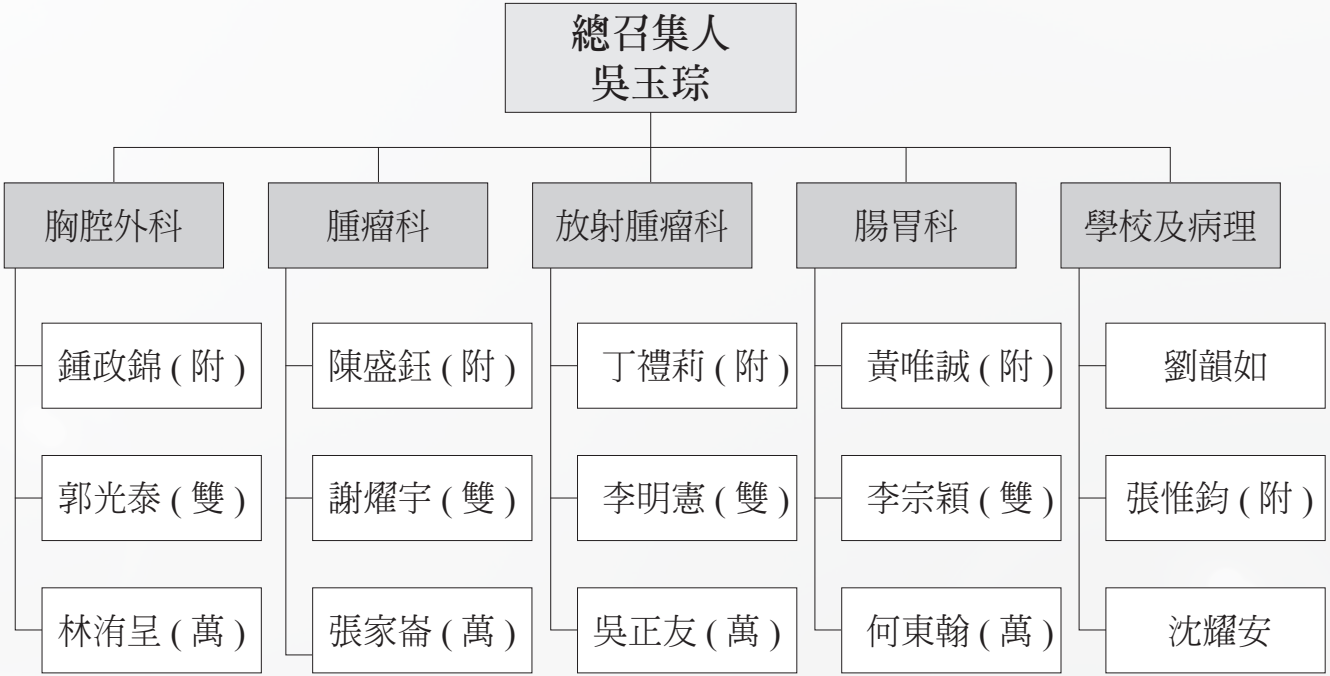
Esophageal and Esophagogastric Junction Cancer Guidelines

食道團隊成員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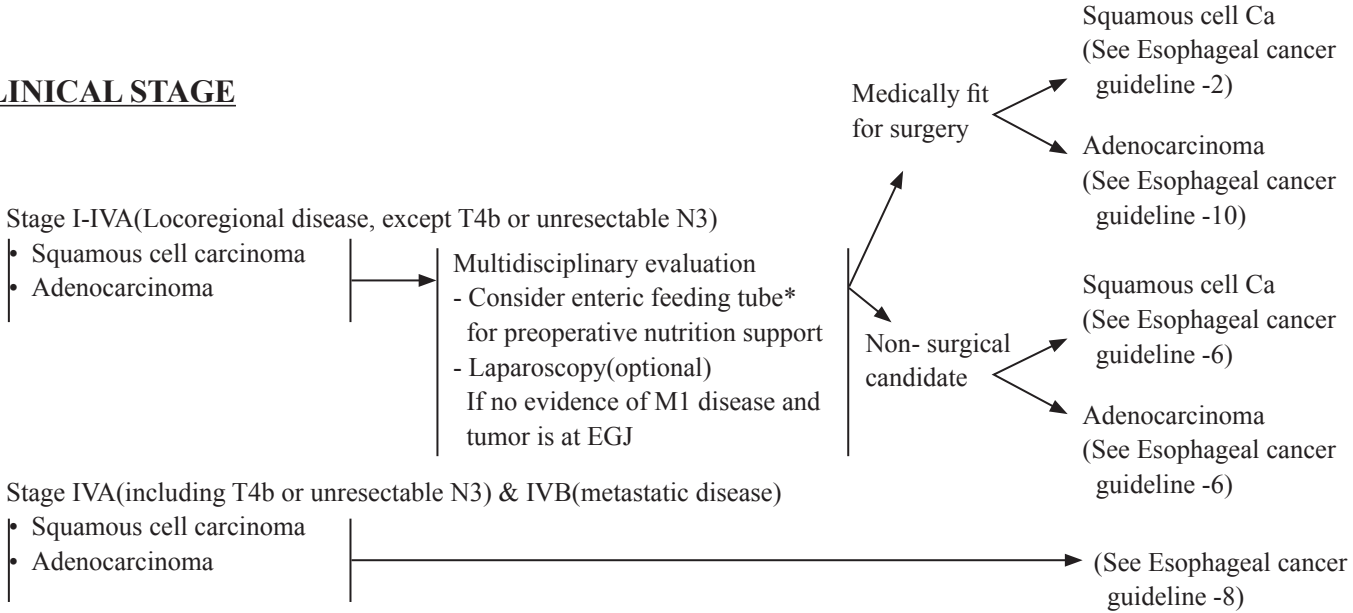
Pretreatment Workup

WORKUP

- H &P
- Upper GI endoscopy and biopsy
- Chest / abdomen CT with oral and IV contrast
- Pelvic CT with contrast as clinical indicated
- PET-CT evaluation (skull base to mid-thigh) if no evidence of M1 disease
- Complete blood count (CBC) and comprehensive Chemistry profile
- Endoscopic ultrasound(EUS), if no evidence of M1 un-resectable disease
- Endoscopic resection (ER) is recommended for the accurate staging of early stage cancers(T1a or T1b). Early-stage cancer can best be diagnosed by ER
- Biopsy of metastatic disease as clinically indicated
- Universal testing for microsatellite instability (MSI) by PCR/next-generation sequencing (NGS) or MMR by IHC is recommended in all newly diagnosed patients
- Programmed death ligand 1 (PD-L1) testing if advanced / metastatic disease is documented/suspected
- HER2-neu testing if metastatic adenocarcinoma is documented/ suspected
- Next-generation sequencing (NGS)) should be considered
- Bronchoscopy, if tumor is at or above the carina with no evidence of M1 disease
- Assign Siewert category
- Nutritional assessment and counseling
- Smoking cessation advice, counseling, and pharmacotherapy as indicated
- Screen for family history

