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CASE REPORT

Gastroenterology

Successful endoscopic submucosal dissection of an esophageal granular cell tumor in a pediatric patient: A case report and a therapeutic insight

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Abstract

Esophageal granular cell tumors (GCTs) are rare mesenchymal neoplasms that originate from the Schwann cells of the neural sheath in the esophageal wall. Esophageal GCTs represent approximately 2% of all GCTs. Most cases of esophageal GCT occur in adults with few cases reported in pediatric patients. Although typically benign, these tumors can occasionally exhibit malignant behavior, necessitating timely and appropriate intervention. Traditionally, surgical resection was considered for treatment, nonetheless, considering the invasive nature of such interventions, endoscopic approaches have been developed for diagnosis and treatment. Endoscopic approaches have been shown to lead to serious complications at times, such as incomplete resection or perforation. Here, we present a successful application of endoscopic submucosal dissection in the treatment of an adolescent female patient with esophageal GCT which was discovered during her prior esophagogastroduodenoscopy for vomiting.

KEYWORDS

endoscopic resection, endoscopic ultrasound, esophagoduodenoscopy, esophagus, subepithelial tumor

1 | INTRODUCTION

Esophageal granular cell tumors (GCTs) are rare mesenchymal neoplasms originating from Schwann cells within the neural sheath of the esophageal wall. While GCTs are most commonly observed in the skin, oral cavity, digestive tract, and subcutaneous tissue, they can manifest in various locations, including breast, bladder, nervous system, respiratory, and genitourinary tracts. Approximately 2% of GCTs are found in the esophagus, while other parts of the gastrointestinal (GI) system are rarely affected. GCT incidence in endoscopy series has been estimated to be approximately 0.033%, representing approximately 1% of benign esophageal tumors.[1,2]

This condition can affect individuals of all age groups and genders with predominance in women in their 4th to 6th decades of life with few cases reported

in the pediatric population. Distinguishing GCTs from other submucosal tumors, such as leiomyomas or GI stromal tumors (GIST), is challenging through endoscopy and endoscopic ultrasound (EUS) alone, necessitating comprehensive histopathologic analysis.

Typically, GCTs present as compact nests of polygonal or round cells with condensed nuclei and cytoplasm that stains eosinophilic. Immunohistochemical analysis typically yields strongly positive results for S100, neuron-specific enolase, Nestin, and various myelin proteins. Conversely, staining for smooth muscle actin (SMA), Desmin, CD117, and CD34, among others, is negative.[3] Although typically benign, these tumors can occasionally exhibit malignant behavior, necessitating timely and appropriate intervention. Surgical resection is the traditional approach.

Here, we present a successful application of endoscopic submucosal dissection (ESD) in treating an adolescent female patient diagnosed with esophageal GCT. The purpose of this report is to highlight the efficacy and feasibility of ESD as a therapeutic option for esophageal GCTs, providing valuable insights for clinicians faced with similar cases. ESD success rates are over 90% with low recurrence rate, although there exists a risk for perforations, which can be managed endoscopically.[4]

2 | CASE REPORT

A 15-year-old female with a past medical history of obesity and irritable bowel syndrome was referred to our facility for the evaluation of an incidentally discovered submucosal esophageal lesion on an esophagogastroduodenoscopy (EGD) done for recurrent vomiting. Biopsy at that time showed GCT without malignancy. Physical examination showed a high body mass index (BMI) of 34.37 kg/m^2 otherwise unremarkable. Her laboratory investigations including complete blood count (CBC), comprehensive metabolic panel (CMP), C-reactive protein (CRP), thyroid function tests (TFTs), celiac panel, stool panel, calprotectin, and occult blood were all within normal limits. She opted for endoscopic resection as she was not enthusiastic about endoscopic follow-up. EUS showed an oval intramural (subepithelial) lesion in the middle third of the esophagus between 29 and 30 cm from the incisors. Sonographically, the lesion was hypoechoic, and appeared to originate within the submucosa (Layer 3), measured up to 8.2 × 4.3 mm, with well-defined borders, as shown in Figure 1. The endosonographic appearance was in favor of rather a GCT than a small leiomyoma. ESD was performed after adequate demarcation of the lesion. A total of 45 mL of Eleview® submucosal injectable composition and Endoclot® were injected allowing for an adequate lift of the lesion from the muscularis propria. A circumferential incision around the lesion into the submucosa was performed with a Dual knife-J (Olympus®). The lesion was then dissected en bloc from the underlying deep layers with the electrocautery knife and retrieved with a Roth net. Resected tissue margins were examined. Six hemostatic clips (Boston Scientific®) were successfully placed to prevent bleeding post-intervention, as shown in Figure 2. There was no bleeding during or at the end of the procedure. The patient was discharged home with an uncomplicated course and received proton pump inhibitor daily for 3 weeks and antiemetics as needed. The final pathology result showed a GCT, extending to the surgical resection margin. Immunohistochemical stains were performed which showed positive S100 and CKAE1/3, and negative P40, as shown in Figure 3.

