

# 食道癌專業人員訓練

Minimally Invasive Esophagectomy

國立臺灣大學附設醫院雲林分院

胸腔外科 盤建德醫師

01 NOV 2014

# General Data

Age : 49

Name: 羅○清

Gender: male

Chart No.: J121305536

# Chief complain

- Odynophagia for more than one month with acid regurgitation and bleching, body weight lost.

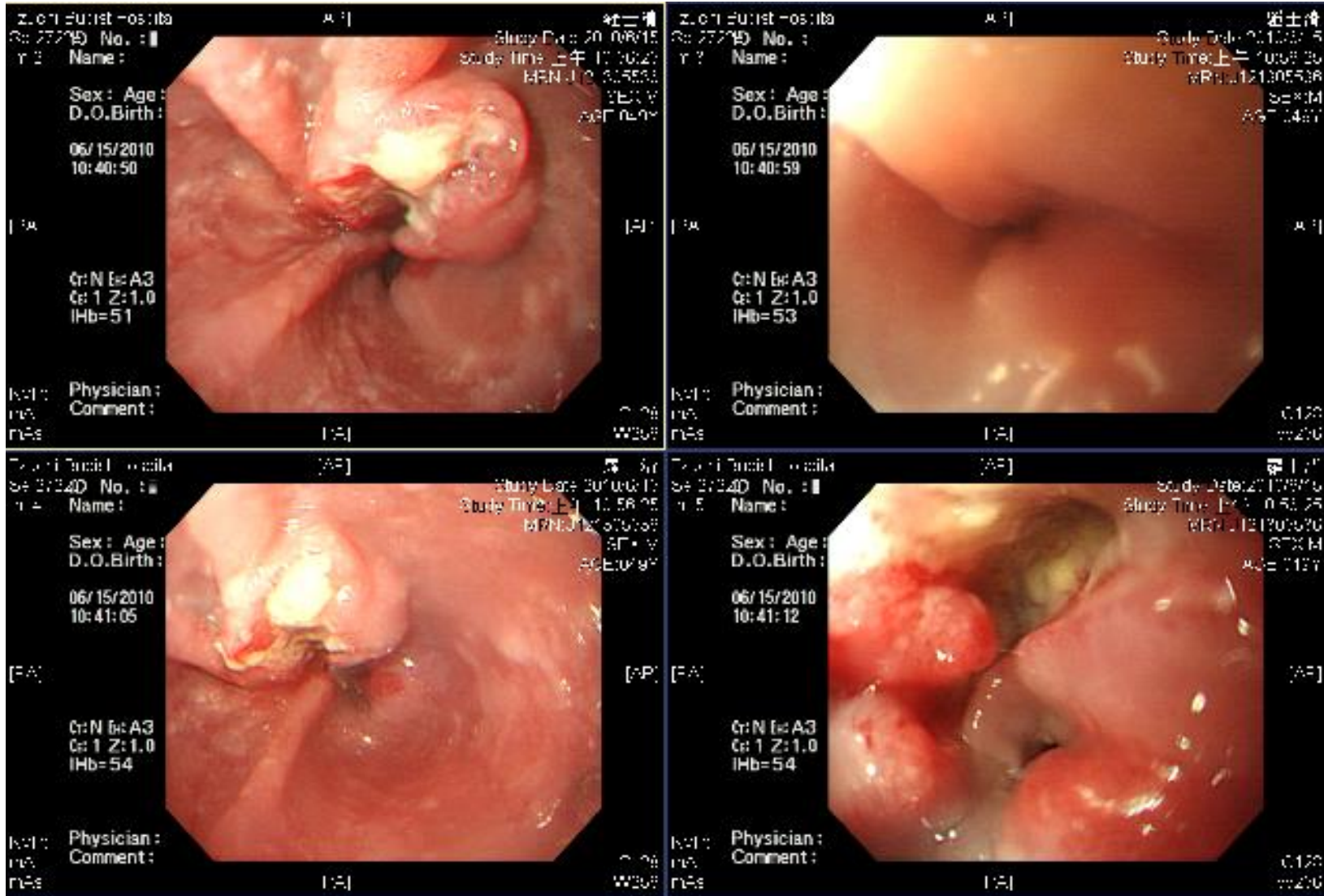
# Present Illness

- This 49 years old male patient denied any systemic disease before.
- Suffered from odynophagia for one month before admission.
- Symptom did not improve after herbal medication was taken.
- Acid regurgitation, belching and body weight lost was also noted in this month.
- 6/15 panendoscopic exam showed ulcerative mass with stricture at 30-35cm. Squamous cell carcinoma is confirmed.
- Admission for further survey.

# Physical Examination

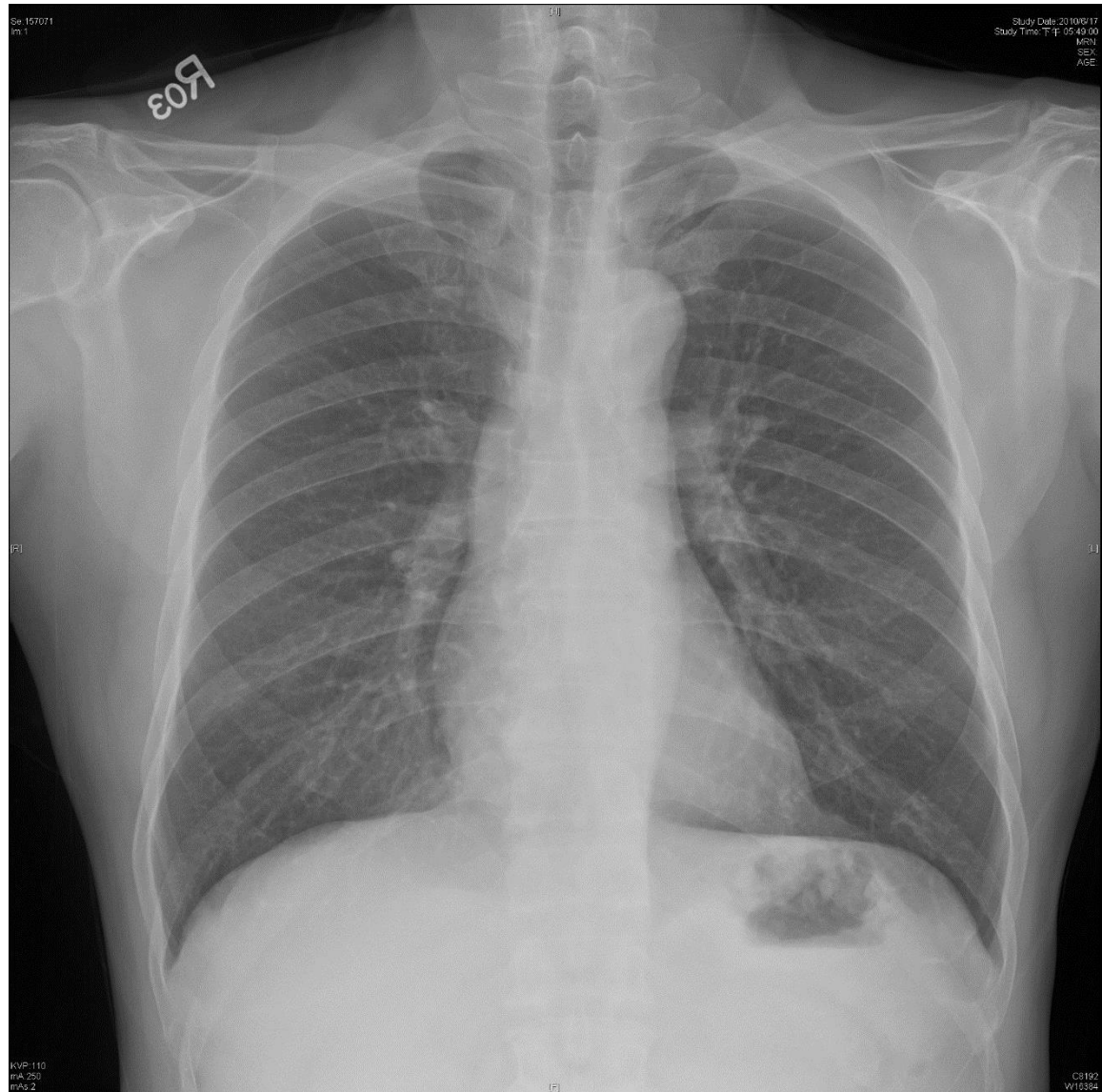
- Grossly normal
- Risk factors:
  - Smoking: 1pk/day for 30+ years.
  - Alcohol: wine occasionally
  - Beta nuts: denied
- Family history: no cancer history
- Occupation: driver for 吊車

