

CT Characteristics and Pathological Correlation of Gastric Hamartomatous Inverted Polyp: A Case Report

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AUTHORS' CONTRIBUTIONS

Xudong Chen: clinical data acquisition, manuscript drafting, writing, editing, submission.

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Zhaoyong Li: imaging and pathology consultation, imaging and pathology data review, upervision, editing, corresponding author.

DISCLOSURES

The authors declare no conflicts of interest.

CONSENT

We contacted the patient for follow-up and obtained her written informed consent for publication. She agreed to share detailed information related to the case and expressed willingness to provide additional information if needed.

HUMAN AND ANIMAL RIGHTS

All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2000 (5).

ABSTRACT

Gastric hamartomatous inverted polyp is a rare subtype of gastric polyp characterized pathologically by proliferation of submucosal gastric-type glands with cystic dilation and accompanying bundles of branching smooth muscle bundles. This report aims to improve understanding of the imaging features of gastric hamartomatous inverted polyp by correlating CT characteristics with pathological results. We present a case of a 51-year-old female patient. The patient underwent thorough endoscopy, endoscopic ultrasound, and CT examinations, and the postoperative pathology confirmed an inverted polyp in the stomach. The CT findings of gastric hamartomatous inverted polyp show a localized depression on top of the nodule, enhanced mucosal line that connects with the gastric mucosa, and small low-density cystic shadows inside the nodule. This case the complementary value of multiple imaging modalities in evaluating gastric lesions and improving diagnostic accuracy.

CASE REPORT

BACKGROUND

Gastric polyps are common benign lesions of the stomach [1], and most can be treated with endoscopic mucosal resection (EMR), with generally favorable long-term outcomes [2]. Gastric hamartomatous inverted polyp (GHIP) is a rare kind of gastric polyp, accounting for only about 1% [3]. Right now, most reports on GHIP, mainly focus on clinical and pathological characteristics, while descriptions of its computed tomography (CT) features remain limited. CT and endoscopic ultrasound both have their strengths in the diagnosis of benign gastric tumors: endoscopic ultrasound is a key imaging technique that can clearly display the layered structure of the gastric wall, which is essential for figuring out the tumor's nature, size, origin, and

depth; whereas CT is primarily used to evaluate how the tumor relates to nearby tissues and to look at how the tumor enhances, giving a solid foundation for overall evaluation and planning for surgery. In this report, we present a pathologically confirmed case of GHIP with contrast-enhanced CT imaging. We compare the CT findings with the corresponding pathological features and review the relevant literature to improve understanding of this uncommon entity.

CASE REPORT

A 51-year-old female was found to have a gastric fundus mass during a physical examination four days prior to admission. She had no history of previous surgery or significant medical

conditions. Physical examination on admission revealed no notable abnormalities. Routine laboratory tests—including complete blood count, liver and renal function, infectious and immune markers, and coagulation profile—were all within normal limits. Abdominal CT imaging, including non-contrast scan (Figure 1a), arterial phase (Figure 1b), portal venous phase (Figure 1c), and delayed phase (Figure 1d) showed a nodular soft tissue density mass arising from the posterior wall of the gastric fundus and protruding into the stomach. The lesion measured approximately 2.5 cm × 1.8 cm, with uneven density, clear boundaries, and irregular edges. Contrast enhancement showed moderate uneven enhancement that progressed. Arterial phase multiplanar reconstruction (MPR) images (Figure 2) showed a slight dip at the top of the nodule, resembling an "umbilical depression". A distinct enhancing line was observed along the lesion surface, continuous with the adjacent normal gastric mucosa, suggesting a benign submucosal lesion. Endoscopic examination (Figure 3a) and endoscopic ultrasound (Figures 3b, 3c) revealed a pedunculated lesion measuring approximately 2.4 cm in maximum diameter on the greater curvature side of the gastric fundus, with a smooth mucosal surface. Endoscopic ultrasound demonstrated a moderately high echo nodule, with a smooth, intact capsule, and no detectable internal blood flow. The patient underwent EMR surgery to remove the gastric fundus mass. Gross observation (Figure 4a) and pathological examination (Figure 4b, HE ×50) showed a submucosal lesion with partial inversion of the overlying gastric mucosa. The lesion showed glandular hyperplasia with cystic dilation, mixed with smooth muscle tissue around it. Postoperative pathology confirmed the diagnosis of a gastric hamartomatous inverted polyp. At more than two months of follow-up, the patient isn't feeling any noticeable discomfort.