3 | DISCUSSION

Esophageal GCTs, formerly known as myoblastomas or Abrikossoff tumors, are rare, relatively, benign tumors of neurogenic origin arising from Schwann cells that typically remain biologically quiescent for a long time.[5,6] GCTs occur in various parts of the body, but most commonly in the skin and subcutaneous tissues.[5] They are found in the GI tract in 6%–10% of cases, with the distal two-thirds of the esophagus being the most common site representing 30%–60% of these cases.[5] In our patient, the tumor was found in the middle third of the esophagus. Due to the insidious nature of GCTs, they are often discovered incidentally in the investigation of other GI disturbances like in the case of our patient, and presentation is typically asymptomatic especially with lesions less than 20 mm in diameter.[5,7]

Esophageal GCTs are more common in adults compared to children, most commonly occurring in middle-aged patients.[8] It was reported that majority of patients are female with 2.9:1 female to male predominance.[6] Esophageal GCTs are the second most common esophageal stromal tumors after leiomyomas.[5] Nonetheless, in investigating an esophageal subepithelial mass, other diagnoses are usually considered such as, lipomas, GISTs and Xanthomas. On EGD, the light yellowish color on the surface of the lesion and the firm consistency would be suggestive of a GCT rather than a leiomyoma or a GIST.[9] An esophageal GCT appears as a submucosal protrusion with a firm consistency covered with a normal appearing, sometimes slightly yellowish, mucosa,[5,7,8,10,11] unlike lipoma which has a softer and deformable consistency with a classic “pillow” sign on probing. Esophageal Xanthoma, which may also demonstrate a yellowish surface color is very rare.[12] On EUS, esophageal GCTs appear as a hypoechoic and homogenous lesion, with smooth borders within the submucosal layer.[5–7] Definitive diagnosis is made based on tissue histopathologic examinations and immunohistochemistry (IHC).[6,7] Histological characteristics of esophageal GCTs

