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DIAGNOSIS OF MUCINOUS GASTRIC CANCER USING CALCIFIED HEPATIC METASTASES AS A CHAPERON -CASE REPORT

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ABSTRACT:

Mucinous gastric cancer (MGC) represents a unique subtype of gastric adenocarcinoma characterized by significant mucin production, posing diagnostic challenges due to its atypical presentation and imaging features. This study highlights the diagnostic significance of calcified hepatic metastases as a distinctive marker or "chaperon" for MGC. Calcified hepatic metastases, although uncommon, can be identified through imaging modalities such as computed tomography (CT) and play a pivotal role in the diagnostic process.

The presence of calcified hepatic metastases in patients with suspected gastric malignancy can serve as a crucial indicator for MGC, guiding clinicians toward accurate diagnosis and comprehensive disease assessment. This review delves into the pathophysiological mechanisms leading to calcification in hepatic metastases, their imaging characteristics, and their impact on clinical management and therapeutic decision-making for patients with MGC. Recognizing these calcifications can enhance diagnostic precision, facilitate timely intervention, and ultimately improve patient outcomes in mucinous gastric cancer.

Keywords: Mucinous gastric carcinoma, calcified hepatic metastases, computed tomography.

Introduction:

Mucinous gastric cancer (MGC) is a distinct subtype of gastric adenocarcinoma characterized by abundant extracellular mucin production. Its diagnosis often presents challenges due to its atypical presentation and imaging features. One unusual but noteworthy feature in the diagnosis of metastatic MGC is the presence of calcified hepatic metastases. These calcifications, though rare, can serve as important diagnostic clues or "chaperons," guiding clinicians toward an accurate identification of mucinous carcinomas of the gastrointestinal tract like the stomach.

The identification of calcified hepatic metastases through imaging techniques such as computed tomography (CT) can significantly impact the diagnostic pathway for patients with suspected gastric cancer. Recognizing these calcifications not only aids in diagnosing the primary malignancy but also helps in assessing the extent of the disease and planning appropriate therapeutic strategies.

We will explore the diagnostic significance of calcified hepatic metastases in mucinous gastric cancer, reviewing the pathophysiology behind these calcifications, their imaging characteristics, and their role in the clinical management of MGC. Understanding these aspects can enhance diagnostic accuracy and improve patient outcomes in this challenging subset of gastric cancer cases.

Case history and imaging:

A 74-year-old male patient presented to the emergency department with abdominal pain, weight loss, nausea, and early satiety.

The patient was referred for an ultrasound abdomen. On abdominal ultrasonography, there was gross enlargement of liver parenchyma with multiple variable-sized hyperechoic calcified lesions throughout both lobes of the liver. The stomach was empty and displaced by the grossly enlarged hepatic parenchyma. Focal gastric wall thickening was noted in the proximal body of the stomach with loss of GUT signature with few rounded enlarged perigastric lymph nodes. With calcified hepatic metastases and focal gastric wall thickening all the loose ends were tied up with the probability of mucinous gastric carcinoma with peculiar hepatic metastases. Patient was referred for the CECT abdomen and pelvis.

On CECT imaging the findings were confirmed, the liver appears enlarged in size with multiple varied-sized heterodense calcified lesions seen studded in both lobes of the liver showing heterogenous enhancement on the arterial phase with significant washout in the venous phase. The presence of these nodules in the liver results in a pseudo cirrhosis pattern. Furthermore, there was evidence of irregular, heterogeneously enhancing wall thickening in the stomach, specifically along the greater curvature of the body of the stomach, with a maximum thickness of 23 mm. Multiple peri gastric lymph nodes were noted, along with perilesional fat stranding. A diagnosis of carcinoma stomach with nodal and calcified hepatic metastasis was made and the patient was subjected to endoscopy and biopsy.

On endoscopy, there was evidence of diffuse wall thickening of the stomach with subtle mucosal irregularities suspecting gastric carcinoma. Minimum of three punch biopsies were taken from the lesion and sent for histopathology.

Pathology department gave the diagnosis of mucinous adenocarcinoma of the stomach. The patient was referred to the onco-medicine department for further management.

Image Gallery:

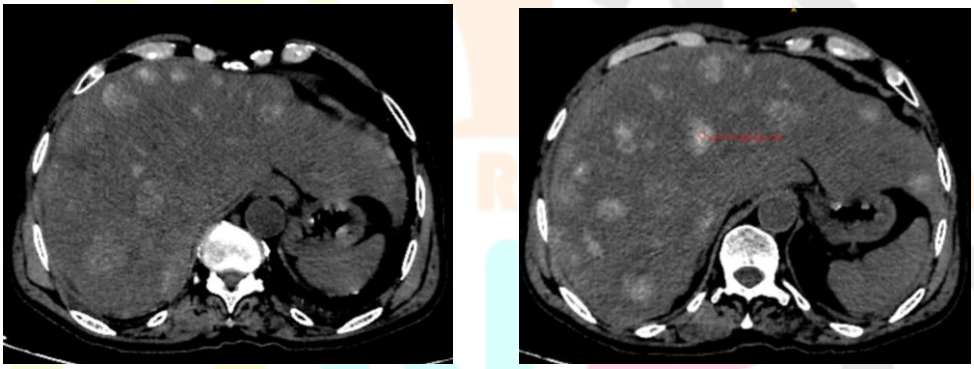

Fig 1: NCCT image showing multiple hyperdense calcified nodules (HU : +115) in both lobes of the liver giving a pseudocirrhosis appearance.

