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Case Report

Calcifying gastro-esophageal carcinoma: Case report and Review of literature

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Abstract

A 70 year old female presented with dysphagia of 6 months duration. Upper GI endoscopy showed a proliferative growth in mid esophagus with occlusion of lumen. Biopsy showed adenocarcinoma of signet ring pattern. Contrast enhanced computer tomography of abdomen showed infiltrating tumor involving esophagus and entire stomach with calcification in lower esophagus and lesser curvature of stomach with ascites. Due to extensive nature of tumor and malignant ascites palliative chemotherapy with feeding jejunostomy was planned. Patient decline all treatment. This case report and review describes the rare phenomenon of calcification of stomach and esophagus.

Keywords: Juvenile polyp; bleeding per rectum; colonoscopy

1. Introduction

Gastrointestinal tumors rarely show calcification unlike breast, thyroid and ovary tumors. Gastric calcification is most commonly found in GIST and mucinous variety of adenocarcinoma. Primary signet ring carcinomas of esophagus and gastro esophageal junction are rare with poor prognosis due to delayed presentation and extensive infiltration. We report a rare case of signet ring carcinoma of esophagus and stomach with extensive calcification and review of literature of pathophysiology of gastric tumor calcification.

2. Case report

A 70year old female presented with history of dysphagia and early satiety since 6 months associated with weight loss. Clinical examination per abdomen showed mild distension with free fluid in abdomen rest of examination was unremarkable. All routine blood investigations were within normal limits. Upper GI endoscopy showed a proliferative growth 33 cm from incisor with near total occlusion of lumen. Biopsy of the growth showed adenocarcinoma of signet ring pattern. Contrast enhanced computer tomography of abdomen showed an infiltrating growth involving esophagus and entire stomach, with calcification in lower esophagus and along lesser curvature of stomach(fig 1-5). There was moderate ascites with no evidence of metastasis or lymph nodes. Ascitic fluid examination revealed exudative fluid with malignant cells. Due to extensive nature of tumor palliative chemotherapy with feeding jejunostomy was planned. Patient declined surgery and any kind of chemotherapy.

Fig 1: Contrast enhanced computer tomography abdomen scout film showing diffuse calcification in left hypochondrium region.

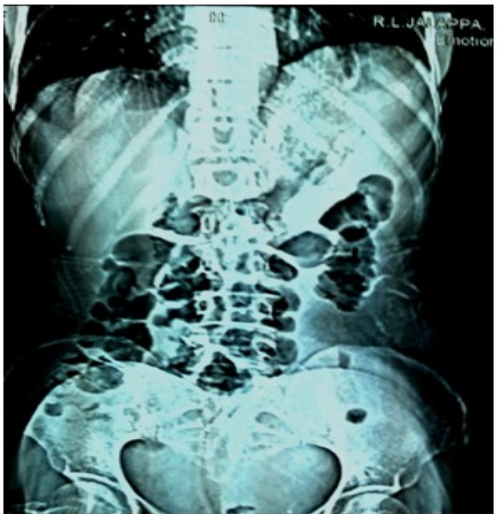


Fig 2: Figure showing calcification in both esophagus and lesser curvature of stomach.

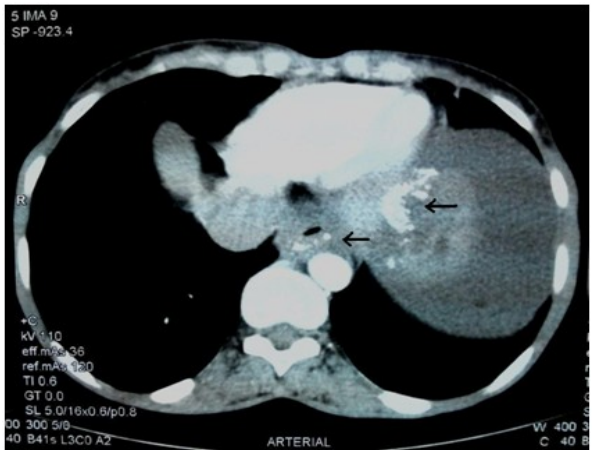


Fig 3: Image showing esophageal lumen narrowing with diffuse wall thickening of stomach.

