

Case Report

# A rare case of gastric glomus tumor and review of literature

Jainil Patel<sup>1</sup> , Vishakha Kalikar<sup>1</sup> , Roy Patankar<sup>1</sup>

<sup>1</sup>Department of General Surgery, Zen Hospital, Chembur, Mumbai, Maharashtra, India

## ABSTRACT

Glomus tumors are mesenchymal neoplasms originating from modified smooth muscle cells of the glomus body, which are relatively rare and help in maintaining thermoregulation. While these tumors are typically found in subungual regions, gastric glomus tumors are uncommon and challenging to diagnose due to imaging similarities with other lesions. We hereby present a case of a gentleman aged 61 years, who had complained of pain in the epigastrium. An endoscopic ultrasound with fine needle aspiration cytology (FNAC) diagnosed him with a gastric glomus tumor. We performed a successful laparoscopic wedge resection of the stomach. Histopathological analysis and immunohistochemistry confirmed the tumor characteristics. This case highlights the diagnostic challenges and the need for effective surgical intervention for gastric glomus tumors.

**Keywords:** Computed tomography scan, Endoscopic ultrasound, Gastric glomus tumor, Immunohistochemistry, Laparoscopic wedge resection

## INTRODUCTION

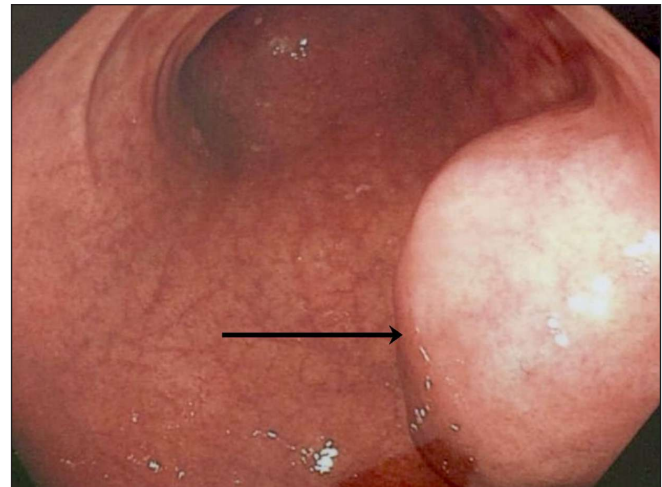
Glomus tumors, while relatively rare, are neoplasms originating from smooth muscle cells of the glomus body, primarily involved in thermoregulation. These tumors typically manifest in subungual regions but can occur in visceral organs like the stomach, where they are infrequently diagnosed due to their obscure presentation and overlapping imaging characteristics with other submucosal lesions. Although generally classified as benign, they can exhibit aggressive behavior, making accurate diagnosis and effective surgical intervention essential. This report discusses a gentleman aged 61 years, who underwent successful laparoscopic resection of a gastric glomus tumor, underscoring the diagnostic challenges and treatment options associated with this rare condition.

## CASE REPORT

A 61-year-old gentleman presented with complaints of recurrent pain in the epigastric region and heartburn, which lasted for several months. Despite receiving proton pump inhibitors, his symptoms did not significantly improve. An endoscopy [Figure 1] and endoscopic ultrasound with fine needle aspiration cytology (FNAC) revealed a heterogeneous lesion with a cystic component located in the distal body of the stomach, along the lesser curvature, which on histopathology was subsequently diagnosed as a glomus tumor. Imaging in

the form of a computed tomography (CT) scan highlighted a rounded, hypodense, mildly enhancing lesion, measuring 4.7 × 3.4 cm, situated along the greater curvature of the antrum and pre-pyloric region of the stomach [Figures 2 and 3]. He was planned for a laparoscopic gastric wedge resection.

The ports were placed as: one 10 mm supra-umbilical port, two 10 mm ports positioned in the left and right mid-

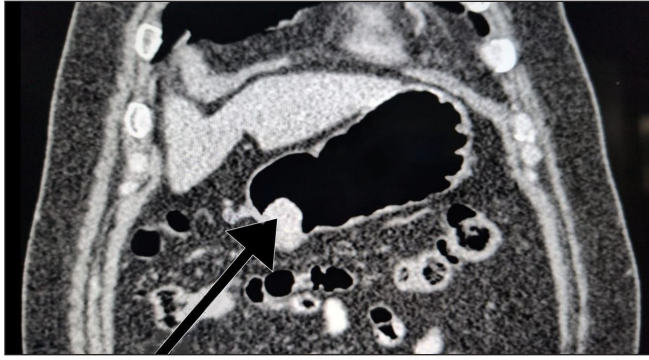


**Figure 1:** Oesophago-gastroduodenoscopy. The black arrow indicates gastric glomus tumor.

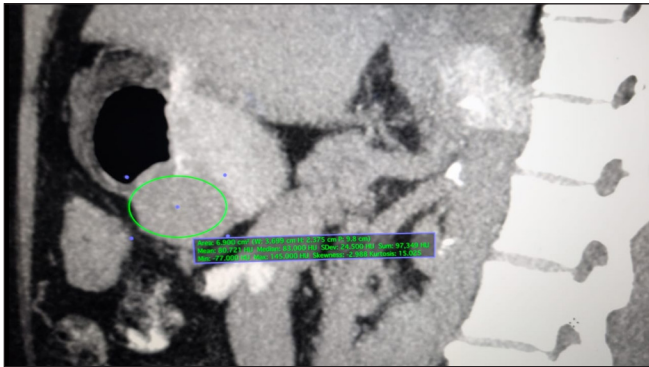
\*Corresponding author: Dr. Jainil Deepak Patel, MBBS, Department of General Surgery, Zen Hospital, Chembur, Mumbai, Maharashtra, India. [jainilpatel42@gmail.com](mailto:jainilpatel42@gmail.com)

