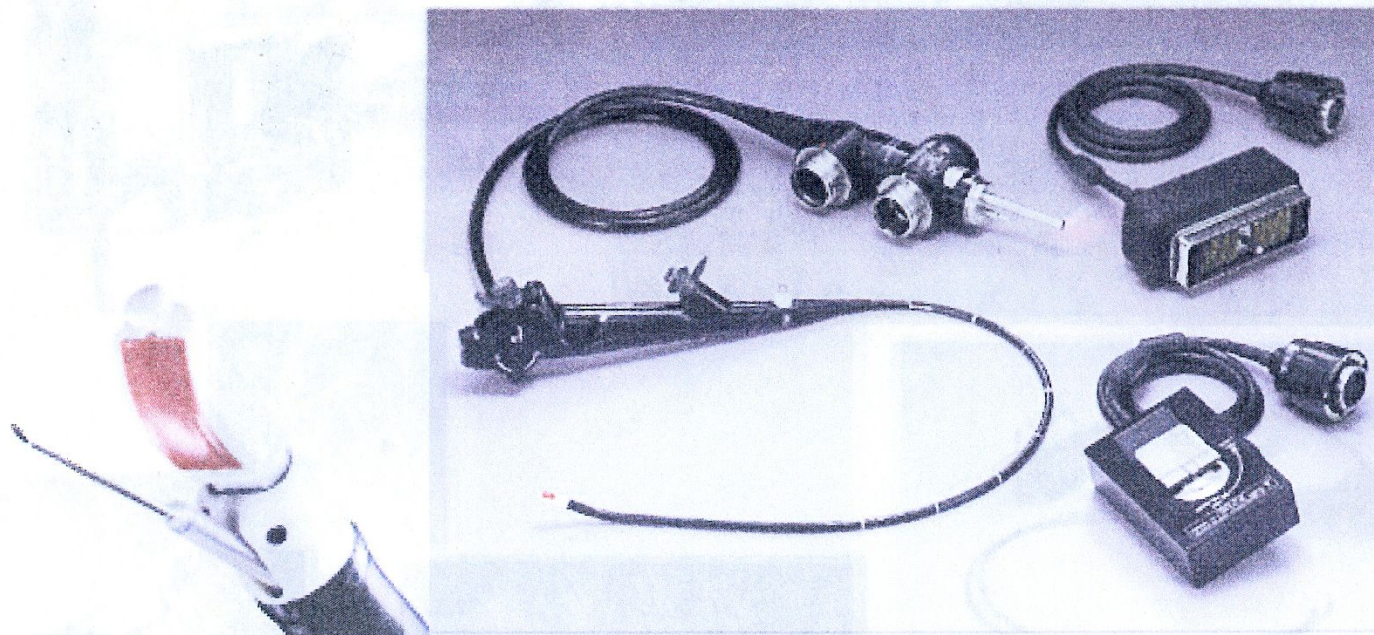


診断感度 90%
合併症 気胸15-25%、喀血2-6%、空気塞栓、胸膜播種

16

超音波気管支鏡

(endobronchial ultrasonography guided trans-bronchial
needle aspiration:EBUS-TBNA)



リンパ節転移(主に縦隔)の診断
気管支壁外に近接する病変に対する診断

超音波気管支鏡
(ガイドシース併用:EBUS-GS)

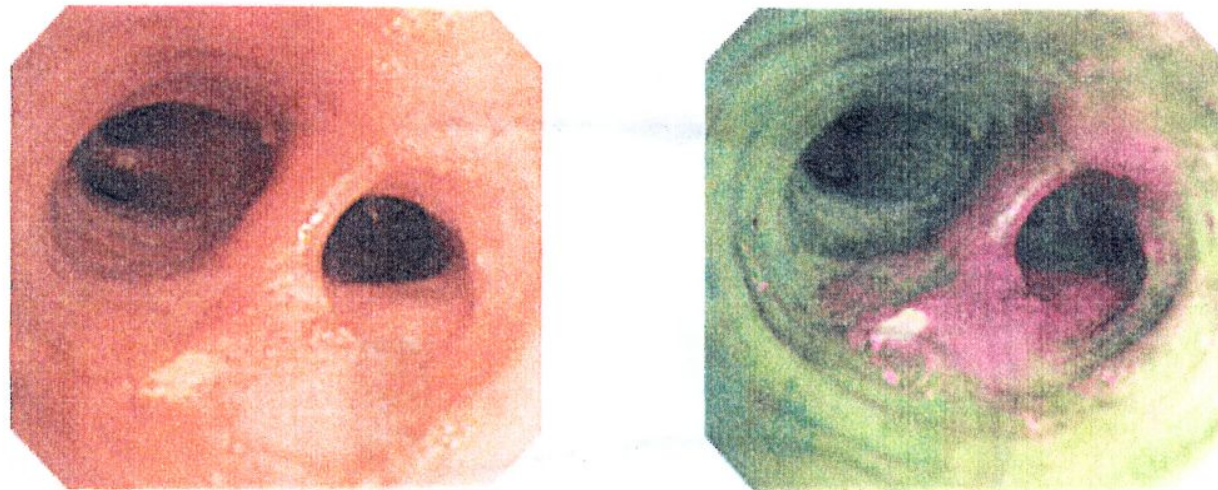
17



末梢小型病変に対する診断率を向上する

18

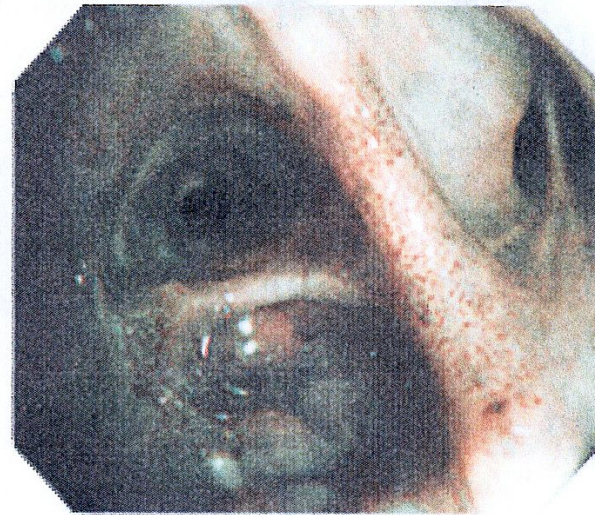
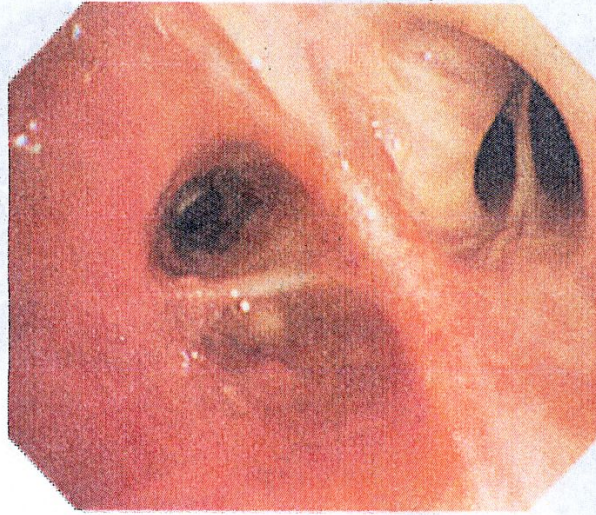
自家蛍光気管支鏡 (Auto Fluorescence Imaging:AFI)



中心型早期癌および化生病変に対する感度が上昇する

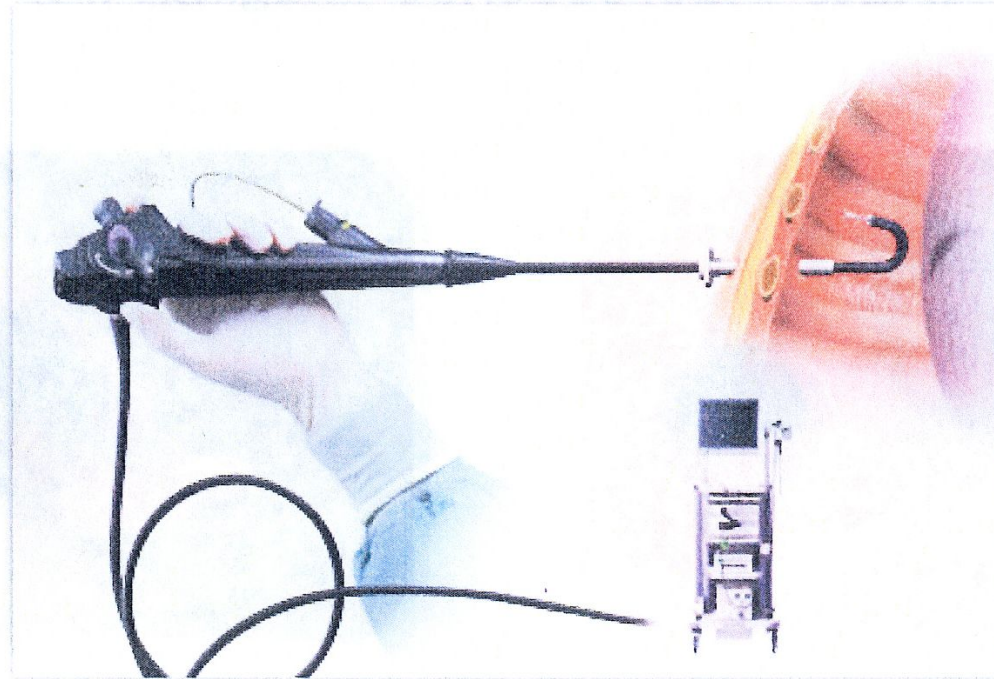
18

狭帯域光観察気管支鏡 (Narrow Band Imaging:NBI)



中心型早期癌および化生病変に対する感度が上昇する

局所麻酔下胸腔鏡



胸水貯留例に対して胸腔内の観察、胸膜生検による診断

胸部レントゲン(比較)