DISCUSSION

Gastric polyps are common benign lesions of the stomach [1], and EMR generally yields favorable long-term outcomes [2]. GHIP is a rare subtype, accounting for only about 1% of all gastric polyps [3]. Although its exact pathogenesis remains unclear, existing studies suggest that GHIP may be associated with mucosal injury and repair processes [4], as well as chronic inflammation [5].

GHIP is often asymptomatic and is typically identified incidentally during endoscopic examinations, after which the diagnosis is confirmed histologically [6]. There are no specific patterns regarding the age of onset and gender. GHIP primarily occurs in the body and fundus of the stomach [7] and is less commonly found in the antrum [8]. In this case, it occurred in the fundus, which is consistent with previously reported common sites. The pathological features include hyperplastic changes in submucosal gastric-type glands, cystic dilation, and surrounding proliferative smooth muscle bundles, which may show infiltration of inflammatory cells [8]. Importantly, these submucosal glandular components are not continuous with the overlying mucosal surface [9], a key feature that aids in distinguishing GHIP from other gastric lesions.

Endoscopic examination of GHIP doesn't show any typical signs [3]. Lesions often appear as submucosal polypoid masses—either pedunculated or sessile—with a smooth surface, intact capsule, and well-defined margins [7]. In this case, ultrasound endoscopic revealed a moderately hyperechoic nodule in the gastric submucosa, along with a smooth and intact capsule, and no blood flow signals. One advantage of ultrasound endoscopy is that it helps clarify where the lesions come from and observe internal structural characteristics [6]. In this case, the diagnosis from the ultrasound endoscopy is gastric submucosal lesions. Small cystic anechoic areas were observed within the nodule, without internal vascularity. These features likely correspond to the previously described hyperplastic gastric-type glands that invert into the submucosa and undergo cystic dilation. Because the proliferating submucosal glands have limited ability to drain mucus, retained secretions lead to progressive dilation. As the condition advances and mucus production increases, the predominantly cystic change becomes more pronounced on ultrasound, appearing as distinct anechoic areas [10].

CT findings in this case showed a nodule protruding into the gastric lumen from the posterior wall of the fundus, with a small dip at the top of the nodule like an "umbilical depression". Contrast-enhanced CT revealed small, patchy areas with moderate uneven enhancement within the nodule. A clear linear enhancement was visible along the surface of the lesion, continuous with the normal gastric mucosa. Comparison of CT findings with the pathological results suggests the following correlations: (1) The small dip on the surface of the nodule, like an "umbilical depression," corresponds to the inverted position of the gastric mucosa under the microscope, possibly due to abnormal growth of submucosal gastric glands and their cystic dilation [10]. Due to the inverted growth of the gastric mucosa, the mucosal tissue gets stuck in the submucosal layer, resulting in the appearance of pore-like or umbilical-like depressions on the surface of the lesion; (2) The small patchy areas with moderate uneven enhancement within the nodule on the enhanced scan may be related to smooth muscle bundles [10]. Because the lesion mainly consists of cystic dilation of glands, it presents with progressive uneven enhancement and small cystic areas without enhancement; (3) The clear linear enhancement seen on the surface of the lesion, continuous with the normal gastric mucosa, suggests that the lesion is located in the submucosa. GHIP is formed due to local gastric mucosal inversion into the submucosa and mucus retention [3]. The wall of the lesion is composed of the original gastric mucosa and does not form new wall tissue, which explains why the lesion's surface mucosa connects with the gastric mucosa. These CT features correlate closely with the underlying pathological changes.

