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Post-CCRT esophageal perforation

a devastating condition

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Esophageal perforation

- Mostly iatrogenic during endoscopy
  - Spontaneous (Boerhaave's syndrome)
  - Foreign body ingestion
  - Trauma
  - Operatively
  - Malignancy
- High mortality was reported from **10-40%**, with a average with 20%

Table 1 Causes of esophageal perforations. Analysis of the literature.

References (year)	*n*	Iatrogenic (%)	Spontaneous (%)	Trauma (%)	FB (%)	Tumor (%)	Surgery (%)	Other (%)
Sung et al. [63] (2002)	20	30	35	10	20	–	–	5
Port et al. [53] (2003)	26	73	8	–	–	–	4	15
Brinster et al. [4] (2004)[a]	559	59	15	9	12	1	2	2
Gupta et Kaman [50] (2004)	57	77	11	4	7	–	–	1
Braghetto et al. [52] (2005)	34	32	27	–	35	–	–	6
Vogel et al. [34] (2006)	47	53	30	7	–	–	4	6
Erdogan et al. [48] (2007)	28	83	11	3	–	–	3	–
Eroglu et al. [32] (2009)	44	61	5	14	20	–	–	–
Griffiths et al. [23] (2009)	34	32	56	6	3	3	–	–
Linden et al. [56] (2009)	43	30	51	2	7	5	5	–
Abbas et al. [31] (2009)	119	63	37	–	–	–	–	–
Vallbohmer et al. [46] (2009)	44	57	20	–	9	–	7	7

FB: foreign body.
[a] Review of the literature.

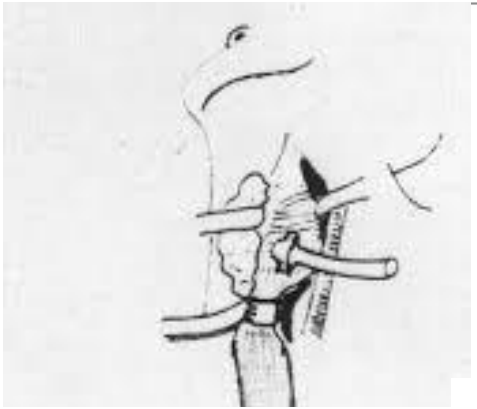
Post-CCRT esophageal perforation

- Rare
  - Chen (2014) reported a incidence of **5.8%** (18 of 322 patients)
  - Mean OS: **2 months** (0-3months)
- Risk factors included:
  - Age younger than 60
  - Extracapsular LN involving the esophagus
  - T4 stage
  - A second course of radiotherapy to the esophagus

J Radiat Res. 2014 Sep; 55(5): 940–947.

Surgical management for esophageal perforation

- Primary repair
- Esophageal exclusion
- Divertion
- Adequate drainage
- Esophagectomy



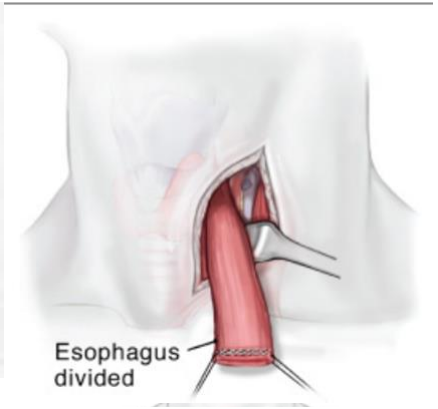


Table 1. Outcome After Treatment of Esophageal Perforation in Series Published Between 1990 and 2003

Treatment	Number of Patients	Number of Deaths	Mortality (%) Mean (Range)	References
Primary repair	322	40	12 (0–31)	5–7, 10, 14, 16, 17, 42, 55, 90–2, 95
Resection	129	22	17 (0–43)	5–7, 12, 16, 42, 64, 90–2
Drainage	88	32	36 (0–47)	5–7, 16, 17, 42, 91
Exclusion and	33	8	24 (0–80)	5–7, 17, 76, 77, 96
Nonoperative	154	26	17 (0–33)	7, 8, 13, 14, 42, 88, 90–2
Total	726	128	18 (0–80)	

