

# Imaging of Barium Esophagogram and Abdominal Computed Tomography of Adenocarcinoma of Esophagogastric Junction: Case Report

Rahadi Edo Fajrin\* & Hanafiah Muhammad Rizal

Department of Radiology of Idaman Government Hospital Banjarbaru, Indonesia

\*Corresponding author details: Rahadi Edo Fajrin; [edofajrin@gmail.com](mailto:edofajrin@gmail.com)

## ABSTRACT

Adenocarcinoma of the esophagogastric junction is one of the most common cancers in the world, with an estimated mortality rate 1 million deaths each year. In this case we report a patient with symptom of dysphagia for the last 3 months. Esophagogram and Abdominal Computed Tomography were performed to diagnosis and determine the staging of the disease. Pathological examination and endoscopy are also needed to support diagnosis. This case highlights the utility of radiological findings, supported by other examinations to determine the diagnosis of Adenocarcinoma of Esophagogastric Junction.

**Keywords:** Adenocarcinoma; Esophagogastric Junction; Barium esophagogram; Abdominal Computed tomography; Adenocarcinoma of the esophagogastric junction

## BACKGROUND

Adenocarcinoma of the esophagogastric junction (AEG) is a cancer that develops in the transition zone between the esophagus and the stomach, and its incidence has rapidly increased in recent decades, especially in Western countries. Even in Asia, including Japan, there is concern that the incidence of AEG adenocarcinoma will increase following a decrease in the *Helicobacter Pylori* infection rate <sup>(1)</sup>.

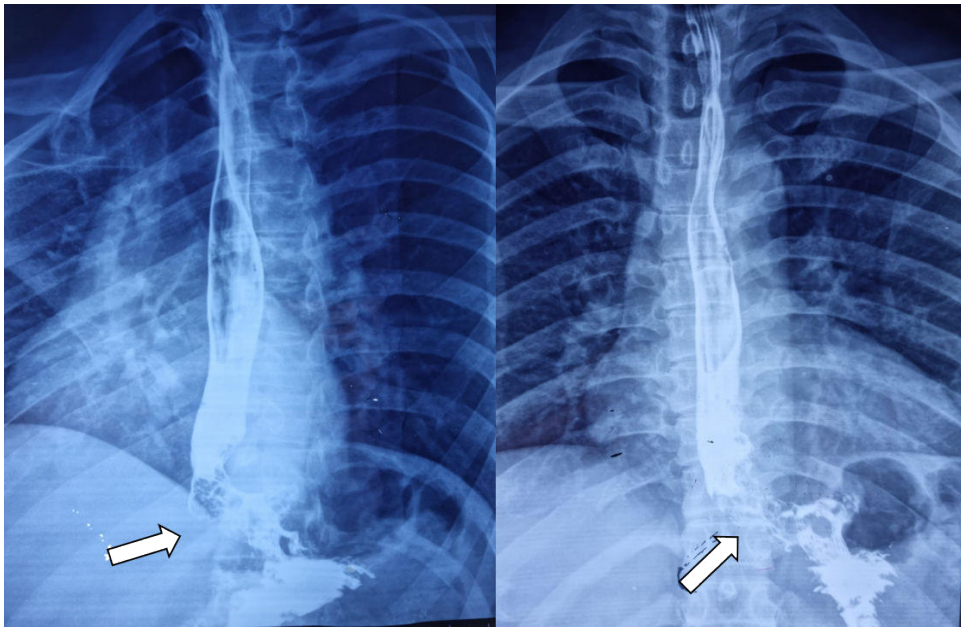
AEG is classified in the past as either esophageal or gastric in origin. Adenocarcinoma located just above the esophagogastric junction (EGJ) was for many years viewed as a distinct entity from Gastric cancer. According to Quante M et al, they mentioned that either AEG, esophageal adenocarcinoma and non-junctional gastric cancer are grouped as one common entity, due to their common origin from gastric progenitor cells which expand due to distinct causes of inflammation (reflux, bile, *Helicobacter pylori*) giving rise to metaplasia or dysplasia at the junctional or non-junctional area stomach <sup>(1,2)</sup>.