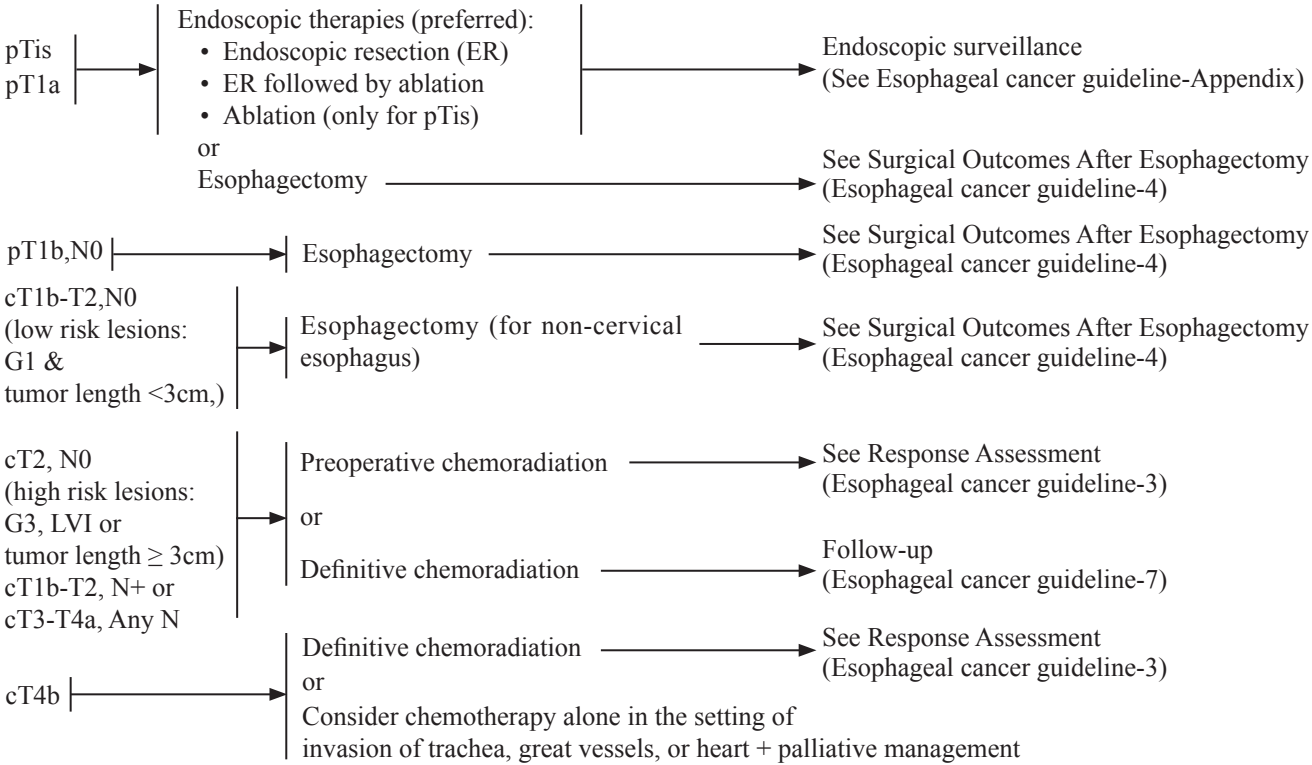
Pretreatment Workup



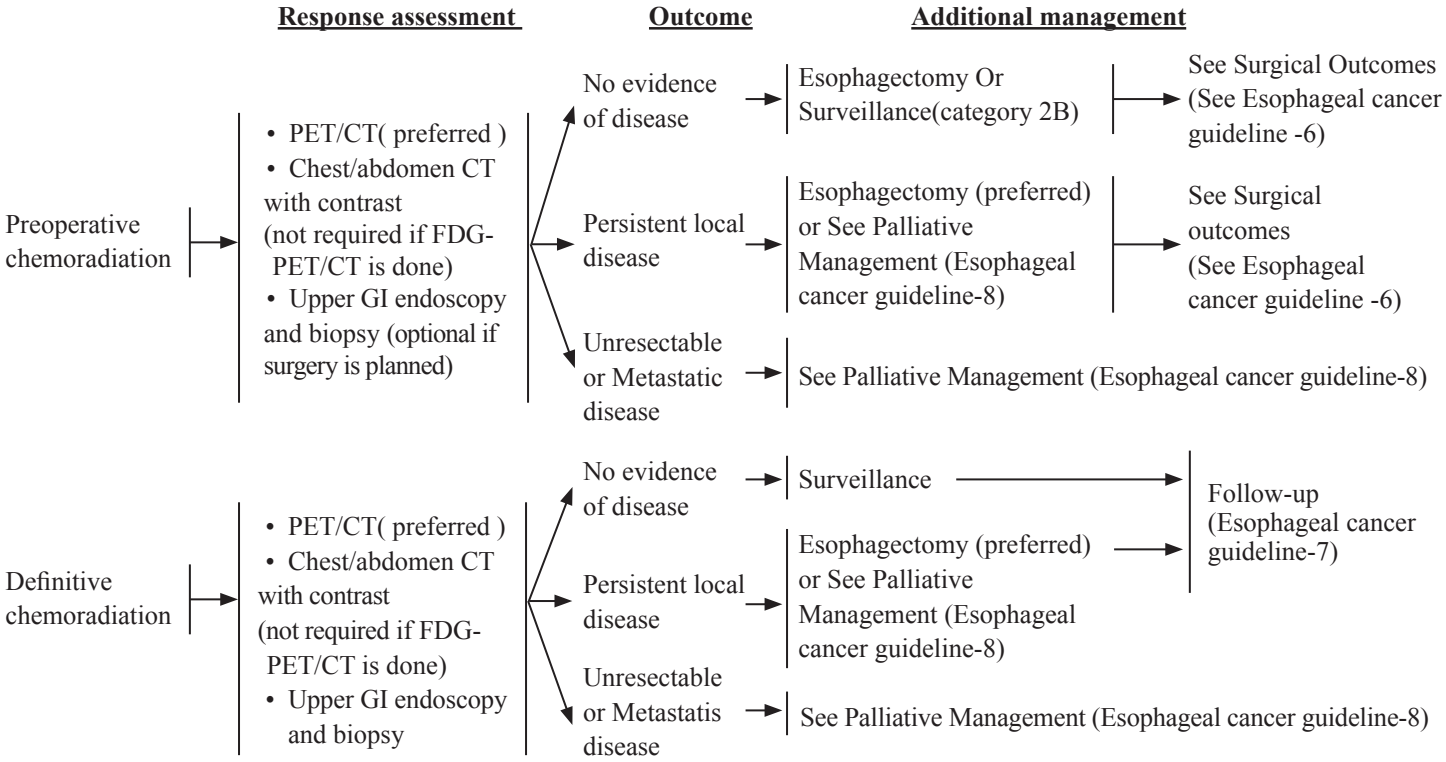
* Percutaneous gastrostomy tube (PCG) may be considered for patient with cervical esophageal tumors receiving definitive chemoradiation or for patients with marginally resectable disease.

《 Esophageal cancer guideline-2》

Squamous cell carcinoma: primary treatment options for medically fit surgery patients



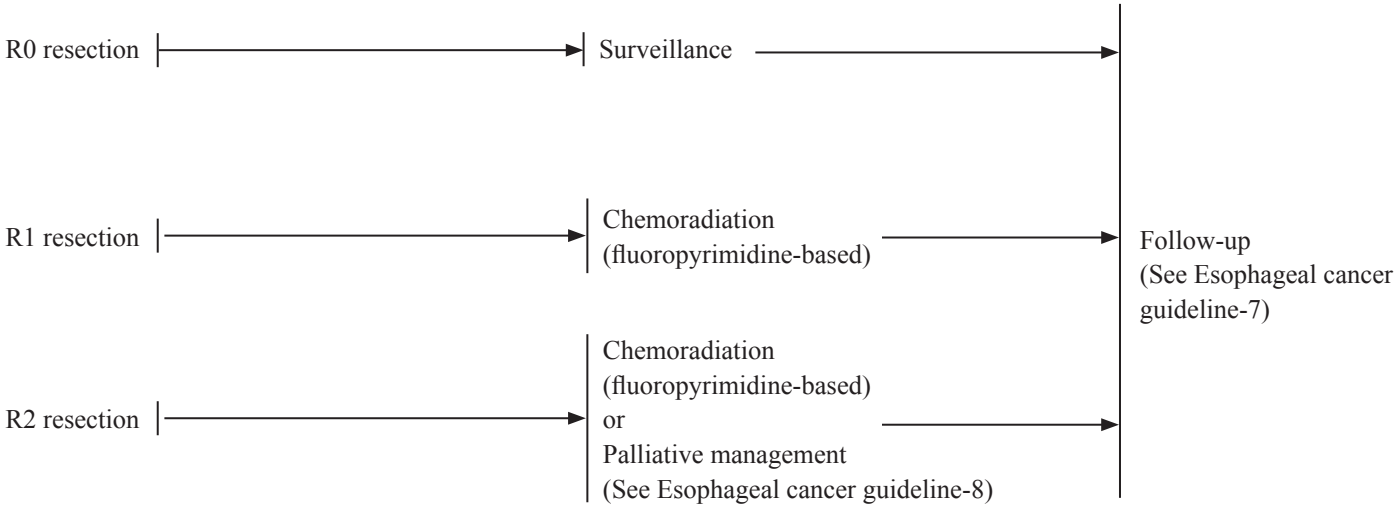
Squamous cell carcinoma: response assessment