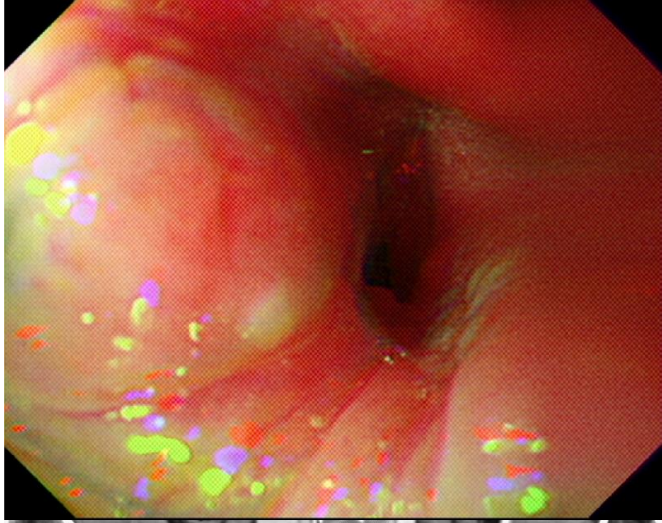
Challenge of malignant esophageal perforation

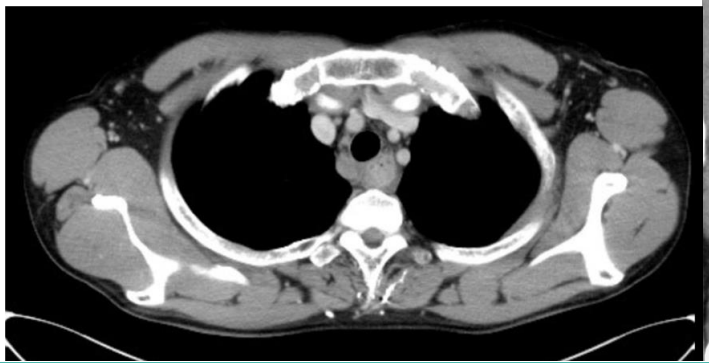
- Rare
  - Most related malignancy was esophageal tumors
  - No currently guidelines for following...
- Severe inflammation and infection
- Fragile tissue due to fibrosis and necrosis after chemoradiation
- Poor nutrition and deteriorated medical condition

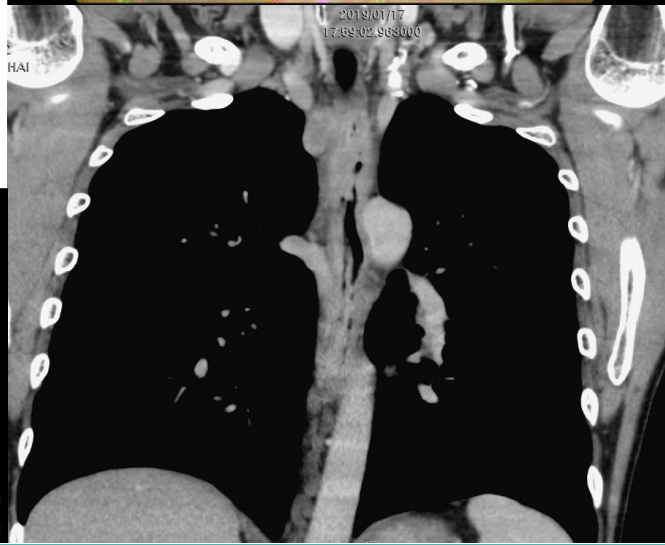
Case presentation

- 張OO
- 42-year-old, male
- Personal history:
  - Tobacco(+): 3 PPD for 20 years
  - Alcohol(+): whisky, wine, frequently
  - Betel nuts(+): for 20 years
- Past history:
  - Hypertension
  - Alcoholic liver cirrhosis
- Chief complain:
  - Progressive dysphagia for months
  - Body weight loss for 15kg within 3 months

