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Gastric lipomatosis

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ABSTRACT

Gastric lipomatosis is a condition characterized by the presence of multiple lipomas or diffuse mature adipose tissue infiltration within the gastric wall. The diffuse form is thought to be an extremely rare, with only few described cases. The lesion may be asymptomatic or associated with symptoms and signs depending on location and size. Treatment depends on clinical presentation, range and complications. In a symptomatic disease, it should be surgical, but conservative treatment is preferred for asymptomatic and solitary lesions. Among diagnostic methods, computed tomography and magnetic resonance imaging are thought to be the most valuable.

LIPOMATOSIS IN THE GASTROINTESTINAL TRACT

Gastric lipomatosis is characterized by multiple gastric lipomas or diffuse gastric distribution of mature adipose tissue within the submucosal or subserosal layer [1]. The form with multiple tumors appears approximately equally in men and women, with the peak incidence of 50-60 years [2]. The prevalence of gastrointestinal lipoma is reported to range from 0.2 to 5.8% [2]. Gastric lipomas are rare, accounting only for 5% of all gastrointestinal tract lipomas and less than 1-3% of all gastric tumors [3]. A diffuse pattern of submucosal adipose tissue accumulation is even a less common phenomenon than multiple encapsulated lesions [1]. Lipomas may occur in any part of the stomach, but the majority are located in the antrum, predominantly on the anterior or posterior wall [4]. The submucosal layer, which physiologically consists of loose connective tissue containing numerous elastic fibers [5], is the most common location within the stomach. Approximately 90-95% of all lipomas are submucosal lesions [3].

PATHOGENESIS OF GASTRIC LIPOMATOSIS

The etiology of lipomatosis in sites where adipose tissue normally does not occur has not been clearly specified. However, the most likely explanation is an embryogenic misplacement of adipocytes [4]. Gastric lipomatosis may be also an effect of chronic chemical or physical irritation [4], congenital predisposition, lipid storage diseases, chronic inflammatory bowel disease, hamartomatous syndromes [1], post-chemotherapeutic fat deposition and alcohol consumption, that apart from causing folate deficiency and macrocytic anemia, promotes lipomas through effects on adipocytes [6]. In some cases, family history of this disease has also been confirmed.

Lipomatous lesions of soft tissue are reported to be associated with the Proteus syndrome, a disease of genetic background, characterized by overgrowth of bones and soft tissues, presence of vascular malformations, skin hyperpigmentation and lipomas. It has been suggested that lipomatous lesions in Proteus syndrome show specific histologic features that distinguish them from more typical lipomas, i.e. lack of an obvious vascular component, a lobulated appearance imposed by marked fibrosis, lack of encapsulation, and a diffuse, infiltrative nature [2]. Recently, Liu *et al*. [2] reported two cases of colonic lipomatosis in pediatric patients with Proteus syndrome. In rare cases, intestinal lipomatosis is also noted in patients suffering from type 1 neurofibromatosis (NF1) [7].

Gastroduodenal lipomatosis can be associated with familial multiple lipomatosis (FML), which is a rare, autosomal dominant disease [8]. It manifests as multiple painless lipomas in the subcutaneous adipose tissue [8]. Only 9 cases of gastrointestinal lipomatosis associated with FML have been reported [8].

Soft tissue lipomatosis has been also reported to be associated with Cowden syndrome and Bannayan-Riley-Ruvalcaba syndrome, which both are characterized by mutation of the *PTEN* gene (phosphatase and tensin homolog) [2]. Among cases with genetic predisposition, a coexistence

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of a gastric lipoma, fibrous tumor and stromal tumor with germline defect of the *PDGFRA* gene (platelet-derived growth factor receptor alpha; V561D) has been reported [9].

MORPHOLOGY OF GASTRIC LIPOMATOSIS

Lipoma is considered to be a benign tumor of mesenchymal origin and adipose tissue differentiation. It is the most common soft tissue tumor in adults. Histologically, the classical subtype is composed of mature adipocytes without any signs of pleomorphism, surrounded by fibrous capsule [10]. Gastrointestinal lesions occur predominantly in the large intestine (64,3%), decreasing in prevalence in the small bowel, stomach and esophagus [2]. Most gastric lipomas are small (4-9 cm in dimension) [3]. The gastrointestinal lesions are likely to ulcerate, become necrotic and inflamed, undergo cystic degeneration, and infrequently present some calcific change [4]. Those features are observed especially in large tumors. In cases of surface ulceration, reactive changes, such as atypical hyperchromatic adipocyte nuclei, mitotic activity with occasional atypical mitoses, and cellular fibrosis may be observed [11]. The number of lipomas required to diagnose lipomatosis has not yet been specified [2]. The diffuse pattern of lipomatosis shows adipose tissue accumulation within the submucosal layer, separating the muscularis mucosa from the tunica muscularis, without fibrous capsule [12] (Fig.1AB).