21

2006/11/20

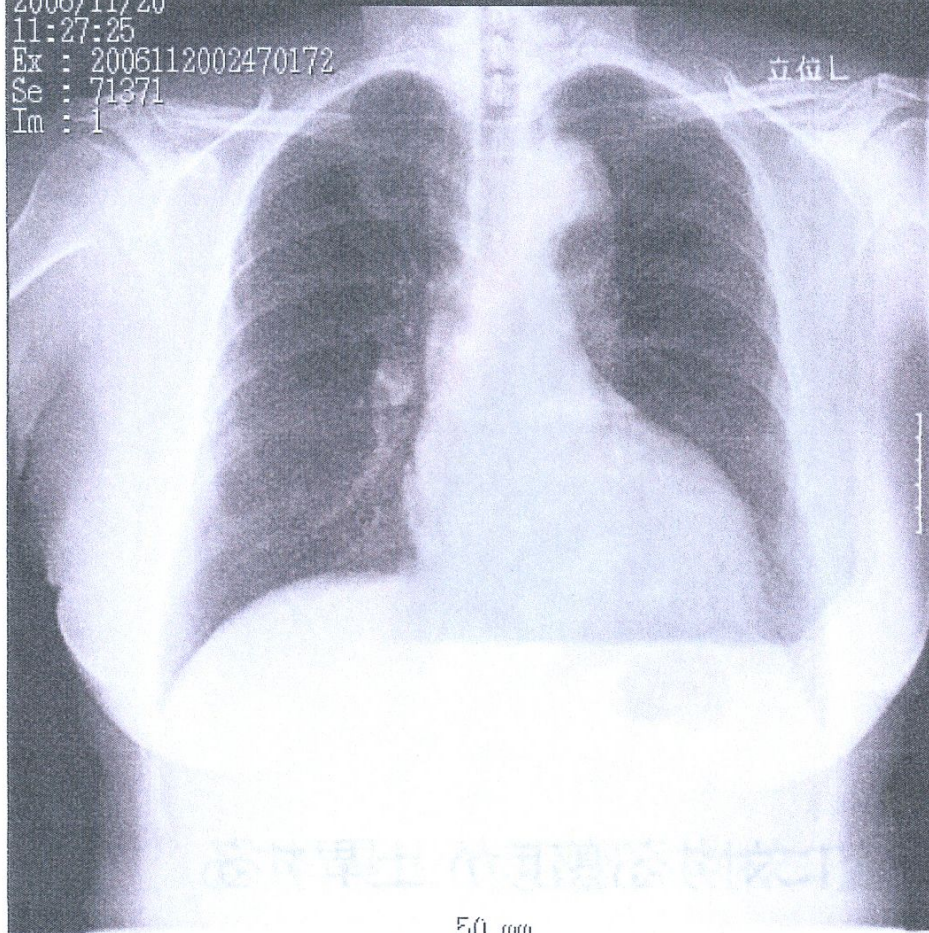
11:27:25

Ex : 2006112002470172

Se : 71371

Im : 1

立位L



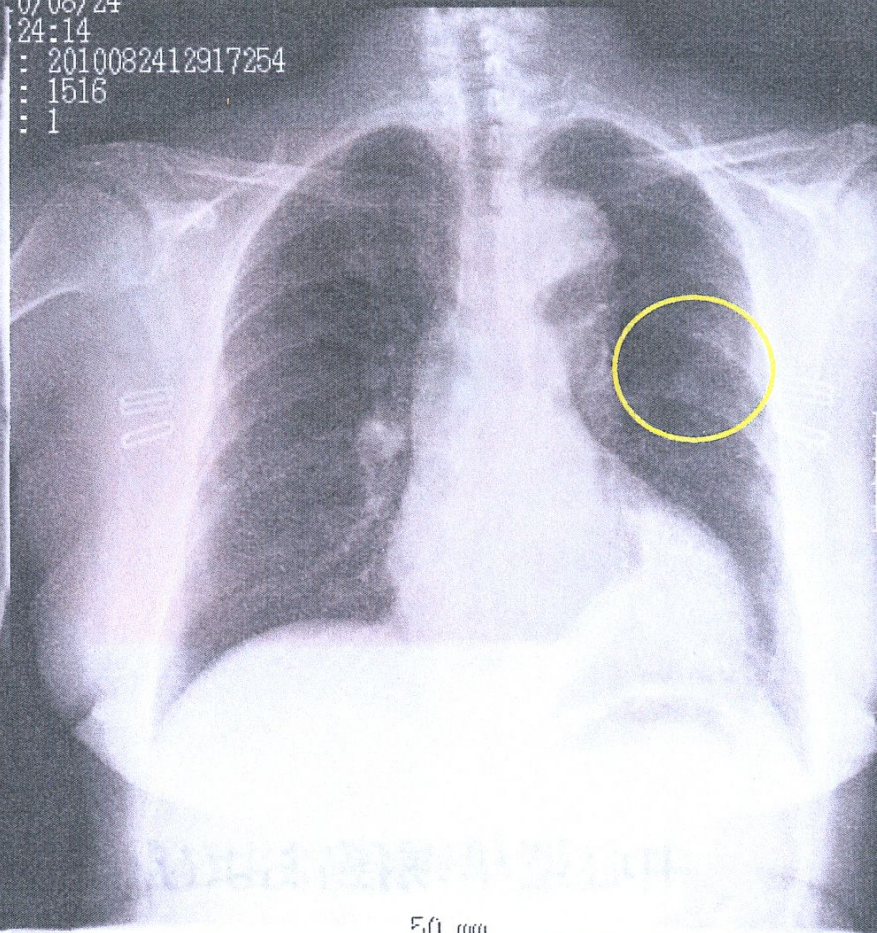
0/03/24

24:14

: 2010082412917254

: 1516

: 1



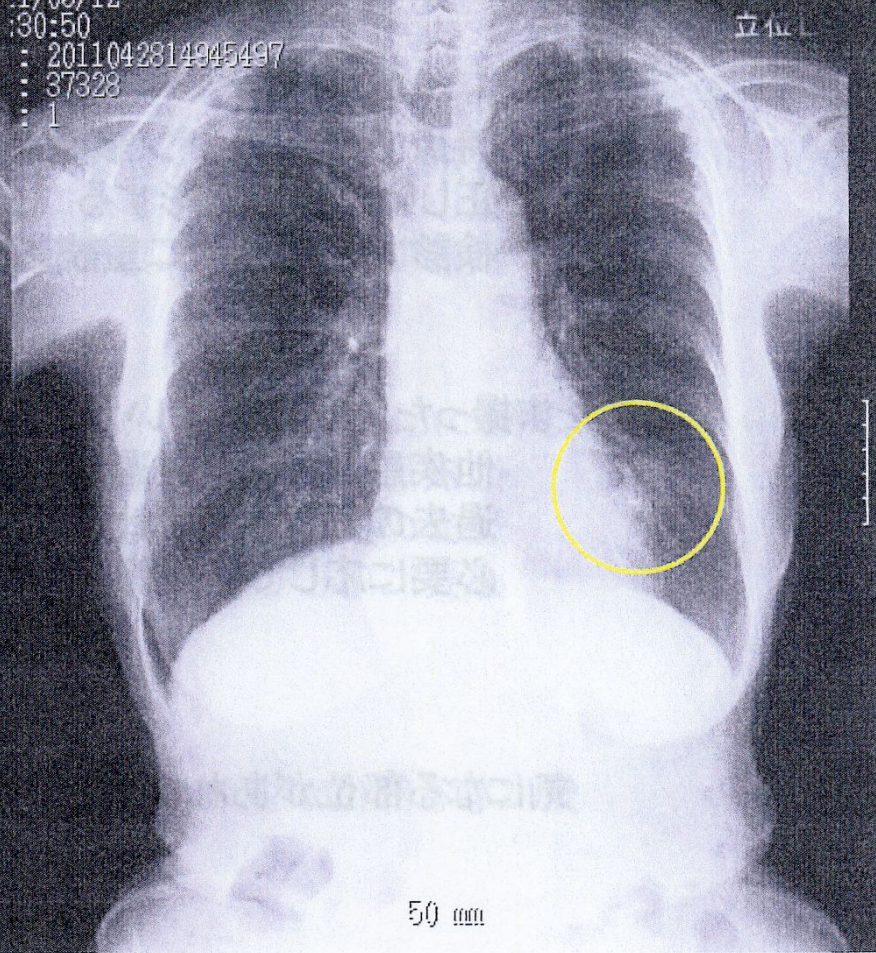
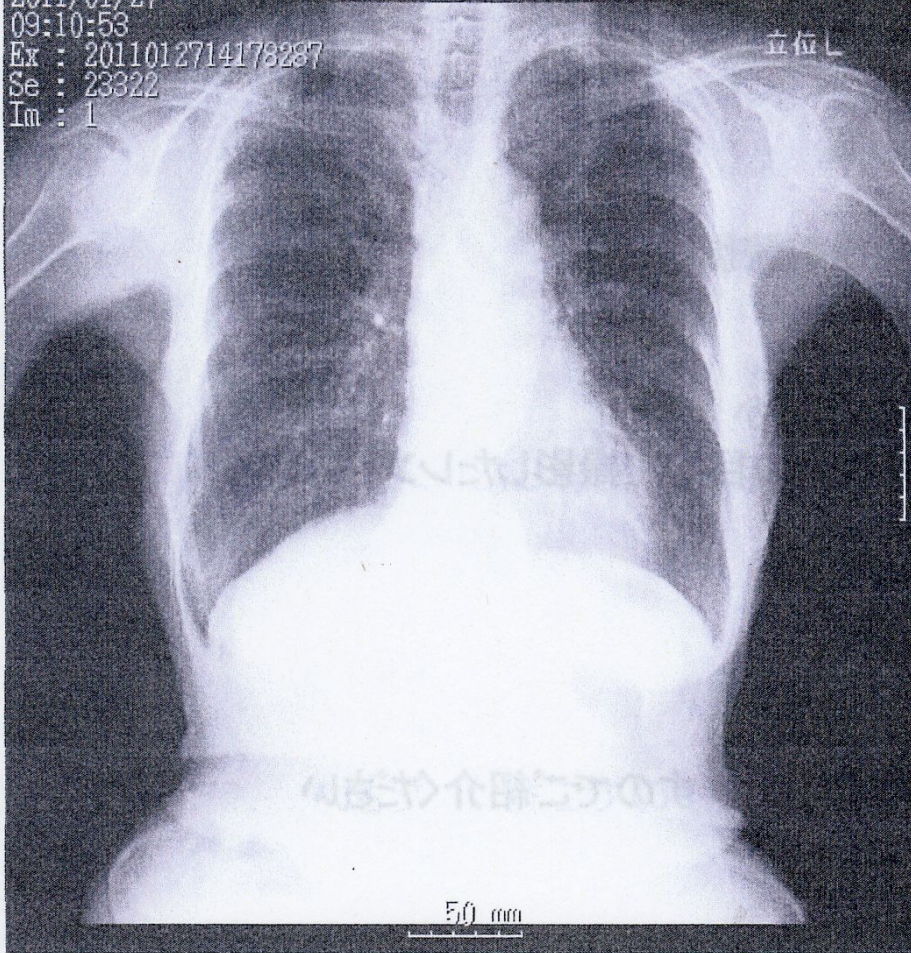
42

22

胸部レントゲン(比較)

2011/01/27
09:10:53
Ex : 2011012714178287
Se : 23322
Im : 1

1/05/12
08:30:50
: 2011042814945497
: 37328
: 1

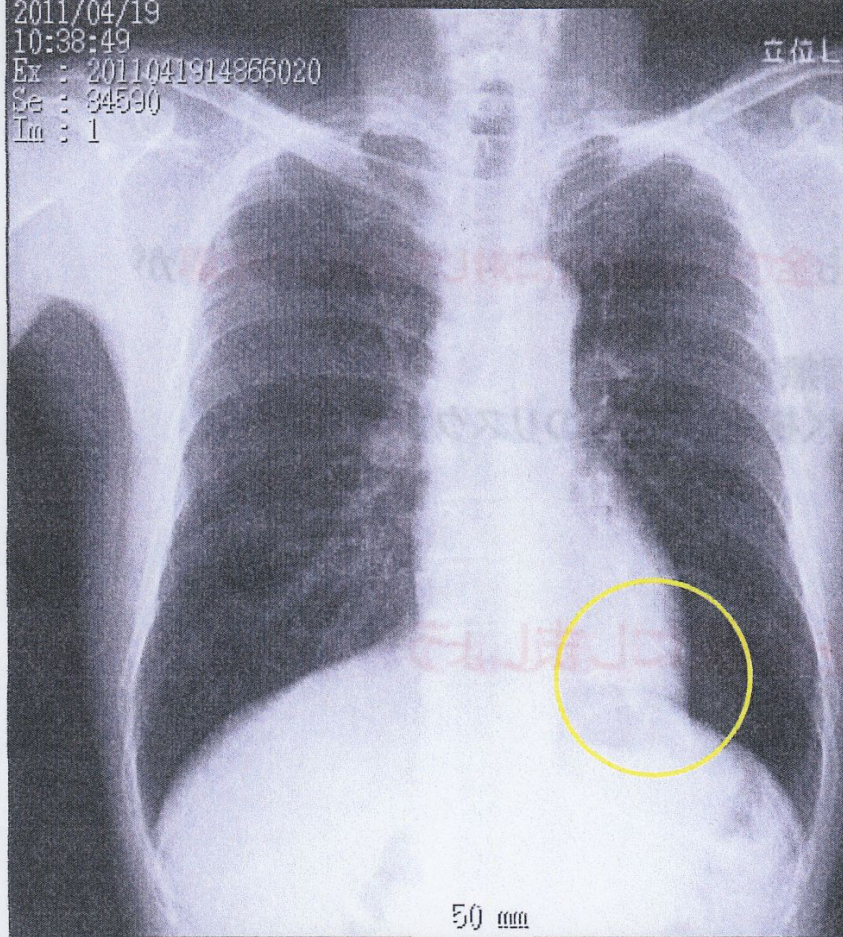


23

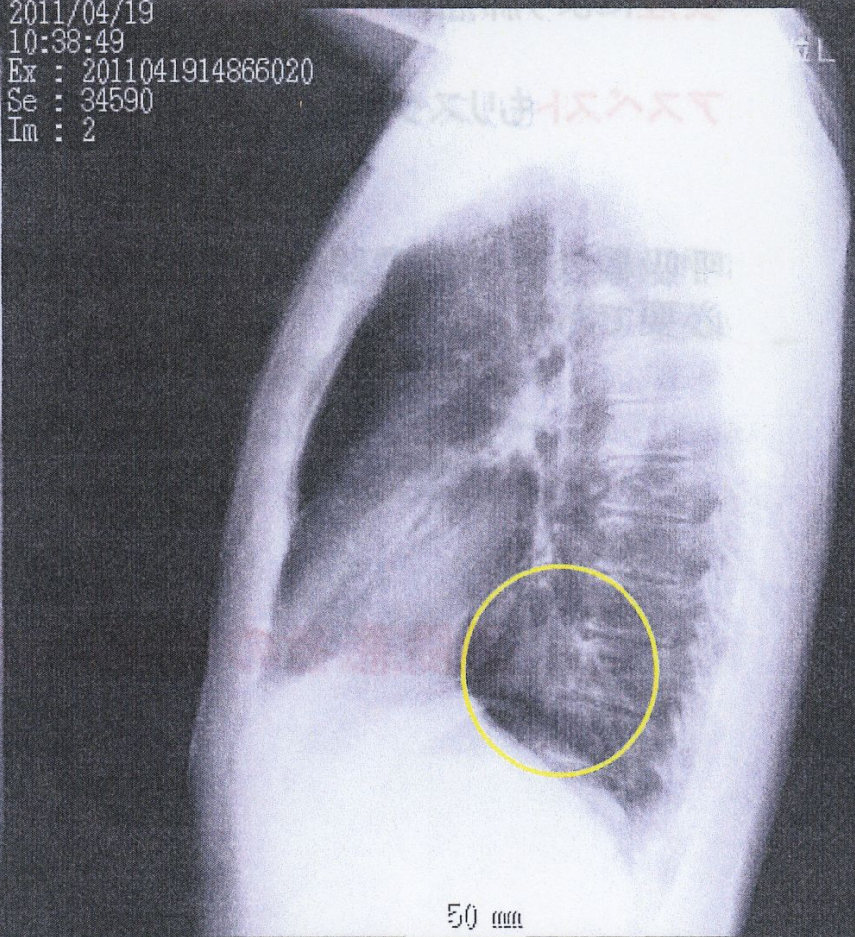
23

胸部レントゲン(2方向)

2011/04/19
10:38:49
Ex : 2011041914866020
Se : 34590
Im : 1



2011/04/19
10:38:49
Ex : 2011041914866020
Se : 34590
Im : 2



まとめ

自覚症状が出た時点では、すでに病期が進行している

無症状の時点でのレントゲン診断が必要

正しい条件で撮影する

検診での読影は二重読影や比較読影を行う

たまたま撮ったレントゲンでいかに診断するか

他疾患などでの経過観察中や他の目的で撮影したレントゲン

過去の画像と必ず比較する

必要に応じて側面像も追加する



気になる部位があれば胸部CTで確認しますのでご紹介ください

予防

25

喫煙により肺癌のリスク4.5倍に増加する

アスベストもリスク要因であるが、すでに規制されている

呼吸器疾患や循環器疾患などがなくても**全ての喫煙者に対して禁煙の指導が必要**である

- 全ての受診患者に喫煙の有無を確認
- 喫煙があれば肺癌のみでなく様々な疾患のリスクが増加
- 禁煙を指導

通院患者の喫煙0%を目標にしましょう

第13回広島北キヤンサーネット研修会
2012-05-24 安佐市民病院南館

26

肺がん外科治療

広島大学・腫瘍外科

岡田守人

Morihito Okada, MD & PhD

35

Today's Line-up

27

Hybrid VATS

Atypical bronchoplasty

Radical sublobar resection

Robotic surgery (Da Vinci)

たぐい
あり

2A

Hybrid VATS

Video **A**ssisted **T**horacic **S**urgery

↔ Complete VATS

Morihito Okada, Hiroshima Univ.

29

Ideal operation?

Lung function
preservation

+

Minimally invasive
approach



Ultimate goal in lung cancer surgery

Quality of surgery

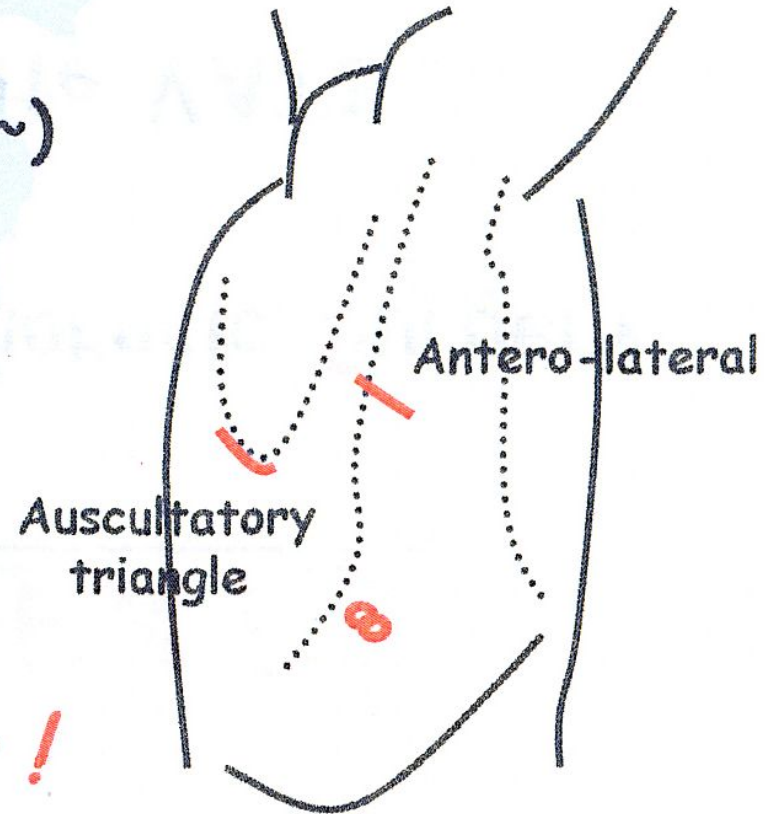
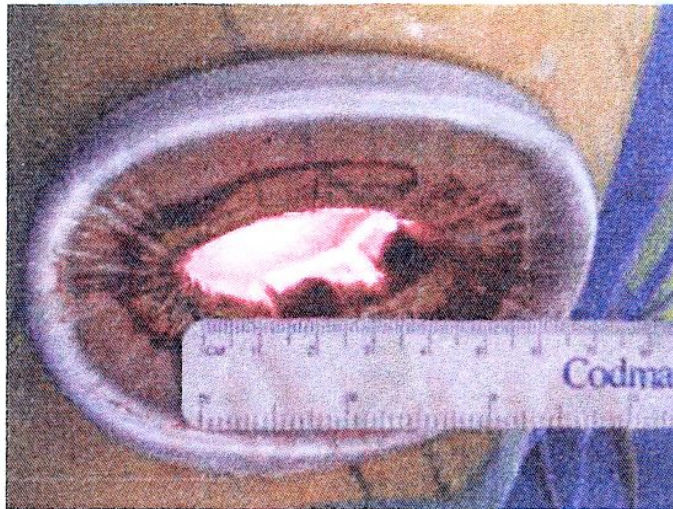
Technique high in the degree of difficulty

→ **Hybrid VATS**

Hybrid VATS

30

2 incisions (1cm~ & 4cm~)



No rib-spreading !

Skin incision should be extended without hesitation if the surgeon felt harder during the procedure.

Okada M, CHEST 128;2696-2701,2005 Morihito Okada, Hiroshima Univ.

31

Hybrid VATS

- 1) Quality of surgery & minimally invasive approach
- 2) Application for various pathologies

Do not stick at

Length of incision (4 cm, 6cm, 8cm, ...)