《 Esophageal cancer guideline-4》

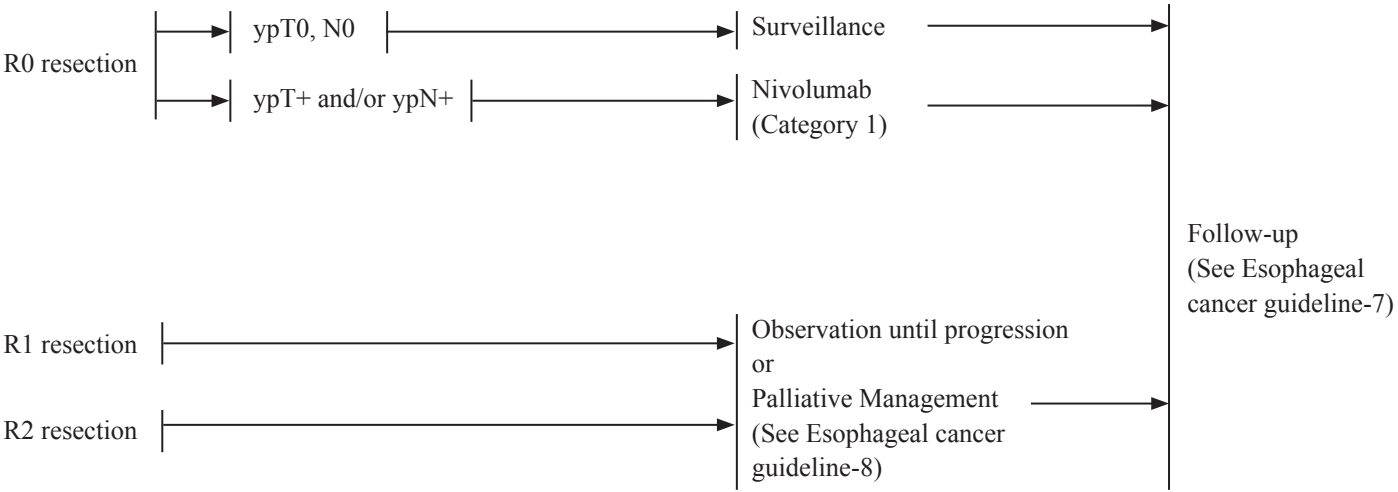
Squamous cell carcinoma: surgical outcomes

Patients **Have Not** Reveived Preoperative Chemoradiation



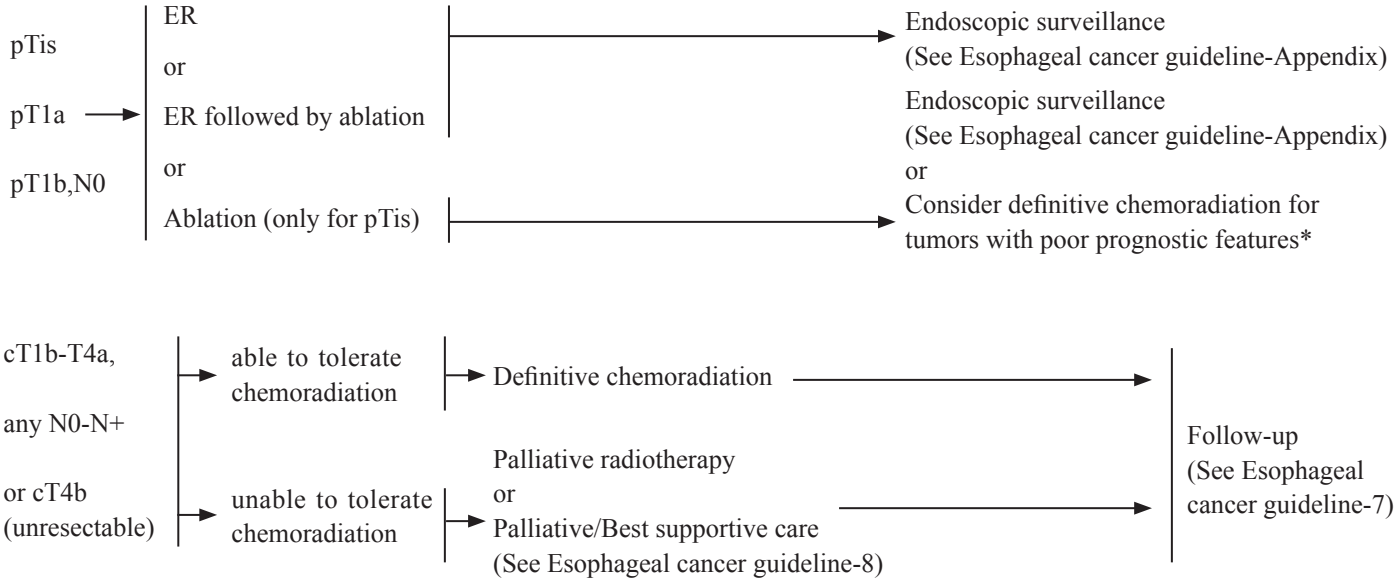
Squamous cell carcinoma: surgical outcomes