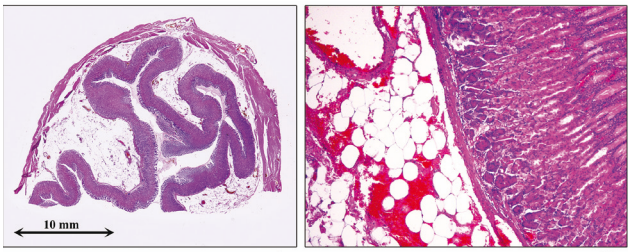

Figure 1AB. Diffuse pattern of gastric lipomatosis composed of adipocytes located within the submucosal layer without fibrous capsule (HE; A – 1:1, B – objective magnification ×10)

Rare coexistence of gastrointestinal lipomas and other separate tumors, either of epithelial or mesenchymal origin, has been described. Xiuli *et al*. [2] reported synchronous occurrence of multiple gastrointestinal stromal tumors (GISTs) of the stomach and multiple intestinal lipomas. The simultaneous occurrence of lipomatosis and early gastric adenocarcinoma has been also reported [12].

SYMPTOMS AND COMPLICATIONS

Most lipomas of the gastrointestinal tract are asymptomatic. Symptoms depend usually on the size of the tumor [4], but anatomical location plays also an important role in the clinical course. Bleeding may occur in case of ulceration. Other commonly presented symptoms include pain, intermittent cramps, constipation, nausea, vomiting, loss of weight, presence of a palpable tumor and signs of obstruction [4]. Furthermore, replacement of the muscular layer by fat tissue may cause weakness of the wall with gastric diverticulum or large duodenal bulb formation [10]. Intussusception is the most common complication, and ulceration, obstruction and prolapse of the tumor also occur in that order of frequency [4]. The most frequent clinical manifestation is gastrointestinal bleeding due to the ulceration of the overlying mucosa. When a large lipoma is present, venous stasis is probably the single most important factor underlying mucosal ulceration. This may lead to acute, and sometimes severe, upper gastrointestinal hemorrhage. Microcytic hypochromic anemia was reported as the primary indicator of large gastric lipoma [3].

DIAGNOSIS OF GASTRIC LIPOMATOSIS

The diagnosis can be made by a barium meal study, computed tomography (CT), magnetic resonance imaging (MRI) and by endoscopic examination [2]. According to available sources, CT and MRI seem to be most reliable diagnostic methods when lipomatosis is suspected. Both show not only the specific nature, but also the extent of the process. Therefore, they should be applied together for diagnosis and follow-up. Moreover, they help in differentiation between solitary lipomas and lipomatosis, which may determine further management [10]. In CT examination, a homogenous gastric submucosal tumor with an attenuation of between -70 and -120 Hounsfield units has been reported as a definitive finding for the diagnosis of gastric lipoma [1].

Microscopic examination of endoscopic samples is not always an accurate method for diagnosis of lipomatosis, since the samples frequently contain only gastric mucosa with some reactive lesions, but the tumor is missed in the specimen.

The differential diagnosis should include a wide range of benign and malignant submucosal tumors, e.g. leiomyomas, hemangiomas, angiolipomas [12,13], GISTs [2], liposarcomas [14], gastric lymphomas [13] and adenocarcinomas [12], as well as metastases.

TREATMENT OF GASTRIC LIPOMATOSIS

Treatment of gastric lipomatosis depends on presented symptoms and risk or development of complications. Surgical treatment is the most appropriate treatment for symptomatic lesions that show extensive gastric involvement, or when lesions are multiple [1]. Conservative treatment is preferred for solitary lipomas that are asymptomatic. However, further evaluation and surgical management should be planned when endoscopic examination shows an ulcer or when tumors contain non-fatty elements, are symptomatic or show infiltrative growth patterns [1]. Different methods of endoscopic treatment (endoscopic submucosal dissection, endoscopic mucosal resection after precutting or unroofing technique) appear to be safe and effective for gastrointestinal lipomas, including large lesions (≥2 cm in diameter) [7].

CONCLUSION

Gastric lipomtosis comprises two different morphological patterns – multiple gastric lipomas or diffuse distribution of adipose tissue within submucosal or subserosal layer. The phenomenon of diffuse pattern remains unexplored.

Only single cases have been reported so far, which allows to suspect that this pathology is either extremely rare, or usually asymptomatic and underdiagnosed.

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