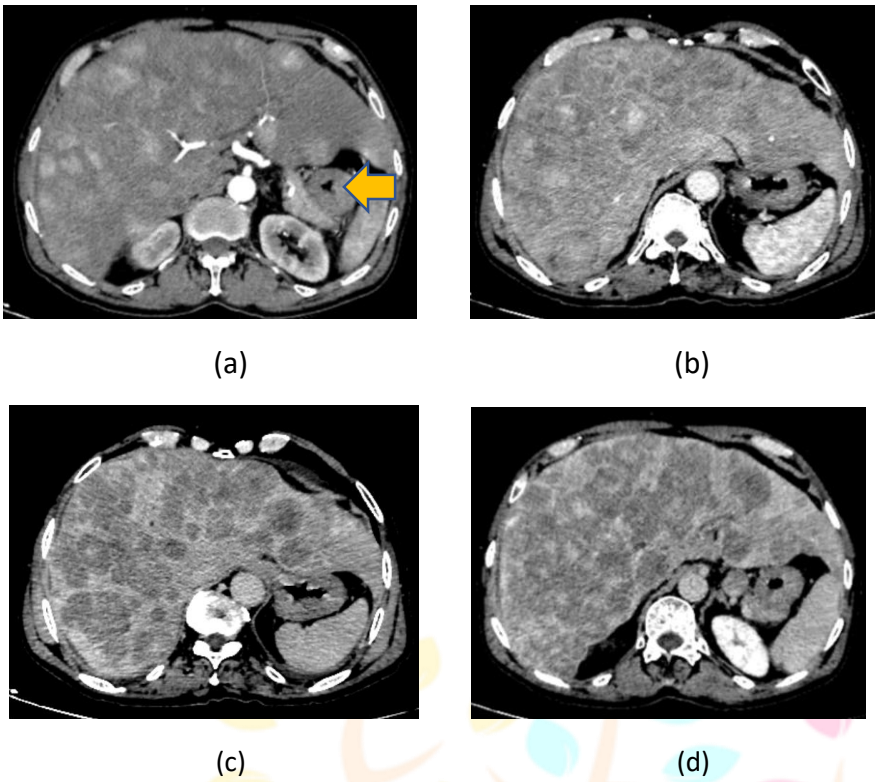

Fig 2: CECT of limited sections of liver and adjacent stomach in arterial (a), portal (b), and venous phases (c,d). Hepatic lesions show moderate enhancement in the arterial phase with significant wash in the portal and venous phases. Body of the stomach in the same sections shows irregular circumferential wall thickening (yellow arrow) with heterogeneous enhancement.

Discussion:

Currently, the primary method for diagnosing gastric cancer (MGC) is through endoscopic biopsy. However, this approach has limitations in accurately assessing certain aspects such as infiltration depth, peripheral invasion, lymph node metastasis, and distant metastasis. Studies indicate that endoscopic biopsy has low sensitivity in diagnosing MGC

In contrast, multidetector computed tomography (MDCT) is highly effective in evaluating various aspects of MGC prior to surgery. MDCT can accurately depict the attenuation value of the primary lesion, infiltration depth, involvement of surrounding structures, enhancement patterns, and even punctate calcifications. Importantly, MDCT imaging is minimally affected by factors like breathing, heartbeat, and gastrointestinal peristalsis [12]. Therefore, MDCT is considered the primary imaging modality for preoperative assessment of gastric carcinoma.

Other imaging tools have specific technical limitations. Magnetic resonance imaging (MRI), for example, is hindered by the influence of gastrointestinal peristalsis due to the lengthy duration of examination.

Endoscopic ultrasound (EUS), while useful, cannot provide clear visualization of infiltration depth in advanced gastric cancer, and it may not accurately assess lymph node and distant metastasis.

Positron emission tomography-computed tomography (PET-CT) also has drawbacks in diagnosing MGC, as its diagnostic accuracy is notably low, making it less valuable in the initial diagnosis and preoperative evaluation of MGC.

Diagnosing gastric cancer retrospectively with calcified hepatic metastases involves a combination of clinical and imaging approaches:

1. Review Patient History

- Clinical History: Assess the patient's medical history for any previous gastric complaints.

- Symptoms: Note any past symptoms consistent with gastric cancer, such as weight loss, abdominal pain, or gastrointestinal bleeding.