Patients **Have** Reveived Preoperative Chemoradiation



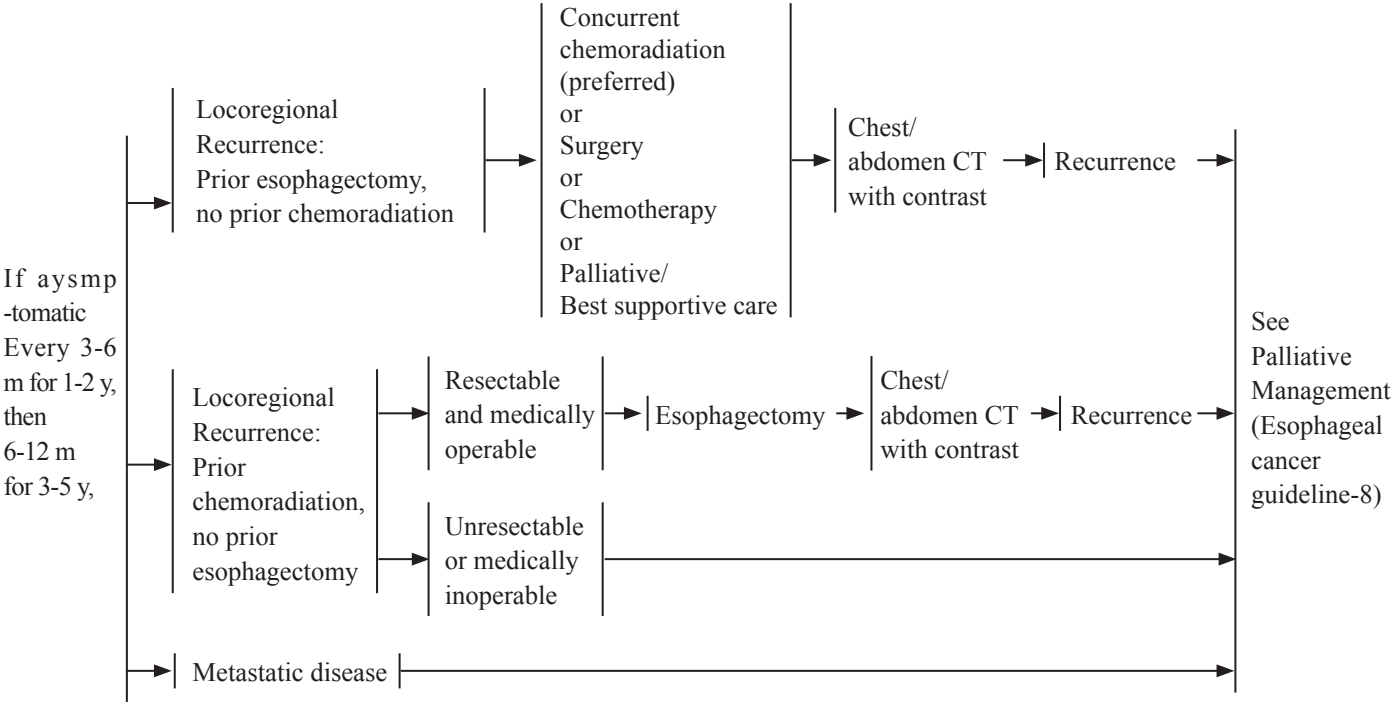
《 Esophageal cancer guideline-6》

Squamous cell carcinoma &adenocarcinoma : non-surgical candidate



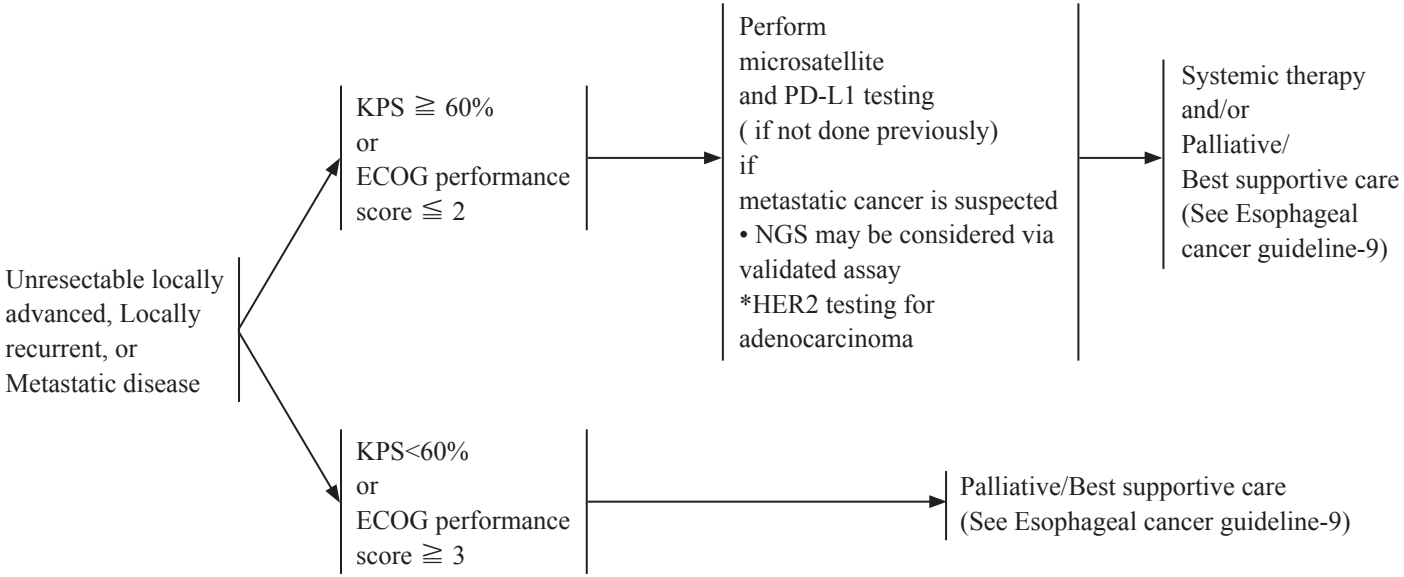
* Poor prognostic features: positive margin(s), max. tumor diameter > 2cm, G2/3, LVI or more

Squamous cell carcinoma & adenocarcinoma follow up – recurrence – palliative management



《 Esophageal cancer guideline-8》

Squamous cell carcinoma & adenocarcinoma : unresectable locally advancer, locally recurrent, or metastatic disease



Principles of Palliative/Best Supportive Care

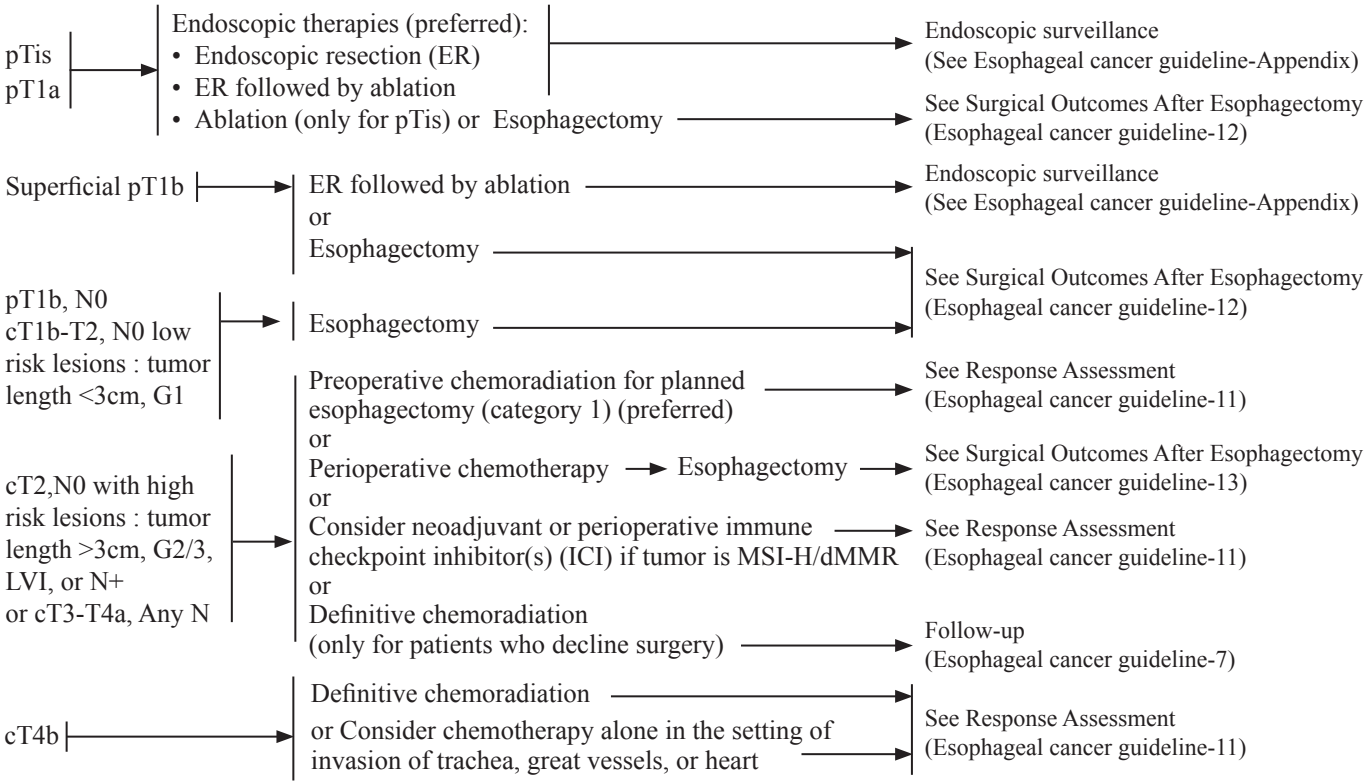
The goal of best supportive care is to prevent and relieve suffering and to support the best possible quality of life for patients and their families, regardless of the stage of the disease or the need for other therapies. For esophageal cancer, interventions undertaken to relieve major symptoms may result in significant prolongation of life. This appears to be particularly true when a multimodality interdisciplinary approach is pursued and, therefore, a multimodality interdisciplinary approach to palliative care of the esophageal cancer patient is encouraged.