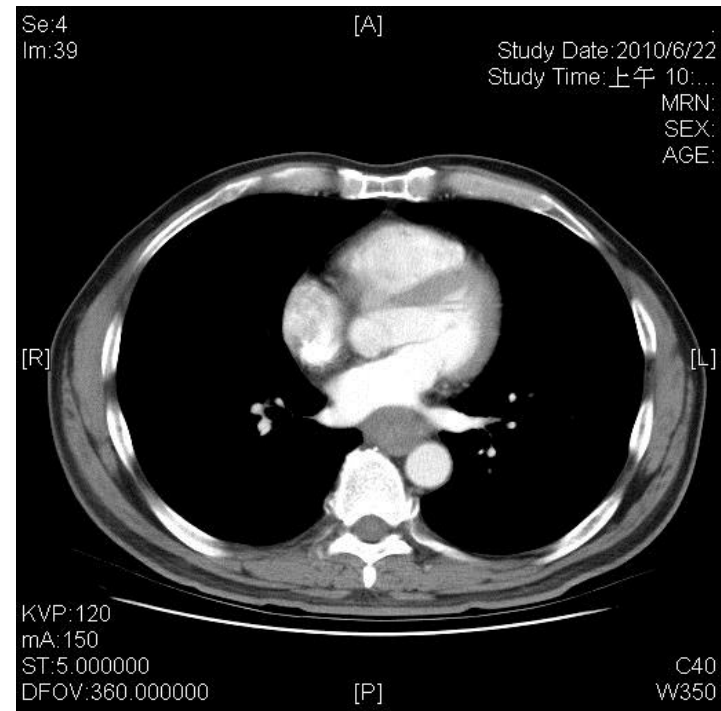
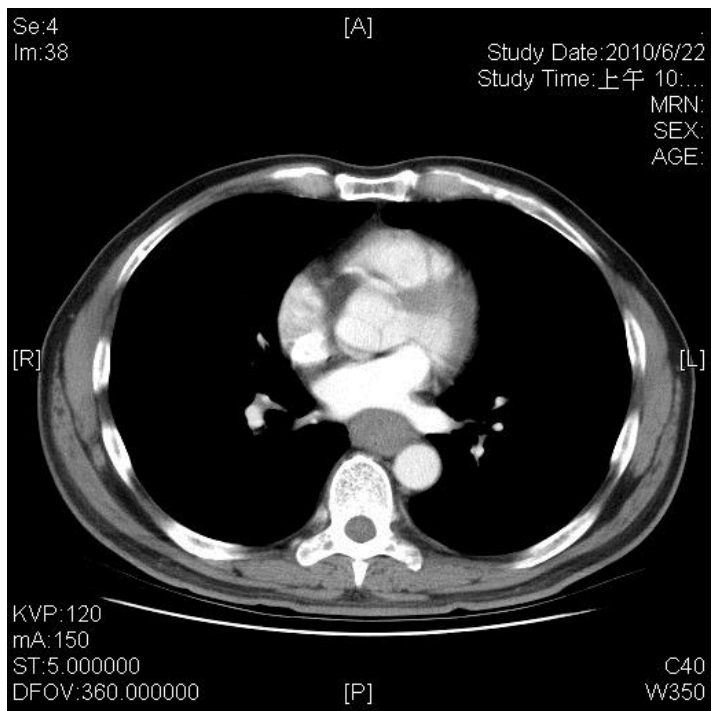
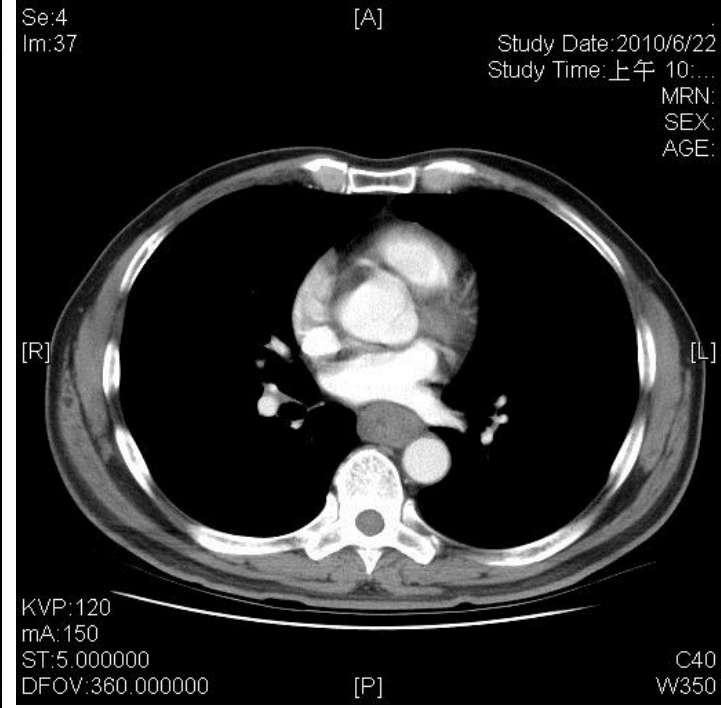
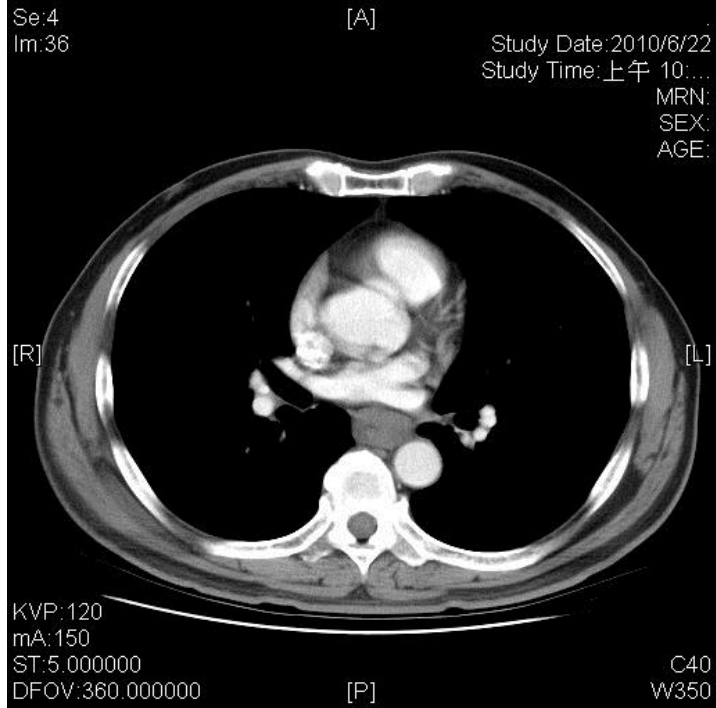
# Panendoscopy 6/15