- 2019/1/14 **[PES]**: Ulcerative tumor over upper third of esophagus
  - Biopsy: **Squamous cell carcinoma**
- 2019/1/17 **[Chest CT]**: cT3-4N1(paratracheal)
- **Definitive CCRT**
  - R/T: 6600cGy/33Fx
  - C/T: PF+5FU

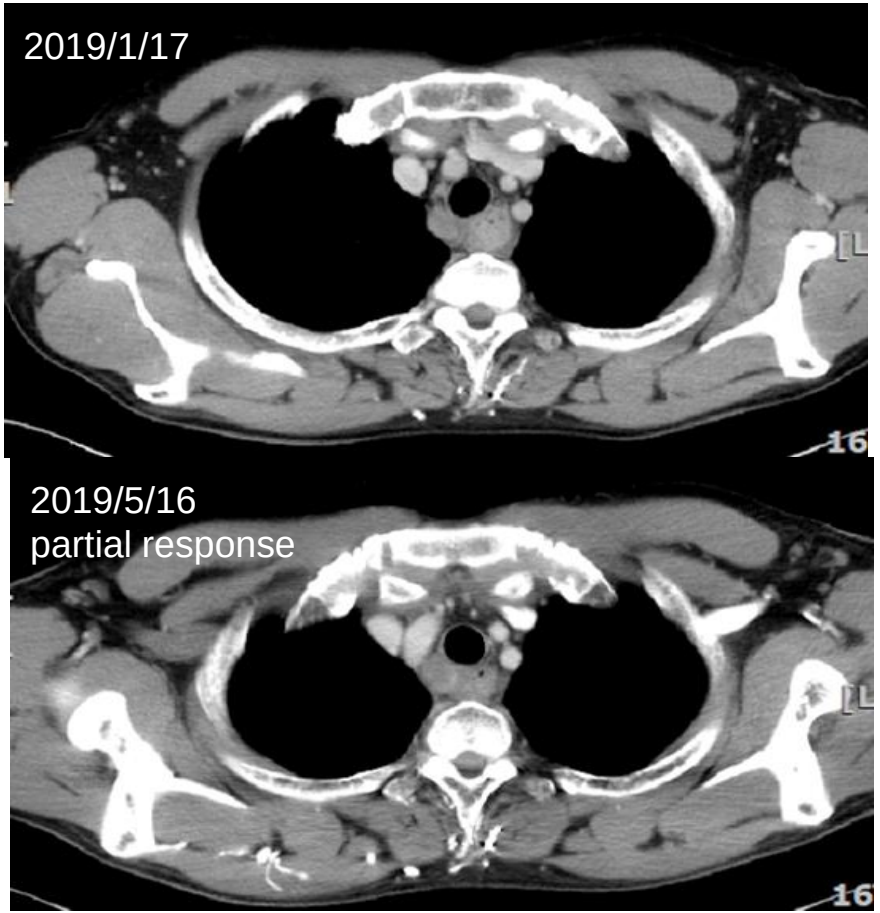






- 2019/5 **[Chest CT & PET]**: partial response
- Chemotherapy was arranged with PF+5FU since 2019/5

- 2019/7/12: **Sudden onset of severe chest pain on 2019/7/12 with fever up to 40 degree**



2019/7/12

Septic shock
(CRP: 17)

Coagulopathy
(INR:1.64, Plt: 70k)

Liver impairment
(ALT: 289; AST: 414)