Dysphagia

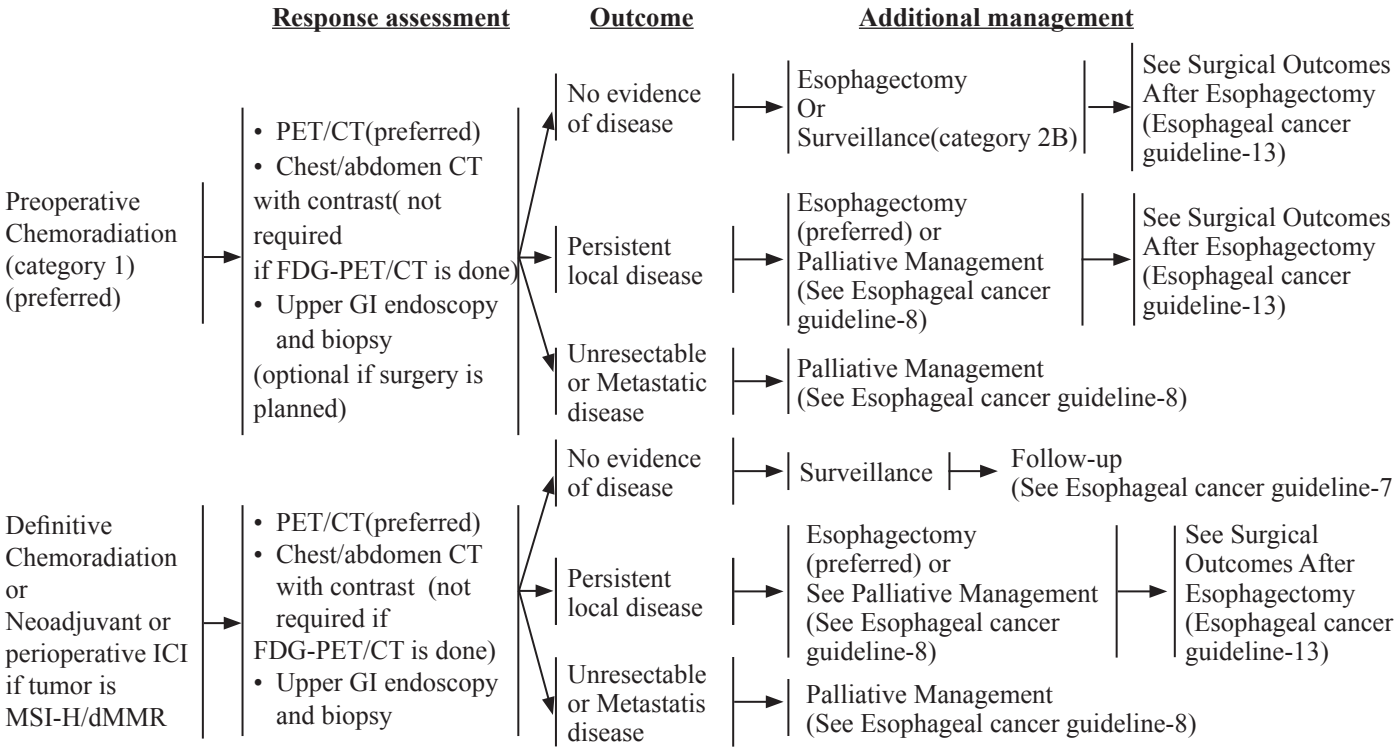
- Assess the extent of disease and the functional degree of swallowing impairment, preferably through a standardized scoring scale and confirm the etiology of dysphagia
- Dysphagia grading scale
  - Grade 0: Able to eat solid food without special attention to bite size or chewing
  - Grade 1: Able to swallow solid food cut into pieces less than 18 mm in diameter and thoroughly chewed
  - Grade 2: Able to swallow semisolid food (consistency of baby food)
  - Grade 3: Able to swallow liquids only
  - Grade 4: Unable to swallow liquids or saliva
- Dysphagia arising from esophageal cancer most often is due to obstruction, but on occasion may be primarily due to tumor-related dysmotility.
- Patients with dysphagia who are not candidates for curative surgery should be considered for palliation of their dysphagia symptoms, based on symptom severity. This can be achieved through multiple modalities, although placement of an esophageal stent is most commonly utilized. In contrast, stent placement is generally not advised in patients who may undergo curative surgery in the future due to concerns that stent-related adverse events may preclude curative surgery in the future.

《Esophageal cancer guideline-10》

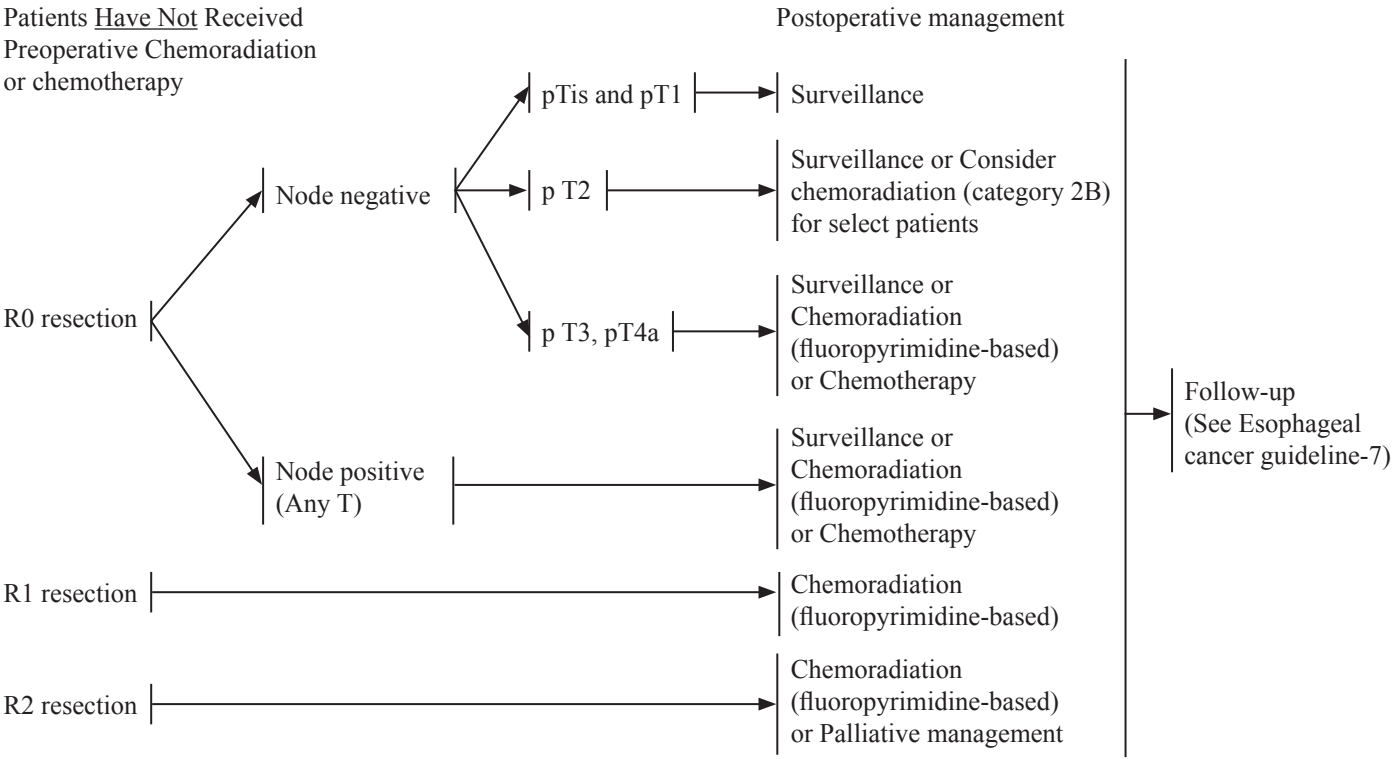
Adenocarcinoma: primary treatment for medically fit surgery patients