Monitor vision or **Direct vision**

3-dimensional anatomical understanding

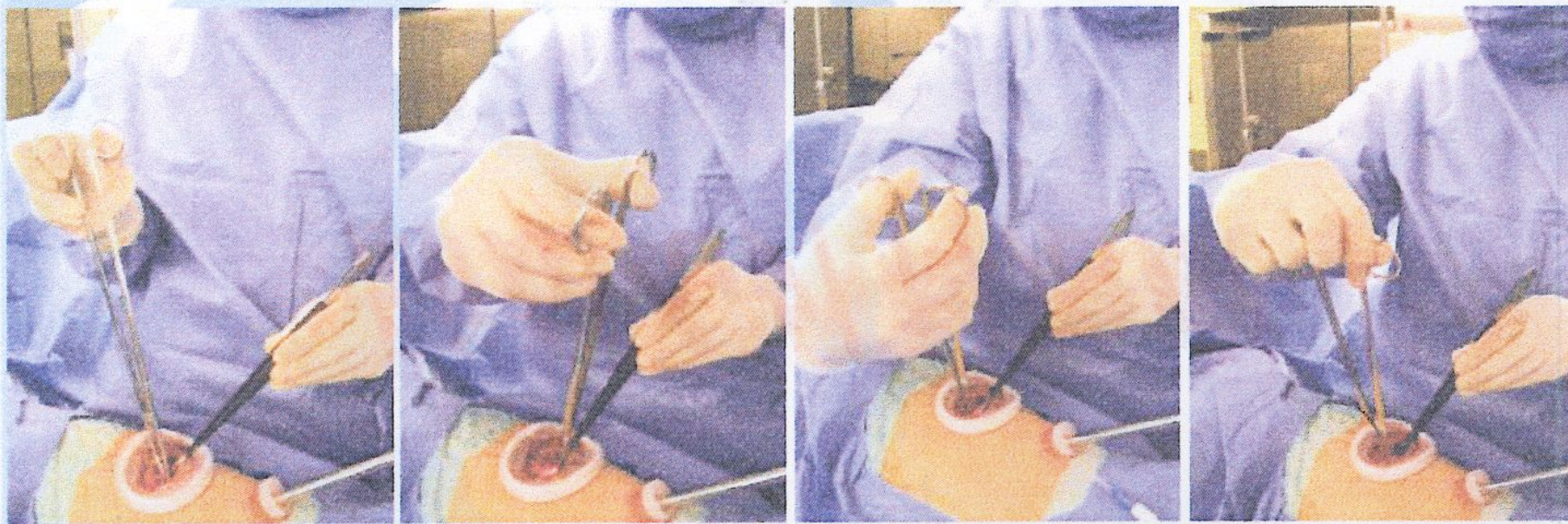
Ex. Dissection of intersegments during radical segmentectomy

A Matter of Taste: Sharp dissection with a 30cm-long scissors
Model 101-8098-30; Mayo-Harrihgton; Stille, Sweden

Morihito Okada, Hiroshima Univ.

Sharp Dissection

Via upside-down backhand grip of long scissors



Upside-down backhand grip of 30 cm-long scissors for sharp dissection and a long needleholder for suturing, initially proposed by Dr. Belsey (Frenchay Hospital, UK), Dr. Pearson (Toronto General Hospital, Canada) and Dr. Tsubota, which is suitable to facilitate deep maneuver in the era of VATS.

Okada M, CHEST 128;2696-2701,2005 Morihito Okada, Hiroshima Univ.

Hybrid Surgical Approach of Video-Assisted Minithoracotomy for Lung Cancer

Significance of Direct Visualization on Quality of Surgery

Okada M, et al.

Study objectives: Controversy regarding the most suitable surgical approach for treating malignancies of the lung is a matter of continuous discussions. "Complete" video-assisted thoracic surgery (VATS) that is performed using only the vision of a monitor is generally limited to lung resections of minimal difficulty. With the great interest in minimally invasive techniques for treating various pathologies, we have widely applied an integrated surgical approach that combines muscle-sparing minithoracotomy (incision, 4 to 10 cm) and video assistance using mainly

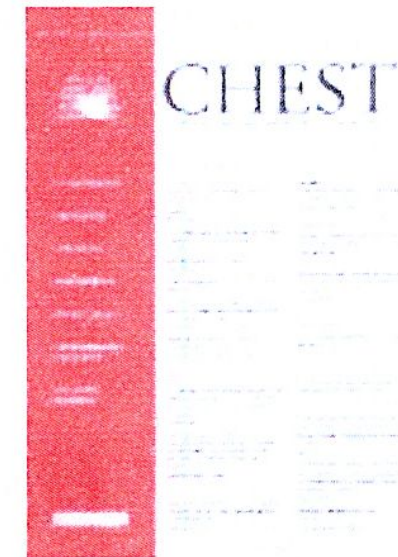
direct visualization of the lung resection, which we have called **hybrid VATS**. The aim of this study is to evaluate the usefulness of hybrid VATS.

Design: Retrospective single-center study.

Interventions: From January 1998 to October 2004, 405 of 678 lobectomies (60%) and 165 of 226 segmentectomies (73%) were performed for primary lung cancer using hybrid VATS.

Results: Bronchoplasty was performed in 93 of the 678 patients (14%) who underwent lobectomy and in 11 of the 226 patients (5%) who underwent segmentectomy. Hybrid VATS was utilized in 33% of sleeve lobectomy procedures and in 27% of sleeve segmentectomy procedures. The mean (\pm SD) surgical time using hybrid VATS was 164 ± 48 min for lobectomy and 158 ± 35 min for segmentectomy, and the mean blood loss was 166 ± 120 and 109 ± 80 mL, respectively. There was one operative mortality (0.2%) secondary to cardiogenic shock. Postoperative complications developed in 11% of patients with p-stage IA disease after undergoing hybrid VATS, in contrast to 19% of patients after undergoing open thoracotomy. The prognosis of patients treated by hybrid VATS was equivalent to that obtained with open thoracotomy.

Conclusions: Minithoracotomy combined with video support that is performed predominantly via direct visualization is a secure, integrated, minimally invasive approach to performing major resection for lung cancer, including atypical procedures such as bronchoplasty. This hybrid VATS can be an acceptable and satisfactory option whenever the performance of complete VATS is considered to be challenging.



October 2005

Morihito Okada, Hiroshima Univ.

American Association for Thoracic Surgery

Promoting Research and Education in Thoracic Surgery



A novel video-assisted anatomic segmentectomy technique Selective segmental inflation via bronchofiberoptic jet followed by cautery cutting

34

Okada M, et al.

OBJECTIVE: Segmentectomy is an anatomic parenchyma-sparing resection that is recently being performed for small-sized lung carcinoma and constitutes a useful procedure in a thoracic surgeon's armamentarium. We have generated a new technique that improves the identification of the intersegmental border and whose clinical utility we evaluate in this study.

METHODS: Under bronchofiberscopy, jet ventilation is selectively applied to the burdened bronchus to develop an anatomic plane between the inflated segment to be resected and the deflated area to be preserved. From April 2004 to June 2006, 52 consecutive patients with a clinical T1 N0 M0 peripheral cancer 2 cm or smaller underwent

video-assisted segmental resection called **hybrid VATS segmentectomy** in which electrocautery with no stapler was used to divide the intersegmental plane detected by selective jet ventilation.

RESULTS: Complete resection was achieved in all patients. The median operative time and bleeding during the operation were 155 minutes (range 85-225 minutes) and 60 mL (range 10-210 mL), respectively. The complication rate was 13.5% (7/52), and the most common was concerning air leak. The median duration of postoperative air leak and chest tube drainage was 1 day and 3 days, respectively. There were no in-hospital deaths. There was one case of mediastinal lymph node recurrence and another of metastasis to the brain although there was no case of local recurrence in the surgical margin area.

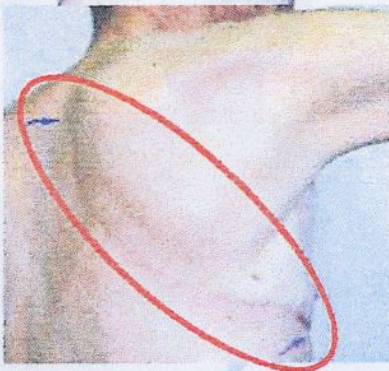
CONCLUSIONS: A novel video-assisted segmentectomy technique for lung cancer is clinically useful. Selective segmental inflation provides an obvious intersegmental plane quickly and easily, allowing a real margin distance in the ventilated segment. Despite the minimally invasive approach, since only the segment to be resected and not the entire lobe is expanded, an appropriate surgical view is possible.



March 2007

Morihito Okada, Hiroshima Univ.

Skin Wound



Open thoracotomy

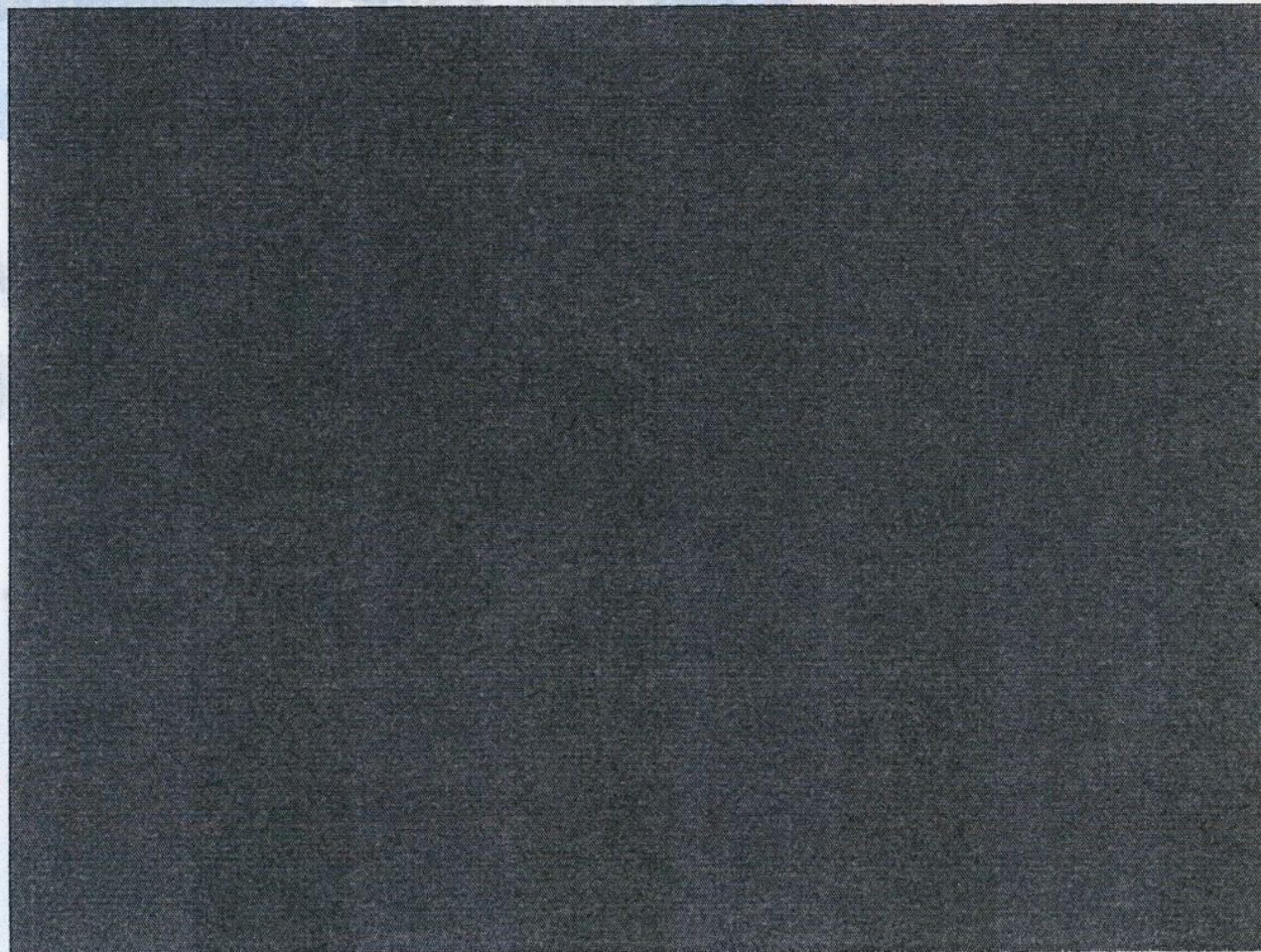


Hybrid VATS approach

Morihito Okada, Hiroshima Univ.

*Basic procedure of Complete VATS
~Right Upper Lobectomy~*

36

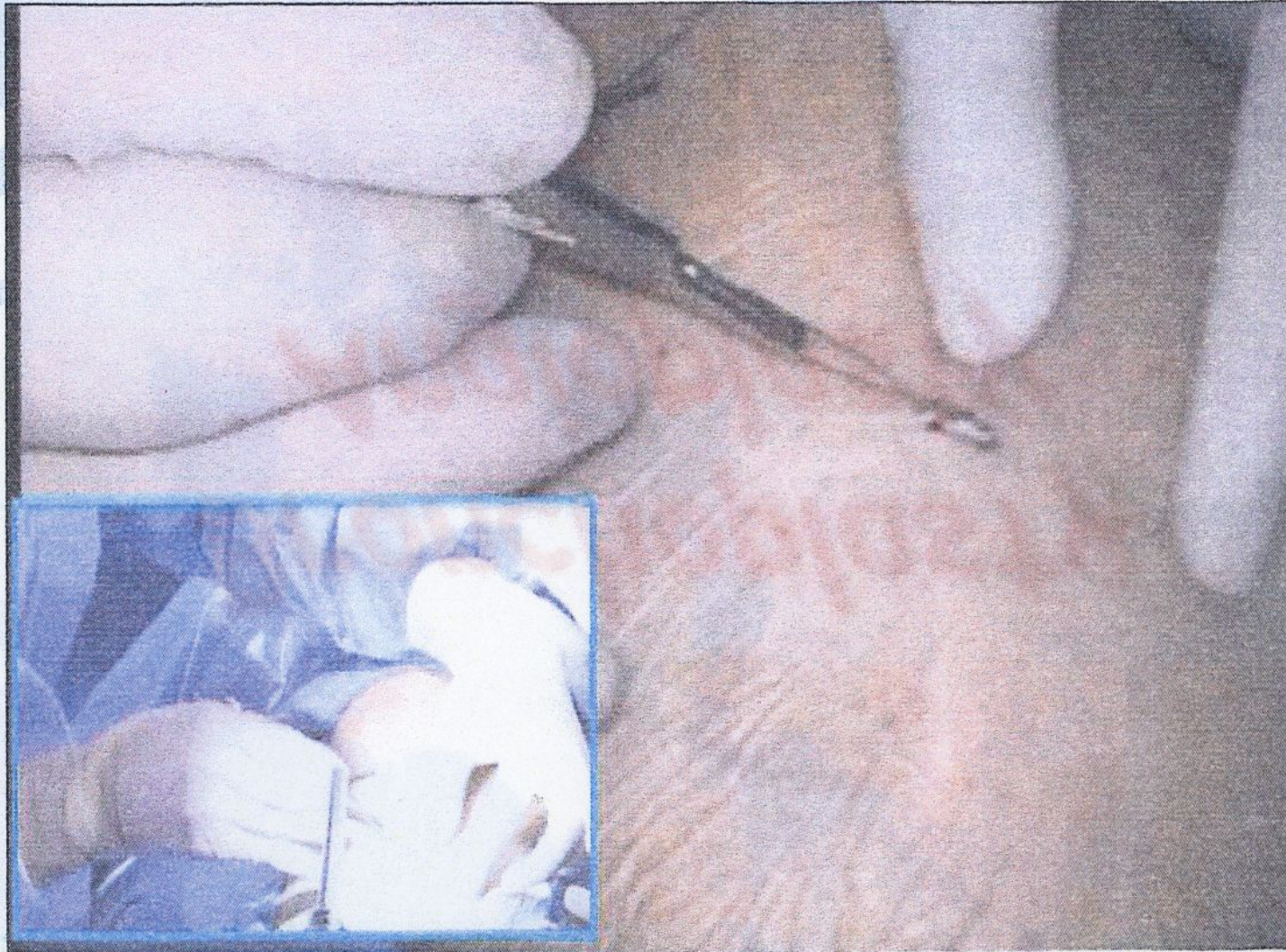


37

Morihito Okada, Hiroshima Univ.

*Basic procedure of Hybrid VATS
~Right Lower Lobectomy~*

37



Morihito Okada, Hiroshima Univ.