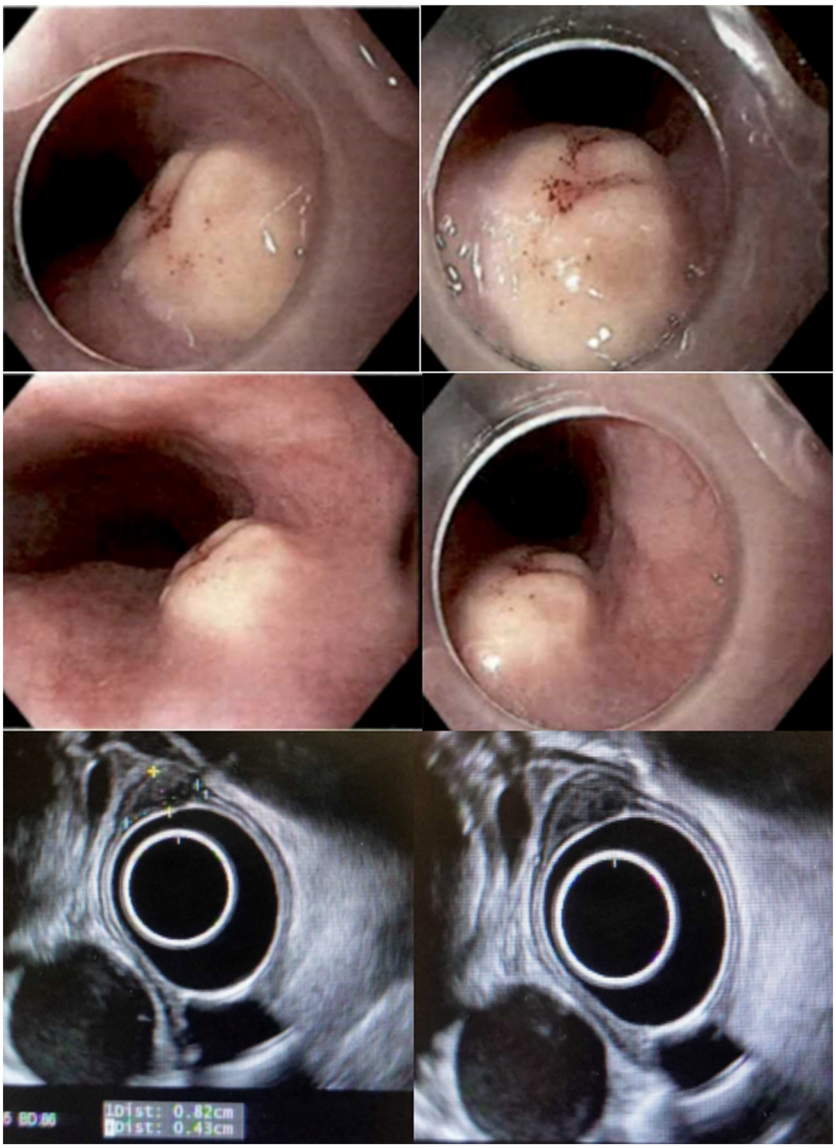

FIGURE 1 Endoscopic and endoscopic ultrasound appearances of granular cell tumor located in the middle third of esophagus: a single 8.2 × 4.3 mm submucosal nodule.

reveal sheets of polygonal or fusiform Schwann cells with abundant eosinophilic or granular amphophilic cytoplasm as a result of enlarged lysosomes.[5–8] Immunohistochemical staining of GCTs shows they are strongly positive for periodic acid Schiff (PAS), Nestin, S100, NSE, and various myelin proteins, and negative for smooth muscle actin (SMA), Desmin, CD117 and CD34.[5,7] Unlike esophageal GCTs, esophageal leiomyomas are positive for both SMA and desmin but typically negative for S100 neuronal maker.[5,7] While melanomas and malignant schwannomas are S100 positive, they are often additionally positive for both vimentin and HMB-45.[5,7] IHC of our patient revealed similar findings to benign esophageal GCT demonstrating S100 and CK AE1 and CK AE3 positivity with negativity for p40.

For esophageal GCTs that are >10 mm, symptomatic, or exhibit suspicion of malignancy endoscopic mucosal resection (EMR) or ESD, is preferred to traditional open resection, with ESD offering more accurate resection than conventional EMR.[5,6,8] The malignant potential of GCT tumors increases with size exceeding 50 mm in diameter.[6] For smaller tumors, ESD is considered a safe and less invasive therapy.[5,8] Our patient was a good candidate for the feasible application of ESD concerning the size of the tumor and better overall accuracy.

Management of GCTs involves various approaches from surveillance to resection. For tumors <10 mm in length and with benign biopsy results, surveillance endoscopic follow-up is sufficient.[5–7] For tumors 10–20 mm in length endoscopic polypectomy is recommended.[6] For tumors >20 mm in length, EMR or ESD can be done, and for symptomatic tumors and/or with high suspicion for malignancy, resection is the standard of care.[5–8]

In summary, although submucosal esophageal neoplasms are rare causes of vomiting in the pediatric population, this case report highlights that esophageal GCTs should be considered in the differential diagnosis