## CASE PRESENTATION

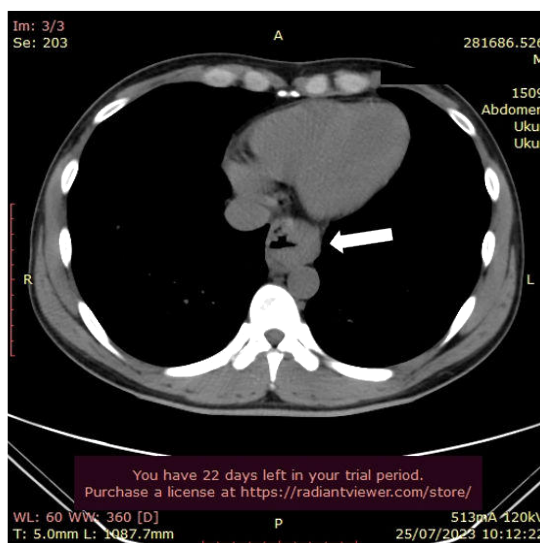
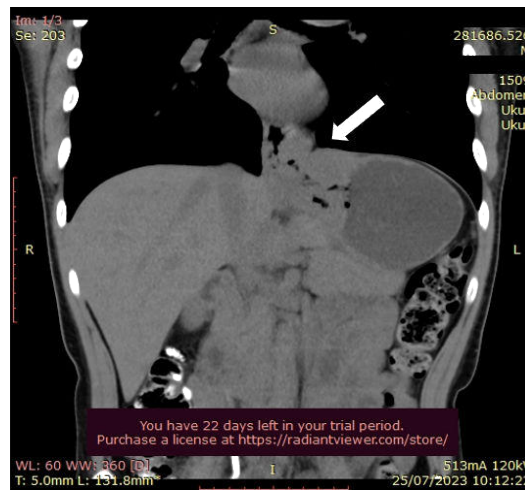
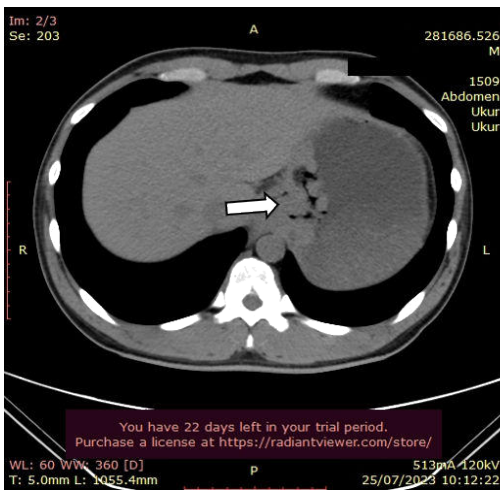
A 33-year-old Asian man was admitted to our hospital because of difficulty of swallowing for the last 3 months, the patient could only consume soft and liquid foods, and also no pain when swallowing.

The past medical history showed no hypertension, gallstones and diabetes and no predominant symptoms of gastric cancer. Gastric ulcer or *Helicobacter Pylori* infection has not been noticed.

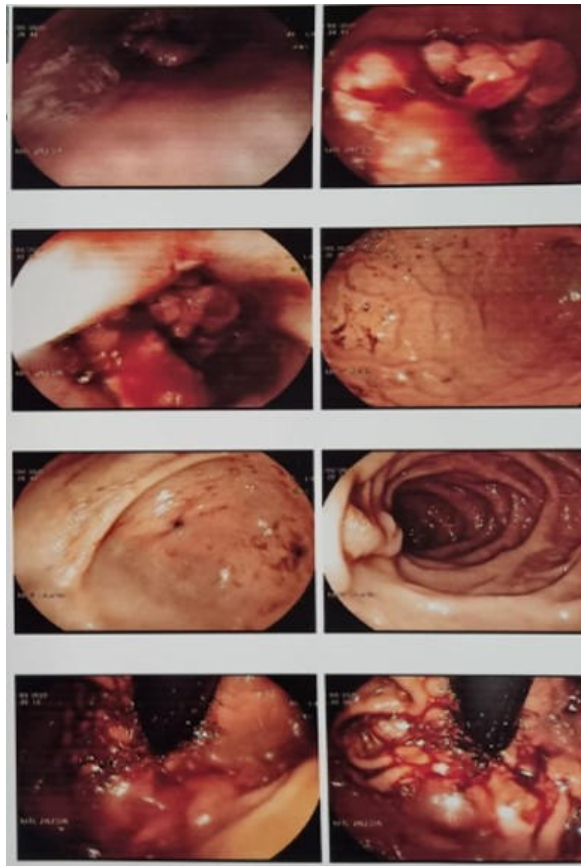
Barium esophagogram (BE) showed narrowing of the distal thoracic esophagus, impression of an intraluminal mass suspected caused by esophageal or gastric tumor. (Figure 1). Abdominal Computed Tomography (CT) showed thickening of the cardiac mucosa of gastric suspected as a gastric mass which appears to extend to the esophagus abdominal segment. (Fig. 2). An endoscopy revealed esophageal mass that is suspected malignant which extends to the cardiac and fundus of the gastric (Fig. 3). The remaining gastric mucosa was unremarkable. The most suspicious area was sampled for pathological examination and diagnosed as adenocarcinoma of gastric which invaded esophagus, *Helicobacter Pylori* bacteria was also found in cardiac area. (Fig. 4). These findings convinced us that based on the Siewert classification its classified as type II AEG. Based on American Joint Commission on Cancer (AJCC) 8<sup>th</sup> edition the patient was diagnosed with stage IIB adenocarcinoma of gastroesophageal junction (T2N0M0).