# Image study

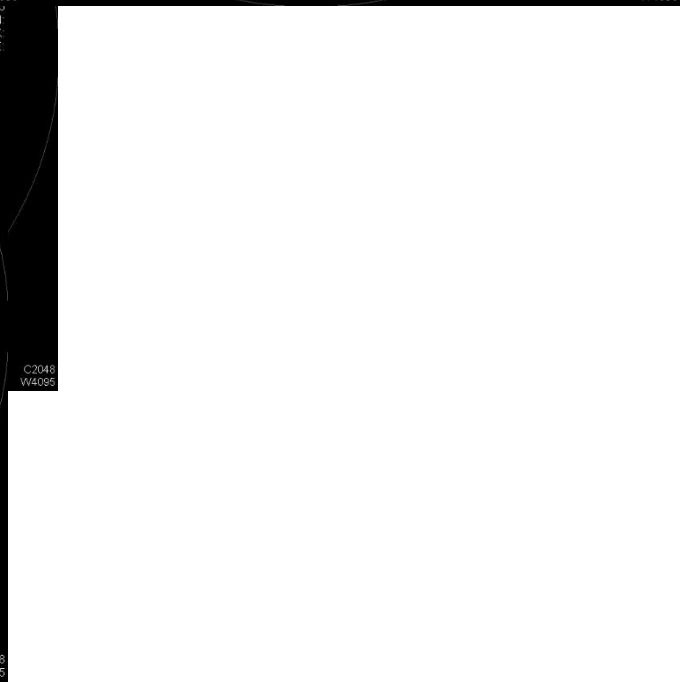
6/17 OPD PA view



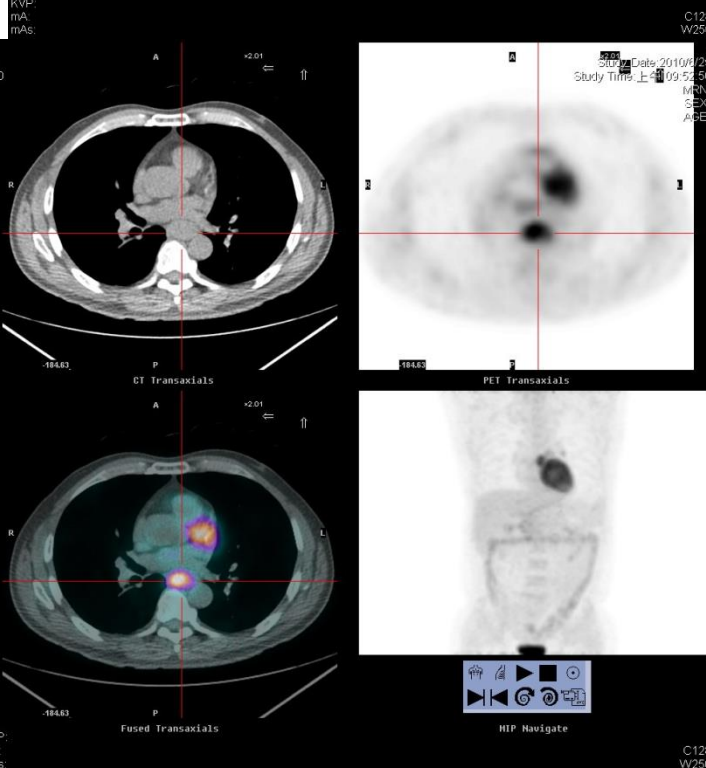
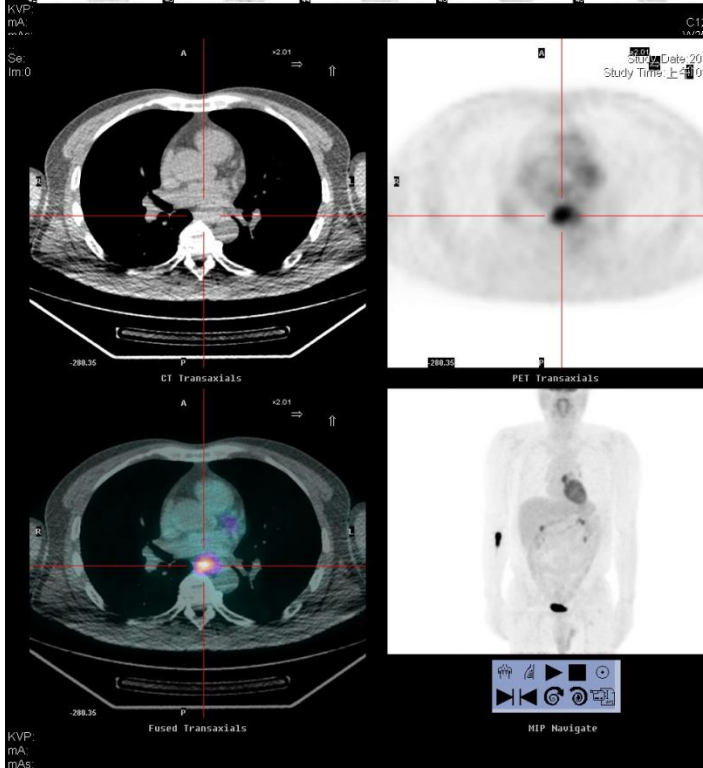
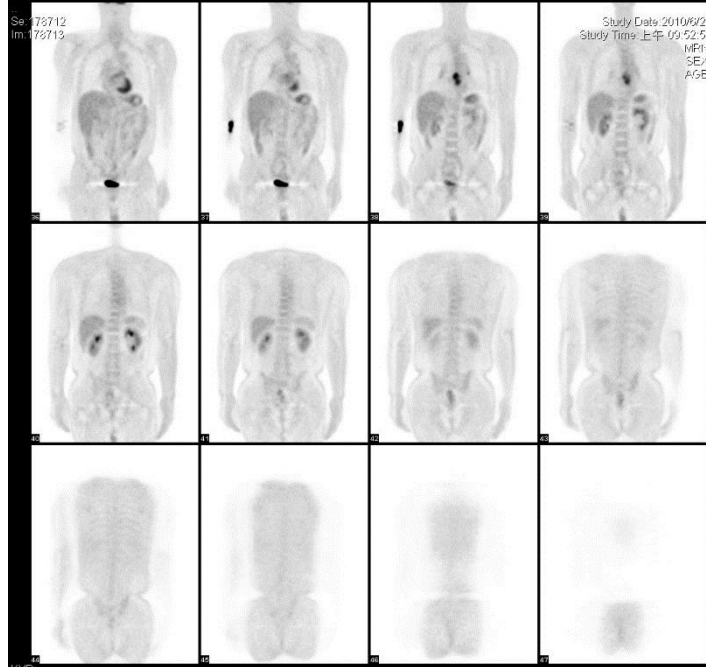
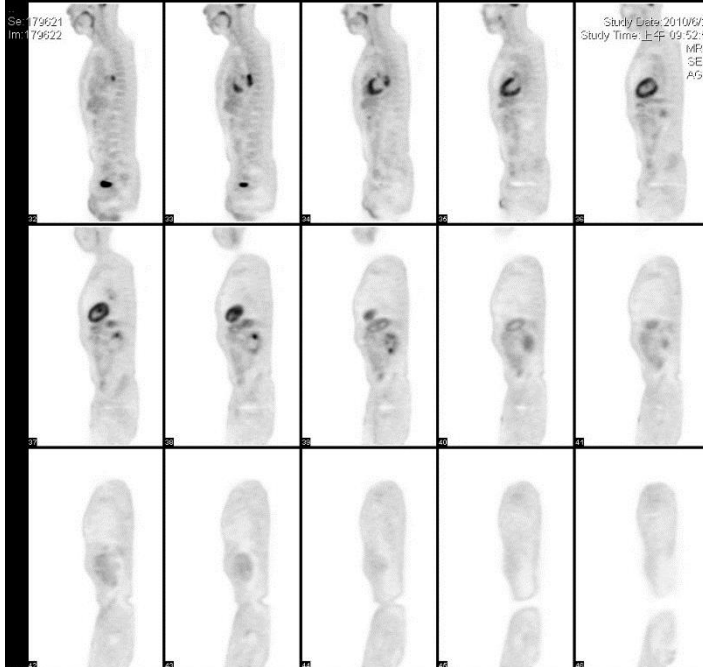




# Eso- phagog ram 6/23



# PET 6/25



# Operation for Esophageal cancer

Pre-op diagnosis : Esophageal cancer, Squamous cell carcinoma, middle third, cT3N0M0, stage IIa

# Thoracoscopic gastric tube reconstruction

# Pathology



# Post op course

- 6/29 post-op ICU care, extubation smooth at 7:35pm
- 7/1 transfer to general ward
- 7/8 esophagogram → barium pass smooth and no leak is noted. Try water & remove NG
- 7/9 remove J-P driange
- 7/10 remove chest tube
- 7/15 Discharge and OPD follow up

# Post op Eso- phago- gram



KVP: 79  
mA:  
mAs:  
I.C.  
Se:1  
Im:2



KVP: 79  
mA:  
mAs:

T.C.  
Se:1  
Im:3

Study Date: 2010/7/8  
Study Time: 上午 09:35:35  
MRN:  
SEX:  
AGE:

St.

KVP: 79  
mA:  
mAs:

C2048  
W4095

Study Date: 2010/7/8  
Study Time: 上午 09:35:35  
MRN:  
SEX:  
AGE:

C2048  
W4095

C2048  
W4095



C2048  
W4095

# Discussion



# Introduction of Esophageal Cancer



熱門關鍵字：求職信 | S 型白絲 | 賞好野人 | 夏日消暑 | 七夕愛戀  
最新 | 發燒 | 時新聞

## 桑田佳祐驚傳罹癌 巡演取消

【聯合報/新加坡訊/台北報導】

限會員觀看!

2010.07.29 03:39 am

屹立日本樂壇20多年的「兩方之星」主唱桑田佳祐，昨天傳出罹患食道癌，為了手術及治療休養，原定10月20日上市的新專輯延期推出，10月28日展開的日本巡迴演唱行程取消。

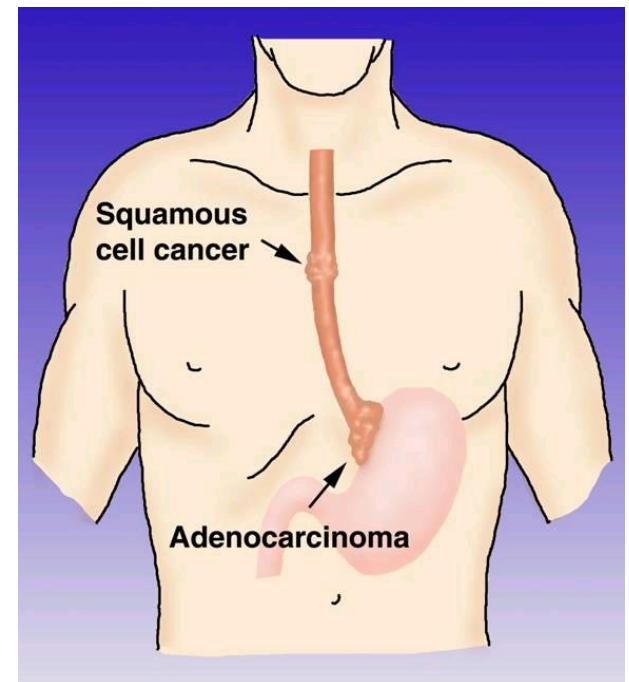
54歲的桑田佳祐影響甚鉅，去年「兩方之星」宣布暫停演藝活動，造成經紀公司「AMUSE」股價下跌。