Poor nutrition

Fluid resucitation

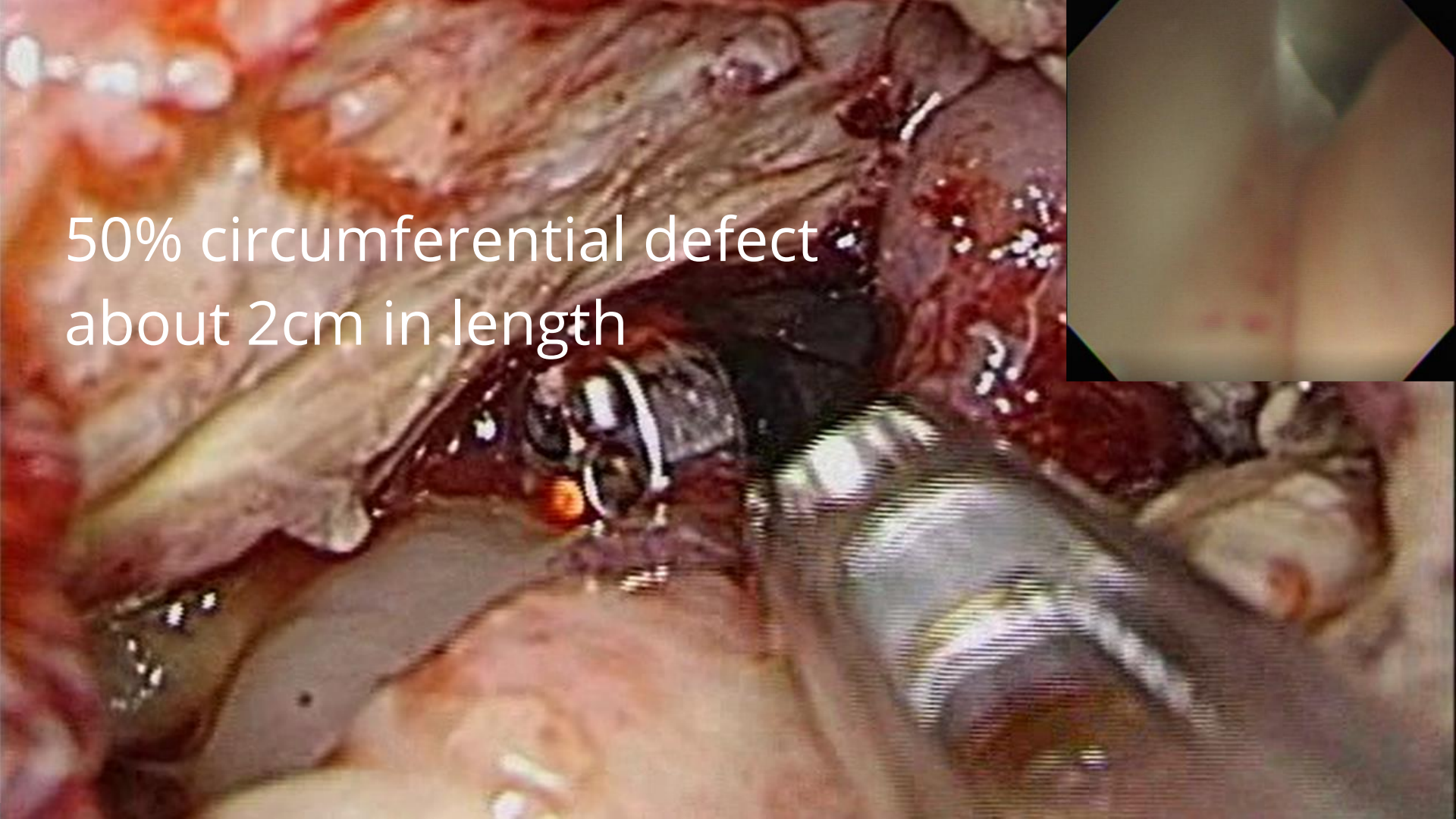
IV antibiotic

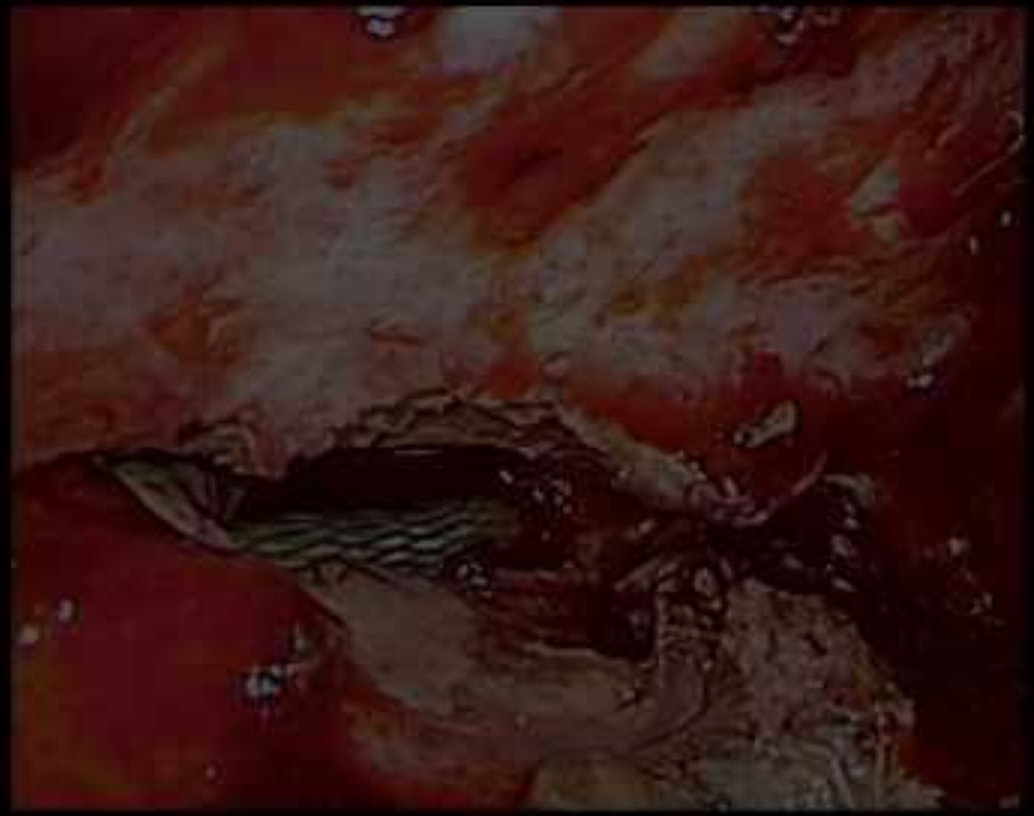
NPO with PPN

2019/7/19

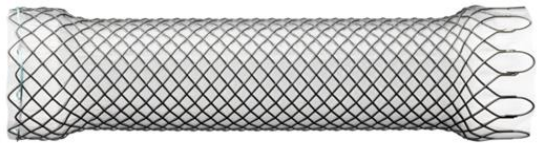
VATS mediastinotomy with abscess drainage