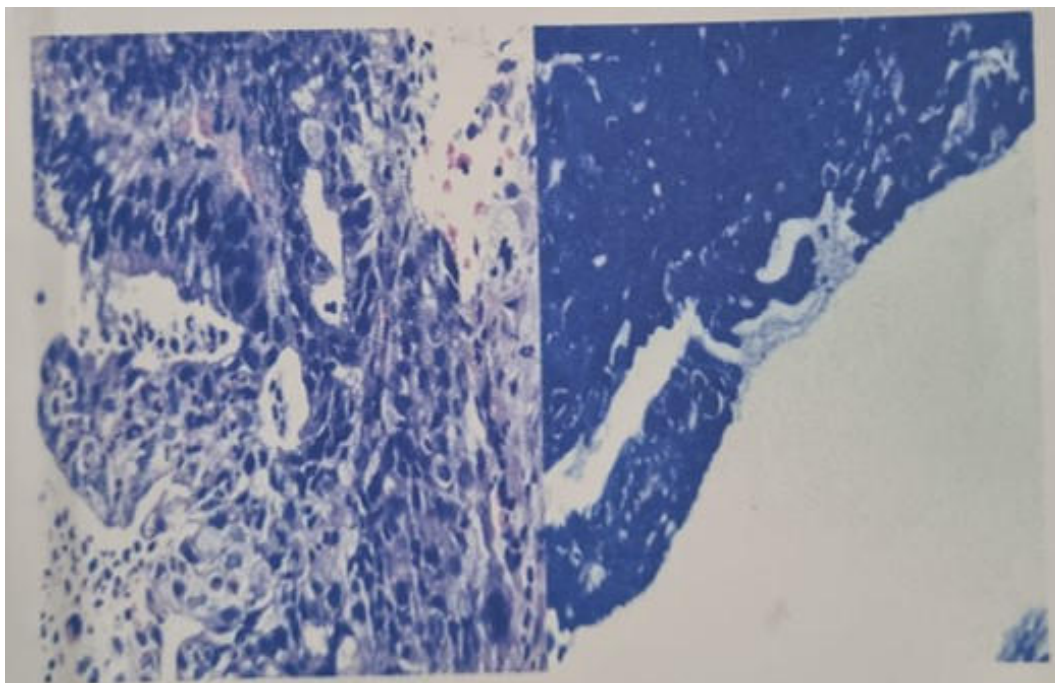
**FIGURE 1:** Barium Esophagogram; A narrowing of the distal thoracic esophagus along +/- 4.5 cm with an irregular surface was seen, no visible contrast leakage was observed.



**FIGURE 2:** Abdominal CT scan; Thickening of the cardia mucosa 33HU along +/- 3 cm which narrows the lumen at that level, when contrast is administered, contrast enhancement (48HU) is visible (suspected as a gastric mass), the lesion appears to extend to the esophagus abdominal segment along -/+ 2.2 cm, there is no visible enlargement of the locoregional lymph nodes, no metastasis lesions were found.



**FIGURE 3:** Endoscopy; Esophagus; polypoid, circular, fragile, easily bleeding mass in the lower esophageal sphincter area invades the cardia and fundus area. Fundus: polypoid, circular, fragile, easily bleeding mass which is suspected originates from the esophagus.



**FIGURE 4:** Pathology; Microscopic images from biopsy specimen (H&E stain). 4 pieces of tissue consisting of 2 pieces of cardiac tissue and 2 pieces of esophagus containing the same tumor cells, consisting of epithelial cells with an irregular glandular structure, with pleomorphic, pyknotic nuclei, mitoses can be found. *Helicobacter Pylori* was also found in cardia preparations.