Lung Cancer Surgery

3A

Major premise : Safety & Radicality

The advance of surgery :
just preserving patient's functional capacity.

1) Minimally invasive approach

Video-Assisted Thoracic Surgery (VATS)

just Approach, not Surgery itself

2) Pulmonary-saving surgery *More important!!!*

Bronchoplasty (Sleeve resection)

Lesser resection (Radical sublobar resection)

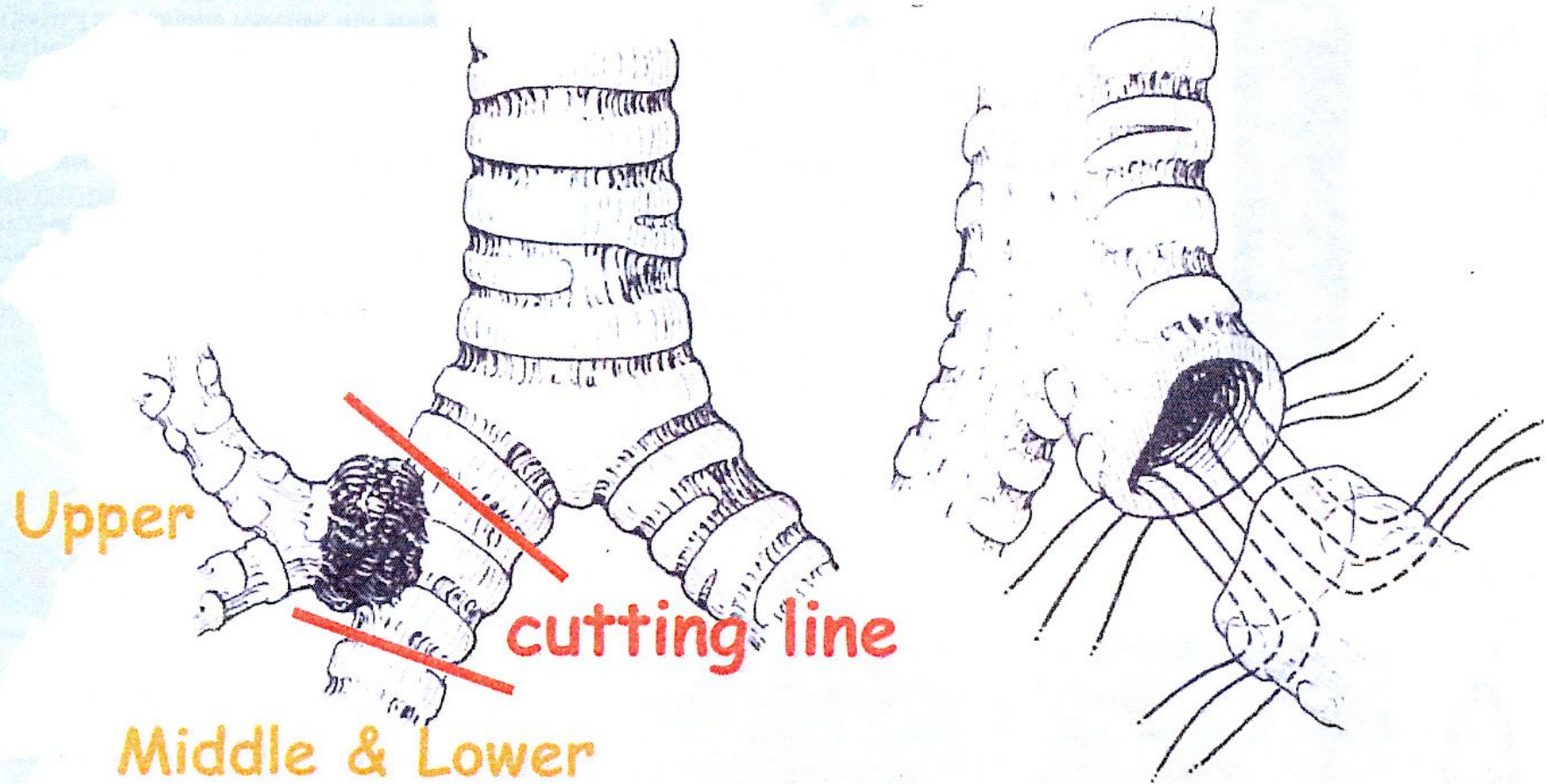
39

Bronchoplasty Angioplasty

31

Morihito Okada, Hiroshima Univ.

Right upper sleeve lobectomy



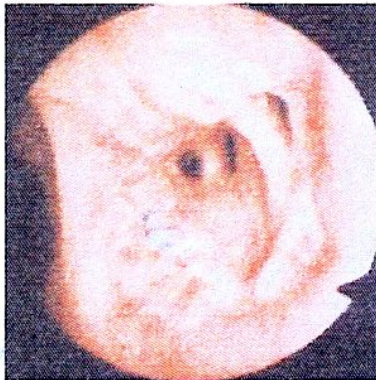
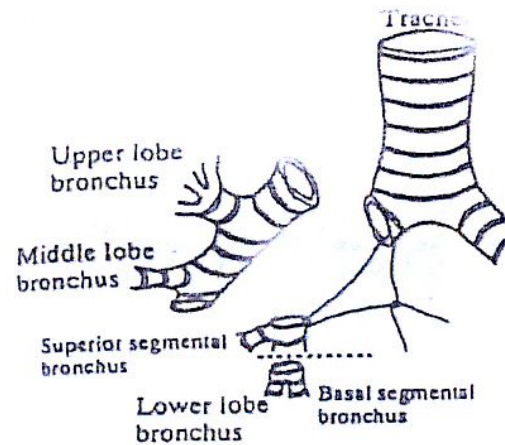


Atypical Bronchoplasty

Morihito Okada, Hiroshima Univ.

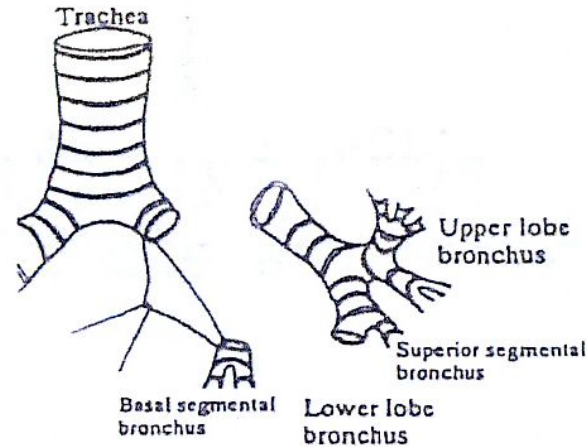
Extended Sleeve Lobectomy 43

Type A



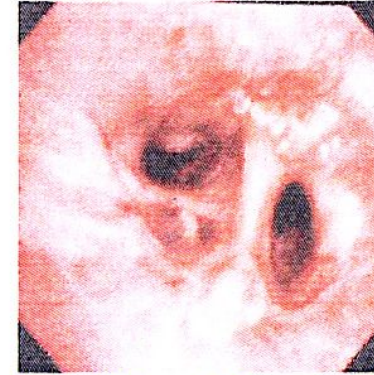
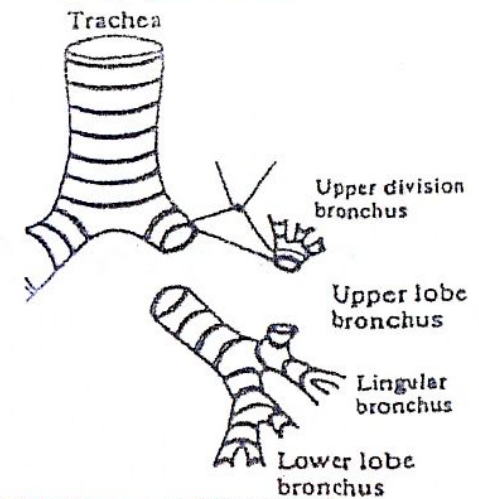
JTCVS 118;710-13,1999

Type B



Morihito Okada, Hiroshima Univ.

Type C



American Association for Thoracic Surgery

Promoting, Research and Education in Thoracic Surgery



Extended Sleeve Lobectomy for Lung Cancer The Avoidance of Pneumonectomy

Okada M, et al.

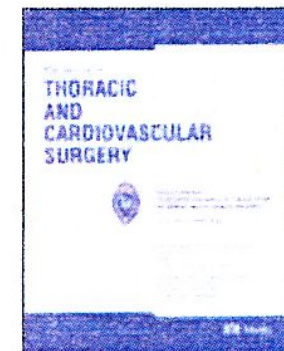
43

Objective: We have tried atypical bronchoplasties in patients with noncompromised lung function with centrally located cancers to avoid pneumonectomy. We evaluated the efficacy of extended sleeve lobectomy in such patients.

Methods: Among 157 patients undergoing bronchoplasty for primary non-small cell lung carcinoma, 15 patients underwent extended sleeve lobectomy.

Results: According to the mode of reconstruction, the 15 patients were classified into 3 groups: (A) anastomosis between the right main and lower bronchi with resection of the upper and middle lobes (n = 6), (B) anastomosis between the left main and basal segmental bronchi with resection of the upper lobe and superior segment of the lower lobe (n = 4), and (C) anastomosis between the left main and upper division bronchi with resection of the lingular segment and lower lobe (n = 5). The tumors were completely resected in all patients. Pulmonary angioplasty was carried out in 8 patients. Bronchial reconstruction was successful in all patients. Pulmonary vein thrombosis resulting from overstretching of the inferior pulmonary vein occurred in 1 patient of group A and was relieved by completion pneumonectomy. There was neither operative mortality nor local recurrence. Although all patients with stage IIB disease and half of patients with stage IIIA disease were alive without recurrence (12-106 months), half of the patients with stage IIIA disease died of distant metastases within 1 year.

Conclusions: We suggest that this extended sleeve lobectomy, which is technically demanding, should be considered in patients with centrally located lung cancer, because this lung-saving operation is safer than pneumonectomy and is equally curative.



October
1999

Morihito Okada, Hiroshima Univ.

Extended Sleeve Lobectomy



Type	Case (Sex, Age)	Clinical Stage TNM	Histology	Induction therapy	PA plasty	Technical result	Pathologic Stage TNM	Prognosis
A	1 (M, 66)	IIIA 3 1 0	AD	+	+	Poor(CompN)	IIIA 3 2 0	12 mo, dead(ca)
	2 (M, 62)	IIIA 3 1 0	SQ	+	+	Good	IIIA 3 1 0	12 mo, dead(ca)
	3 (M, 71)	IIB 3 0 0	SQ	-	-	Good	IIB 3 0 0	106 mo, alive
	4 (M, 58)	IIIA 3 1 0	SQ	-	+	Good	IIIA 3 1 0	99 mo, alive
	5 (F, 51)	IIIA 3 2 0	AD	+	+	Good	IIB 2 0 0	29 mo, dead(ca)
	6 (M, 47)	IIB 3 0 0	AD	+	-	Good	IIIA 0 0 1	26 mo, alive
	7 (F, 74)	IIB 2 1 0	AD	-	+	Good	IIIB 4 2 0	19 mo, alive
B	1 (M, 72)	IIB 2 1 0	SQ	-	+	Good	IIB 2 1 0	112 mo, alive
	2 (M, 65)	IIIA 3 1 0	SQ	-	+	Good	IIIA 3 1 0	51mo, alive
	3 (M, 64)	IIB 3 0 0	SQ	-	-	Good	IIB 3 0 0	57 mo, dead(ca)
	4 (M, 70)	IIB 2 1 0	SQ	-	+	Good	IIB 2 1 0	79 mo, alive
	5 (F, 51)	IIIA 2 2 0	SQ	+	+	Good	IIB 2 1 0	60 mo, alive
C	1 (M, 64)	IIB 2 1 0	SQ	-	-	Good	IIB 2 1 0	68 mo, alive
	2 (M, 68)	IIB 2 1 0	SQ	-	-	Good	IIB 2 1 0	116 mo, alive
	3 (M, 66)	IIIA 2 2 0	SQ	+	-	Good	IIIA 1 2 0	9 mo, dead(ca)
	4 (M, 56)	IIB 3 0 0	SQ	-	-	Good	IIB 3 0 0	99 mo, alive
	5 (M, 62)	IIB 2 1 0	SQ	-	-	Good	IIB 2 1 0	26 mo, dead(ca)
	6 (M, 53)	IIIA 3 2 0	SQ	+	-	Good	IIB 3 2 0	13 mo, alive
	7 (F, 78)	I 1 0 0	AD	-	-	Good	IIA 2 0 0	26 mo, dead(ca)
	8 (M, 60)	IIB 2 1 0	SQ	-	-	Good	IIIB 4 2 0	19 mo, alive
	9 (M, 61)	IIIA 3 1 0	SQ	-	-	Good	IIIA 3 2 0	27 mo, alive
	10 (M, 72)	IB 2 0 0	SQ	-	-	Good	IIB 2 1 0	7 mo, alive
	11 (M, 63)	IB 2 0 0	SQ	-	-	Good	IB 2 0 0	3 mo, alive

A-1 & A-5, Anastomosis between right main bronchus and basal segmental bronchus.

Morihito Okada, Hiroshima Univ.



45

Sleeve segmentectomy for non-small cell lung carcinoma

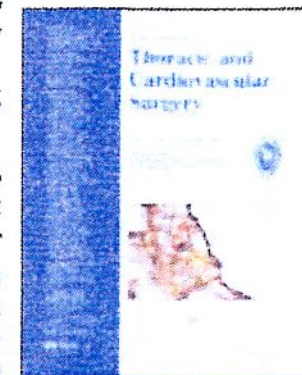
Okada M, et al.

OBJECTIVE: Although sleeve segmentectomy for centrally located lung cancers was originally designed for patients unable to tolerate lobectomy, we have tried it in patients with noncompromised function as well. We evaluated the efficiency of this atypical type of bronchoplasty.

METHODS: Of 202 patients for whom we performed bronchoplasty for primary non-small cell lung carcinoma, 16 underwent sleeve segmentectomy.

RESULTS: Sixteen patients were classified into 4 groups according to the mode of bronchial reconstruction: type A, anastomosis between the right intermediate or left main and basal segmental bronchi with removal of the superior segment of the lower lobe (S6; n = 7); type B, anastomosis between the left main and lingular bronchi with removal of the upper division of the left upper lobe (S1+2+3; n = 3); type C, anastomosis between the left main and upper division bronchi with removal of the lingular segments (S4+5; n = 4); and type D, others (n = 2). Nine patients had pulmonary function sufficient to tolerate lobectomy. The tumors were completely resected in all patients. Combined performance of pulmonary angioplasty was carried out in 2 patients. Bronchial reconstruction was successful in all patients, with neither bronchial complications nor local recurrences. Ten patients had stage IA disease, and 6 had more advanced disease. All patients were alive, except 1 who died as a result of distant metastasis and 2 who died of noncancerous causes. Overall 3-year and 5-year survivals were 93.3% and 68.1%, respectively.

CONCLUSIONS: Sleeve segmentectomy, which is technically demanding, should be considered in patients with centrally located and possibly curable early non-small cell lung cancer because the prevalence of small-sized or multiple lung tumors has been increasing and because our findings suggest that this lung-saving operation is safe and useful.

