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Case Report

Imaging of duodenal lipoma, case report of a rare tumor of the gastro intestinal tract ☆

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ABSTRACT

Duodenal lipoma is a rare tumor, and only a few cases have been reported in the literature. Despite some complicated cases, most patients are asymptomatic, which explains the frequency of incidental findings on imaging. The presented case involves a 77-year-old man who presented with malaise and dyspnea. A CT scan of the chest and abdomen was performed, leading to the incidental discovery of the lesion. Modern imaging techniques, including CT scans and MRI, are fundamental for ruling out differential diagnoses. These, combined with endoscopy and EUS, are key elements in reaching the final diagnosis. Treatment may include simple observation, endoscopic resection, or surgical resection, depending on the characteristics of the lesion.

Introduction

Duodenal lipomas are rare benign tumors of the gastrointestinal tract [1]. According to a study that included more than 4,000 patients with benign tumors of the digestive tract, only 0.16% of cases were related to duodenal lipomas [2]. The majority of cases are asymptomatic and are discovered incidentally during endoscopy, surgery, or radiological imaging [3]. However, when they are larger, complications such as ulceration, gastrointestinal bleeding, abdominal pain, intussusception, or obstruction of the intestine can occur due to acute lesions of the overlying mucosa or intestinal wall. In addition to endoscopy, modern imaging modalities such as CT scans and MRIs play an important role in diagnosis [4]. Imaging also plays a crucial role in differential diagnosis by examining the distinctive density or signal of fat tissue [3]. The presented case is a duodenal bulb lipoma that was discovered incidentally through a CT scan in our radiology department.

Case report

A 77-year-old man presented to our emergency department with malaise, fever, and dyspnea. A few months prior, he had been admitted to our hospital for cardiac decompensation due to pneumonia. The patient has a history of coronary artery disease, with a stent placed in 2019, and ischemic cardiomyopathy with a left ventricular ejection fraction estimated at 20%. The clinical examination revealed percussion dullness and diminished breath sounds on auscultation of the

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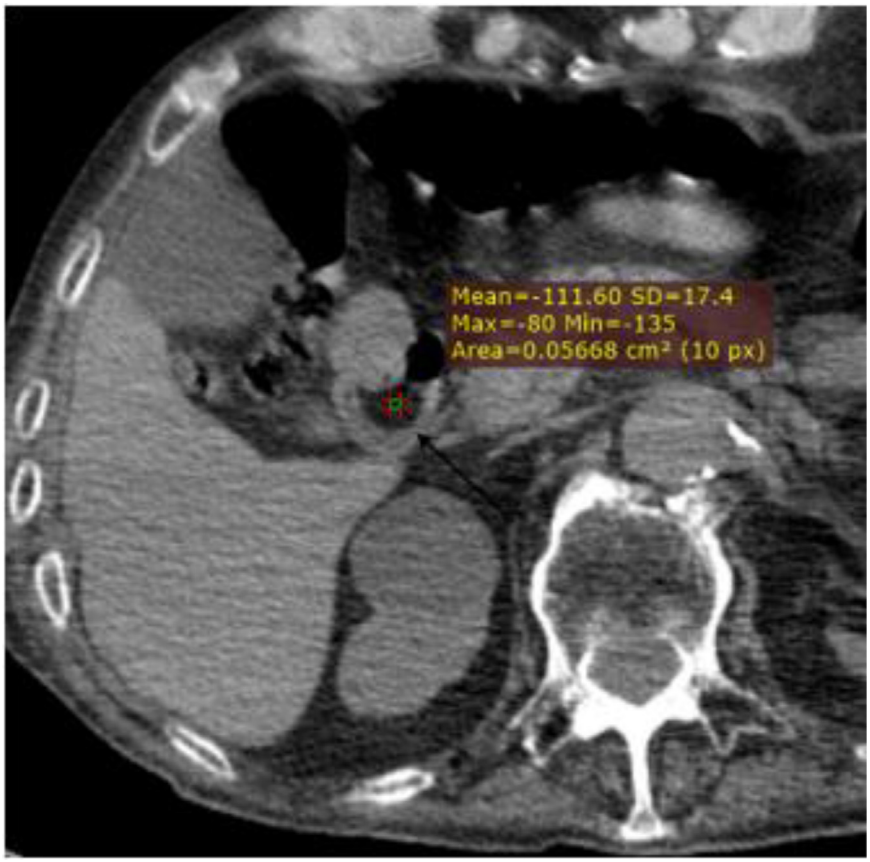

Fig. 1 – Axial view: duodenal formation with a fatty density (back arrow).

right thoracic side. Laboratory investigations showed elevated leukocyte count, erythrocyte sedimentation rate, and CRP values, which initially suggested an infectious origin.