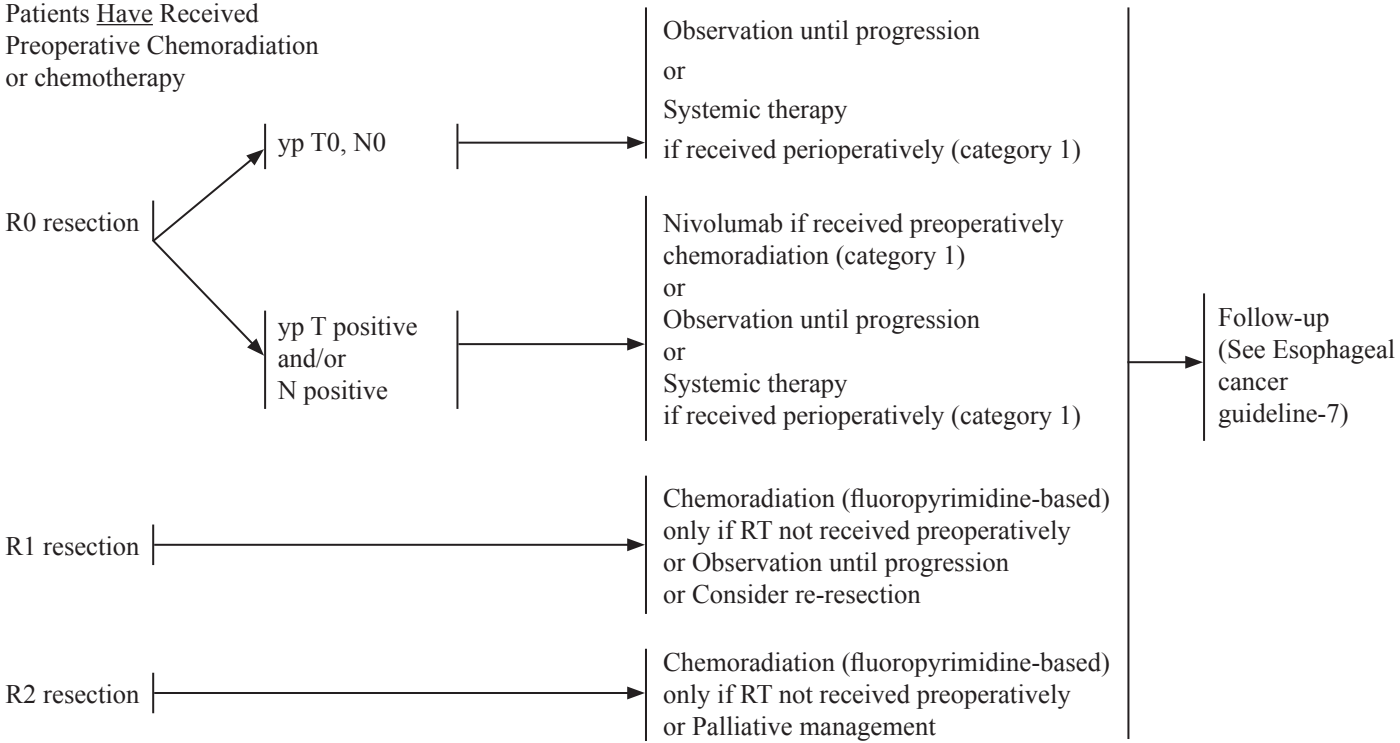
Adenocarcinoma: response assessment



Adenocarcinoma: surgical outcomes



Adenocarcinoma: surgical outcomes



Principles of Endoscopic Staging and Therapy

Treatment of Symptoms

- Esophageal dilation can be performed with the use of dilating balloons or bougies to temporarily relieve obstruction from tumors, or treatment-related strictures. Caution should be exercised to avoid overdilation, to minimize the risk of perforation.
- Long-term palliation of dysphagia can be achieved with endoscopic tumor ablation by Nd:YAG laser, PDT and cryoablation, or endoscopic and radiographic-assisted insertion of expandable metal or plastic stents.
- Long-term palliation of anorexia, dysphagia, or malnutrition may be achieved with endoscopic or radiographic-assisted placement of feeding gastrostomy or jejunostomy. The placement of a gastrostomy in the preoperative setting may compromise the gastric vasculature, thereby interfering with the creation of the gastric conduit in the reconstruction during esophagectomy and should be avoided.

Post-Treatment Surveillance

- Consider deferring assessment endoscopy with biopsy to 6 weeks or later after completion of preoperative therapy in patients whom avoidance of surgery is being considered.
- EUS exams performed after chemotherapy or radiation therapy have a reduced ability to accurately determine the present stage of disease. Similarly, biopsies performed after chemotherapy or radiation therapy may not accurately diagnose the presence of residual disease.
- Endoscopic surveillance following definitive treatment of esophageal cancer requires careful attention to detail for mucosal surface changes, and multiple biopsies of any visualized abnormalities. Strictures should be biopsied to rule out neoplastic cause. EUS-guided FNA should be performed if suspicious lymph nodes or areas of wall thickening are seen on cross-sectional imaging.
- Endoscopic surveillance after ablative therapy or ER of early-stage esophageal cancer should continue after completion of treatment. Biopsies should be taken of the neosquamous mucosa even in the absence of mucosal abnormalities as dysplasia may occasionally be present beneath the squamous mucosa.
- Endoscopic surveillance should also include a search for the presence of Barrett esophagus and four-quadrant biopsies to detect residual or recurrent dysplasia. The ablation of residual or recurrent high-grade and low-grade dysplasia using RFA or cryoablation should be considered.
- Patients who have received therapeutic ER should have endoscopic surveillance.

Principles of Pathologic Review

- The purposes of Pathologic review include ：
  - Classification of tumor
  - Determine the extent of invasion
  - Establish status of cancer involvement of surgical margins
- All surgical pathology reports should be in accordance with the WHO classification of esophageal cancer
- All surgical pathology reports should be in accordance with the WHO classification of esophageal cancer
- The surgical pathology report should include the following items
  - Histologic type
  - Histologic grade (G1: well differentiated; G2: moderately differentiated; G3: poorly differentiated)
  - Microscopic tumor extension
  - Margin status

Principles of Pathologic Review

The pathology report should include the following items depending on the specimen:

- Biopsy: invasion, if present; high-grade dysplasia in Barrett esophagus; histologic type; Grade; Presence or absence of Barrett esophagus; Universal testing for MSI by PCR/NGS or MMR by IHC is recommended in all newly diagnosed patients
- Endoscopic resection (ER): include all elements as for biopsy specimen plus the depth of tumor invasion; lymphovascular invasion (LVI), and the status of mucosal and deep margins; Universal testing for MSI by PCR/NGS or MMR by IHC is recommended in all newly diagnosed patients
- Esophagectomy, without prior chemoradiation: include all elements as for ER specimen plus the location of the tumor midpoint in relation to the EGJ, whether the tumor crosses EGJ, lymph node status, and the number of lymph nodes recovered; Universal testing for MSI by PCR/NGS or MMR by IHC is recommended in all newly diagnosed patients, if not previously performed
- Esophagectomy, with prior chemoradiation :
  - the tumor sites should be thoroughly sampled, with submission of entire EGJ or ulcer/tumor bed for specimens without grossly obvious residual tumor
  - For pathology report, include all elements as for esophagectomy without prior chemoradiation, plus assessment of the treatment effect
  - Assessment treatment effect: The modified Ryan scheme in the CAP Cancer Protocol for Esophageal Carcinoma

Description	Tumor Regression Score
No viable cancer cells (complete response)	0
Single cells or rare small groups of cancer cells (near complete response)	1
Residual cancer with evident tumor regression, but more than single cells or rare small groups of cancer cells (partial response)	2
Extensive residual cancer with no evident tumor regression (poor or no response)	3

Principles of Biomarker Testing

- Molecular testing of HER2 status, microsatellite instability (MSI) status, programmed death ligand 1 (PD-L1) expression, and NTRK gene fusion detection are used to predict locally advanced, unresectable, or metastatic esophageal and EGJ cancers clinical treatment drug selection.
- Assessment of overexpression or amplification of Her2 in Esophageal and EGJ Cancer
  - For patients with inoperable locally advanced, recurrent, or metastatic adenocarcinoma of esophagus or EGJ for whom trastuzumab therapy is being considered
  - Immunohistochemical criteria for scoring HER2/neu expression

	Surgical Specimen Expression Pattern, Immunohistochemistry	Biopsy Specimen Expression Pattern, Immunohistochemistry	HER2 Overexpression Assessment
0	No reactivity or membranous reactivity in <10% of cancer cells	No reactivity or no membranous reactivity in any cancer cell	Negative
1+	Faint or barely perceptible membranous reactivity in ≥10% of cancer cells; cells are reactive only in part of their membrane	Cluster of five or more cancer cells with a faint or barely perceptible membranous reactivity irrespective of percentage of cancer cells positive	Negative
2+	Weak to moderate complete, basolateral or lateral membranous reactivity in ≥10% of cancer cells	Cluster of five or more cancer cells with a weak to moderate complete, basolateral, or lateral membranous reactivity irrespective of percentage of cancer cells positive	Equivocal
3+	Strong complete, basolateral, or lateral membranous reactivity in ≥10% of cancer cells	Cluster of five or more cancer cells with a strong complete, basolateral, or lateral membranous reactivity irrespective of percentage of cancer cells positive	Positive

  - HER2 IHC is performed first, followed by FISH methods in cases showing 2+ (equivocal) expressions by IHC. Cases with HER2: CEP17 ratio >=2 or an average HER2 copy number >=6.0 signals/cell are considered positive by FISH.