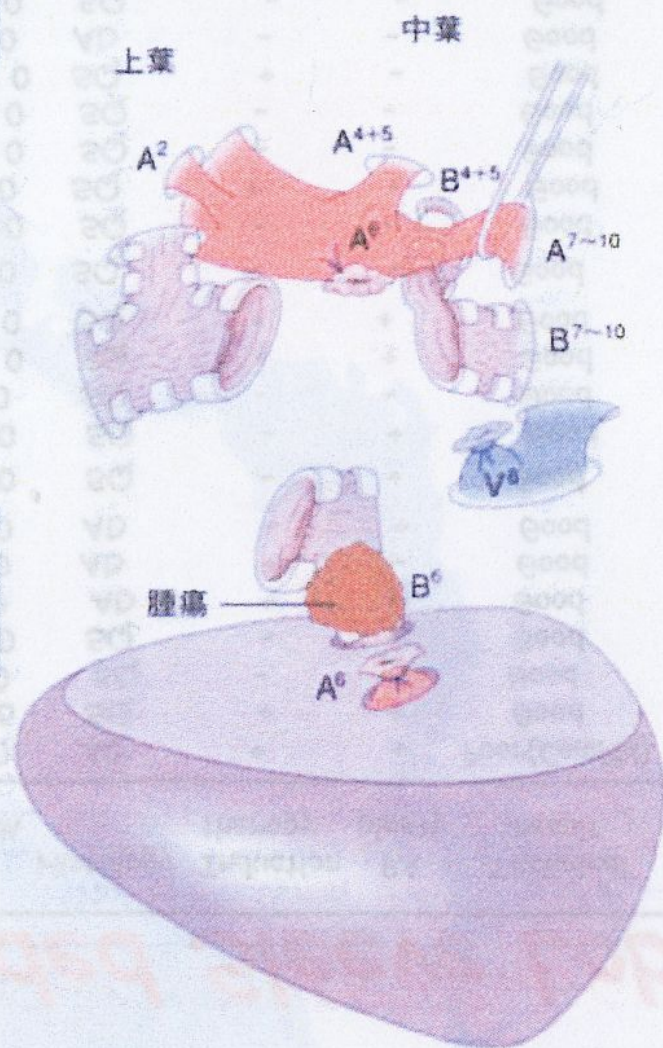


September
2004

Morihito Okada, Hiroshima Univ.

Right S6 Sleeve Segmentectomy

46



Morihito Okada, Hiroshima Univ.

Sleeve Segmentectomy

47

Class	Lung resection	Anastomosis	Preservation
Type A	S6	Right intermedial bronchi--basal bronchi Left main bronchi--basal segmental bronchi	Basal segments
Type B	Left S1+2+3	Left main bronchi--lingular bronchi	Left S4+5
Type C	Left S4+5	Left main bronchi--upper division bronchi	Left S1+2+3
Type D	Unclassified (others)		

Type	No.	Sex	Age (y)	Histologic type	Resected segment	Pathologic				Local recurrence	Prognosis
						T	N	M	Staging		
A	1†	M	74	SQ	Left S6	1	0	0	IA	No	152 mo. alive
	2†	M	58	SQ	Right S6	1	0	0	IA	No	58 mo. dead‡
	3	M	62	AD	Left S6	1	0	0	IA	No	57 mo. alive
	4	M	74	SQ	Right S6	2	0	0	IB	No	53 mo. dead‡
	5	M	70	SQ	Left S6	1	1	0	IIA	No	39 mo. alive
	6†	M	65	SQ	Left S6	1	0	0	IA	No	38 mo. alive
	7	M	59	SQ	Right S6	2	1	0	IIB	No	35 mo. alive
B	1	M	57	SQ	Left S1+2+3	1	1	0	IIA	No	75 mo. alive
	2†	M	54	SQ	Left S1+2+3	1	0	0	IA	No	65 mo. alive
	3†	M	61	SQ	Left S1+2+3	1	0	0	IA	No	35 mo. alive
C	1†	M	63	SQ	Left S4+5	1	0	0	IA	No	103 mo. alive
	2†	M	74	SQ	Left S4+5	1	0	0	IA	No	41 mo. alive
	3*	F	76	SQ	Left S4+5	2	1	0	IIB	No	24 mo. dead§
	4*	F	69	AD	Left S4+5	1	1	0	IIA	No	7 mo. alive
D	1†	M	75	SQ	Left S1+2	1	0	0	IA	No	70 mo. alive
	2†	F	20	ME	Right S3	1	0	0	IA	No	39 mo. alive

4.8

Radical sublobar resection

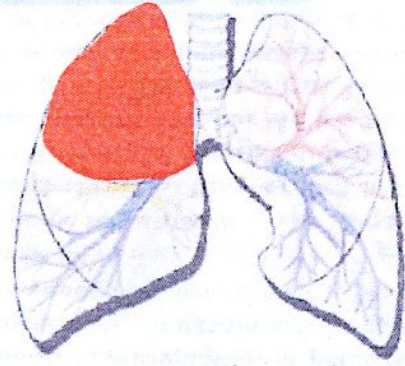
Small-sized cancers are increasingly detected
all over the world



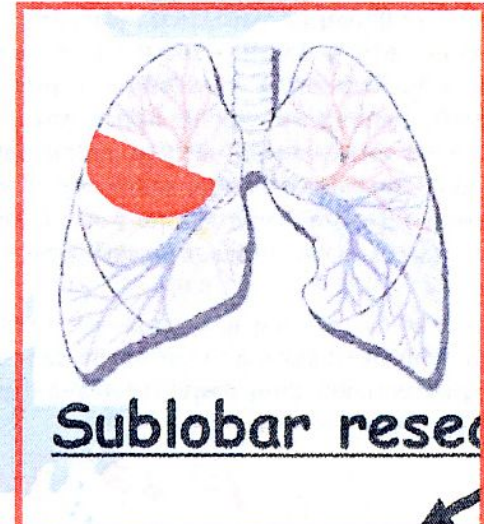
Progress of radiographic modality
Widespread of screening

49

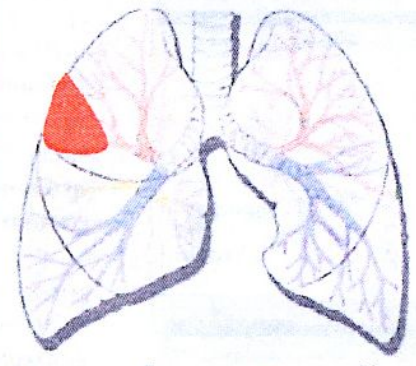
Surgery for small-sized lung cancer



Standard



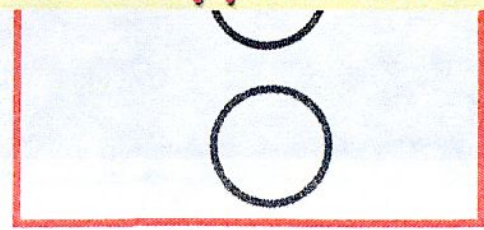
Sublobar resection (Limited)



Strategy for **small-sized solitary pulmonary nodules** potentially underlying malignancy: Quality Control
Diagnostic lobectomy is not acceptable even via VATS approach

lymph nodes

Deep lesions



X

American Association for Thoracic Surgery

Promoting Research and Education in Thoracic Surgery



50

Effect of tumor size on prognosis in patients with non-small cell lung cancer: The role of segmentectomy as a type of lesser resection

Okada M, et al.

OBJECTIVE: As a result of increasing discovery of small-sized lung cancer in clinical practice, tumor size has come to be considered an important variable affecting planning of treatment. Nevertheless, there have been no reports including large numbers of patients and focusing on tumor size, and controversy remains concerning the surgical management of small-sized tumors. Therefore, we investigated the relationships between tumor dimension and clinical and follow-up data, as well as surgical procedure in particular.

METHODS: We reviewed the records of 1272 consecutive patients who underwent complete resection for non-small cell carcinoma of the lung.

RESULTS: Fifty patients had tumors of 10 mm or less, 273 had tumors of 11 to 20 mm, 368 had tumors of 21 to 30 mm, and 581 had tumors of greater than 30 mm in diameter. The cancer-specific 5-year survivals of patients in these 4 groups were 100%, 83.5%, 76.5%, and 57.9%, respectively. For patients with pathologic stage I disease, they were 100%, 92.6%, 84.1%, and 76.4%, respectively. Multivariate analysis demonstrated that male sex, older age, larger tumor, and advanced pathologic stage adversely affected survival. Lesser resection was performed in 167 (52%) of 323 patients with a tumor of 20 mm or less in diameter but in 156 (16%) of 949 patients with a tumor of greater than 20 mm in diameter. The percentages of lesser resection among all procedures performed were 79%, 56%, 30%, and 15% in patients with pathologic stage I disease with a tumor of 10 mm or less, 11 to 20 mm, 21 to 30 mm, and greater than 30 mm in diameter, respectively. The 5-year cancer-specific survivals of patients with pathologic stage I disease with tumors of 20 mm or less and 21 to 30 mm in diameter were 92.4% and 87.4% after lobectomy, 96.7% and 84.6% after segmentectomy, and 85.7% and 39.4% after wedge resection, respectively. On the other hand, with a tumor of greater than 30 mm in diameter, survivals were 81.3% after lobectomy, 62.9% after segmentectomy, and 0% after wedge resection, respectively.

CONCLUSIONS: Tumor size is an independent and significant prognostic factor and important for planning of surgical treatment. Although lobectomy should be chosen for patients with a tumor of greater than 30 mm in diameter, further investigation is required for tumors of 21 to 30 mm in diameter. Segmentectomy should, as a lesser anatomic resection, be distinguished from wedge resection and might be acceptable for patients with a tumor of 20 mm or less in diameter without nodal involvement.

Morihito Okada, Hiroshima Univ.



January
2005

Our practice

Sublobar resection for lung cancer

- 1) Peripheral 2cm or smaller cT1N0M0 NSCLC
- 2) Able to tolerate a lobectomy
- 3) Basically, wedge resection could be used for a tumor of 20 mm or smaller as well as for a tumor observed as pure GGO (100% TDR), otherwise segmentectomy is performed.
- 4) To obtain sufficient margins, resection line could be placed on the segment adjacent to the affected one or portions of a few segments could be resected.
- 5) When the margin might be imperfect or any lymph node was found to be diseased, lobectomy have to be performed instead.

(5)

Morihito Okada, Hiroshima Univ.

Multicenter analysis of high-resolution computed tomography and positron emission tomography/computed tomography findings to choose therapeutic strategies for clinical stage IA lung adenocarcinoma

Morihito Okada, MD, PhD,^a Harubiko Nakayama, MD, PhD,^b Sakae Okumura, MD, PhD,^c Hiromitsu Daisaki, PhD,^d Shuji Adachi, MD, PhD,^e Masahiro Yoshimura, MD, PhD,^f and Yoshihiro Miyata, MD, PhD^g

Objective: The detection rates of small lung cancers, especially adenocarcinoma, have recently increased. An understanding of malignant aggressiveness is critical for the selection of suitable therapeutic strategies, such as sublobar resection. The objective of this study was to examine the malignant biological behavior of clinical stage IA adenocarcinoma and to select therapeutic strategies using high-resolution computed tomography, fluorodeoxyglucose-positron emission tomography/computed tomography, and a pathologic analysis in the setting of a multicenter study.

Methods: We performed high-resolution computed tomography and fluorodeoxyglucose-positron emission tomography/computed tomography in 502 patients with clinical T1N0M0 adenocarcinoma before they underwent surgery with curative intent. We evaluated the relationships between clinicopathologic characteristics and maximum standardized uptake values on fluorodeoxyglucose-positron emission tomography/computed tomography, ground-glass opacity ratio, and tumor disappearance rate on high-resolution computed tomography and component of bronchioloalveolar carcinoma on surgical specimens, as well as between these and surgical findings. We used a phantom study to correct the serious limitation of any multi-institution study using positron emission tomography/computed tomography, namely, a discrepancy in maximum standardized uptake values among institutions.

Results: Analyses of receiver operating characteristic curves identified an optimal cut-off value to predict high-grade malignancy of 2.5 for revised maximum standardized uptake values, 20% for ground-glass opacity ratio, 50% for tumor disappearance rate, and 30% for bronchioloalveolar carcinoma ratio. Maximum standardized uptake values and bronchioloalveolar carcinoma ratio, tumor disappearance rate, and ground-glass opacity ratio mirrored the pathologic aggressiveness of tumor malignancy, nodal metastasis, recurrence, and prognosis, including disease-free and overall survival.

Conclusions: Maximum standardized uptake value is a significant preoperative predictor for surgical outcomes. High-resolution computed tomography and fluorodeoxyglucose-positron emission tomography/computed tomography findings are important to determine the appropriateness of sublobar resection for treating clinical stage IA adenocarcinoma of the lung. (*J Thorac Cardiovasc Surg* 2011;141:1384-91)

52

American Association for Thoracic Surgery

Promoting Research and Education in Thoracic Surgery



DB

Radical sublobar resection

for small-sized non-small cell lung cancer: A multicenter study

Okada M, et al.

OBJECTIVE: At present, even when early-stage, small-sized non-small cell lung cancers are being increasingly detected, lesser resection has not become the treatment of choice. We sought to compare sublobar resection (segmentectomy or wedge resection) with lobar resection to test which one is the appropriate procedure for such lesions.

METHODS: From 1992 to 2001, a nonrandomized study was performed in 3 institutes for patients with a peripheral cT1N0M0 non-small cell lung cancer of 2 cm or less who were able to tolerate a lobectomy. The results of the sublobar resection group enrolled preoperatively (n = 305) were compared with those of the lobar resection group (n = 262).

RESULTS: Except for distribution of tumor location, there were no significant differences in any variable, patient characteristics, curability, pathologic stage, morbidity, or recurrence rate. Median follow-up was more than 5 years. Disease-free and overall survivals were similar in both groups with 5-year survivals of 85.9% and 89.6% for the sublobar resection group and 83.4% and 89.1% for the lobar resection group, respectively. Multivariate analysis confirmed that the recurrence rate and prognosis associated with sublobar resection were not inferior to those obtained with lobar resection. Postoperative lung function was significantly better in patients who underwent sublobar resection.

CONCLUSIONS: Sublobar resection should be considered as an alternative for stage IA non-small cell lung cancers 2 cm or less, even in low-risk patients. These results could lay the foundation for starting randomized controlled trials anew, which would bring great changes of lung cancer surgery in this era of early detection of lung cancer.



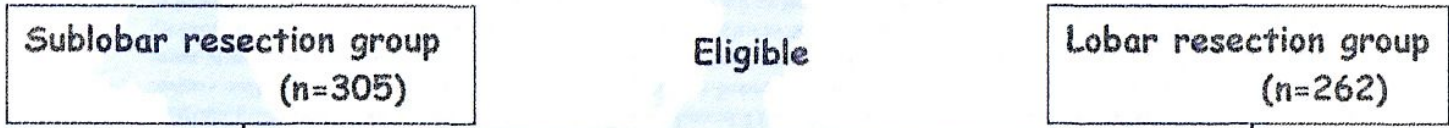
October
2006

Morihito Okada, Hiroshima Univ.