日前演唱會開票，歌迷紛紛致上關心，祝他早日康復，桑田佳祐在官網發表聲明：「這次的空令你們擔心，真的非常抱歉，現在最重要的就是把病治好，將製作中的新專輯完成獻給大家。巡迴雖然取消了，我剛好趁這段時間好好治療和靜養，等待和大家再次見面的那一天。請不要太



# Epidemiology in Taiwan

- 粗發生率: 10.92/十萬 (7th in male)
- 致死率: 10.6/十萬 (6th in male)
- 1350 cases/year
- 男性多於女性



# Comparison of risk factors

Risk factors	Squamous cell carcinoma	Adenocarcinoma
Cigarettes	+++	++
Alcohol	+++	-
Barrett's esophagus	-	++++
GERD	-	+++
Overweight	-	++
Corrosive injury in esophagus	+++	-
Hx of head and neck cancer	+++	-
Hx of breast cancer with R/T	+++	+++

# Special risk factor in Taiwan

*European Journal of Clinical Investigation* (2006) 36, 236–241

## Interaction between cigarette, alcohol and betel nut use on esophageal cancer risk in Taiwan



I. C. Wu<sup>\*</sup>, C.Y. Lu<sup>\*</sup>, F. C. Kuo<sup>\*†</sup>, S. M. Tsai<sup>†</sup>, K.W. Lee<sup>\*</sup>, W. R. Kuo<sup>\*</sup>, Y. J. Cheng<sup>\*</sup>, E. L. Kao<sup>\*</sup>, M. S. Yang<sup>†</sup> and Y. C. Ko<sup>§</sup>

<sup>\*</sup>Kaohsiung Medical University Hospital, <sup>†</sup>Kaohsiung Medical University, and <sup>‡</sup>E-Da Hospital, I-Shou University, Kaohsiung, <sup>§</sup>National Health Research Institutes, Kaohsiung, Taiwan

喝酒比不喝酒者得到食道癌之危險比為17.6倍，歸因比率為76%；而抽菸比不抽菸者的危險比為5.4倍，歸因比率為72%，嚼食檳榔比起不嚼食檳榔的危險比為1.7倍，未達統計學之意義，但若再細分其嚼食檳榔的行為如嚼食的檳榔含有老花，其危險比則增加為4.2倍；若吞嚥檳榔汁，也達3.3倍，具有統計學上之意義

# 90% Squamous Cell Carcinoma

組織形態	男		女	
	個案數	百分比	個案數	百分比
鱗狀細胞癌	1,010	87.98	80	70.80
腺癌	52	4.53	17	15.04
腺性鱗狀癌	7	0.61	-	-
其他明示癌	19	1.66	2	1.77
未明示癌	27	2.35	5	4.42
明示之肉瘤	2	0.17	3	2.65
未明示之肉瘤	1	0.09	-	-
其他惡性腫瘤	30	2.61	6	5.31
總計*	1,148	100.00	113	100.00

總計\*：其中未經顯微鏡檢證實者，男性有39位、女性有6位。

# 食道癌分期

# Current AJCC 2002 staging

## DEFINITION OF TNM

### Primary Tumor (T)

- TX Primary tumor cannot be assessed
- T0 No evidence of primary tumor
- Tis Carcinoma *in situ*
- T1 Tumor invades lamina propria or submucosa
- T2 Tumor invades muscularis propria
- T3 Tumor invades adventitia
- T4 Tumor invades adjacent structures

### Regional Lymph Nodes (N)

- NX Regional lymph nodes cannot be assessed
- N0 No regional lymph node metastasis
- N1 Regional lymph node metastasis

### Distant Metastasis (M)

- MX Distant metastasis cannot be assessed
- M0 No distant metastasis
- M1 Distant metastasis

Tumors of the lower thoracic esophagus:

- M1a Metastasis in celiac lymph nodes
- M1b Other distant metastasis



Tumors of the midthoracic esophagus:

- M1a Not applicable
- M1b Nonregional lymph nodes and/or other distant metastasis

Tumors of the upper thoracic esophagus:

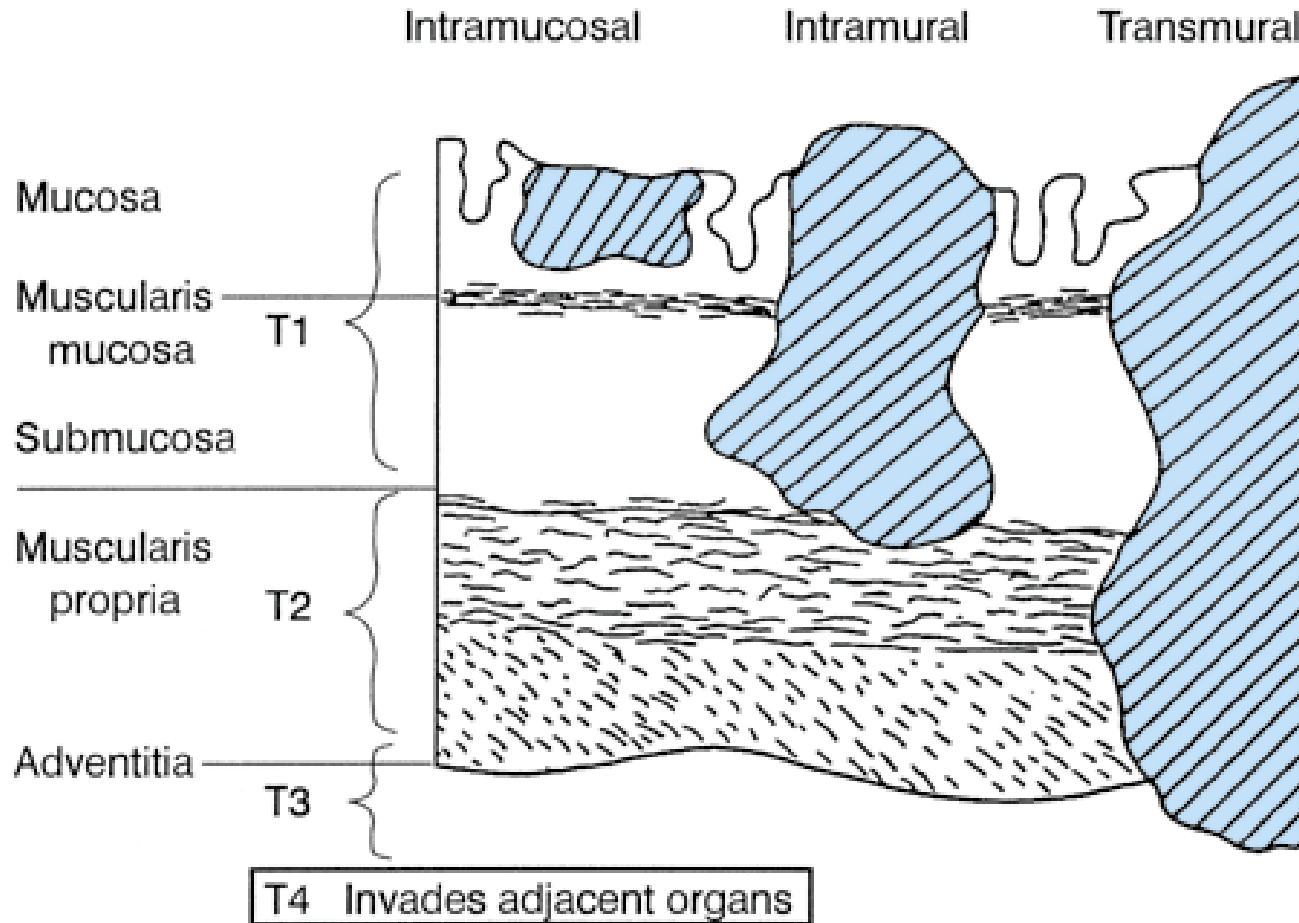
- M1a Metastasis in cervical nodes
- M1b Other distant metastasis

## STAGE GROUPING

Stage 0	Tis	N0	M0
Stage I	T1	N0	M0
Stage IIA	T2	N0	M0
	T3	N0	M0
Stage IIB	T1	N1	M0
	T2	N1	M0
Stage III	T3	N1	M0
	T4	Any N	M0
Stage IV	Any T	Any N	M1
Stage IVA	Any T	Any N	M1a
Stage IVB	Any T	Any N	M1b