2. Imaging Studies

- Identify Calcified Lesions: Use imaging modalities like CT or MRI to identify and characterize calcified liver lesions.

- Patterns of Metastasis: Evaluate the distribution and appearance of the liver metastases. Mucinous adenocarcinoma typically presents with multiple, well-circumscribed calcified lesions.

3. Exclude Other Primary Sites

- Differentiation: Rule out other primary sources of calcified metastases (e.g., ovarian or pancreatic mucinous tumors) through clinical and pathological correlations.

4. Multidisciplinary Approach

- Collaborative Evaluation: Involve a team of specialists, including radiologists, oncologists, pathologists and gastroenterologists, to integrate all findings and confirm the diagnosis.

Calcific metastases are relatively uncommon overall, but when they do occur, they are often associated with certain types of cancers, including gastric cancer, particularly mucinous adenocarcinoma.

Reasons why calcific metastases can be seen in gastric cancer:

1. Mucin Production

- Mucinous Adenocarcinoma: Gastric cancers that produce a large amount of mucin (mucinous adenocarcinoma) can lead to calcific metastases. The mucinous component of these tumors often leads to the deposition of calcium within the metastatic deposits.

- Calcification Mechanism: The mucinous environment can promote calcification due to the high calcium content and altered local pH, which can favor the precipitation of calcium salts.

2. Tumor Biology

- Tumor Necrosis: Calcifications can also arise from necrotic tumor tissue. As the tumor grows and outstrips its blood supply, areas of necrosis develop. These necrotic areas can become dystrophic calcifications.

- Tumor Cell Death: The death of tumor cells can release intracellular components that can serve as nucleation sites for calcium deposition.

3. Metastatic Spread

- Hematogenous Spread: Gastric cancer commonly spreads to the liver via the portal vein. The metastatic deposits in the liver can undergo calcification through the mechanisms mentioned above.

- Metastatic Microenvironment: The microenvironment of liver metastases, influenced by factors such as local inflammatory responses and tissue remodeling, can further promote calcification.

Differential Diagnosis for Calcified Hepatic Metastases:

Most common : Mucinous Adenocarcinomas: Gastric, colorectal, ovarian.

Others include Pancreatic neuro endocrine tumour, carcinoid, Osteosarcoma, chondrosarcoma, Mucinous, lobular carcinoma of breast , Melanoma, Adenocarcinoma of lung, Papillary thyroid carcinoma, Cholangiocarcinoma, Renal Cell Carcinoma.

Conclusion:

Mucinous adenocarcinoma of the stomach (MGC) presents unique diagnostic challenges due to its mucin-rich nature and subtle endoscopic features. Advances in imaging, particularly MDCT, have improved preoperative assessment by providing detailed insights into tumor extent and infiltration depth. Treatment typically involves surgical resection followed by tailored adjuvant therapies, yet prognosis remains guarded, often due to the advanced stage at diagnosis. Future research should focus on early detection methods and personalized treatment strategies to enhance outcomes for MGC patients. Collaborative efforts are crucial for advancing our understanding and management of this complex gastric malignancy.

References:

1. Yoon S, Kim YT, Jeon L, Kim HI, Choi WS, Cheong JH. Clinical significance of mucin phenotype, beta-catenin and p53 expression in gastric carcinoma with mucin phenotype. J Gastric Cancer. 2010 Dec;10(4):201-9. doi: 10.5230/jgc.2010.10.4.201. PMID: 22500289; PMCID: PMC3320712.

2. Li C, Kim S, Lai JF, Hyung WJ, Choi WH, Choi SH, Noh SH. Advanced gastric carcinoma with signet ring cell histology. Oncology. 2007;72 Suppl 1:64-8. doi: 10.1159/000111694. PMID: 18204232.

3. Japanese Gastric Cancer Association. Japanese classification of gastric carcinoma: 3rd English edition. Gastric Cancer. 2011 Jun;14(2):101-12. doi: 10.1007/s10120-011-0041-5. Epub 2011 May 13. PMID: 21567149; PMCID: PMC3128593.

4. Wang Z, Chen JQ, Liu JL, Qin XG, Huang Y. FDG-PET in diagnosis, staging and prognosis of pancreatic carcinoma: a meta-analysis. World J Gastroenterol. 2013 Feb 14;19(6):480-8. doi: 10.3748/wjg.v19.i6.480. PMID: 23429435; PMCID: PMC3574582.

5. Wakahara T, Ueno N, Furukawa T, Ito S, Kubota T, Yamasaki M, Yamashita K, Ishida K, Amano R, Hosokawa M. [A case of multiple lymph node metastasis and peritoneal dissemination from a mucinous gastric carcinoma successfully treated with combined therapy of weekly paclitaxel and ramucirumab]. Gan To Kagaku Ryoho. 2019 Apr;46(4):766-769. Japanese. PMID: 31164525.