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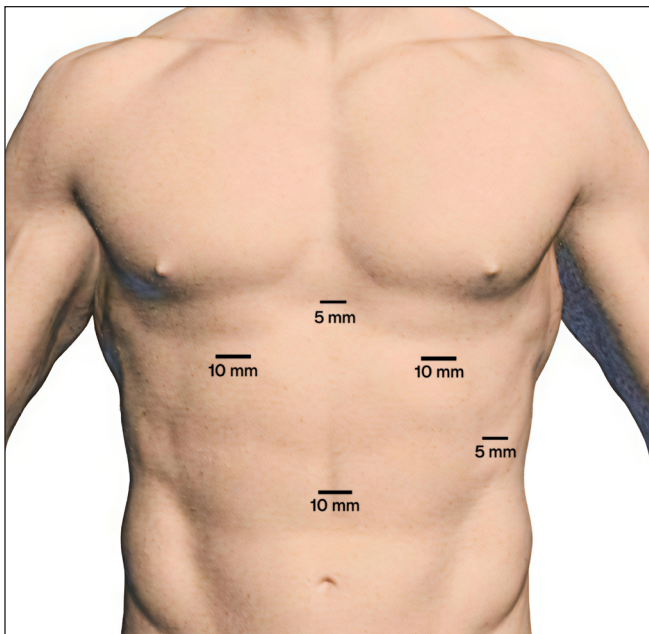
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**Figure 2:** Computed tomography scan. The black arrow indicates the gastric glomus tumor.

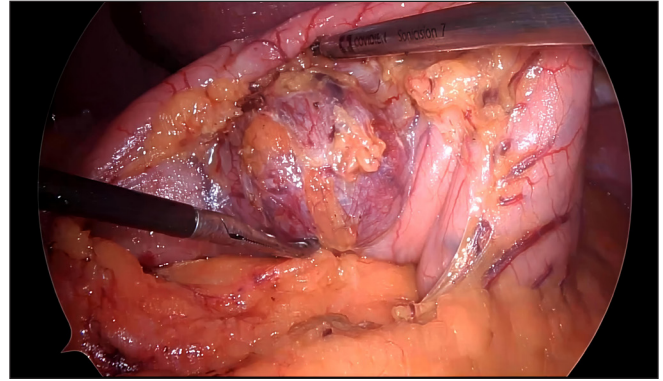


**Figure 3:** Computed tomography scan. The circle indicated the gastric glomus tumor.



**Figure 4:** Port placement.

clavicular regions in the hypochondrium, a 5 mm port in the left anterior axillary line, and a 5 mm incision in the epigastric region for the liver retractor [Figure 4]. The lesser curvature



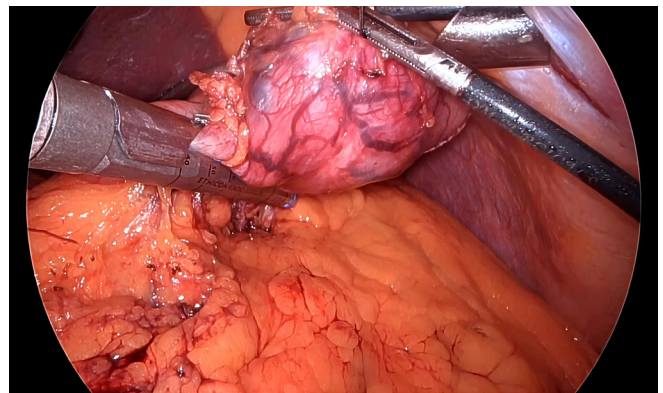
**Figure 5:** Laparoscopic findings.

was identified and the lesion was located in the antrum along the greater curvature [Figure 5]. The anterior and posterior vagus nerves were visualized and carefully protected. Intraoperative esophago-gastro-duodenoscopy (OGDscopy) was done, and a guided wedge resection was performed using four linear staplers with adequate margins with an OGDscope in situ to preserve the pyloric channel [Figure 6]. The patient was discharged 5 days post-surgery.

Histopathological examination demonstrated a well-circumscribed submucosal neoplasm characterized by a solid growth pattern, composed of cuboidal cells surrounded by a capillary-sized vascular network. On immunohistochemistry (IHC), the tumor cells were positive for smooth muscle actin (SMA), h-caldesmon, and epithelial membrane antigen (focal), while displaying weak expression of synaptophysin. They were negative for cytokeratin (AE1/AE3), INSM1, c-KIT, and desmin. The Mib-1 labeling index was approximately 2%. These findings were suggestive of a glomus tumor in the stomach.