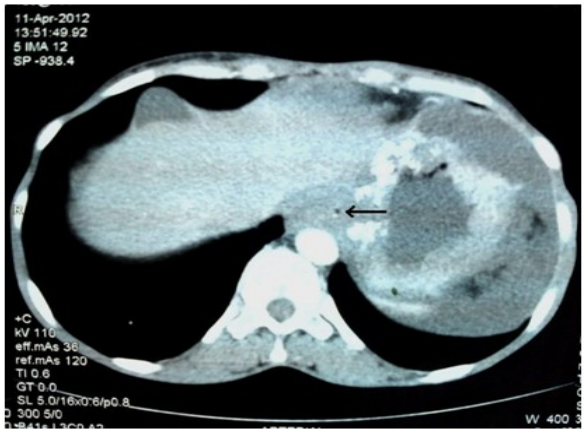


Fig 4: Image showing complete esophageal lumen obliteration with calcification in stomach.

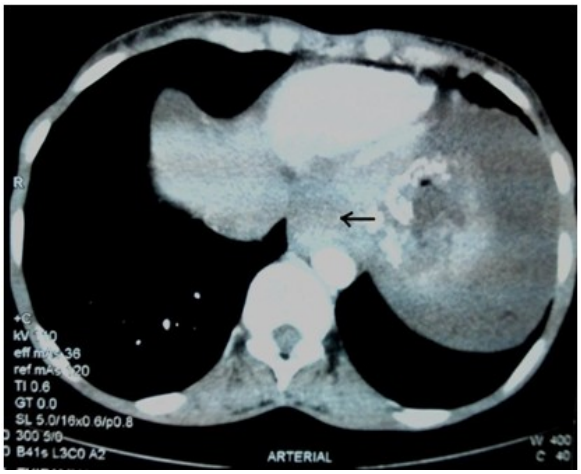


Fig 5: Single arrow ascites double arrow showing diffuse wall thickening of entire stomach with calcification.

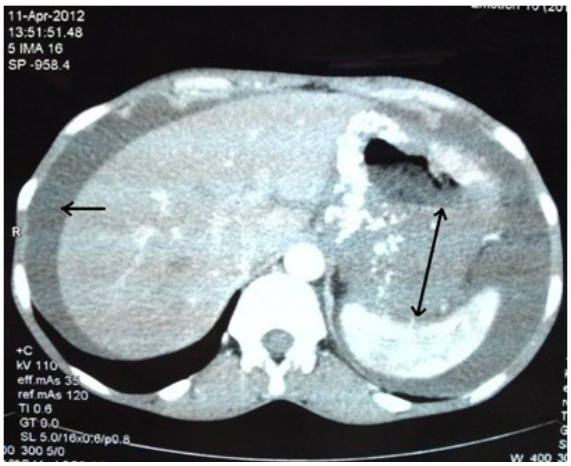
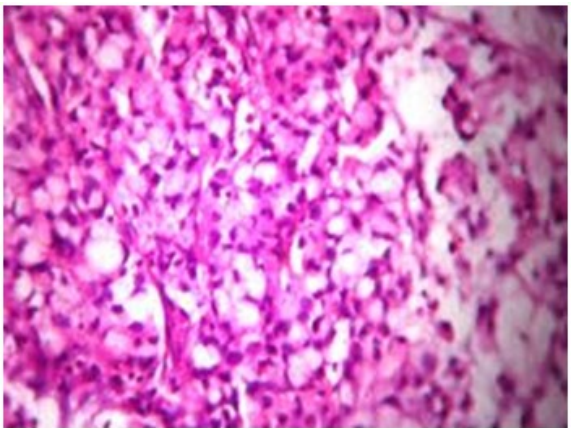


Fig 6: Histopathology of growth showing adenocarcinoma of signet ring pattern.



3. Discussion

Unlike in thyroid, breast and ovarian neoplasm, the digestive tract cancers are rare examples of tumors that show calcification[1-3]**.** Gastrointestinal leiomyomas, angiomas, carcinoid tumors and more rarely mucinoid adenocarcinomas of the stomach and colon are distinctive examples of tumors that may undergo calcification[4-5]. Gastric carcinomas show some characteristic features in respect to tumoral calcification. Calcifications within primary gastric cancer are a rare finding. Most of the cases described are mucinous adenocarcinomas. These tumors rarely calcify in their mucinous pools in advanced stages of tumoral progression[6]**.** The patients with calcified gastric cancer are relatively young in age and probably have a better survival than those gastric cancer cases without calcification[7].

Spotty calcification gastric carcinoma comprises 0.5% surgically resected specimen and 4.4-10.2% in autopsy material. Heavy mineralization of gastric carcinomas that can be visualized on abdominal x ray is rare finding. Calcification in gastric adenocarcinoma is infrequent. The first autopsy report of calcified gastric adenocarcinoma was by Fukuda in 1922. In the English literature, the earliest case of calcified mucus-secreting adenocarcinoma demonstrated radiologically was described by Weston in 1900.