Consequently, thoracic, abdominal, and pelvic CT scans were performed. The chest CT scan revealed bilateral pleural effusion and lobar consolidation of the right lower lobe. Abdominal imaging showed an oval, well-encapsulated formation in the duodenal bulb. The lesion appears homogeneous with a fatty density (-112 HU) and is relatively small, measuring 15 × 12 mm. No enhancement was noted following contrast injection. The stomach, pylorus, and proximal duodenum do not appear dilated, and there are no apparent signs of chronic stenosis. Given the pneumonia diagnosed on the CT scan, the patient underwent antibiotic therapy and improved after receiving the treatment. After the incidental diagnosis of a duodenal lipoma, the patient was referred to a gastroenterologist for further investigation and treatment planning. As a result, an echoendoscopy was performed, revealing the pathognomonic features of a duodenal lipoma, including the ''naked fat sign'', the ''cushion sign'', and the ''tenting sign.''

Discussion

Duodenal lipomas (DL) are exceptionally rare, and their incidence is primarily documented in case reports [4]. In a study on benign gastrointestinal tumors, among thousands of patients, only 4% of cases were related to lipomas, with the most prevalent site being the colon (64%). The second most frequent site was the small intestine (26%), followed by the duodenum (4%), stomach (3%), and esophagus (2%). Moreover, it has been noted that lipomas originating in the duodenum typically form in the second portion of the duodenum [5]. Duodenal lipomas are generally benign and slow-growing, with malignant transformation being unheard of for these formations. A systematic review indicated a peak incidence in the fifth to seventh decades of life, which is consistent with our case, and the incidence does not significantly differ between men and women [4]. The cause of DL remains unidentified. Some authors attribute it to embryonic displacement of fatty tissue or its relation to degenerative diseases and dyslipidemia [4,6], while others suggest it may be associated with a combination of inflammatory stimulation and fat aggregation or with aberrant hormonal secretion from the pituitary gland [1].

In the literature, the clinical manifestation and size of the lipoma are closely correlated [3]. Small lipomas are asymptomatic and are discovered incidentally during endoscopic investigation, radiological imaging, or surgical procedures, whereas larger tumors may cause symptoms. Reports have demonstrated that 80% of patients with duodenal lipomas whose diameter exceeds 2 cm are symptomatic [5]. Symptoms most commonly include a sensation of epigastric fullness that progressively worsens, potentially leading to intussusception or intestinal obstruction [5], as well as ulceration, anemia, and bloody discharge [7]. In rare circumstances, unusual manifes-