GHIP is classified as a submucosal lesion and must be differentiated radiologically from other submucosal conditions such as gastric stromal tumors, schwannomas, and deep cystic gastritis. These conditions share similar radiological features, which makes it a bit tricky to tell them apart. Therefore, we mainly diagnose GHIP by looking at pathological features.

GHIP is a benign lesion, and endoscopic resection is the preferred treatment. But if GHIP has central depression or erosion, it could be at risk of turning malignant [11]. In this case, a central indentation was noted at the apex of the lesion. At more than two months of follow-up, the patient isn't feeling any noticeable discomfort, but continued clinical follow-up is warranted to monitor postoperative recovery and detect any potential recurrence or progression.

Although CT findings can reflect the pathological characteristics of GHIP, their diagnostic value remains uncertain and requires further validation in larger studies. This case underscores the value of multimodal imaging in the assessment of GHIP, offering a valuable reference for improving clinical diagnosis.

TEACHING POINT

Gastric hamartomatous inverted polyp is a rare type of gastric polyp characterized pathologically by proliferation of submucosal gastric-type glands with cystic dilation and accompanying bundles of branching smooth muscle bundles, sometimes with infiltration of inflammatory cells. The CT findings of GHIP show a localized depression on top of the nodule, enhanced mucosal line that connects with the gastric mucosa, and small low-density cystic shadows inside the nodule, which closely correspond to the pathological changes.

QUESTIONS

Question 1: Which demographic or clinical feature is consistent with GHIP according to the report?

1. Predilection for the gastric antrum.
2. Association with hereditary syndromes.
3. Common occurrence in the gastric body and fundus. (applies)
4. Typical symptomatic presentation with bleeding.
5. Higher incidence in males.

Explanation: GHIP primarily occurs in the gastric body and fundus, with the fundus location illustrated in this case [Discussion]. The report notes this as a common site for the lesion.

Question 2: Which of the following imaging findings on contrast-enhanced CT is characteristic of GHIP as described in the case?

1. Homogeneous avid enhancement in the arterial phase.
2. A localized depression on the nodule surface resembling an "umbilical depression." (applies)
3. Calcifications within the lesion.
4. Invasion into adjacent organs.
5. Diffuse wall thickening of the stomach.

Explanation: The CT findings of GHIP include a small dip on the surface of the nodule, similar to an "umbilical depression," which corresponds to the inverted gastric mucosa [Case Presentation]. This feature is a key characteristic highlighted in the report.

Question 3: What pathological feature correlates with the small patchy areas of moderate enhancement observed on CT in GHIP?

1. Necrotic tissue.
2. Proliferating smooth muscle bundles. (applies)
3. Hemorrhagic areas.
4. Foreign body reaction.
5. Lipid deposits.

Explanation: The moderate uneven enhancement within the nodule on CT may correspond to the proliferating smooth muscle bundles observed pathologically [Discussion]. This correlation is emphasized in the discussion of imaging-pathological findings.

Question 4: What is the pathological basis for the enhancing mucosal line continuous with the gastric mucosa, as seen on CT in this case of GHIP?

1. It represents neovascularization associated with malignant transformation.
2. It corresponds to the original gastric mucosa forming the wall of the lesion. (applies)
3. It is due to fibrosis and scarring from chronic inflammation.
4. It indicates submucosal invasion by the tumor.
5. It is an artifact caused by peristalsis during the scan.

Explanation: The linear enhancement is continuous because the lesion wall is composed of the original gastric mucosa inverted into the submucosa, not new tissue [Discussion]. This explains why the mucosal line seamlessly connects with the surrounding normal mucosa.

Question 5: How is GHIP typically managed based on the case report?