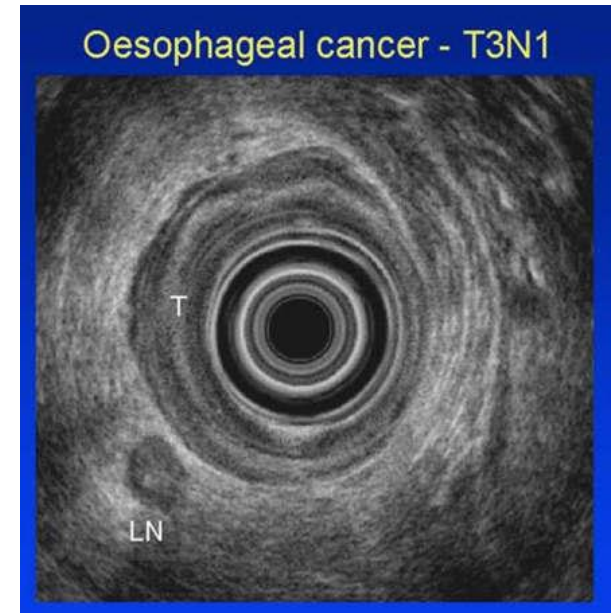
# AJCC Staging - T Stage





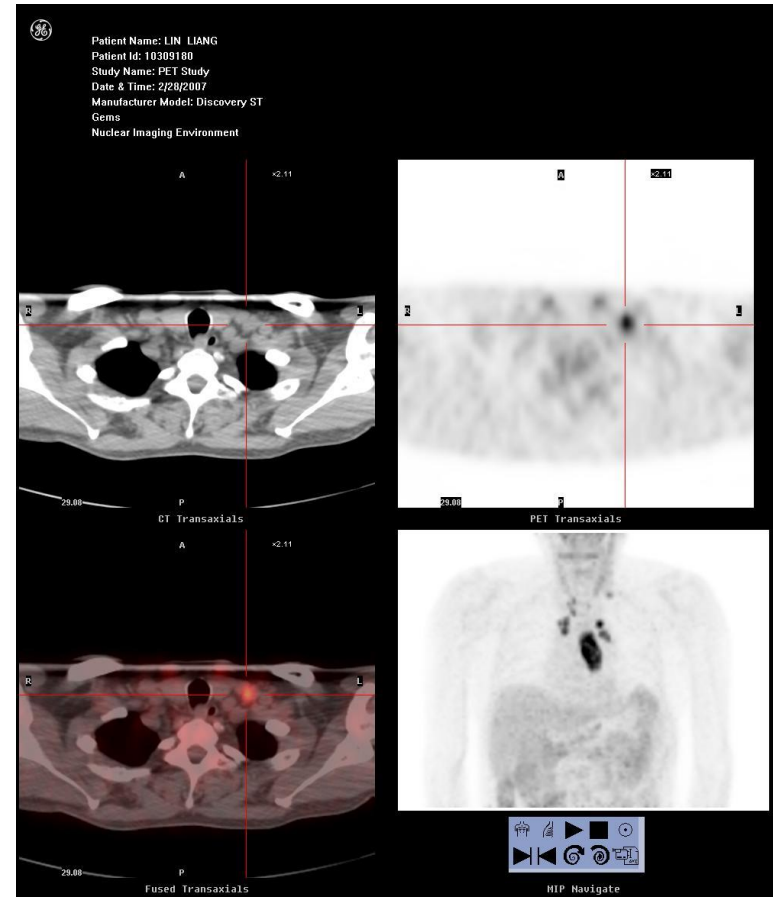
# Clinical T stage determination-1

- EUS(Endoscopic ultrasound)
  - T stage 準確度高( >80%)
  - 對 After CCRT / Complete tumor obstruction則準確度降低
- CT
- Bronchoscopy



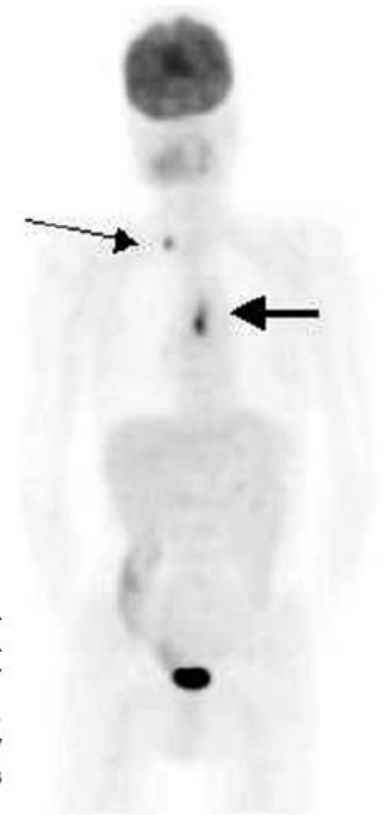
# Clinical N stage determination

- EUS: better than CT
- CT scan: not sensitive
- PET S:
  - Also not sensitive enough



# Clinical M stage determination

- PET scan
  - Not sensitive of brain
  - But important for f/u
- Brain MRI
  - If brain tumor is suspected
- Bone scan
  - If symptom of pain



**FIGURE 2.** Detection of supraclavicular lymph node metastases with  $^{18}\text{F}$ -FDG PET leading to correct upstaging. Thick arrow indicates primary tumor; thin arrow indicates cervical node metastasis.

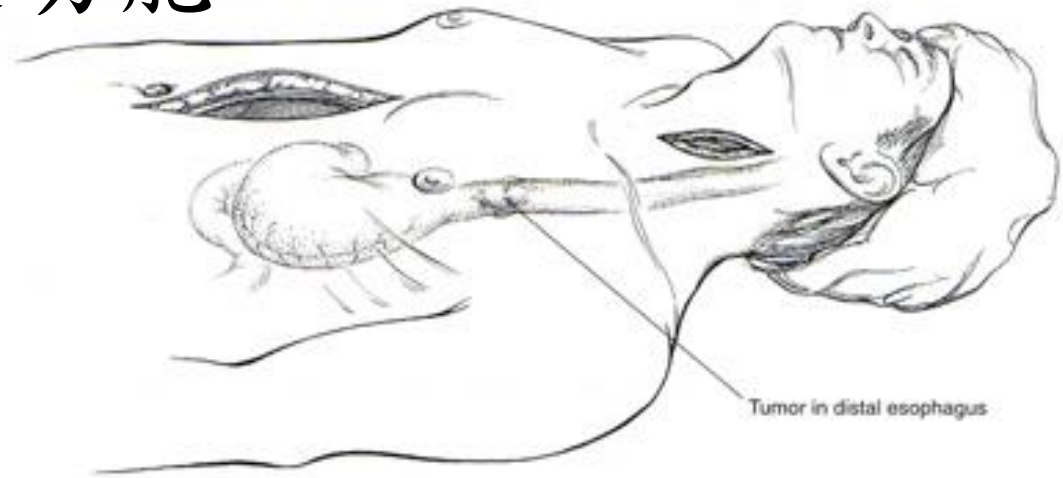
# AJCC Staging and Prognosis

Stage	Tumor	Node	Metastasis	5-Yr Survival
				%
0	Tis	N0	M0	>95
I	T1	N0	M0	50–80
IIA	T2-3	N0	M0	30–40
IIB	T1-2	N1	M0	10–30
III	T3	N1	M0	10–15
	T4	Any N	M0	
IVA	Any T	Any N	M1a	<5
IVB	Any T	Any N	M1b	<1

# 手術治療

# 食道癌外科手術目標

- 將癌病變區域切除
- 周邊淋巴結廓清
- 重建食道功能



# 手術術式選擇原則

1. 癌病變所在區域
2. 癌病變區域與周邊組織之關係
3. 預期替代器官之可用性
4. 有否施行過術前電療與化療
5. 外科醫師之偏好





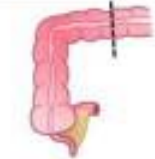



# 食道切除之方式

1. Ivor Lewis (lapa + r't thoracotomy)
2. McKeown (r't thoractomy + lapa + cervical anastomosis)
3. Transhiatal (lapa + cervical anastomosis)
4. Minimally invasive Ivor Lewis
5. Minimally invasive McKeown
6. Robotic minimally invasive op
7. Left thoraco-abdominal approach



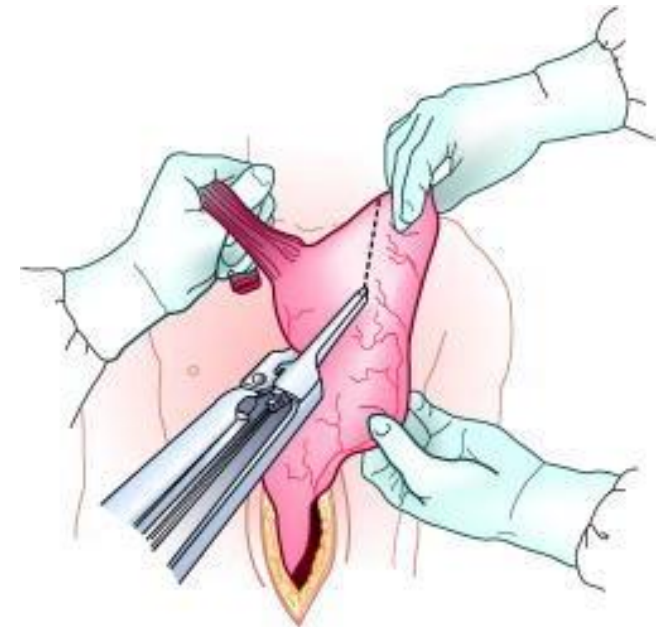
# 食道重建之組織選擇

- 胃
  - 第一優先選擇，血管供應良好，肌肉組成與食道類似，長度絕對足夠。缺點：胃酸逆流
- 大腸
  - 食道癌的第二選擇，腐蝕性食道切除重建的第一選擇
- 小腸
- Free Flap
- 組織皮瓣