## DISCUSSION

Glomus tumors represent around 2% of all soft tissue neoplasms and are most frequently located in the subungual



**Figure 6:** Laparoscopic gastric wedge resection.

areas of the fingers, although they are rarely found in visceral organs.<sup>1</sup> They originate from modified smooth muscle cells within the glomus body, which consists of afferent arterioles, an anastomotic Sucquet-Hoyer canal, and efferent venules, all surrounded by modified smooth muscle cells called glomus cells. Its primary function is thermoregulation, achieved by modulating blood flow through direct arterio-venous shunting.<sup>2</sup>

These tumors are predominantly diagnosed in middle-aged to elderly individuals, with a peak incidence between 40 and 70 years of age, and show a slight female predominance.<sup>3</sup> In the gastric region, the antrum is the most commonly affected site;<sup>4,5</sup> however, gastric glomus tumors are quite rare, occurring at a frequency approximately 100 times lower than that of gastrointestinal stromal tumors (GISTs).<sup>6</sup> Patients usually present with gastrointestinal bleeding and symptoms associated with peptic ulcers, including epigastric discomfort, nausea, vomiting, and decreased appetite.<sup>7</sup>

Generally regarded as benign, some glomus tumors may present with more aggressive characteristics.<sup>2</sup> Malignant transformation of gastric glomus tumors (GGTs) is extremely rare but has been documented in a few case reports. Criteria for malignancy include tumor size  $\geq 5$  cm, nuclear atypia, high mitotic activity, and vascular invasion.<sup>8,9</sup>

Current imaging modalities, such as endoscopic ultrasound (EUS) and CT scans, exhibit limitations in making precise diagnosis of submucosal tumors due to intersecting imaging features. While EUS can help determine the originating layer of a tumor, it does not offer precise findings that would allow for a conclusive diagnosis of a glomus tumor prior to surgery.<sup>7</sup> EUS typically reveals a clearly defined hypoechoic mass located in the third or fourth layer of the gastric wall. This mass often shows irregular internal echoes and bright echogenic areas, accompanied by a surrounding acoustic halo.<sup>7,10,11</sup> On CT scans during the arterial phase, these tumors demonstrate significant enhancement with clear borders, indicative of their hypervascularity; however, distinguishing them from other submucosal lesions, which are well enhancing like carcinoids and certain GISTs, can be challenging.<sup>7,12</sup> A triphasic CT scan has a specificity of up to 100% in differentiating it from other small GISTs.<sup>13</sup> In magnetic resonance imaging, GGTs appear mildly hypointense on T1-weighted scans and slightly hyperintense on T2-weighted scans, showing hypervascularity and sustained enhancement following gadolinium contrast administration.<sup>14</sup>

Given their intramural positioning, glomus tumors are often diagnosed histologically post-surgery since endoscopic biopsy is not feasible. EUS-guided aspiration has been reported as an effective technique for diagnosing glomus tumors through cytologic and IHC evaluation.<sup>7,10</sup> EUS guided FNA when

combined with IHC, has demonstrated a diagnostic accuracy of approximately 95.6%.<sup>15</sup>

The recommended treatment for GGTs involves subtotal gastrectomy, wedge resection, or excision depending on the tumor's size and location, with a primary goal during operative procedures being the attainment of negative margins during wedge resection. A laparoscopic approach is suggested whenever it is technically possible.<sup>3,16</sup> Combined gastroscopy with laparoscopy is another promising treatment modality.<sup>17</sup> Few case reports have indicated that endoscopic techniques, such as endoscopic submucosal dissection, are promising less invasive treatment modalities for gastric glomus tumors. These methods may lead to an improved quality of life when compared to surgical interventions; however, they also carry an increased risk of bleeding due to the vascular nature of the tumor.<sup>18,19</sup>

Histologically, glomus tumors display a uniform architecture similar to hemangiopericytomas, which requires differentiation from GISTs, carcinoids, paragangliomas, and hemangiopericytomas. Immunohistochemical testing is crucial for their diagnosis. Glomus tumors usually show the expression of markers such as SMA, calponin, h-caldesmon, actin, vimentin, laminin, and collagen IV, while typically testing negative for markers like DOG-1, CD117, S100, CD34, desmin, and various neuroendocrine markers including chromogranin, CD56, synaptophysin, and CD57.<sup>4,11</sup>

## CONCLUSION

GGTs, though rare, require careful consideration due to diagnostic challenges and similarities to other submucosal lesions. Accurate diagnosis relies on distinct histological and immunohistochemical features, prompting the need for surgical intervention. Emphasizing negative margins during resection and utilizing a laparoscopic approach when feasible are crucial. Increased awareness and understanding of these tumors are essential for effective management and timely diagnosis.

**Authors' contributions:** JP: Drafting of manuscript, review of literature; VK: Review of manuscript, review of literature; RP: Concept and design, review of final manuscript.

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**Declaration of patient consent:** The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given consent for their images and other clinical information to be reported in the journal. The patient understands that the patient's names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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