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Case Report

Gastric Adenocarcinoma in Childhood. Case Report and Literature Review

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Abstract

Gastric tumors, especially gastric adenocarcinoma, are uncommon in childhood and adolescence. For this reason, the information on this pathology is limited, hence the management is extrapolated from adult patients.

We report the case of a 10-year-old girl referred to our institution with constitutional syndrome and pyloric syndrome, in whom an infiltrative anthropyloric lesion was found without evidence of metastasis. The histopathological report confirmed a diffuse undifferentiated gastric adenocarcinoma with signet ring cells, a diagnostic laparoscopy was performed where signs of peritoneal carcinomatosis are found, for which chemotherapy was offered with palliative intention.

Keywords: *Gastric Cancer; Adenocarcinoma; Stomach Neoplasms; Child*

Introduction

Gastric cancer is a common pathology in the adult population, according to Globocan statistics it is the fifth most frequent cancer and the third cause of death worldwide [1], however it is rare in the pediatric population. In them, gastrointestinal neoplasms correspond to 5% of all cancers, 0.05% being gastric adenocarcinoma cases [2,13], which are mostly diffuse type with signet ring cells associated with metastasis or carcinomatosis, which gives them a worse prognosis, data on this pathology in children is limited.

Risk factors for the development of gastric adenocarcinoma include: diet, lifestyle and infection by *Helicobacter pylori*, in addition, the genetic factor is present in 10% of cases [3] and is possibly the most important in pediatric population. Gastric cancer is classified into intestinal and diffuse type; the latter being more common in young people. Diffuse gastric adenocarcinoma has demonstrated a molecular abnormality in the cell adhesion protein E-Cadherin (CDH1), families with autosomal dominant trait for hereditary diffuse gastric cancer, the CDH1 gene is involved in 25 - 36% and the majority have cells signet ring accompanied by intestinal component [4]. In the intestinal type, a progression from chronic gastritis to chronic atrophic gastritis, intestinal metaplasia, dysplasia and finally adenocarcinoma has been described [5]. The symptoms are nonspecific, the management varies according to the stage of the disease, in our environment most are advanced stages in adult patients.

Presentation of the Case

A 10-year-old girl, referred to our institution for a 2-month evolution of non-irradiated abdominal pain in the epigastrium, associated with episodes of vomiting after ingestion and loss of 7 kilograms of weight. No pathological or surgical history, family history of colon cancer in a paternal aunt. On physical examination in good condition, without lymphadenopathy; her abdomen was soft, with a hard epigastric mass, not mobile and attached to deep planes.

Ultrasound of the abdomen reported thickening of the gastric walls, upper digestive endoscopy observed signs of gastric retention with stiffness of the gastric walls and infiltrative lesion of the body and gastric antrum with mucosal enhancement and decreased caliber of the lumen, of which Multiple biopsies are taken (See image 1), advanced nasojejunal tube was passed through endoscopy for enteral feeding. The thoracoabdominal tomography found concentric wall thickening in the antrum pyloric region with perigastric nodes in the greater and lesser curvature, the gastrohepatic ligament and the left para-aortic ligament of up to 6 mm, with no evidence of liver or lung metastases (See image 2). The histopathological report showed diffuse, undifferentiated gastric adenocarcinoma with signet ring cells and positive immunohistochemistry for cytokeratin, common leukocyte antigen, E. cadherina, MSH6, MLH1, MSH2 and PMS2 (See image 3). Tumor markers were taken; Carcinoembryonic antigen 1.37 ng / ml (< 2.5 ng/ml) and carbohydrate antigen 125 146 U/ml (0 - 35 U/ml). Diagnostic laparoscopy was performed to determine abdominal involvement and plan surgical intervention; where suspicious peritoneal seeding lesions were observed in both hemidiaphragms where biopsies are taken, serohematic peritoneal fluid was found, a 250 ml cell block was taken; the stomach presented diffuse thickening of the body and the gastric antrum, mobilization was not possible due to strong adhesion of the antrum pyloric region to the body of the pancreas, no other lesions were observed. The histopathological study of the peritoneal fluid showed loose mesothelial cells and cell population with mild atypia, the biopsy of the right hemidiaphragm was negative for malignancy, the biopsy of the left hemidiaphragm is positive for metastatic involvement due to carcinoma. The patient was classified as stage IV, so treatment was started with chemotherapy with cisplatin and 5-fluorouracil with palliative intent. Four months after the diagnosis and initiation of chemotherapy, an abdominal tomography was performed, which revealed disease progression with ascites, peritoneal thickening, and increased gastric wall thickening; the patient died 7 months after diagnosis.