1. Systemic chemotherapy.
2. Endoscopic mucosal resection (EMR). (applies)
3. Total gastrectomy.
4. Radiation therapy.
5. Watchful waiting without intervention.

Explanation: Endoscopic resection is stated as the preferred treatment for GHIP, as demonstrated in this case where EMR was successfully performed [Case Presentation, Discussion]. The report confirms EMR as the standard approach for such lesions.

REFERENCES

- [1] Vallot T. Polypes gastriques [Gastric polyps]. *Presse Med.* 2007; 36(10 Pt 2): 1412-7. French. PMID: 17482791.
- [2] Brahmania M, Lam E, Telford J, Enns R. Endoscopic mucosal resection: early experience in British Columbia. *Can J Gastroenterol.* 2010; 24(4): 239-244. PMID: 20431812.
- [3] Du ZH, Hong M, Zhang ZF, Zhao J, Lin XF, Yang HF. [Gastric hamartomatous inverted polyps: a clinicopathological analysis of five cases]. *Zhonghua Bing Li Xue Za Zhi.* 2024; 53(3): 282-287. PMID: 38433057.

- [4] Mori H, Kobara H, Tsushimi T, Fujihara S, et al. Two rare gastric hamartomatous inverted polyp cases suggest the pathogenesis of growth. *World J Gastroenterol*. 2014; 20(19): 5918-5923. PMID: 24914354.
- [5] Hou JZ, Dong NN, Yue B, Meng FD, Wang YJ. Autoimmune gastritis with a gastric hamartomatous inverted polyp and two hyperplastic polyps: a case report. *J Int Med Res*. 2023; 51(3): 3000605231162451. PMID: 36967703.
- [6] Mogi M, Koito Y, Otake H, et al. [A case of gastric hamartomatous inverted polyp (GHIP), preoperatively diagnosed based on EUS findings]. *Nihon Shokakibyo Gakkai Zasshi*. 2021; 118(4): 327-339. PMID: 33840714.
- [7] Mori H, Kobara H, Tsushimi T, et al. Two rare gastric hamartomatous inverted polyp cases suggest the pathogenesis of growth. *World J Gastroenterol*. 2014; 20(19): 5918-5923. PMID: 24914354.
- [8] Meng L, Guo Y, Zhao X, et al. [Gastrointestinal hamartomatous inverted hyperplastic polyps: a clinicopathological analysis of ten cases]. *Zhonghua Bing Li Xue Za Zhi*. 2025; 54(2): 142-148. Chinese. PMID: 39863529.
- [9] Han YP, Min CC, Li YB, et al. Diagnosis and treatment of gastric hamartomatous inverted polyp (GHIP) by endoscopic submucosal dissection: A case report. *Medicine (Baltimore)*. 2023; 102(13): e33443. PMID: 37000057.
- [10] Dong N, Meng F, Yue B, Hou J. Clinicopathologic and endoscopic characteristics of ten patients with gastric hamartomatous inverted polyp: a single center case series. *BMC Gastroenterol*. 2024; 24(1): 139. PMID: 38649806.
- [11] Nakamura Y, Nomi T, Yasui S, et al. Gastric inverted polyp successfully resected by underwater endoscopic mucosal resection. *DEN Open*. 2025; 5(1): e70103. PMID: 40129531.