Esophageal stenting

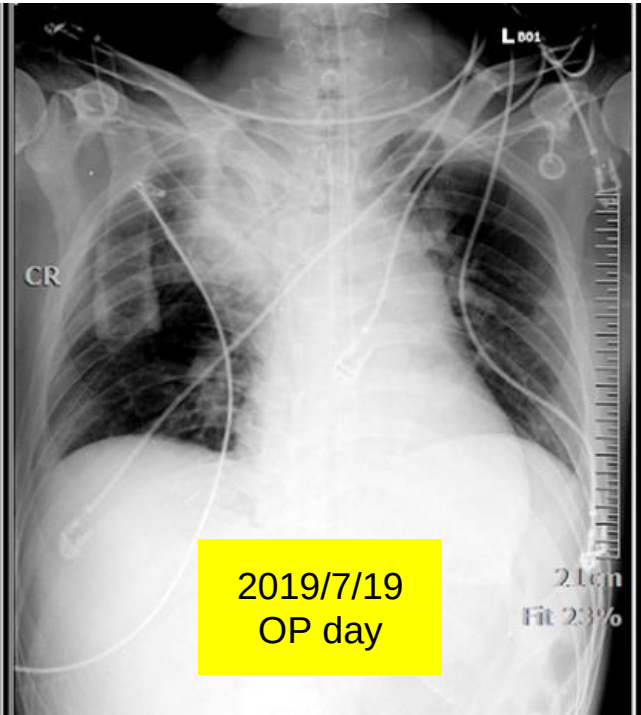

50% circumferential defect
about 2cm in length

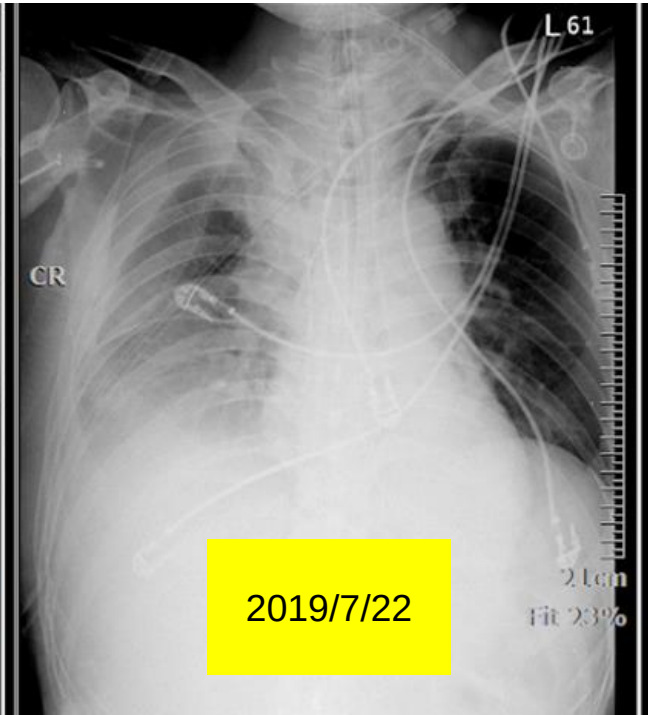


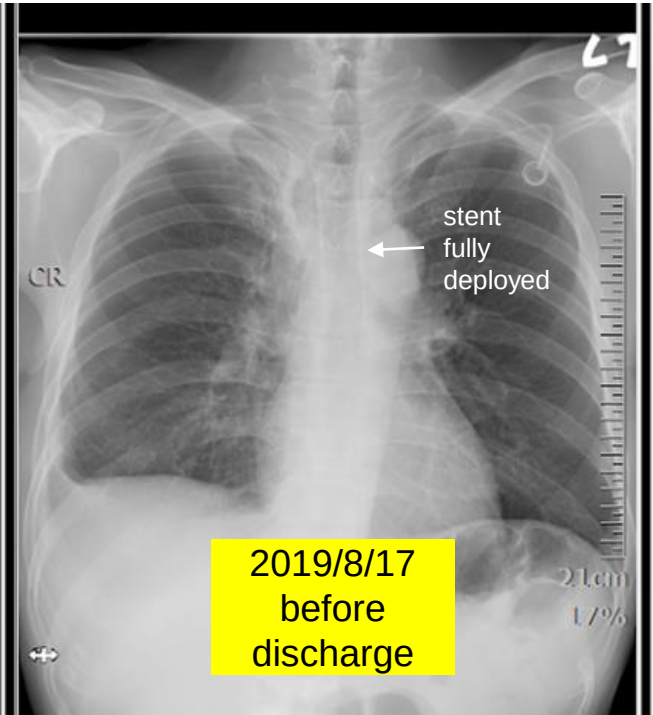
Fully covered
SMES
(23/28mm x 10cm)



	7/15	7/20	7/25	7/30	8/16
WBC	4300	3300	3900	6100	3900
Plt	71000	77000	83000	117000	111000
CRP	17.72	19.25		7.21	3.36