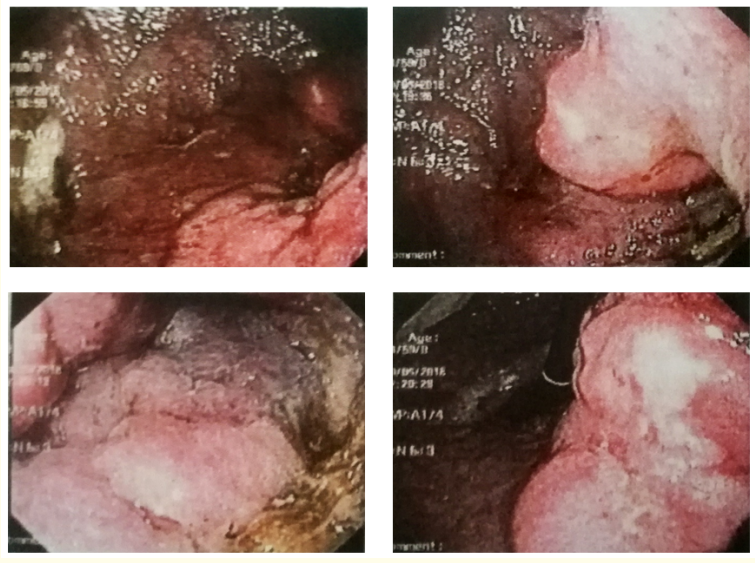

Image 1: *Endoscopy finding showing infiltrative lesion in the antrum pyloric region.*

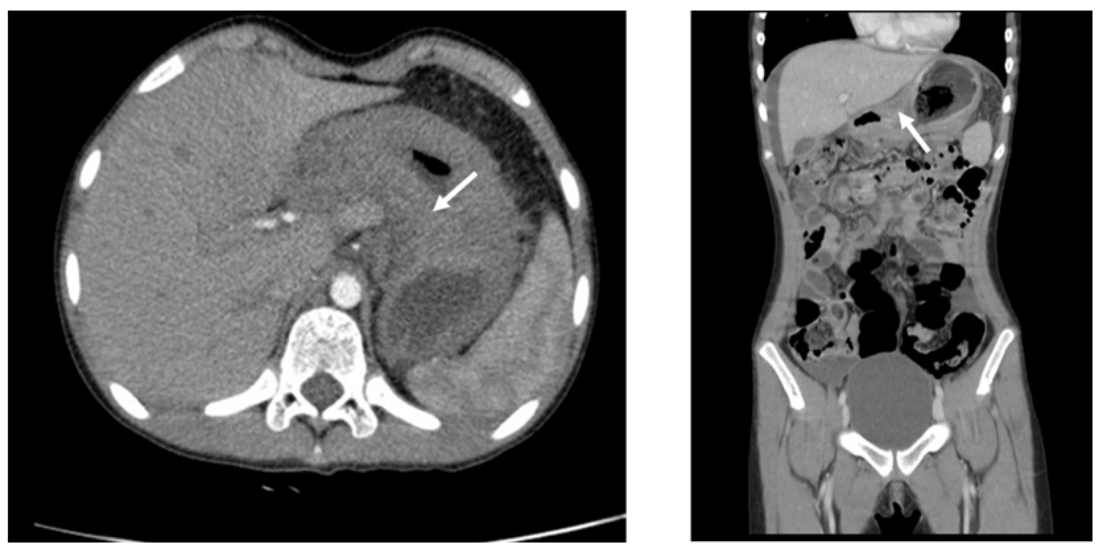

Image 2: *Contrast abdominal tomography of the abdomen, the white arrows show the thickening of the gastric walls.*

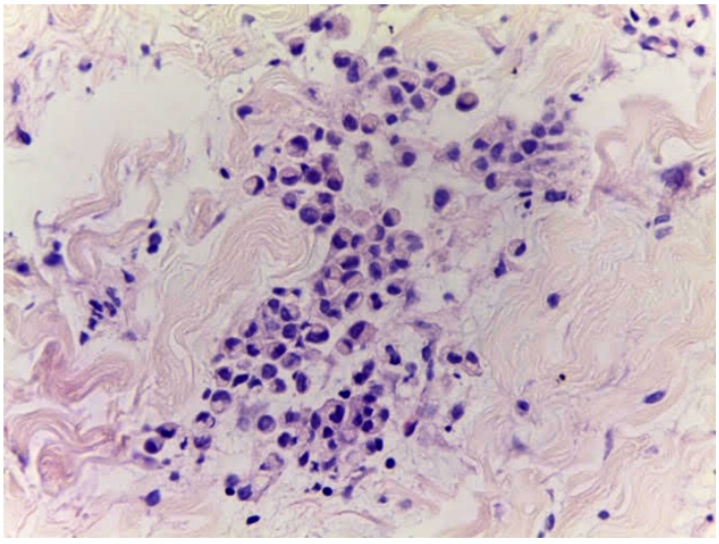

Image 3: *40 X light microscopy, hematoxylin and eosin staining with evidence of signet ring cells.*

Discussion

The development of gastric cancer involves the interaction of several elements, including environmental factors such as diet, lifestyle, and *Helicobacter pylori* infection. Although most gastric cancers are sporadic in adults, the familial factor is present in approximately 10%

of cases, represents 1 - 3% of the global burden, and has been described in Lynch syndrome, adenomatous polyposis familial, Li-Fraumeni syndrome, Peutz Jeghers syndrome, and juvenile polyposis.