Organ	Technique	Number of anastomoses	Inherent morbidity difficulty	Upper level of usefulness	Disadvantages
Stomach		1	+	Cervical esophagus and pharynx	Bulky Reflux risk
Greater curvature tube		1	+	Cervical esophagus and pharynx	Reflux risk
Reversed gastric tube		1	+++	Cervical esophagus and pharynx	Long suture line Limited blood supply
Nonreversed gastric tube		1	++	Lower cervical esophagus	Long suture line
Right colon		3	+++	Lower cervical esophagus	Thin-walled Bulky Short pedicle
Left colon		3	++++	Most versatile organ for use at any level Lower third to pharynx	Extensive operation Redundancy over time
Jejunum		2 (Roux loop) 3 (Interposition)	++	Lower third	Limited graft length without revision of pedicle or bowel
Free graft		5 (2 micro-vascular)	+++++	Pharynx and cervical esophagus	Microvascular anastomoses required

# Reconstruction

The **stomach is the first conduit of choice** because of ease in mobilization and ample vascular supply



# 最早的一篇 Series of MIE

## Minimally Invasive Esophagectomy

James D. Luketich, MD, Philip R. Schauer, MD, Neil A. Christie, MD, Tracey L. Weigel, MD, Siva Raja, BS, Hiran C. Fernando, MD, Robert J. Keenan, MD, and Ninh T. Nguyen, MD

Section of Thoracic Surgery and the Minimally Invasive Surgery Center, University of Pittsburgh Medical Center Health System, Pittsburgh, Pennsylvania

*Background.* Open esophagectomy can be associated with significant morbidity and delay return to routine activities. Minimally invasive surgery may lower the morbidity of esophagectomy but only a few small series have been published.

*Methods.* From August 1996 to September 1999, 77 patients underwent minimally invasive esophagectomy. Initially, esophagectomy was approached totally laparoscopically or with mini-thoracotomy; thoracoscopy subsequently replaced thoracotomy.

*Results.* Indications included esophageal carcinoma (n = 54), Barrett's high-grade dysplasia or carcinoma in situ (n = 17), and benign miscellaneous (n = 6). There were 50 men and 27 women with an average age of 66 years (range 30 to 94 years). Median operative time was

7.5 hours (4.5 hours with > 20 case experience). Median intensive care unit stay was 1 day (range 0 to 60 days); median length of stay was 7 days (range 4 to 73 days) with no operative or hospital mortalities. There were four nonemergent conversions to open esophagectomy; major and minor complication rates were 27% and 55%, respectively.

*Conclusions.* Minimally invasive esophagectomy is technically feasible and safe in our center, which has extensive minimally invasive and open esophageal experience. Open surgery should remain the standard until future studies conclusively demonstrate advantages of minimally invasive approaches.

(Ann Thorac Surg 2000;70:906-12)

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# Minimally Invasive Esophagectomy

Alberto de Hoyos, MD, Virginia R. Litle, MD,  
James D. Luketich, MD\*

*Division of Thoracic and Foregut Surgery and the Minimally Invasive Surgery Center,  
University of Pittsburgh Medical Center, UPMC Presbyterian, Suite C-800,  
200 Lothrop Street, Pittsburgh, PA 15213, USA*

- 1.最早發表MIE的團隊，截至2005年已經有400多例的CASE。
- 2.使用的是Mckeown 的方式：  
VATS esophagectomy → laparoscopic gastric mobilization →  
neck esophagogastrostomy with posterior mediastinum route
3. Mean operation time : 7.5hours
4. 30days operative mortality is 1.4% (n=3)
5. Convert rate: 5.4%, leak rate : 6.4%

The North Pacific Surgical Association

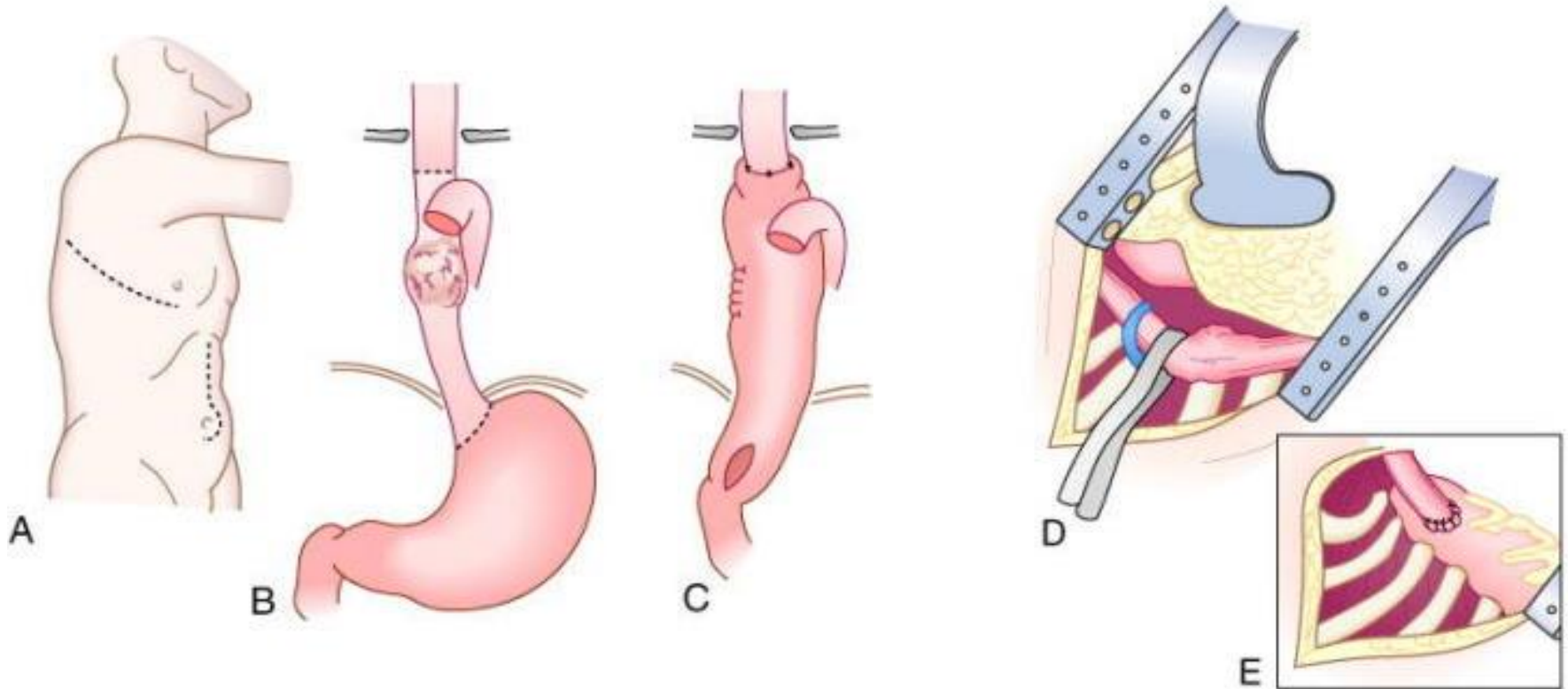
## Comparison of perioperative outcomes after combined thoracoscopic-laparoscopic esophagectomy and open Ivor–Lewis esophagectomy

Thai H. Pham, M.D.<sup>a</sup>, Kyle A. Perry, M.D.<sup>b</sup>, James P. Dolan, M.D.<sup>a</sup>,  
Paul Schipper, M.D.<sup>a</sup>, Mithran Sukumar, M.D.<sup>a</sup>, Brett C. Sheppard, M.D.<sup>a,\*</sup>,  
John G. Hunter, M.D.<sup>a</sup>