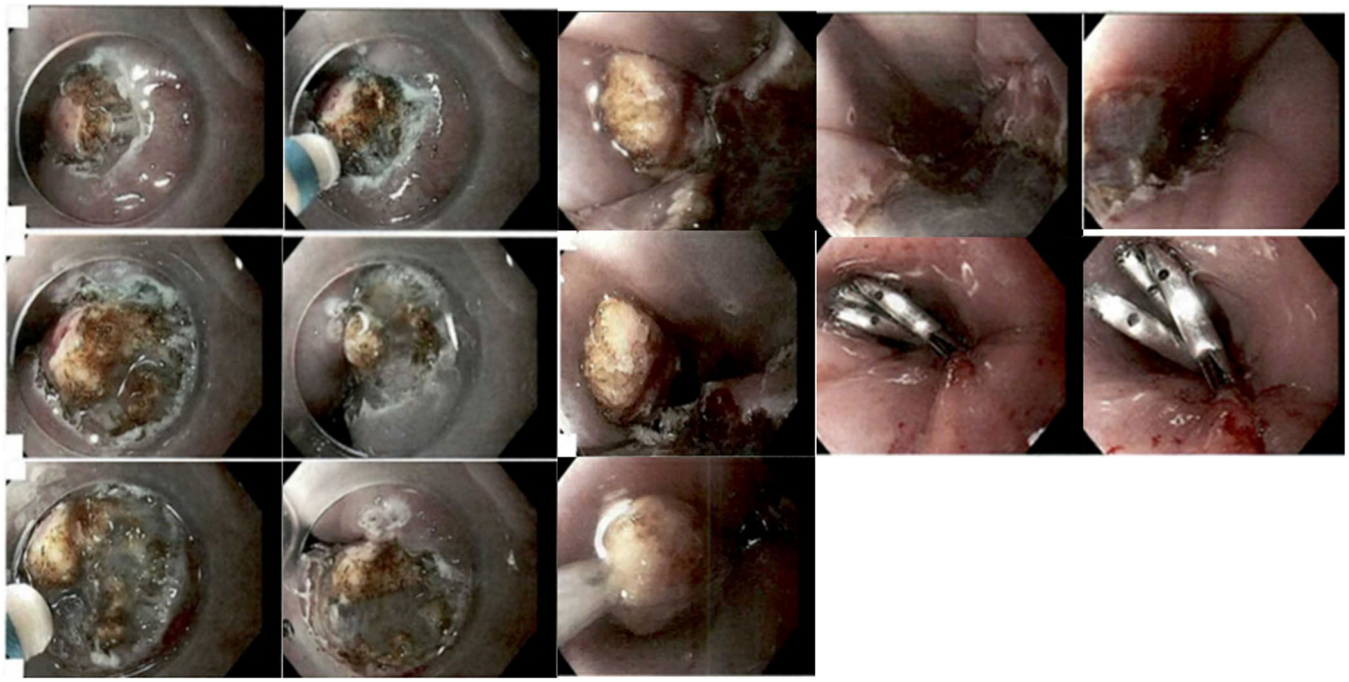

FIGURE 2 Full endoscopic submucosal dissection steps.

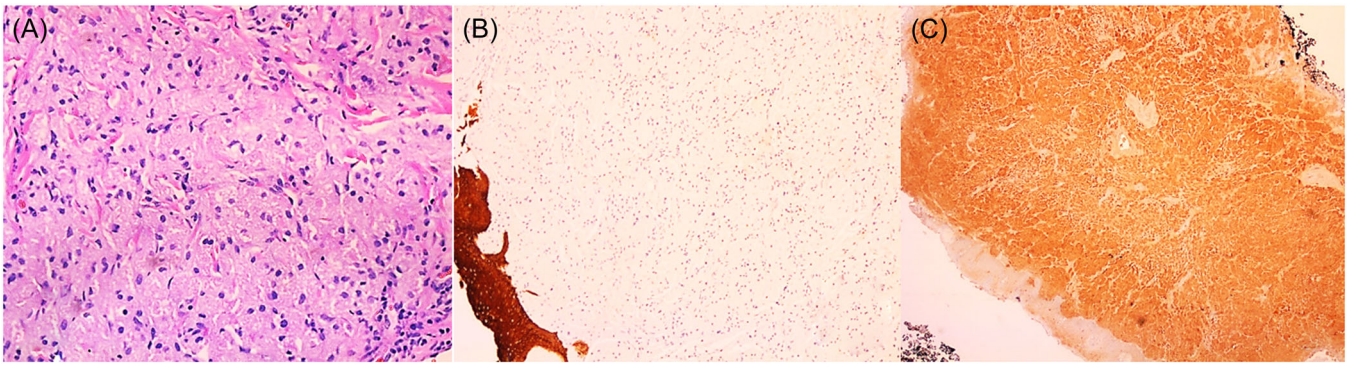

FIGURE 3 (A) Hematoxylin and eosin ×40 showed granularity nucleated cells with foamy cytoplasm, consistent with granular cell tumor. (B) Pan-cytokeratin ×10, as an epithelial marker, showed positivity on squamous cell linings of the esophagus and negativity on granular cell tumors. (C) S100 ×10, showed positivity on granular cell tumors and negativity on epithelial cells.

in children presenting with persistent vomiting. This is particularly important in the presence of sub-epithelial lesions in the distal two-thirds of the esophagus.[5] Diagnostic workup involves EGD and EUS for morphological assessment and further information regarding tumor extension and layer of origin.[6,7] Esophageal GCTs generally have low malignant potential and can be followed up with endoscopic surveillance.[5–8] Nonetheless, patient preference of therapy especially with bigger size or symptomatic GCTs is to be taken into consideration and fulfilled. En bloc endoscopic resection is a feasible option in most cases as presented here.

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CONFLICT OF INTEREST STATEMENT

The authors declare no conflict of interest.

ETHICS STATEMENT

The patient's parent has given written and verbal consent to publish her case.

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