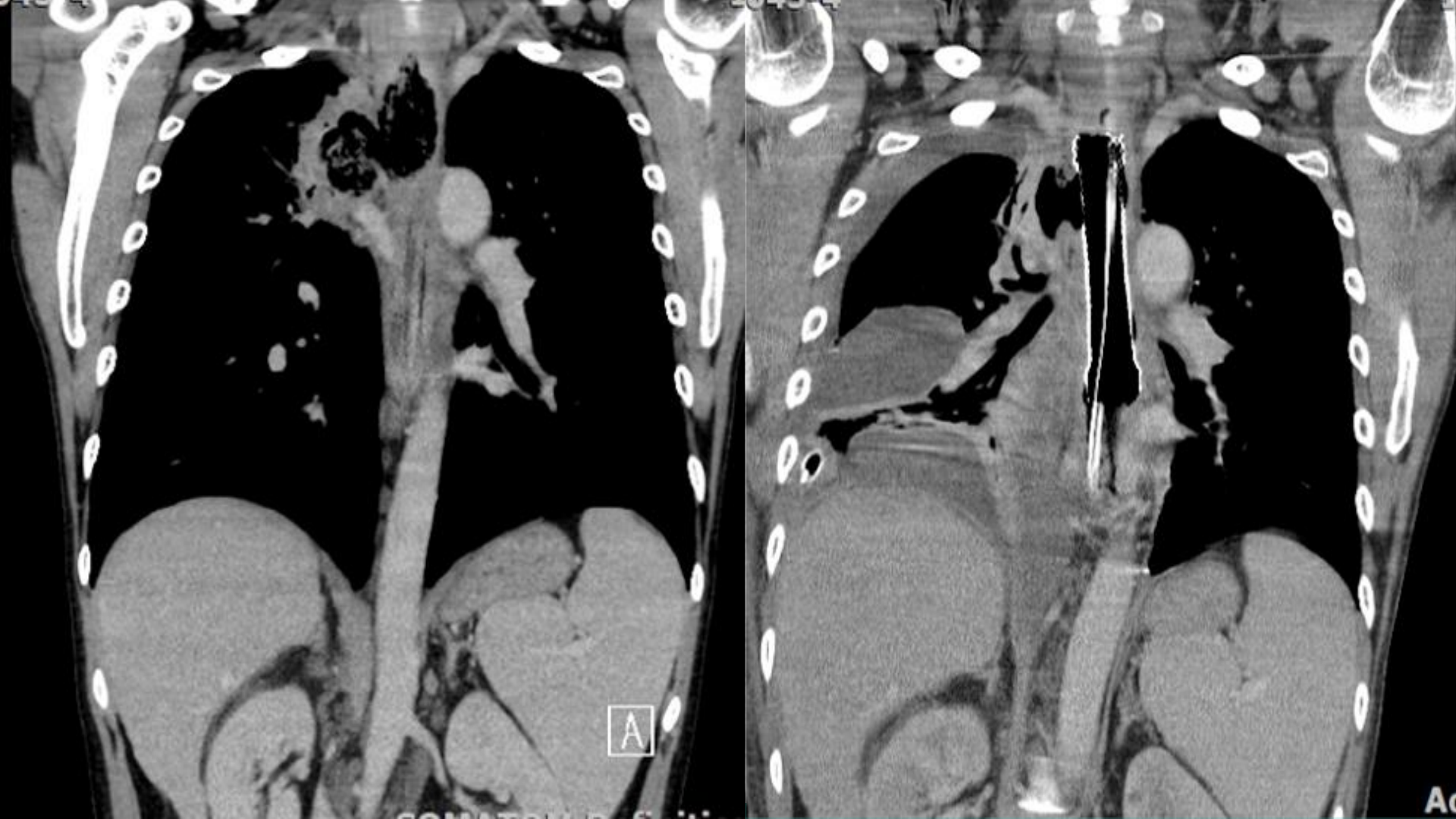

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Table 3 Treatment of esophageal perforations with endoprostheses. Analysis of the literature.