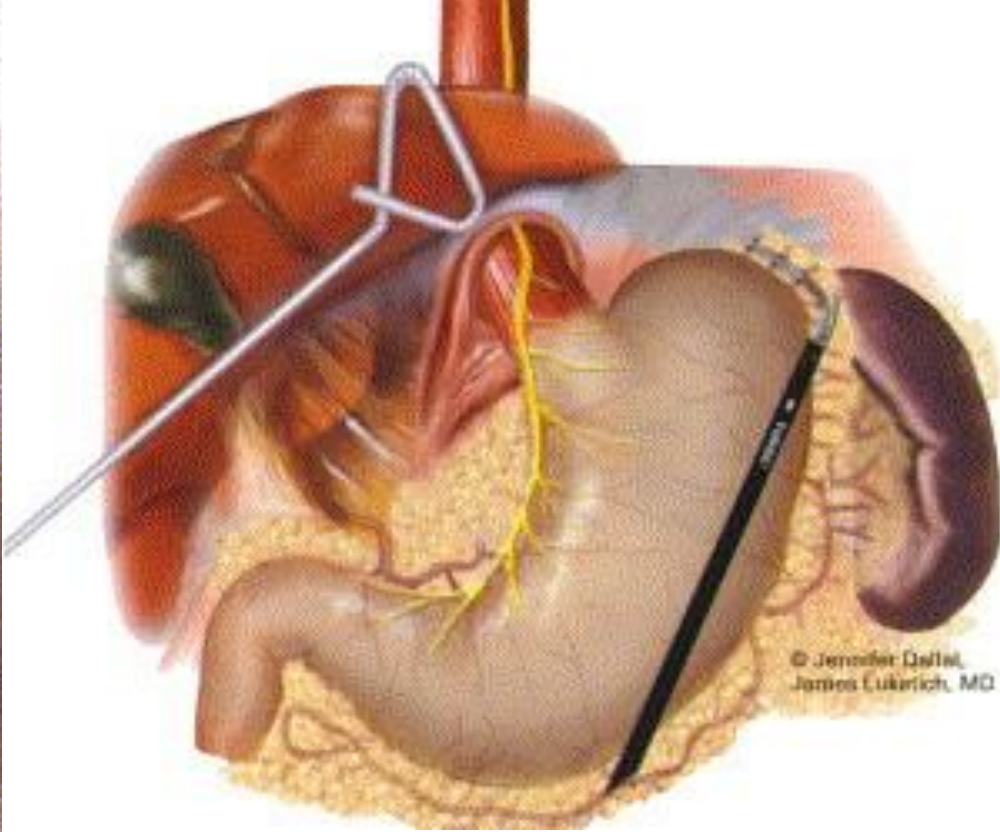
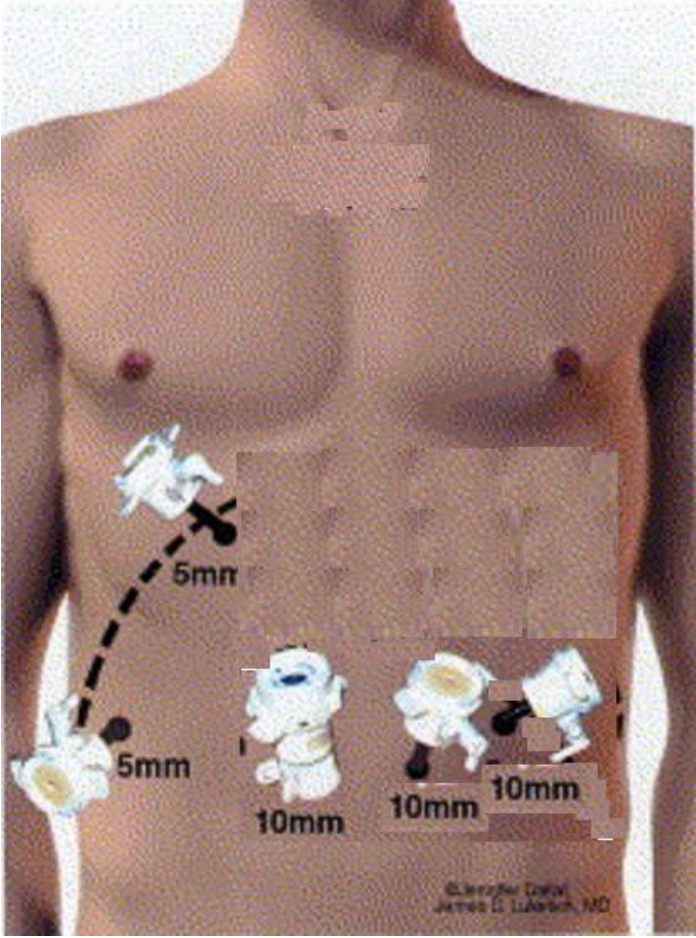
<sup>a</sup>Department of Surgery, Oregon Health and Science University, M/C L223A, 3181 Sam Jackson Park Rd., Portland, OR 97239; <sup>b</sup>Department of Surgery, Ohio State University, Columbus, OH, USA

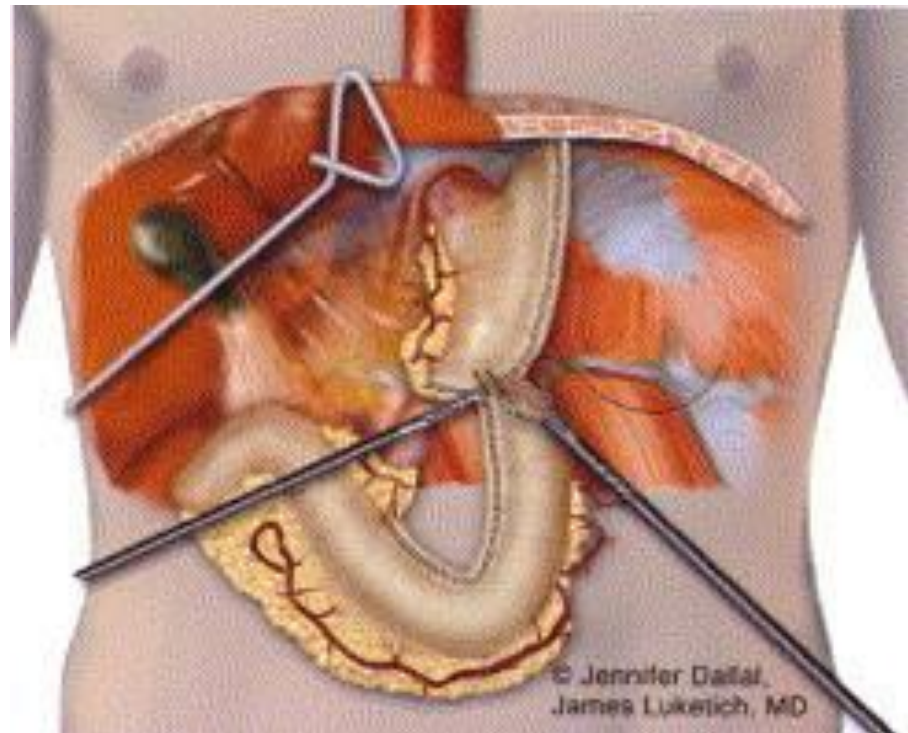
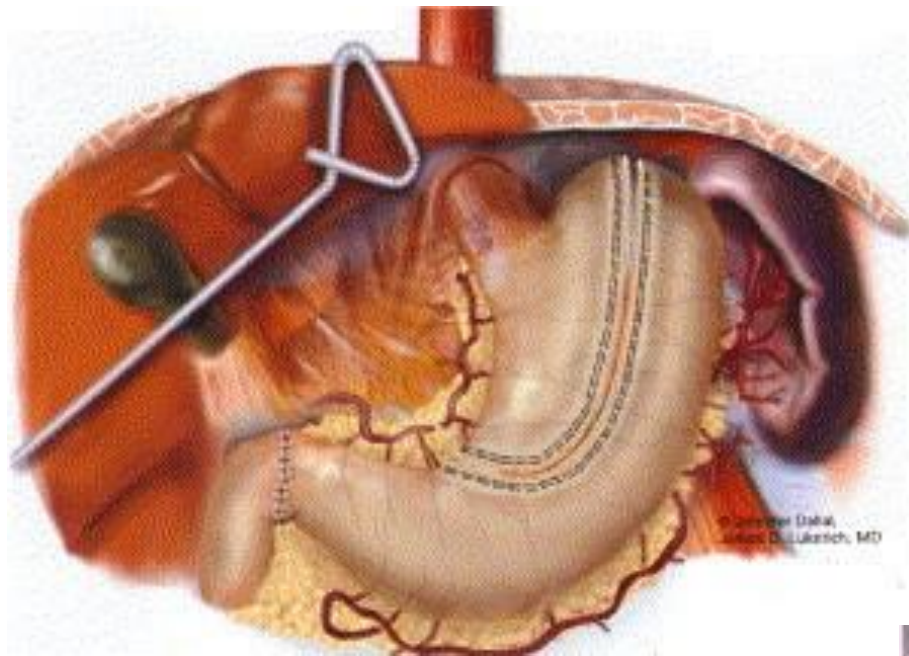
1. 44 MIE v.s. 46 Ivor lewis porcedure
2. OP time longer in MIE ( 543 vs 437 min;  $p < 0.01$ )
3. Less blood lost in MIE (407ml vs 780ml ,  $p < 0.01$ )
4. Median length of stay and 30 days mortality did not differ in both groups
5. Cardiovascular complication (41% vs 30%,  $p = 0.19$ )
6. Pulmonary complication (31% vs 30%;  $p = 1.0$ )
7. Wound complication (4% vs 17%;  $p = 0.05$ )