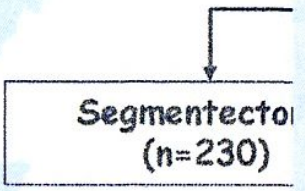
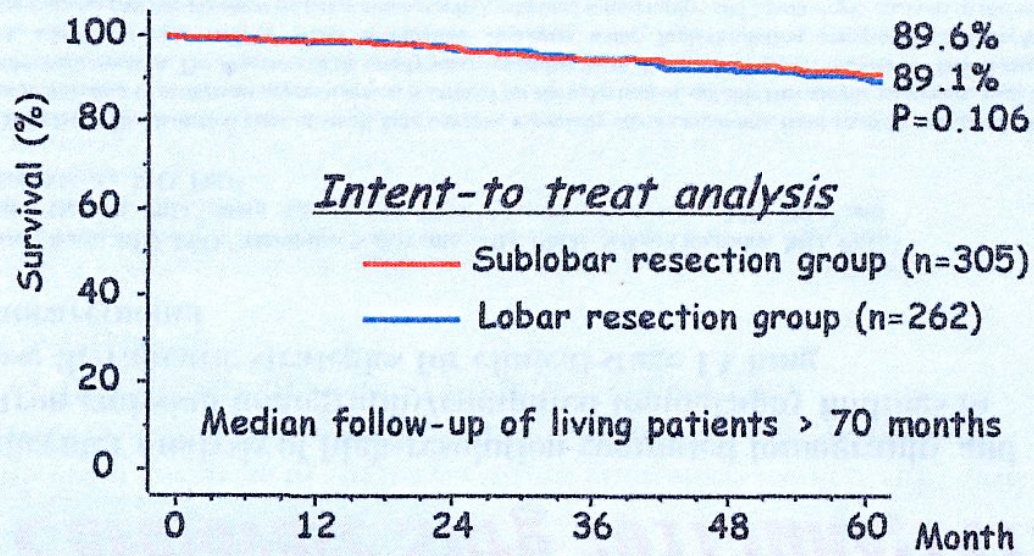
Sublobar resection vs Lobectomy

54

[1992 - 2001] for cT1N0M0 NSCLC 2cm or less, able to tolerate a lobectomy



Overall survival

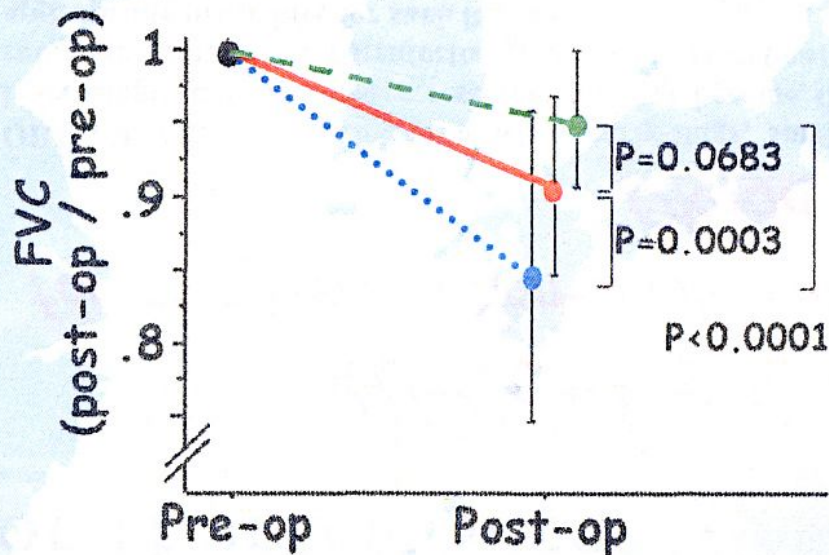


lobectomy (n=262)

Change of lung function

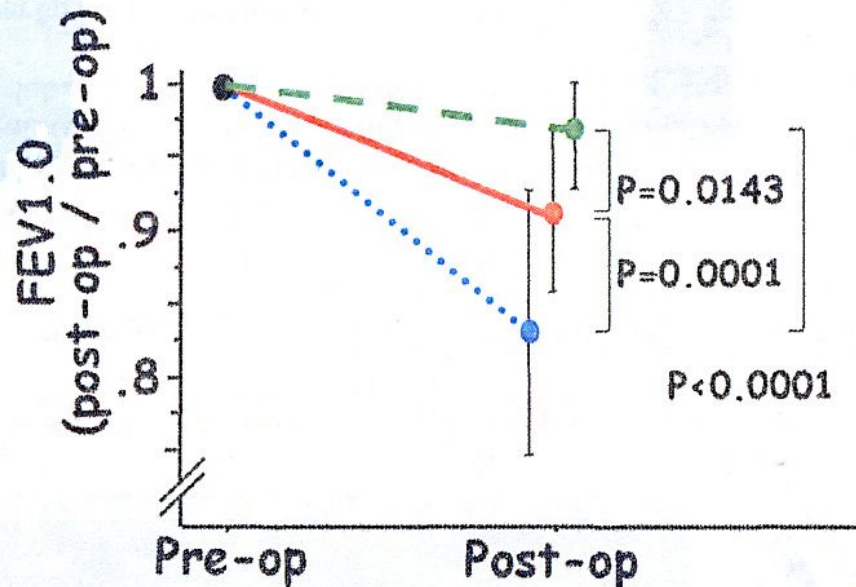
- Wedge resection (n=18)
- Segmentectomy (n=168)
- Lobectomy (n=168)

SS



FVC

JTCVS 132;769-75,2006



FEV1.0

Morihito Okada, Hiroshima Univ.

56

Summary of literature in prognosis following sublobar and lobar resection for stage IA NSCLC

Author year	Sublobar resection		Lobar resection	
	Number	5-year survival(%)	Number	5-year survival(%)
Read 1990	113	84	131	74
LCSG 1995	122	44*	125	65*
Kodama 1997	46	93	77	88
Landreneau 1997	102	62	117	70
Okada 2001	68	87	104	87
Koike 2003	74	89	159	90
Okada 2006	305	89.6	262	89.1

*statistically significant

JTCVS 132:769-75,2006

Morihito Okada, Hiroshima Univ.

American Association for Thoracic Surgery

Promoting Research and Education in Thoracic Surgery

A novel video-assisted anatomic segmentectomy technique Selective segmental inflation via bronchofiberoptic jet followed by cautery cutting Okada M, et al.

OBJECTIVE: Segmentectomy is an anatomic parenchyma-sparing resection that is recently being performed for small-sized lung carcinoma and constitutes a useful procedure in a thoracic surgeon's armamentarium. We have generated a new technique that improves the identification of the intersegmental border and whose clinical utility we evaluate in this study.

METHODS: Under bronchofiberscopy, jet ventilation is selectively applied to the burdened bronchus to develop an anatomic plane between the inflated segment to be resected and the deflated area to be preserved. From April 2004 to June 2006, 52 consecutive patients with a clinical T1 N0 M0 peripheral cancer 2 cm or smaller underwent video-assisted segmental resection called **hybrid VATS segmentectomy** in which electrocautery with no stapler was used to divide the intersegmental plane detected by selective jet ventilation.

RESULTS: Complete resection was achieved in all patients. The median operative time and bleeding during the operation were 155 minutes (range 85-225 minutes) and 60 mL (range 10-210 mL), respectively. The complication rate was 13.5% (7/52), and the most common was concerning air leak. The median duration of postoperative air leak and chest tube drainage was 1 day and 3 days, respectively. There were no in-hospital deaths. There was one case of mediastinal lymph node recurrence and another of metastasis to the brain although there was no case of local recurrence in the surgical margin area.

CONCLUSIONS: A novel video-assisted segmentectomy technique for lung cancer is clinically useful. Selective segmental inflation provides an obvious intersegmental plane quickly and easily, allowing a real margin distance in the ventilated segment. Despite the minimally invasive approach, since only the segment to be resected and not the entire lobe is expanded, an appropriate surgical view is possible.

Morihito Okada, Hiroshima Univ.

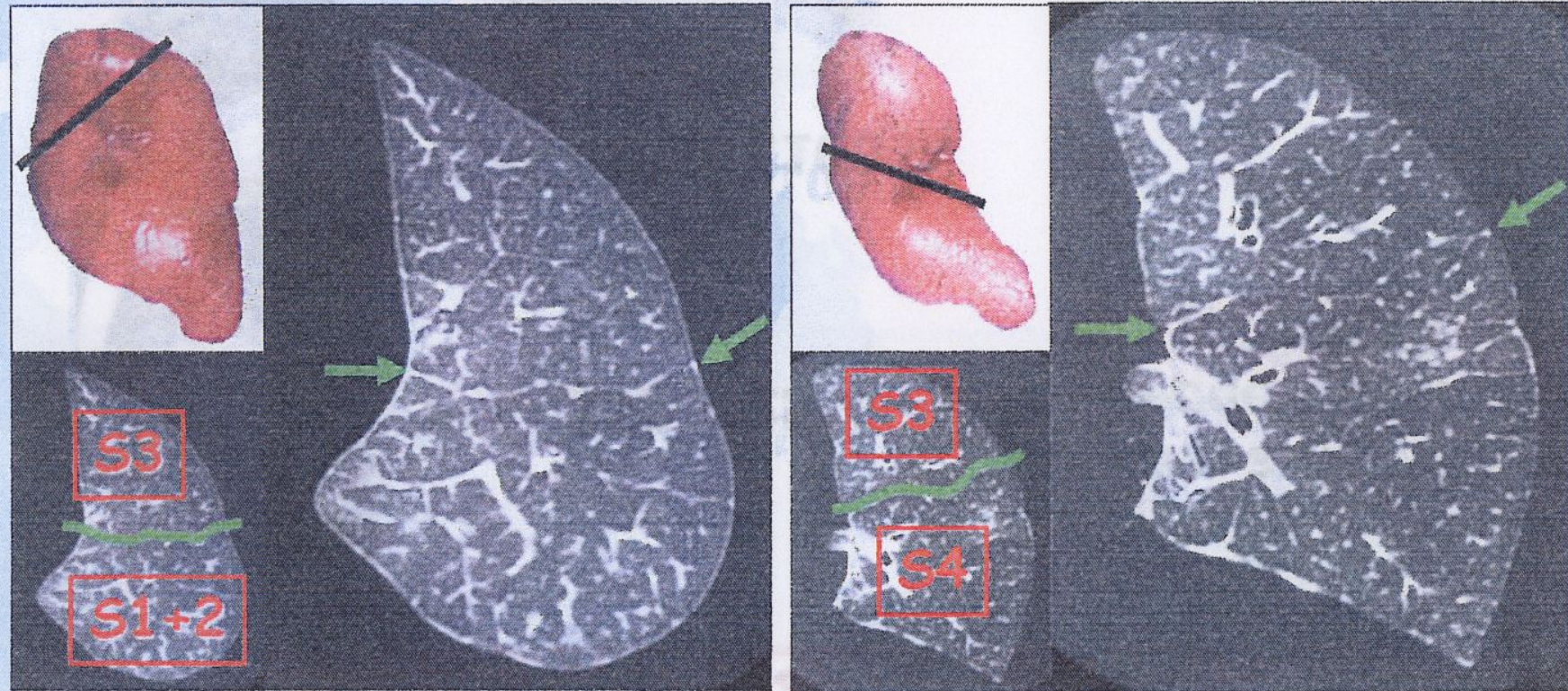


March 2007

*A novel video-assisted anatomic segmentectomy technique
selective segmental inflation via bronchofiberoptic jet followed by cautery cutting*

Anatomical Intersegmental Lines

58



Transaxial Specimen CT

Coronal Specimen CT

Presented by Prof. Ito H (Fukui University)

JTCVS 133;753-8,2007

Morihito Okada, Hiroshima Univ.

Detection of intersegmental plane

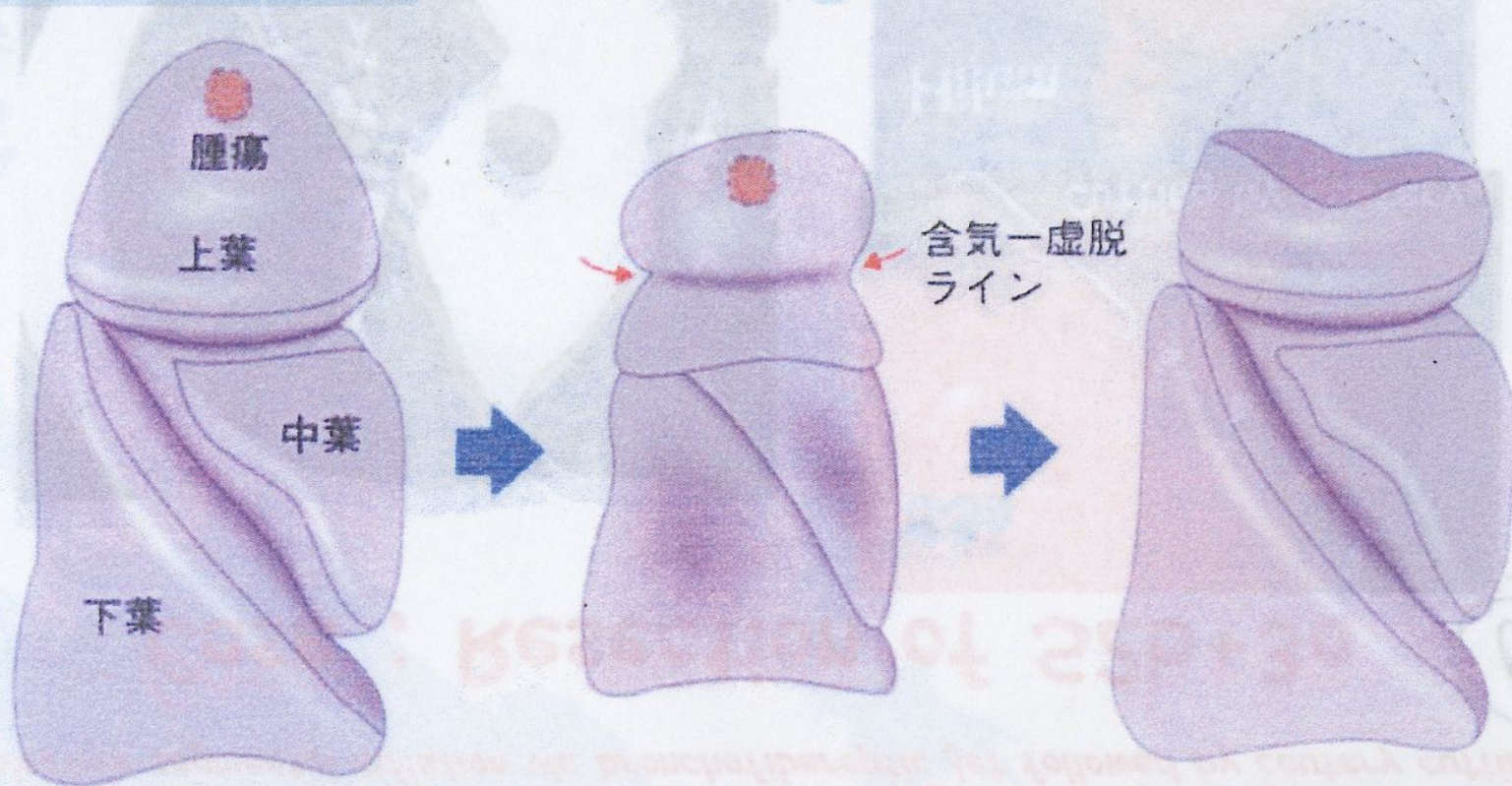


Segmentectomy needs detecting and cutting accurate anatomical intersegmental plane.

*Otherwise,
it would be only wide wedge resection !!!*

Detection of intersegmental plane Resected segments inflation

60



Opposite to the conventional technique

JTCVS 133;753-8,2007

Morihito Okada, Hiroshima Univ.

61

Hybrid VATS Segmentectomy Jet segmental inflation + Cautery cutting

Merit

1)



If you use staplers,
the preserved segments would be collapsed
like Chinese-style dumplings.

2)

not by staples provides
a reduction of local failure at the margin.
maximum pulmonary function.
(the preserved adjacent segments fully expansive)

*A novel video-assisted anatomic segmentectomy technique
selective segmental inflation via bronchofiberoptic jet followed by cautery cutting*

Case : Resection of S2b+3a

62



JTCVS 133;753-8,2007

Morihito Okada, Hiroshima Univ.

99

Ongoing randomized phase III clinical trial in the United States

CALGB-140503

63

A Phase III Randomized Trial of **Lobectomy Versus Sublobar Resection** for Small (≤ 2 CM) Peripheral Stage IA Non-Small Cell Lung Cancer

Primary Outcome Measures: Disease-free survival

Secondary Outcome Measures: Overall survival, Rate of loco-regional and systemic recurrence, Pulmonary function

Estimated Enrollment: 1258 patients

Study Start Date: June 2007

Arm I: Active Comparator Patients undergo lobectomy by open thoracotomy or video-assisted thoracoscopic surgery (VATS)

Arm II: Experimental Patients undergo a wedge resection or anatomical segmentectomy by open thoracotomy or VATS

Study Chair: Nasser K. Altorki (Cornell University), Harvey I. Pass (New York University), Daniel L. Miller (Emory University), Kemp H. Kernstine (Holden Comprehensive Cancer Center)

Morihito Okada, Hiroshima Univ.

Ongoing Trial of Limited Resection for Small-sized NSCLC in Japan

64



0% < Solid < 25%

One-arm, wide wedge resection (phase II)



25% < Solid < 100%



.....

Lobectomy vs. Limited (Seg) (phase III)

JCOG
Japan Clinical Oncology Group

Japan Clinical Oncology Group (日本臨床腫瘍研究グループ)
肺がん外科グループ

JCOG0802

West Japan Oncology Group (西日本がん研究機構)
呼吸器グループ(外科)



WJOG4607L

肺野型小型非小細胞肺癌に対する肺葉切除と縮小切除(区域切除)の
第III相試験

A Phase III randomised trial of lobectomy versus limited resection
(segmentectomy) for small (≤ 2 cm) peripheral non-small cell lung cancer

JCOG肺がん外科グループ代表者

坪井正博

神奈川がんセンター 呼吸器外科

JCOG研究代表者

浅村尚生

国立がんセンター中央病院 呼吸器外科

JCOG研究事務局

佐治 久

東京医科大学病院 呼吸器外科

WJOG外科系グループ代表者

多田弘人

大阪市立総合医療センター 呼吸器外科

WJOG研究代表者

岡田守人

広島大学病院 呼吸器外科

WJOG研究事務局

中嶋 隆

大阪市立総合医療センター 呼吸器外科

Morihito Okada, Hiroshima Univ.