The World Health Organization classifies gastric carcinoma into four types—(a) papillary, (b) tubular,(c) mucinous, and (d) signet ring cell—and defines mucinous gastric carcinoma as "an adenocarcinoma in which a substantial amount of extracellular mucin (more than 50% of the tumor) is retained within the tumor"[8].

At least three types of calcification have been reported in gastric cancer: mucin pool calcifications, psammomatous calcifications, and heterotopic ossification[9]. In addition, four mechanisms of calcification within tumor have been suggested[10]: (a) calcified scar tissue or granulomatous disease is engulfed by the tumor; (b) dystrophic calcification occurs within the areas of tumor necrosis; (c) calcium is deposited within the tumor as a result of a secretory function of the carcinoma; (d) metastatic calcification occurs as a result of hypercalcemia.

As it is generally known, dystrophic calcification occurs in ischemic and necrotic tissue samples. Denatured proteins bind specially to phosphate ions and thereafter react with calcium ions to form calcium phosphate precipitates. A relatively alkaline environment helps this precipitation to occur easily. In this situation, the plasma calcium level is usually within the normal range.

Mucinous adenocarcinomas are likely to develop calcification due to the presence of mucinous material and a relatively alkaline environment[11] The acid pH is a relatively soluble environment for calcium phosphate and calcium carbonate salts. However, calcium salts undergo precipitation at alkaline pH.

Metastatic calcification is in cases with persistant hypercalcemia secondary to functional parathormone PTH or PTH like substance producing tumor. No reported cases of PTH secreting gastric tumors are present in literature. Murayama *et al*[11] reported higher level of PTH like substance in tissue extract of their gastric carcinoma with calcification but serum levels of calcium and PTH were normal and the mechanism of calcification was different from metastatic calcification.

The mechanism of psammomatous calcification in papillary cancer is different from that in mucinous variants of gastric cancer. The mechanism can be divided into intracellular and extracellular calcification. Its suggested that psammomatous calcification is result of direct mineralization of round whorled collagen bodies which are precursors lesion of psammoma bodies. Its also been suggested that the initial foci of mineralization in psammoma bodies are extracellular matrix vesicles derived from cellular degeneration with demonstrations of hydroxyapatite within matrix vesicles. The mechanism of intracellular calcification is release of calcium from mitochondrium. Initial foci of calcification have been suggested to be cytoplasmic fibrils, osmiophilic intracytoplasmic deposits of lysosome. Its been postulated that expression of osteopontin mRNA increases in macrophages within the necrotic area and osteopontin protein appears to play an important role in development of calcification[12]. The sequence of calcification of intracytoplasmic calcification and subsequent active secretion of calcific bodies into extracellular spaces or shedding of tumor cells by degeneration.

Focal calcification within GIST has been reported, ranging from 10% to 50% in reported series[13]. However, extensive thick calcification visible on plain radiograph is a rare phenomenon[14]. Most calcifications within GIST are circumscribed and patchy type.

Adenocarcinomas with signet-ring cell or mucinous histology included mucinous adenocarcinomas, carcinomas

with mucinous features, signet-ring cell carcinomas, carcinomas with signet-ring cell, and adenocarcinomas with mixed signet-ring cell and mucinous histology. Signet-ring cell carcinoma is a unique subtype of mucin-producing adenocarcinoma characterized by abundant intracellular mucin accumulation and a compressed nucleus displaced toward one extremity of the cell. Mucinous carcinoma has abundant extracellular mucin. These two histologic morphologies commonly occur together[15].

Primary signet-ring cell carcinoma of the esophagus and EGJ is infrequent[16-17] Signet-ring cell carcinoma may arise in various organs, including the stomach, colon, urinary bladder,prostate, and breast. In general, the prognosis of patients with signet-ring cell carcinoma of any site is poor[18-20].

This dismal outcome has been attributed to the diffusely infiltrating nature of the neoplasm, leading to widespread metastases before being clinically apparent[21]. Though adenocarcinomas of esophagus and EGJ are poor response to preoperative chemotherapy and radiation. Adenocarcinoma of the esophagus and EGJ with signet-ring cell and mucinous features represents a distinct subgroup of cancer with characteristic pathologic and clinical features and a favorable response to chemoradiation therapy[22].

4. Conclusion

Calcification in gastric carcinomas is rare finding most of them occurring in GIST. Calcification of adenocarcinoma represent a distinct pathophysiology. Primary esophageal and EGJ signet ring carcinoma is very infrequent and the case report describes a rare finding of calcification in esophagus and stomach both.

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