FIGURES

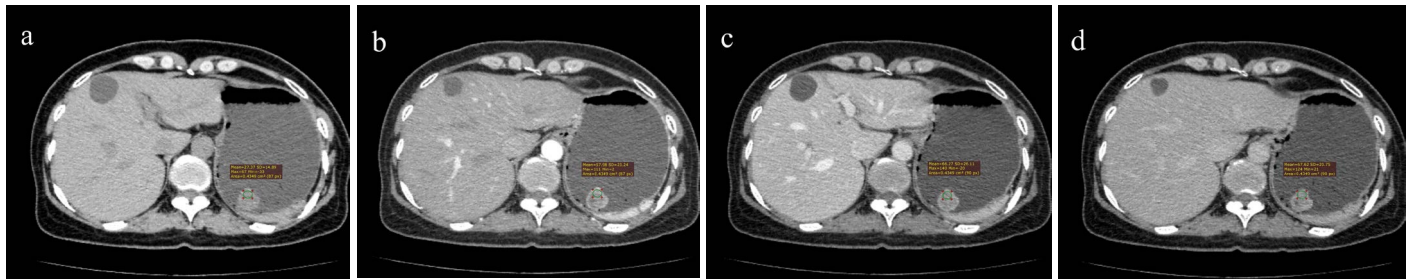


Figure 1: A CT scan (a) shows a nodular soft tissue density lesion on the posterior wall of the gastric fundus protruding into the stomach. It shows uneven density, has fairly clear boundaries, and with irregular edges. The CT scans with three-phase enhancements (b,c,d) exhibit progressively moderate and uneven enhancement of the lesions.



Figure 2: The MPR in the arterial phase shows a shallow indentation at the top of the lesion, similar to an "umbilical indentation." The surface of the lesion shows a prominent enhanced linear shadow that is continuous with the normal gastric mucosa, indicating a benign submucosal lesion in the gastric mucosa, measuring approximately 2.3 cm × 1.8 cm × 2.6 cm.



Figure 3: The endoscope shows a pedunculated lesion on the greater curvature of the gastric fundus, measuring about 2.4 cm in length, and the surface mucosa appears smooth (a). Endoscopic ultrasound shows a moderately hyperechoic nodule with a peduncle in the gastric fundus that has a smooth, intact capsule (b), and no blood flow detected (c).

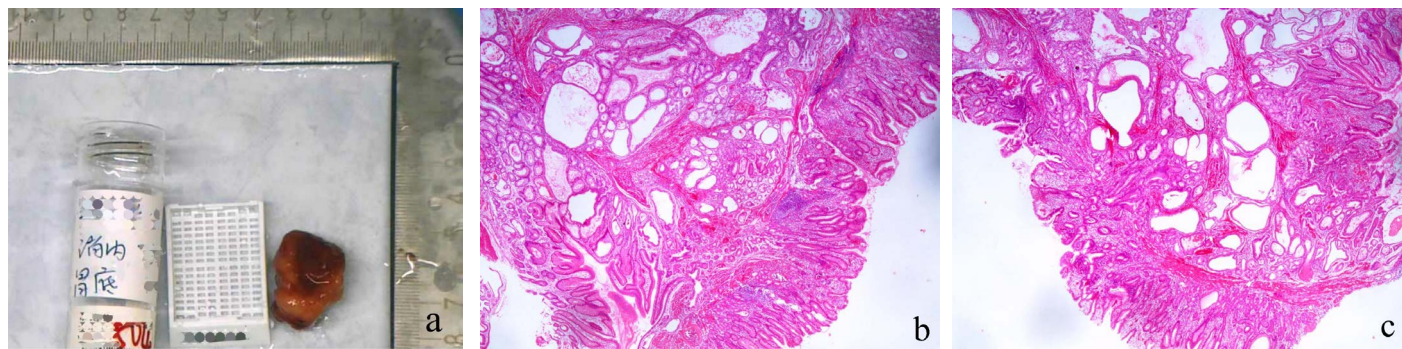


Figure 4: Under the microscope (HE ×50), the lesion is found in the submucosa, with an invagination of the local gastric mucosa, showing glandular hyperplasia and cystic dilation, and is mixed with surrounding smooth muscle tissue.

KEYWORDS

gastric hamartomatous inverted polyp; computed tomograph; endoscopic ultrasound; endoscopy; pathology; submucosal lesion

ABBREVIATIONS

GHIP = Gastric Hamartomatous Inverted Polyp

EMR = Endoscopic Mucosal Resection

CT = Computed Tomography

MPR = Multi Planar Reconstruction

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