# Ivor-lewis procedure, open



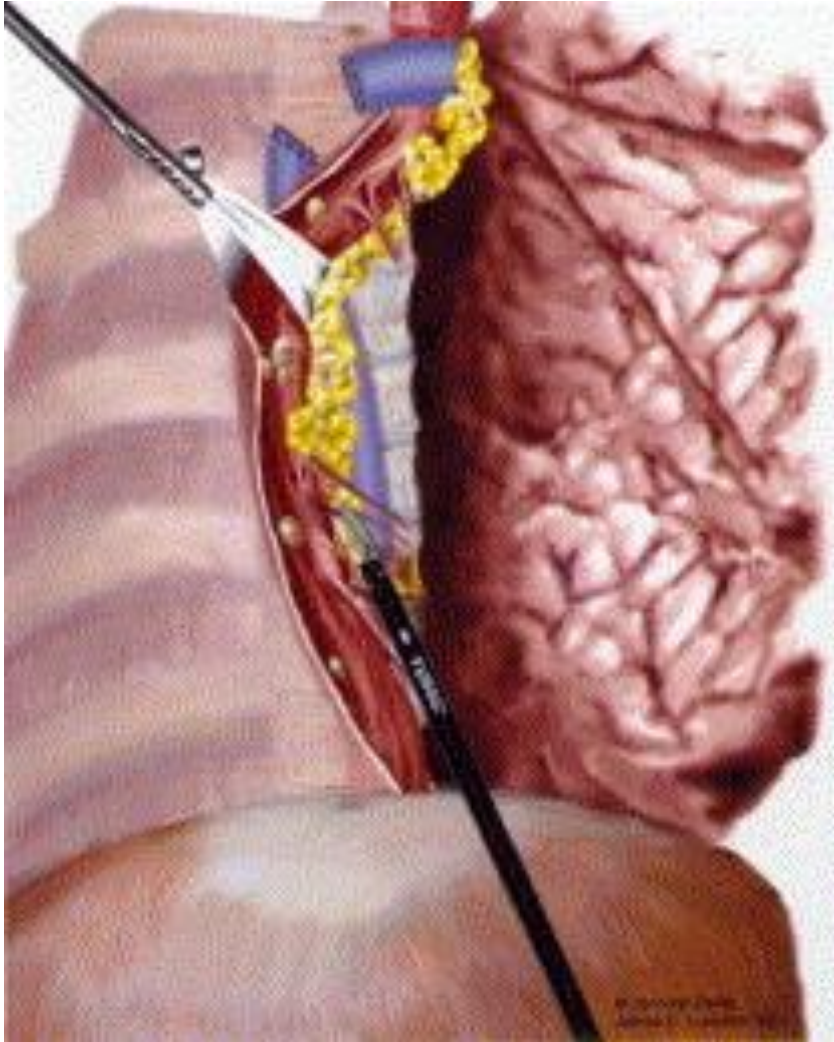
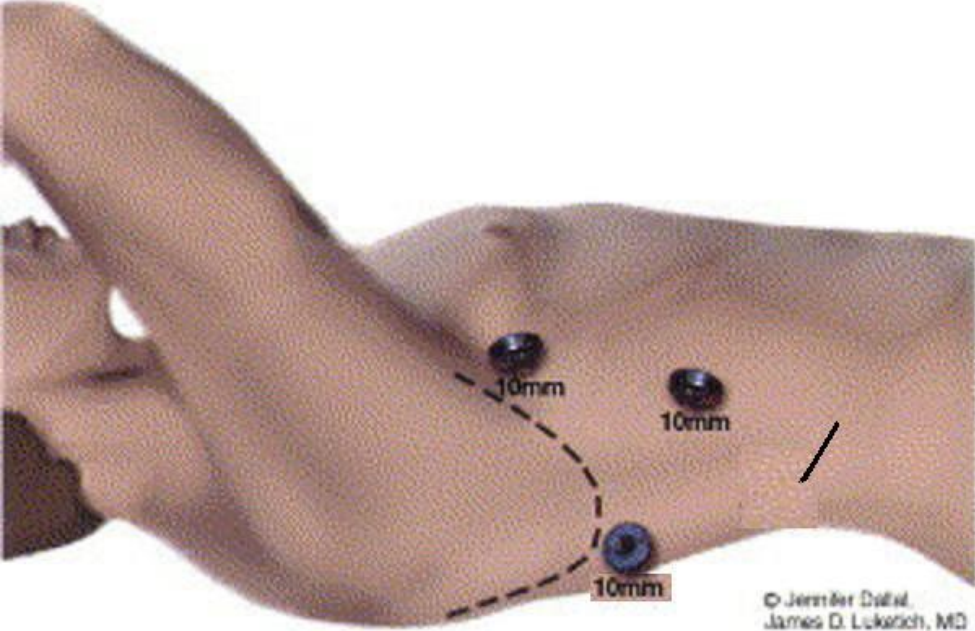
# Laparoscopic Subtotal Gastrectomy







# Videothoracoscopic Esophagectomy



# DST Series™ EEA™ OrVil™ 21mm & 25mm Devices

The First

and Only Trans-oral Delivery Device



21mm

25mm

**DST Series™  
EEA™ OrVil™**



21mm

25mm

**Stealth™**

# 內視鏡手術與傳統開胸手術比較

- Minimally invasive esophagectomy is associated with at least equivalent results in terms of mortality, morbidity, and survival as open esophagectomy (level: 3b )
- Pain control and pulmonary function may be better after VATS compared to thoracotomy for esophagectomy (level 3b)

## ↑ Oxford Centre for Evidence-based Medicine Levels of Evidence (May 2001)

Level	Therapy/Prevention, Aetiology/Harm	Prognosis	Diagnosis	Differential diagnosis/symptom prevalence study	Economic and decision analyses
1a	SR (with homogeneity*) of RCTs	SR (with homogeneity*) of inception cohort studies; CDR† validated in different populations	SR (with homogeneity*) of Level 1 diagnostic studies; CDR† with 1b studies from different clinical centres	SR (with homogeneity*) of prospective cohort studies	SR (with homogeneity*) of Level 1 economic studies
1b	Individual RCT (with narrow Confidence Interval‡)	Individual inception cohort study with ≥ 80% follow-up; CDR† validated in a single population	Validating** cohort study with good††† reference standards; or CDR† tested within one clinical centre	Prospective cohort study with good follow-up****	Analysis based on clinically sensible costs or alternatives; systematic review(s) of the evidence; and including multi-way sensitivity analyses
1c	All or none§	All or none case-series	Absolute SpPins and SnNouts††	All or none case-series	Absolute better-value or worse-value analyses ††††
2a	SR (with homogeneity*) of cohort studies	SR (with homogeneity*) of either retrospective cohort studies or untreated control groups in RCTs	SR (with homogeneity*) of Level >2 diagnostic studies	SR (with homogeneity*) of 2b and better studies	SR (with homogeneity*) of Level >2 economic studies
2b	Individual cohort study (including low quality RCT; e.g., <80% follow-up)	Retrospective cohort study or follow-up of untreated control patients in an RCT; Derivation of CDR† or validated on split-sample§§§§ only	Exploratory** cohort study with good†††† reference standards; CDR† after derivation, or validated only on split-sample§§§§ or databases	Retrospective cohort study, or poor follow-up	Analysis based on clinically sensible costs or alternatives; limited review(s) of the evidence, or single studies; and including multi-way sensitivity analyses
2c	"Outcomes" Research; Ecological studies	"Outcomes" Research		Ecological studies	Audit or outcomes research
3a	SR (with homogeneity*) of case-control studies		SR (with homogeneity*) of 3b and better studies	SR (with homogeneity*) of 3b and better studies	SR (with homogeneity*) of 3b and better studies
3b	Individual Case-Control Study		Non-consecutive study; or without consistently applied reference standards	Non-consecutive cohort study, or very limited population	Analysis based on limited alternatives or costs, poor quality estimates of data, but including sensitivity analyses incorporating clinically sensible variations.
4	Case-series (and poor quality cohort and case-control studies§§)	Case-series (and poor quality prognostic cohort studies***)	Case-control study, poor or non-independent reference standard	Case-series or superseded reference standards	Analysis with no sensitivity analysis
5	Expert opinion without explicit critical appraisal, or based on physiology, bench research or "first principles"	Expert opinion without explicit critical appraisal, or based on physiology, bench research or "first principles"	Expert opinion without explicit critical appraisal, or based on physiology, bench research or "first principles"	Expert opinion without explicit critical appraisal, or based on physiology, bench research or "first principles"	Expert opinion without explicit critical appraisal, or based on economic theory or "first principles"

# Summary

- 本案例使用最新的Orvil EEA經口進入腸胃自動吻合釘，大量縮短手術時間。
- 本案例使用全內視鏡Ivor Lewis食道切除及重建手術，讓傷口達到最小，復原最快與最少併發症。
- ICU stay <48 hours，短期併發症：無
- 進食時間：10天，還有機會縮短
- 住院16天，還有機會縮短。

# 題目1

- 台灣食道癌最常見的組織型態？
  - A. 腺癌 adenocarcinoma
  - B. 鱗狀上皮癌 squamous cell carcinoma
  - C. 肉瘤 sarcoma
  - D. 轉移癌 metastasis carcinoam
  - E. 其他 other carcinoma

# 題目2

- 哪些是鱗狀上皮癌最常見的危險因子？
  - A. 喝酒 alcohol
  - B. 吃檳榔 Betal nuts
  - C. 頭頸部癌症 head and neck SCC
  - D. 腐蝕性食道傷害 corrosive injury of esophagus
  - E. 以上皆是

# 題目3

- 食道重建最優先使用的器官？
  - A. 胃
  - B. 大腸
  - C. 小腸
  - D. 皮瓣
  - E. 組織皮瓣