## DISCUSSION

The junction between the esophagus and the stomach can be defined in two ways: anatomically with the diaphragmatic hiatus or histologically with the transition between the esophageal squamous epithelium to the gastric glandular cells. This histological transition renders the mucosa of the lower esophagus and the gastroesophageal junction particularly vulnerable to the damaging effect of gastric acid reflux with an increased risk of neoplasia and malignant transformation<sup>(3)</sup>.

Risk factors for adenocarcinoma of the esophagogastric junction are symptomatic gastroesophageal reflux disease (GERD), *Helicobacter pylori* infection, Barrett's esophagus, obesity and a consumption of alcohol and smoking. Mainly, adenocarcinomas enlarge with inside the distal third of the esophagus, with inside EGJ and gastric cardia. The predominant signs of patients with esophageal cancers are dysphagia, weight loss, dyspepsia or signs of anemia. To investigate the exact location of the tumor and to affirm the diagnosis, an endoscopy with biopsy must be performed. For the treatment of EGJ tumors specially it's far vital to evaluate the unfold of the tumor into the esophagus and the gastric cardia<sup>(4)</sup>.

EGJ staging has been restricted with the aid of using reliance on easy measurements to decide whether or not an adenocarcinoma is esophageal or gastric. EGJ become redefined with inside the eighth edition of AJCC: adenocarcinomas with epicenters no extra than 2 cm into the gastric cardia are staged as esophageal adenocarcinomas, and those extending more than 2 cm are staged as gastric cancers<sup>(5)</sup>. For the surgical classification of AEG, the Siewert classification is used despite its limitations. This classification divides tumors in type I-III based on anatomical criteria:

- Type I: adenocarcinoma of the distal esophagus with the center located within 1 to 5 cm above the anatomic EGJ.
- Type II: true cardia carcinoma infiltrating from 1 centimeter on the side of the esophagus up to 2 cm below the EGJ in the stomach.
- Type III: sub-cardia gastric carcinoma with the tumor center between 2-5 cm below the EGJ.

Siewert type II cancers are considered as true AEG, arising from the EGJ epithelium<sup>(6)</sup>. The main symptoms in patients with EGJ tumors are dysphagia and weight loss. However, many have a long history of reflux which is often dismissed as in significant. The symptoms shown in the patient were in accordance with the literature, but no risk factors were found to support the emergence of the disease<sup>(3)</sup>.

On conventional barium esophagogram, all malignant esophageal tumors have common imaging features of a mass or stricture with mucosal irregularity, ulceration, and nodularity.

Esophageal carcinoma may be squamous cell type or adenocarcinoma with their relative share various via way of means of geographical location. It is tough to differentiate between squamous cell type carcinoma (SCC) and adenocarcinoma on imaging. SCC commonly includes upper portion or mid portion of esophagus, while adenocarcinoma involves lower esophagus with propensity to extend into gastric fundus<sup>(7)</sup>.

The selection of the suitable treatment notably influences the prognosis of patients with AEG. Therefore, determining the staging of AEG is crucial for treatment decision-making<sup>(8)</sup>. BE is the initial imaging modality of choice for evaluation of suspected esophageal diseases. Besides providing excellent mucosal detail, it helps in functional evaluation of esophagus and accurate diagnosis of a variety of neoplastic and non-neoplastic conditions<sup>(7)</sup>. Accurate preoperative clinical staging plays an important role in determining the treatment strategy of patients. The American Joint Commission on Cancer (AJCC)/the Union for International Cancer Control (UICC) recommended that computed tomography (CT) of the abdomen may be used as a critical technique for staging medical tumor lymph node metastasis (TNM) of advanced upper gastrointestinal tumors<sup>(9)</sup>.

In this case, the image from the patient's BE is in accordance which were stated in the literature that mentioned: irregular infiltrative lesion with shouldering in distal esophagus extending till EGJ. This finding suggest that the disease had reached an advanced stage<sup>(7)</sup>. Our patient's CT scan results fits the key finding on CT scan in AEG patient such as a wall thickening greater than 5 mm (circumferential or part of the wall)<sup>(10)</sup>. Other supporting data such as endoscopy and pathology result also further convinces us to diagnose this patient with stage IIB adenocarcinoma of gastroesophageal junction (T2N0M0). Pathology examination also revealed *Helicobacter Pylori* was found in cardiac of gastric specimen. These bacteria also increase risk factor for AEG incidence, however previous gastric ulcer or *Helicobacter Pylori* infection has not been noticed in this patient<sup>(2)</sup>.