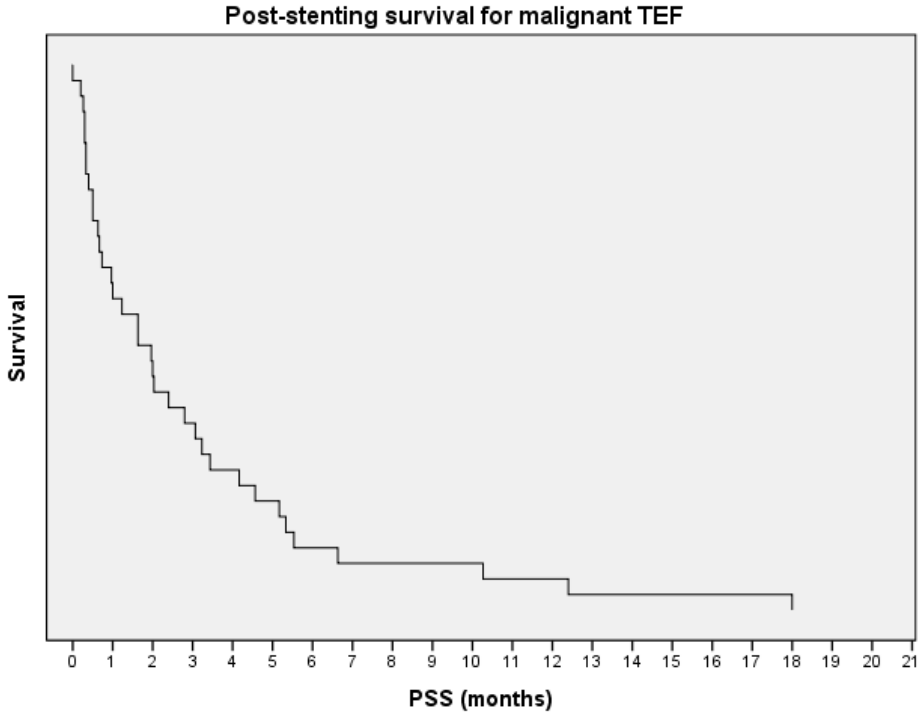
References (year)	Siersema et al. [41] (2003)	Gelbmann et al. [40] (2004)	Johnson et al. [38] (2005)	Fischer et al. [39] (2006)	Tuebergen et al. [37] (2008)	Salminen et al. [36] (2009)	Kim et al. [35] 2009
Patients (*n*)	11	9	22	15	32	10	17
Anastomotic fistula (*n*)	3	5	2	0	22	2	11
Perforations (*n*)	8	4	20	15	10	8	6
Localization of the perforation (*n*)							
Cervical	0	0	0	0	0	0	NS
Thoracic	11	9	22	15	32	10	NS
Abdominal	0	0	0	0	0	0	NS
Delay before management (*d*) (range)	3 (1–28)	7.7 (2–10)	11 < 1	0.5 (30–13)	14 (0–611)	13 (2h–48)	6.5 (1–65)
Type of endoprosthesis	Flamingo®/Ultraflex	Polyflex®	Ultraflex ®	Ultraflex®/ Niti-S-Stent®	Ultraflex®	ULtraflex®	Mongomery®
Technically successful insertion of endoprothesis (%)	100	100	95	100	100	100	100
Morbidity (%)	NS	33	12.5	13	28	20	59
Migration of endoprotheses (%)	9	30	14	NS	6	10	35
Mortality (%)	0	33	23	7	15	30	6
Extraction of endoprotheses (%)	64	67	77	80	70	90	88
Interval before extraction of endoprotheses (*d*) (range)	49 (42–98)	135 (32–242)	21	28 (10–56)	45 (4–426)	70 (21–112)	36.5 (1–109)
Recovery (%)	93	66	77	93	81	70	88

NS: not specified.

J Visc Surg. 2010 Jun;147(3):e117-28.

VGHTPE experience

- 40 patients since 2005/3
  - 36 M vs 4 F
  - 58.7 +/- 1.7 years
- Esophageal fistula site:
  - 34 to airway (20 T, 14B)
  - 4 to mediastinum
- Stent preferrence:
  - 29 SEMS; 13 PS; 2 combined case
  - Average OP time: 102 +/- 14.8 mins (62+/-8.3 mins)
- 30-day post-stenting survival(PSS): 64.1%
  - Average PSS: 89 +/- 19.6 days (0-540)
  - Mean PSS: 49 +/- 17.7 days



Pitfalls for esophageal stenting

- Very high proximal esophageal perforations
- Long segments of defect
- Self expanding metallic stent (SEMS) would take 48-72 hours to achieve fully expanded
- Stent related complication should be always aware
  - malposition
  - migration
  - compression to airway
  - fracture

Conclusion

- Esophageal perforation after CCRT is a davastating and critical situation with high mortality rates
- Stent implantation is a feasible alternatives in case of malignant esophageal perforation, it should be considered especially in those physically unfit for surgery
- Intraoperative fluroscopic examination would be helpful for defect localization and adjusting stent
- Using guidewires makes things easier

Thanks for your attentions