Study Schema

66

Primary endpoint:

全生存期間

Secondary endpoints:

術後肺機能(6か月、1年後)

無再発生存期間

局所再発発生割合

有害事象

在院日数、

ドレーン留置期間

手術時間

出血量

自動縫合器使用数

治療

A群: 肺葉切除

B群: 区域切除

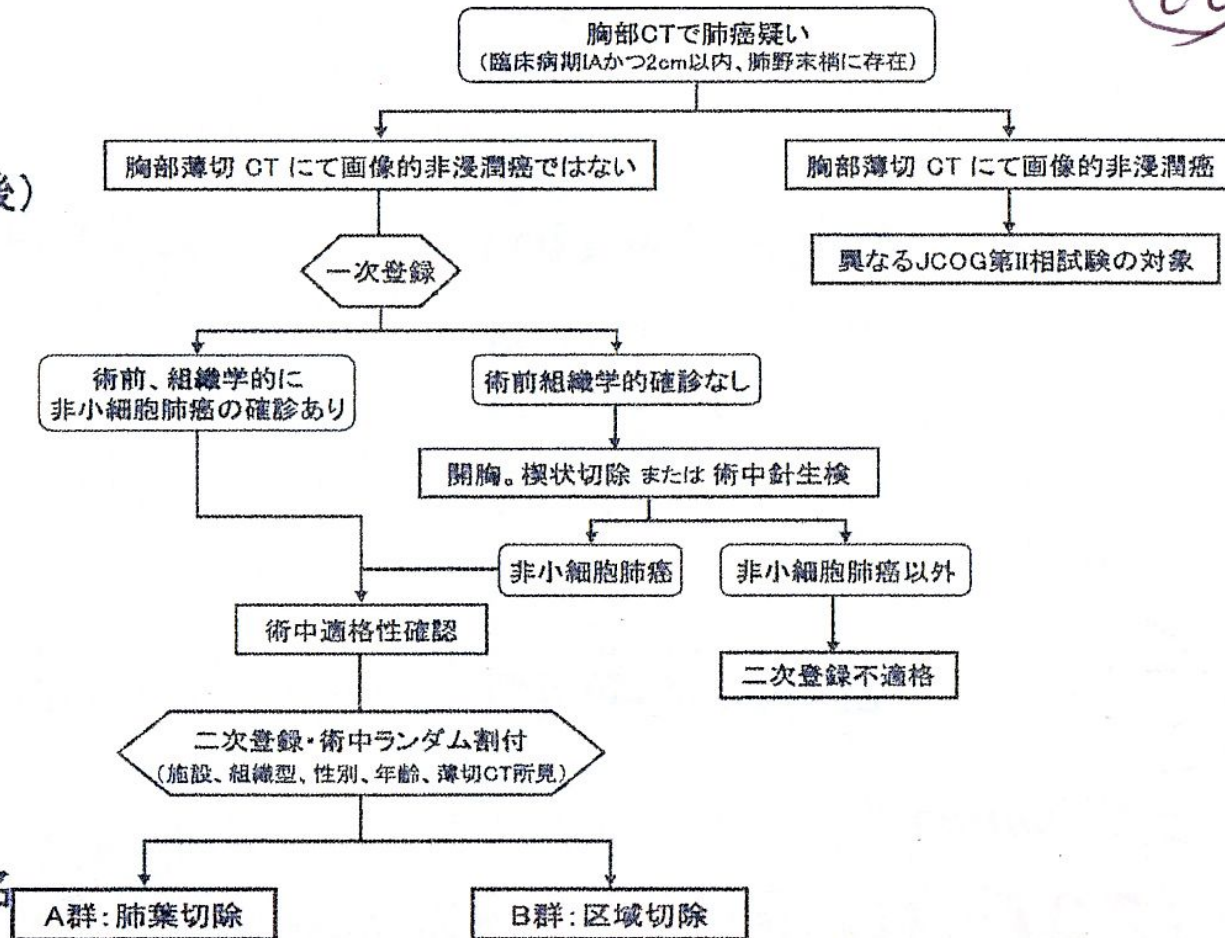
予定登録数と研究期間

予定登録患者数: 1100名

登録期間: 3年

追跡期間: 登録終了後5年

総研究期間: 8年



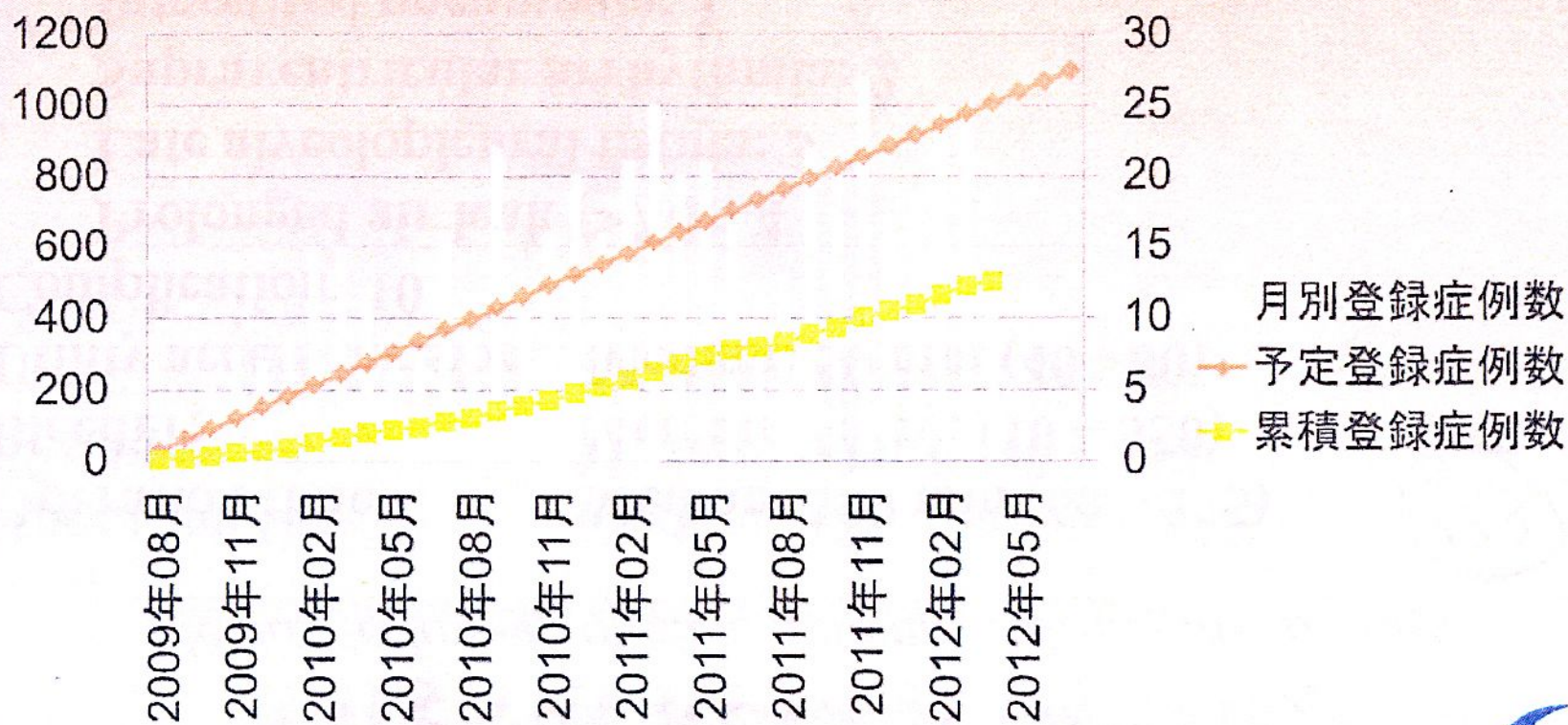
Morihito Okada, Hiroshima Univ.

JCOG0802/WJOG4607L

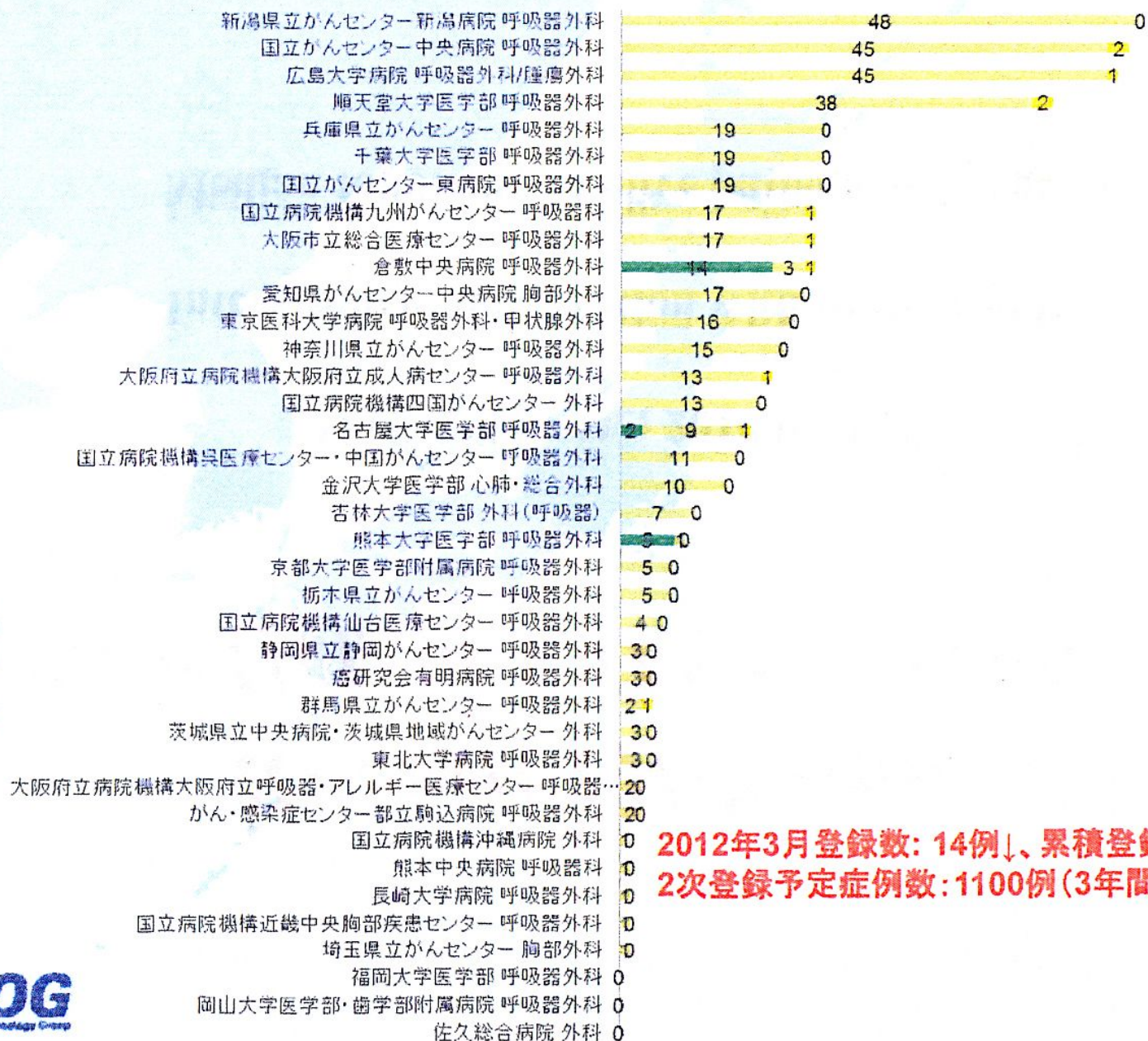
(Small NSCLC LB vs SG P3)登録状況

67

2012年4月登録数: 14例↓、累積登録数: 499例
 2次登録予定症例数: 1100例(3年間)、30.5例(月)



■ WJOG時登録数 ■ JCOG0802施設別登録数先月 ■ JCOG0802施設別登録数今月

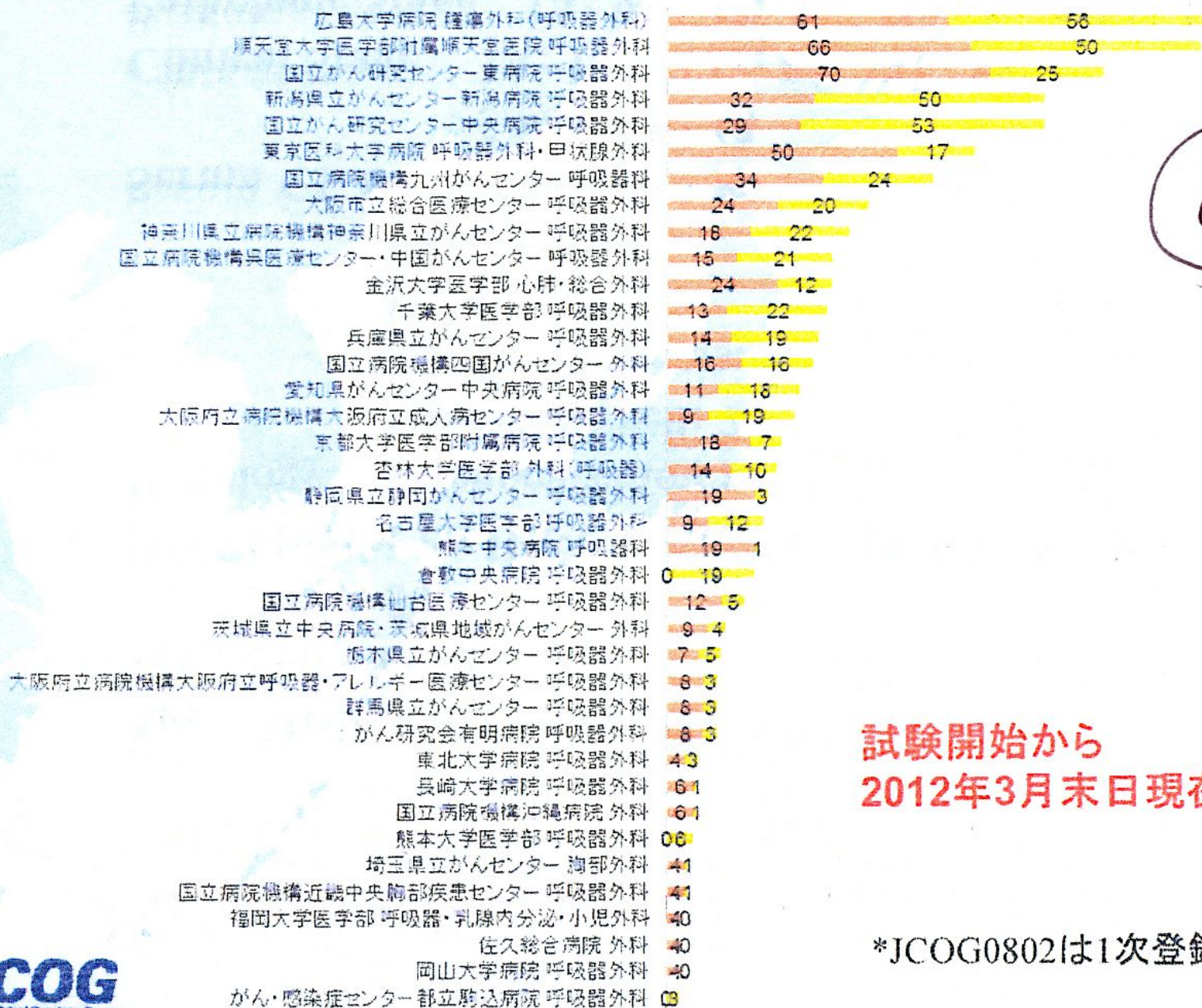


60

2012年3月登録数: 14例↓、累積登録数: 499例
2次登録予定症例数: 1100例(3年間)、30.5例(月)

JCOG0707登録数

JCOG0802登録数



69

試験開始から
2012年3月末日現在

*JCOG0802は1次登録数

70

Recent Outcome

Radical Hybrid VATS Segmentectomy

April 2004 ~ Oct 2010 (n=102)

Intersegmental dissection with cautery only

Median follow-up of alive patients > 5 years

98

Morihito Okada, Hiroshima Univ.