## CONCLUSION

This case highlights the utility of radiological findings, supported by other examinations. BE is the initial imaging modality of choice for evaluation of suspected esophageal diseases. it helps in functional evaluation of esophagus and accurate diagnosis of a variety of neoplastic and non-neoplastic conditions. CT scan can be used as an important method for staging clinical tumor lymph node metastasis (TNM) of advanced upper gastrointestinal tumors. Barium Esophagogram and CT scan are the recommend modality for diagnosing and evaluating of AEG with the hope that a precise diagnosis can improve the patient's treatment strategy and prognosis.

## REFERENCES

- [1] Li KY, Ou J, Zhou HY, Yu ZY, Gao D, You XY, Zhang XM, Li R, Chen TW. Gross tumor volume of adenocarcinoma of esophagogastric junction corresponding to cT and cN stages measured with computed tomography to quantitatively determine resectability: A case control study. *Front Oncol.* 2022 Nov 17; 12:1038135. doi: 10.3389/fonc.2022.1038135. PMID: 36465362; PMCID: PMC9714446.
- [2] Quante M, Wang TC, Bass AJ. Adenocarcinoma of the oesophagus: is it gastric cancer? *Gut.* 2023 Jun;72(6):1027-1029. doi: 10.1136/gutjnl-2022-327096. Epub 2022 Apr 1. PMID: 35365571; PMCID: PMC10176420.
- [3] Chevallay M, Bollschweiler E, Chandramohan SM, Schmidt T, Koch O, Demanzoni G, Mönig S, Allum W. Cancer of the gastroesophageal junction: a diagnosis, classification, and management review. *Ann N Y Acad Sci.* 2018 Dec;1434(1):132-138. doi: 10.1111/nyas.13954. Epub 2018 Aug 23. PMID: 30138540.
- [4] Jezerskyte E, van Berge Henegouwen MI, Cuesta MA, Gisbertz SS. Gastro-esophageal junction cancers: what is the best minimally invasive approach? *J Thorac Dis.* 2017 Jul;9(Suppl 8): S751-S760. doi: 10.21037/jtd.2017.06.56. PMID: 28815071; PMCID: PMC5538974.
- [5] Rice TW, Patil DT, Blackstone EH. 8th edition AJCC/UICC staging of cancers of the esophagus and esophagogastric junction: application to clinical practice. *Ann Cardiothorac Surg.* 2017 Mar;6(2):119-130. doi: 10.21037/acs.2017.03.14. PMID: 28447000; PMCID: PMC5387145.
- [6] Kim JJ. Epidemiology of Gastroesophageal Junction Adenocarcinoma in Korea. *J Gastric Cancer.* 2018 Dec;18(4):328-338. doi: 10.5230/jgc.2018.18. e38. Epub 2018 Dec 13. PMID: 30607296; PMCID: PMC6310763.
- [7] Debi U, Sharma M, Singh L, Sinha A. Barium esophagogram in various esophageal diseases: A pictorial essay. *Indian J Radiol Imaging.* 2019 Apr-Jun;29(2):141-154. doi: 10.4103/ijri.IJRI\_465\_18. PMID: 31367085; PMCID: PMC6639862.
- [8] Ou J, Li R, Zeng R, Wu CQ, Chen Y, Chen TW, Zhang XM, Wu L, Jiang Y, Yang JQ, Cao JM, Tang S, Tang MJ, Hu J. CT radiomic features for predicting resectability of oesophageal squamous cell carcinoma as given by feature analysis: a case control study. *Cancer Imaging.* 2019 Oct 16;19(1):66. doi: 10.1186/s40644-019-0254-0. PMID: 31619297; PMCID: PMC6796480.
- [9] Chang X, Guo X, Li X, Han X, Li X, Liu X, Ren J. Potential Value of Radiomics in the Identification of Stage T3 and T4a Esophagogastric Junction Adenocarcinoma Based on Contrast-Enhanced CT Images. *Front Oncol.* 2021 Mar 3; 11:627947. doi: 10.3389/fonc.2021.627947. PMID: 33747947; PMCID: PMC7968370.
- [10] Singh, R. K. (2019). Esophagogastric Junction (EGJ) Carcinoma: An Updated Review. *GI Surgery Annual*, 1-62. doi:10.1007/978-981-13-3227-2\_1