Principles of Biomarker Testing

◆ *Microsatellite Instability (MSI) or Mismatch Repair (MMR) Testing:*

- 所有新診斷的食道癌和食道胃結合部癌應透過聚合酶鏈反應 (PCR)、NGS 或 IHC MMR 進行 MSI 通用檢測。 根據 CAP DNA 錯配修復生物標記報告指南，結果被解釋爲 MSI 高 (MSI-H) 或錯配修復缺陷 (dMMR)。 測試只能在臨床實驗室改進修正案 (CLIA) 批准的實驗室中進行。 MSI-H 或 dMMR 腫瘤患者應轉診至遺傳學顧問，以在適當的臨床背景下進行進一步評估。
- MMR Interpretation
  - ◊ No loss of nuclear expression of MMR proteins: No evidence of dMMR (low probability of MSI-H)
  - ◊ Loss of nuclear expression of one or more MMR proteins: dMMR
- MSI Interpretation
  - ◊ MSI-stable (MSS)
  - ◊ MSI-low (MSI-L)
  - – 1%–29% of the markers exhibit instability
  - – 1 of the 5 National Cancer Institute (NCI) or mononucleotide markers exhibits instability
  - ◊ MSI-H
  - – ≥ 30% of the markers exhibit instability
  - – 2 or more of the 5 NCI or mononucleotide markers exhibit instability

◆ *PD-L1 Testing:*

- PD-L1 IHC testing may be considered on locally advanced, recurrent, or metastatic esophageal and EGJ cancer in patents who are candidate for treatment with PD-1 inhibitors
- Assessment of PD-L1 Protein Expression
  - Pembrolizumab as a second-line treatment option for esophageal SCC with PD-L1 expression levels by combined positive score (CPS) of >=10, and as a third-or subsequent-line treatment option for EGJ adenocarcinoma with PD-L1 expression levels by CPS >=1, as determined by an FDA-approved companion diagnosed test
  - CPS is determined by

$$\text{CPS} = \frac{\text{\# of PD-L1-positive cells (tumor cells, lymphocytes, macrophages)}}{\text{Total \# of tumor cells}} \times 100$$

Principles of Biomarker Testing

◆*次世代定序 (Next-Generation Sequencing ,NGS):*

- 目前，多種標靶治療藥物例如 : trastuzumab, pembrolizumab/nivolumab, and entrectinib/larotrectinib, selpercatinib, and dabrafenib / trametinib, 已被 FDA 核准用於食道癌和食道胃結合部癌。 Tratuzumab 基於 HER2 過度表現測試。選擇免疫節點抑制劑的使用是基於 PCR 檢測 MSI 或 IHC 檢測 NGS/MMR、PD-L1 免疫組織化學表達或 NGS 檢測高腫瘤突變負荷 (TMB)。 FDA 核准使用選定的 TRK 抑制劑治療 NTRK 基因融合陽性實體瘤，並核准使用 selpercatinib 治療 RET 基因融合陽性腫瘤。 Dabrafenib/trametinib 已被批准用於治療具有 BRAF V600E 突變的腫瘤。當可用於測試的組織有限，或患者無法進行傳統的活檢時，單一生物標記的連續測試或使用有限的分子診斷面板可能會很快耗盡樣本。在這些情況下，透過在 CLIA 批准的實驗室中進行的經過驗證的 NGS 檢測進行全面的基因組分析可用於識別 HER2 擴增、MSI 狀態、MMR 缺陷、TMB、NTRK 基因融合、RET 基因融合和 BRAF V600E 突變。 應先考慮使用 IHC/ISH/ 靶向 PCR，然後視情況進行 NGS 檢測。

◆ *Liquid Biopsy*:

- The genomic alterations of solid cancers may be identified by evaluating circulating tumor DNA (ctDNA) in the blood, hence a form of “liquid biopsy.” Liquid biopsy is being used more frequently in patients with advanced disease, particularly those who are unable to have a clinical biopsy for disease surveillance and management. The detection of mutations/alterations in DNA shed from esophageal and EGJ carcinomas can identify targetable alterations or the evolution of clones with altered treatment response profiles. Therefore, for patients who have metastatic or advanced esophageal/esophagogastric cancers who may be unable to undergo a traditional biopsy or for disease progression monitoring, testing using a validated NGS-based comprehensive genomic profiling assay performed in a CLIA-approved laboratory may be considered. A negative result should be interpreted with caution, as this does not exclude the presence of tumor mutations or amplifications.

Principles of Biomarker Testing

- Assessment of *NTRK* gene fusions:
  - The FDA granted approval for the use of select TRK inhibitors for *NTRK* gene fusion-positive solid tumors
  - A two-step approach is used, which includes IHC first and confirmation of any positivity detected with IHC by Next generation sequencing (NGS)
  - TRK IHC as a screening tool:
    - IHC negative: No TRK expression
    - IHC positive: Detection of TRK expression, confirmation by NGS

- 若只有少量組織 (biopsy specimen) 可供檢測不同種類的 biomarker， 建議臨床醫師開立檢測請在病理申請單註明，同一次病理組織切片除了 HE，應預留組織空白片，以避免因蠟塊多次處理，造成腫瘤細胞消耗。

Principles of Endoscopic Staging and Therapy

1. 食道鱗狀細胞癌病患，在初步確診時，必須由專精影像強化技術 IEE 的內視鏡醫師進行一次上消化道內視鏡精查，以確認是否同時存在其他源於黏膜的癌症及癌前病變。(work up)
2. 所有食道癌病患，在進行手術或 CCRT 前，應會診胃腸科醫師討論是否施行內視鏡或外科性胃腸造口，以顧全病患治療前後的營養狀態。(principle of surgery)
3. 食道癌在接受治療前，除了已明確證實爲 M1 的病人外（如 CT scan、PET scan），應進行 EUS 診斷。(work up)
4. 關於早期食道癌：適用內視鏡切除的絕對適應症爲腫瘤深度侷限在 m1、m2 層，且 LN(-)；相對適應症爲腫瘤深度侷限在 m3、sm1 層，且 LN(-)；無法辨明情況下，可考慮行 diagnostic ESD。
5. 如果在上述測試完成後有足夠的組織可用，可以考慮用 NGS 做第二次檢測。
6. 食道癌病患若 EUS 發現 LN(+)，可選擇性加做 FNA/FNB。
7. 食道癌 CCRT 之後，可選擇性加做 EUS 做 re-staging。(optional)
8. 姑息性的內視鏡治療（例如：金屬支架擴張術、氬氣電漿凝固術局部消融…等），應於食道癌多科團隊會議中提出討論後執行。

註一：執行上消化道內視鏡精查時，應備有擴大型內視鏡、魯格爾試液（Lugol's solution）、稀釋醋酸、影像強化光源（例如 NBI、BLI 等），由具早期癌判斷能力的內視鏡醫師執行並撰寫報告。

註二：巴瑞特氏食道病患，須例行接受上消化道內視鏡精查，以確認是否發生癌變，精查應由專精影像強化技術 IEE 的內視鏡醫師執行。（有 dysplasia 者至少每年一次，無 dysplasia 者至少每三年一次。）

註三：應由食道癌共識會議向三院相關癌症多科團隊提出診療建議「所有口腔癌（含舌癌）、頭頸癌、下咽癌、喉癌等病患，在初步確診時及術後至少每年，必須由專精影像強化技術 IEE 的內視鏡醫師進行一次上消化道內視鏡精查，以確認是否同時存有食道癌及癌前病變。」