Gastric cancer has been classified according to its histological appearance in intestinal and diffuse, and according to its degree of differentiation into good, moderately and poorly differentiated. The characteristic of signet ring cells adds worse prognosis.

The clinical manifestations of gastric cancer can be nonspecific in early cancers or very conspicuous in an advanced stage such as dyspepsia, epigastric pain, nausea, anorexia, weight loss, abdominal masses, lymphadenopathy and gastrointestinal bleeding. Endoscopy with systematic biopsies of suspicious lesions is the diagnostic procedure of choice for gastric cancer, with a sensitivity of 98% and specificity of 70% [6]. The stage is determined by TNM classification. Tumor markers such as carcinoembryonic antigen (CEA), cancer antigen 125 (CA 125), and cancer antigen 19-9 (CA 19-9) may be elevated, but have low sensitivity and specificity. Diagnostic laparoscopy, although invasive, has the advantage of visualizing the intra-abdominal surface and obtaining samples for peritoneal cytology, which can change management in many patients [7].

Tumors with locoregional disease are potentially resectable (stage I-III), in contrast, those with advanced disease (stage IV) are considered unresectable (See table 1). Treatment for gastric cancer includes endoscopic resection, neo and adjuvant therapies, as well as surgery. The surgical approach requires a total or subtotal gastrectomy, depending on the location of the tumor. Among pediatric cases reported in the literature, survival ranges from 5 months to 8 years after diagnosis [2]. The report Vivek Subbiah., *et al.* of 292,621 cancer patients, identified 5 pediatric patients with gastric cancer, representing 0.0017% of all patients, 0.11% of all gastric cancer patients and 0.08% of all cancer patients under 18 years of age. The median age was 17 years (range 8 - 17 years), all patients had nonspecific symptoms including hematemesis, abdominal pain, anemia and weight loss, the average duration of symptoms was 3 months, 2 patients had a family history of gastric cancer and colorectal cancer. 4 patients had metastatic disease at diagnosis, 3 patients with liver metastases and 1 patient with lung metastasis, histology was poorly differentiated adenocarcinoma in all patients and signet ring cells were identified in 3 patients, chemotherapy management included cisplatin or oxaliplatin with 5-fluoracil, 4 patients died in an average of 2.8 months, the only patient who did not present metastasis was still alive at 8.5 years of follow-up who underwent a total gastrectomy [2]. As in our patient, most of the cases reported in the literature have nonspecific symptoms, such as abdominal pain in the epigastrium, low back pain, vomiting, and weight loss [8-11,13]. There are no differences in the use of diagnostic techniques such as endoscopy and tomography [8,9,11,15], the histopathological findings do not differ much; reporting poorly differentiated adenocarcinoma with signet ring cells [9,10,13,14] and positive for E-cadherin and p53 [11], Mario Perezpeña., *et al.* report the case of a 13-year-old adolescent girl with gastric adenocarcinoma with cells in signet ring and neuroendocrine differentiation [15]. Most of the reported patients presented advanced disease, as part of their management they received chemotherapy with palliative intent with various regimens, the majority based on platinum, including capecitabine, epirubicin and 5 fluroracil [2,8-10]. Due to the aggressiveness of the disease and the advanced stage when the diagnosis is established, most patients cannot be offered surgical management with curative intent, Jan E. Slotta., *et al.* Present the case of a 15-year-old patient with gastric adenocarcinoma Moderately differentiated that underwent gastrectomy with lymphadenectomy and reconstruction with transmesocolic jejunal loop, no relapse was observed at 4 months of follow-up [12].

Stadium	Type of treatment
Stage 0	Endoscopic resection or surgery: total or subtotal gastrectomy depending on location
Stage I	Surgery: Total or subtotal gastrectomy according to location, adjuvant according to lymph node involvement
Stage II	Neoadjuvant, surgery: total or subtotal gastrectomy according to location, adjuvant.
Stage III	Neoadjuvant, surgery: total or subtotal gastrectomy according to location, adjuvant.
Stage IV	Chemotherapy or chemoradiation with palliative intent.

Table 1: *Stage treatment of gastric cancer in adults.*

The management of pediatric gastric adenocarcinoma is limited due to the infrequency of the disease; Most pediatric surgeons and pediatric oncologists have little experience in the management of this pathology, staging and therapy in children is based on the oncological experience of adults.

Although genetic testing was not performed in our patient, recognition of hereditary diffuse gastric cancer will allow genetic testing in relatives. Carriers of the CDH1 mutation should proceed with an endoscopic screening approach and/or prophylactic gastrectomy and breast surveillance in women, due to the risk of breast cancer.

Conclusion

Adenocarcinoma is a rare neoplasm in childhood, there are no algorithms for its management in children and these must be extrapolated from the management in adults, pediatric surgeons and pediatric oncologists generally do not have experience in the management of this pathology.

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