Patient characteristics (n=102)

April 2004 ~ Oct 2010, Intersegmental dissection with cautery only

Age Median: 67 years (34 – 89)

Sex Female: 52

Male: 50

Size of tumor on HR-CT Median: 18 mm (8 – 29)

Histology Adenocarcinoma: 91

Squamous cell: 7

Adenosquamous: 2

Large cell: 1

Carcinoid: 1

Serum CEA ≤ 5.0 ng/mL: 89

> 5.0 ng/mL: 13

Clinical Stage IA: 102 (T1a: 84, T1b: 18)

Pathologic Stage IA: 92, IB: 8, IIA: 1, IIIA: 1

71

Morihito Okada, Hiroshima Univ.

Location of burdened lung (n=102)

April 2004 ~ Oct 2010, Intersegmental dissection with cautery only

Right upper lobe: 30

S^1 : 8

S^1+S^2a : 1

S^2 : 9

S^2b+S^3a : 6

S^2+S^3a : 1

S^3 : 5

Right lower lobe: 26

S^6 : 16

S^6+S^8 : 1

S^7+S^8 : 1

S^8 : 3

S^8+S^9 : 2

S^9+S^{10} : 1

S^7-S^{10} : 2

Left upper lobe: 22

$S^{1+2}+S^3$: 10

$S^{1+2}a$: 1

S^{1+2} : 3

$S^3+S^{1+2}a$: 1

$S^3a+b+S^4+S^5$: 1

S^4+S^5 : 6

Left Lower lobe: 24

S^6 : 16

S^8 : 2

S^9 : 2

S^9+S^{10} : 3

S^8-S^{10} : 1

72

Morihito Okada, Hiroshima Univ.

Surgical Results (n=102)

Median follow-up of alive patients : 61 months (6 - 84)

Operation time **Median: 129 min (60 – 275)**

Bleeding **Median: 50 mL (10 – 350)**

Utility access incision **Median: 50 mm (40 - 80)**

Complication: 10

Prolonged air leak (>7 d): 4

Late alveolopleural fistula: 3

Supraventricular arrhythmia: 2

Interstitial pneumonia: 1

Operative mortality: 0

Mortality: 9 (Cancer-death: 5, Other: 4)

Recurrence: 12

Locoregional Dissemination: 2, Mediastinum: 2, Margin: 1

Distant Lung: 4, Brain: 2, Meningitis: 1

Morihito Okada, Hiroshima Univ.

73

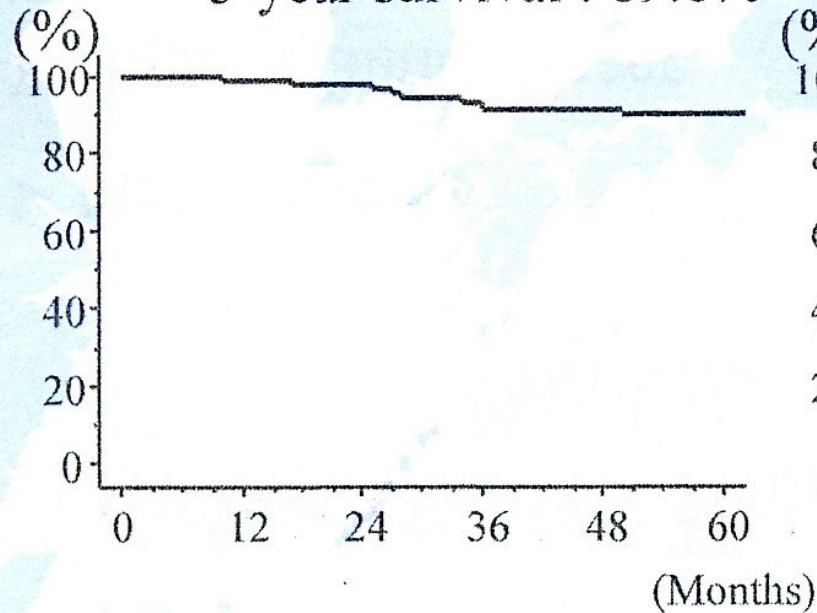
Survival (n=102)

Median follow-up of alive patients : 61 months (6 - 84)

74

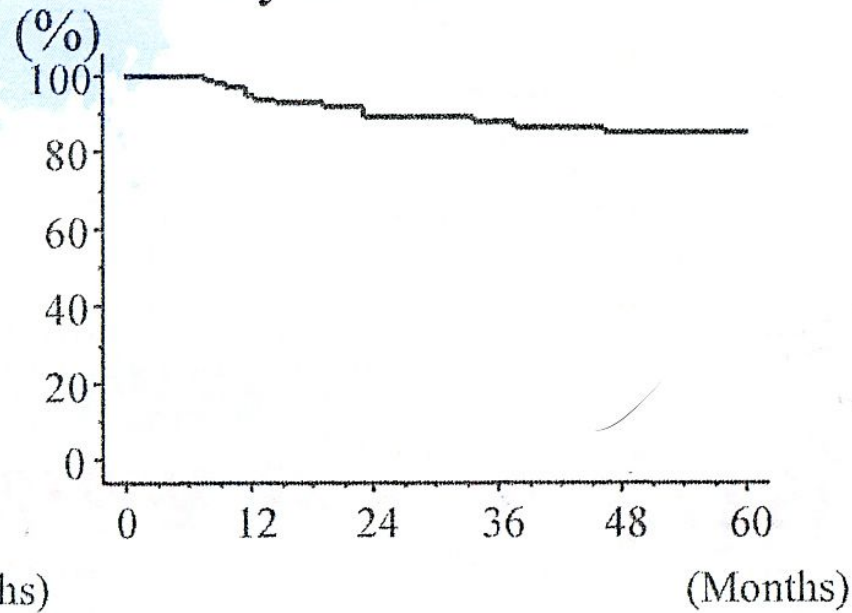
Overall survival

3-year survival : 91.5%
5-year survival : 89.8%



Disease-free survival

3-year survival : 87.8%
5-year survival : 84.7%



Morihito Okada, Hiroshima Univ.

Priority of lung cancer surgery

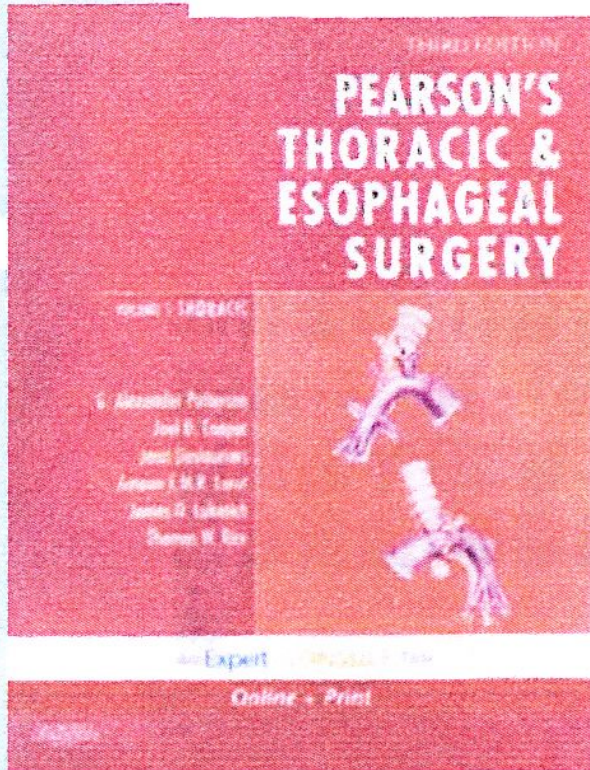
75

- 1) Safety & Radicality
- 2) Pulmonary function-sparing surgery
Bronchoplasty Angioplasty
Sublobar resection
- 3) Minimum invasive approach
VATS

Our goal : Fusion of 1) 2) and 3)

Pearson's textbook

76



教科書:呼吸器外科
世界で最も普及
1834+830ページ
2008-04改訂第3版

Volume 1 Thoracic

Section 1 INTRODUCTION

Chapter 1 History and Development of General Thoracic Surgery 3
Frank R. J. van der Wal

Chapter 2 Preoperative Assessment of the Thoracic Surgical Patient 9
Mark F. Brennan

Chapter 3 Pulmonary Testing 15
Frank C. Sciortino

Chapter 4 Anesthesia for Thoracic Surgery 21
Robert M. M. Slone, M. D.

Chapter 5 Perioperative Management 27
Chris A. Guffee

Chapter 6 Laryngoscopy 33
Patrick J. Lee, M.D., FRCPC

Chapter 7 Bronchoscopy 39
Andrew F. Hill

Chapter 8 Mediastinoscopy 45
Brian C. Meyer

Chapter 9 Thoracoscopy 51
Elizabeth Ryan, M.D., FRCPC

Chapter 10 Thoracic Imaging 57
David C. Miller

Chapter 11 Principles of Thoracic Care 63
Narciso L. Ramirez, M.D., FRCPC

Chapter 12 Critical Care of the Thoracic Surgical Patient 69
Eric J. Cantu

Chapter 13 Early Postoperative Complications 75
Richard J. Durr

Chapter 14 Late Postoperative Complications 109
R. Thomas Tazawa, Norman Gertler, and
Arashpour Naderi-Nia

Section 2 Upper Airway 117

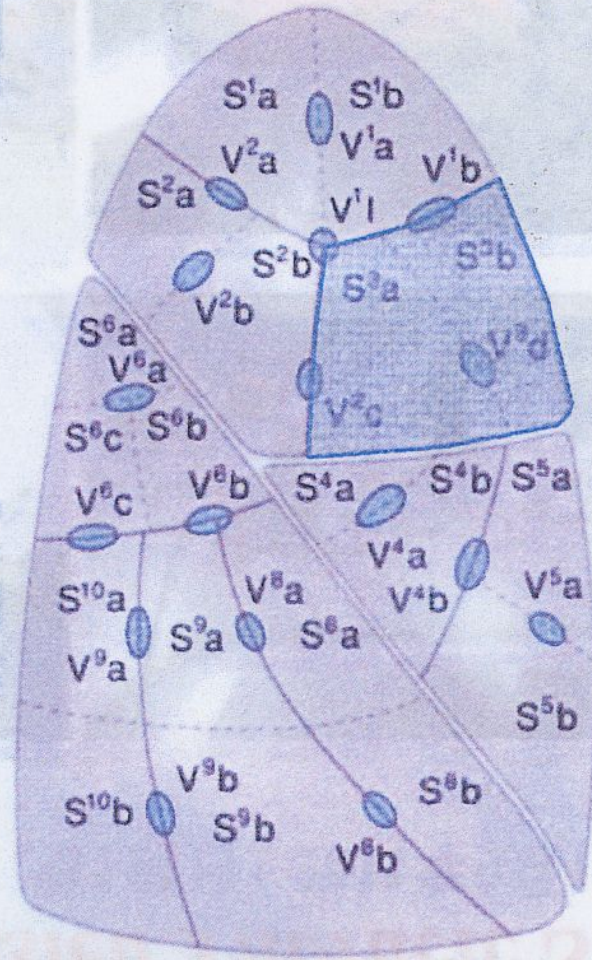
Chapter 15 Anatomy, Physiology, and Embryology of the Upper Airway 119
Carroll D. Wright

Recently, however, a number of centers speculated that a lesser resection may be as effective as lobectomy for the smaller T1 N0 tumors. The most persuasive, published evidence for this proposal is reported by Okada and colleagues from Japan.³¹ They have evaluated the role of extended segmentectomy in the management of non-small cell T1 N0 tumors of less than 2 cm in diameter. In this prospective study, reported in 2004, they concluded that segmentectomy may well provide comparable outcomes to those reported for lobectomy. They have designed an ingenious technique of segmentectomy in which the lung on the operated side remains collapsed and the segment to be removed remains inflated. The intersegmental plane is dissected under direct vision with fine cautery (like the original segmentectomies) and *without* the use of staplers. In 2004, this same Japanese group described and reported experience with their new technique of sleeve segmentectomy³² and minimally invasive hybrid VATS segmentectomy in 2007.³³

Morihito Okada, Hiroshima Univ.

Right S3 Segmentectomy

77



VIDEO

Morihito Okada, Hiroshima Univ.

イラストで学ぶ系統的肺区域切除術 区切アトラス

78

著
野守裕明(慶應義塾大学教授)
岡田守人(広島大学教授)
B5判・276頁・4色刷
2011年5月12日発行

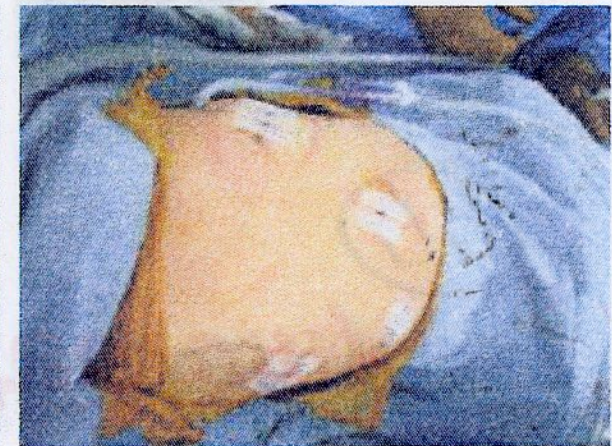
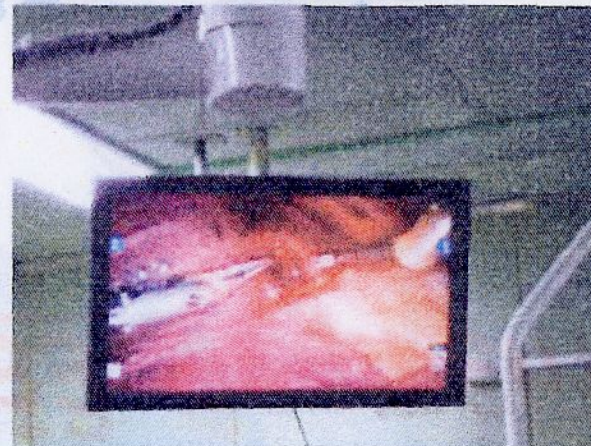


Morihito Okada, Hiroshima Univ.

Robot-Assisted Thoracic Surgery (RATS)

第1例目 (2011年9月15日)

79



Morihito Okada, Hiroshima Univ.

Robot-Assisted Thoracic Surgery (RATS)

Potential Advantages



- Magnification
- High-definition image
- 3D visualization
- Improvement of dexterity and articulation
- Motion stability with tremor filtration and motion scaling

First Case of Da Vinci

Morihito Okada, Fukuoka Univ.

Finally

JO

王様のランチ

I'd like to thank you all.

Morihito Okada, Hiroshima Univ.

がん診療連携拠点病院研修会のお知らせ
コンセプト

エキスパートに学ぶ“がん治療最前線”

第14回 広島北キヤンサーネット研修会



日時 平成24年
7月26日(木)
19:00~20:30

場所 広島市立安佐市民病院
北館2階 WAP

対象者 当院医師、看護師、その他
地域医療機関医師、看護師、
その他

プログラム

講演Ⅰ

『放射線治療の推進と副作用』

広島市立安佐市民病院 放射線科部長 伊東 淳 先生

講演Ⅱ

『肝がんの外科治療』

広島大学病院 消化器外科診療科長
教授 大段 秀樹 先生

安佐市民病院

がん診療に携わる医師のための

緩和ケア研修会

開催予定

当研修会は厚生労働省の開催指針で定められたプログラムに準拠しており、すべての単位を修了後、厚生労働省より修了証書が発行されます。

9/16(日) 8:30~16:30
17(祝) 9:00~17:15

広島市立安佐市民病院
南館3階 講堂

定員:20名

※詳細は後日追って連絡します。

広島市立安佐市民病院
医療支援センター 担当:中林、長屋
広島市安佐北区可部南二丁目1番1号
電話 082-815-1062
FAX 082-815-5691

The PEACE project