Principles of Surgery

- 手術前之臨床分期應使用胸腹部電腦斷層， 正子電腦斷層掃描 (PET-CT）及內視鏡超音波，以評估可否切除
- 治療前所有病患皆需諮詢胸腔外科醫師，接受是否可以耐受食道切除之生理評估
- 所有生理狀態適合食道切除，且爲局部可切除之胸腔 (超過環咽部 5 公分以下) 及腹腔食道癌患者，皆應考慮手術切除
- 食道交接處 (EGJ) 腺癌之病患皆應有 Siewert 分類
  - Siewert Type I: adenocarcinoma of the lower esophagus with the epicenter location located within 1cm to 5 cm above the anatomic EGJ
  - Siewert Type II: true carcinoma of the cardia with the tumor epicenter within 1 cm above and 2 cm below the EGJ
  - Siewert Type III: subcardial carcinoma with the tumor epicenter between 2 cm and 5 cm below the EGJ, which infiltrates the EGJ and lower esophagus from below
- Siewert type I 及 II 腫瘤應遵從食道癌及胃食道交接癌治療準則。 Siewert type III 則視爲胃癌，應遵從胃癌治療準則，然某些狀況下需增加部分食道切除，以獲取適當的之切除距離
- 腹腔內視鏡可以偵測放射線影像檢查無法找到之潛伏轉移病灶（Occult metastatic disease) 尤其是 Seiwert type II 及 III 腫瘤
- 腹膜積液細胞學檢查陽性與不良預後相關，應視爲 M1 疾患。患者若爲進展期之腫瘤，臨床分期 T3 或 N+ 疾患，應考慮接受腹腔內視鏡腹膜沖洗分期檢查 (laparoscopic staging with peritoneal washings)。
- 頸部食道癌或不超過環咽部 (cricopharygeal) 5 公分以上之食道癌應該以決定性放射化療 (definitive chemoradiation) 治療

Principles of Surgery

- 可切除的食道癌 Stage I-IVA(Locoregional disease, except T4b or unresectable N3)
  - Tis or T1a 腫瘤 (可考慮 EMR+Ablation 或手術)
  - T1b 腫瘤
  - T1-T3 腫瘤，即使局部淋巴腺已經轉移，多區域 (multi-station) 淋巴腺或巨大 (bulky) 淋巴腺轉移爲手術切除之 relative contraindication ，可否切除尙應考慮，如年齡、體能狀態、或治療反應等其他因素
  - T4a 腫瘤，侵犯至肋膜、心包膜或橫隔膜

- 不可切除的食道癌 Stage IVA(including T4b or unresectable N3) & IVB(metastatic disease)
  - cT4b 腫瘤 : 侵犯心臟、大血管、氣管、或鄰近器官包括肝、胰、肺及脾臟
  - 多區域 (multi-station) 淋巴腺或巨大 (bulky) 淋巴腺侵犯，大多數應視爲不可切除，然而淋巴侵犯可否切除尙應考慮，如年齡、體能狀態、或治療反應等其他因素
  - EJG 腫瘤患者合併鎖骨上淋巴轉移應視爲不可切除
  - 轉移第 IV 期之食道癌 (包括非區域淋巴腺 non-regional lymph node 轉移）

- 食道切除方式之選擇取決於腫瘤位置、可選擇重建之器官，手術者之經驗及喜好，以及病患之喜好
- 病患在術前引導期間無法經口進食以維持營養者可考慮食道擴張或空腸造瘻 (J-tube)，優於胃造瘻術 (會妨礙往後胃重建手術時胃管之健全）

Principles of Surgery

- 可接受之食道及胃交接腫瘤切除術式
  - Ivor Lewis esophagogastrectomy (開腹及右側開胸）
  - McKeown esohagogastrectomy (右側開胸、開腹及頸部吻合)
  - Minimally invasive Ivor Lewis esophagogastrectomy (腹腔鏡及微創右側開胸)
  - Minimally invasive McKeown esophagogastrectomy (胸腔鏡、微創開腹 / 腹腔鏡及頸部吻合)
  - Transhiatal esophagogastrectomy (開腹不經胸腔及頸部吻合)
  - Robotic minimally invasive esophagogastrectomy (機器手臂輔助微創術式)
  - Left transthoracic or thoracoabdominal approaches with anastomosis in chest or neck(左側開胸或胸腹聯合術式、胸腔或頸部吻合)
- 可接受之食道重建取代物
  胃（優先選擇）
  大腸
  空腸
- 可接受之淋巴擴清方式
  標準方式
  擴展方式（整體 En-bloc 方式)
- 至少需移除或評估 15 個以上之淋巴結以達到適當的淋巴分期 , 若術前接受過放射化學治療 , 雖適切需移除或評估之淋巴結數量仍然未知，仍建議移除或評估 15 個以上之淋巴結
- 患者經過決定性放射及化學治療後，仍有可切除之局部腫瘤，且沒有遠端轉移，可以考慮食道切除
- 食道切除，內視鏡食道黏膜切除，及其他燒灼術式，應在高容量之食道治療中心由有經驗的外科醫師或內視鏡醫師執行

Reference for principles of surgery

1. NCCN Practice Guidelines in Oncology, Esophageal Cancer, 2024 V4.
2. Hsu PK, Huang CS, Wang BY, Wu YC, Hsu WH. Survival Benefits of Postoperative Chemoradiation in Lymph Node-Positive Esophageal Squamous Cell Carcinoma. Ann Thorac Surg 2014;97:1734-41.(SCI)
3. Hsu PK, Huang CS, Wu YC, Chou TY, Hsu WH. Open versus Thoracoscopic Esophagectomy in Patients with Esophageal Squamous Cell Carcinoma. World J Surg. 2014;38:402-9. (SCI)
4. Hsu PK, Huang CS, Wang BY, Wu YC, Chou TY, Hsu WH. The Prognostic Value of the Number of Negative Lymph Nodes in Esophageal Cancer Patients after Transthoracic Resection. Ann Thorac Surg 2013;96:995-1001. (SCI)
5. Hsu PK, Chien LI, Huang CS, Hsieh CC, Wu YC, Hsu WH, Chou TY. Comparison of survival among neoadjuvant chemoradiation responders, non-responders and patients receiving primary resection for locally advanced oesophageal squamous cell carcinoma: does neoadjuvant chemoradiation benefit all? Interact Cardiovasc Thorac Surg. 2013;17:460-6. (SCI)
6. Wang BY, Liu CY, Lin CH, Hsu PK, Hsu WH, Wu YC, Cheng CY. Endoscopic Tumor Length Is an Independent Prognostic Factor in Esophageal Squamous Cell Carcinoma. Ann Surg Oncol. 2012;19:2149-58. (SCI)
7. Hsu PK, Wang BY, Huang CS, Wu YC, Hsu WH. Prognostic factors for post-recurrence survival in esophageal squamous cell carcinoma patients with recurrence after resection. J Gastrointest Surg. 2011;15:558-65. (SCI)
8. Hsu PK, Wang BY, Chou TY, Huang CS, Wu YC, Hsu WH. The total number of resected lymph node is not a prognostic factor for recurrence in esophageal squamous cell carcinoma patients undergone transthoracic esophagectomy. J Surg Oncol. 2011;103:416-20. (SCI)
9. Wang BY, Goan YG, Hsu PK, Hsu WH, Wu YC. Tumor length as a prognostic factor in esophageal squamous cell carcinoma. Ann Thorac Surg. 2011;91:887-93. (SCI)

Follow-up

- 病史和身體檢查
  - 每 3 到 6 個月一次，維持 1 到 2 年 .
  - 然後，每 6 到 12 個月一次，維持 3 到 5 年 .

- 臨床檢查
  - 依臨床指示，生化檢驗及全套血液檢查。
  - 依臨床指示安排影像學檢查。
  - 根據臨床需求進行上消化道內視鏡檢查和組織切片。
  - 針對食道手術吻合口狹窄處進行擴張術治療。
  - 安排營養評估與諮詢。