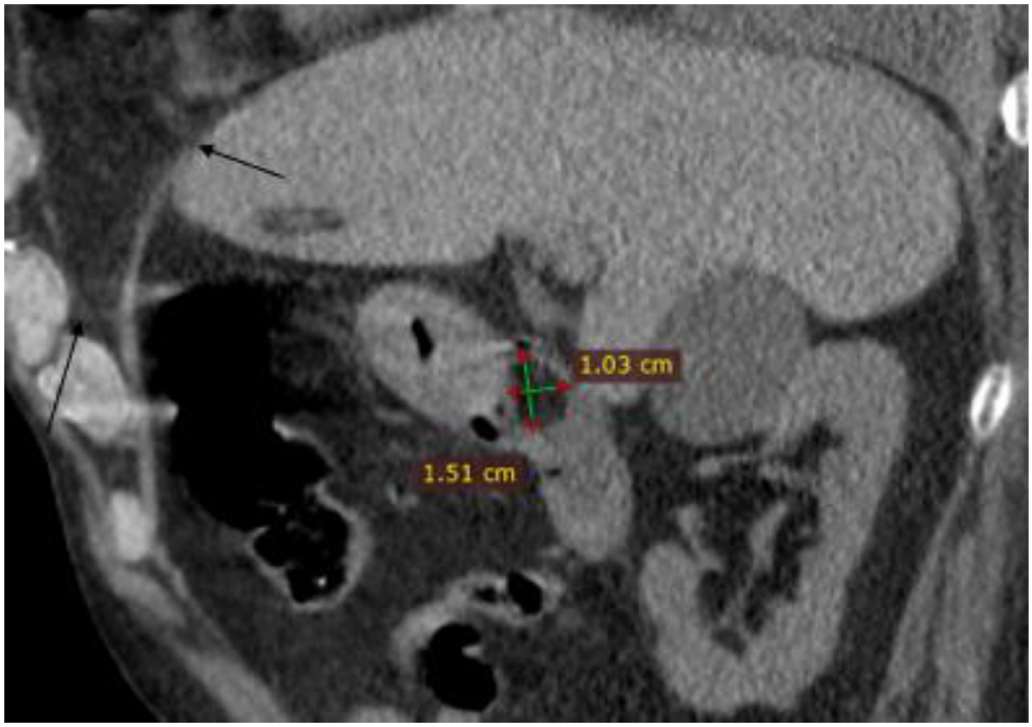

Fig. 2 – Sagittal view: The duodenal lipoma with measurements of ventro-dorsal and cranio-caudal size. Pleural effusion can also be seen (black arrow).

tations such as obstructive jaundice and pancreatitis may also be present [8].

Lipomas of the duodenal bulb may be revealed noninvasively with computed tomography (CT) [9]. Both CT and MRI show a homogeneous, well-circumscribed, and encapsulated formation with regular edges. Rarely, thin fibrous septa may be found within the lesion [3]. CT scans characterize duodenal lipomas as hypodense masses with a density similar to fat (between -60 HU and -120 HU), while MRI demonstrates high signal intensity on T1-weighted imaging and iso-signal intensity on T2-weighted imaging [5]. One exception to these findings is ulceration, which can result in soft tissue attenuation secondary to inflammation on CT scans [10]. Fat-suppression sequences can also be useful for diagnosing lipomas by showing a loss of signal intensity [5]. There is typically no enhancement of the tumor following contrast injection. Calcifications have been reported in a few cases [1]. Due to cost and time considerations, CT represents the modality of choice for the initial diagnosis and description of lipomas, despite MRI's ability to provide images in multiple planes and precisely localize the tumor [9]. While CT and MRI are valuable for diagnosis, endoscopic investigation is required to determine the site of lesion development [5]. Three signs have been considered pathognomonic: "the naked fat sign," which corresponds to the apparent fat on the surface of the lesion; "the cushion sign," which reveals a mark when forceps are pressed against the tumor; and "the tenting sign," observed when the overlying mucosa can be readily retracted with forceps. However, endoscopy may remain inconclusive if the lesion is submucosal [11]. Endoscopic ultrasonography (EUS) can also be beneficial by demonstrating the origin and depth of the lesion, with the classical appearance consisting of a homogeneous hyperechoic mass originating from the submucosa. Echo attenuation behind or within the lesion may also be observed [5].

The differential diagnoses for duodenal lipomas are numerous. Depending on the imaging modality used and the apparent radiological features, several conditions should be considered. On CT and MRI, the differential diagnosis may include reactive or congenital lipomatosis, complex histotypes of lipomas, well-differentiated liposarcoma, gastrointestinal stromal tumors (GISTs), and teratomas [12,13].

Reactive lipomatosis or submucosal aggregation of fatty tissue can occur following chronic gut inflammation, such as in ulcerative colitis or Crohn's disease, or may occur spontaneously in healthy individuals. Congenital lipomatosis is an autosomal dominant condition that results in numerous subcutaneous lipomas and may also produce lipomas in the digestive tract. In contrast to lipomatosis, a lipoma is a distinct fat-containing lesion. Complex histotypes of lipomas may include angiolipomas and fibrolipomas, and their histological and cytological findings can affect their radiological features on CT and MRI. Careful evaluation of imaging features before and after contrast injection is crucial to distinguish these masses from lipomas [12].

Liposarcoma, which has 4 histological subtypes—pleomorphic, round cell, myxoid, and well-differentiated—can be challenging to differentiate from a well-differentiated lipoma [11]. Well-differentiated liposarcoma, unlike lipoma, typically presents with thick, irregular, and nodular fibrous septa. It has attenuation values and signal intensities similar to muscle on CT and MRI and may show strong enhancement

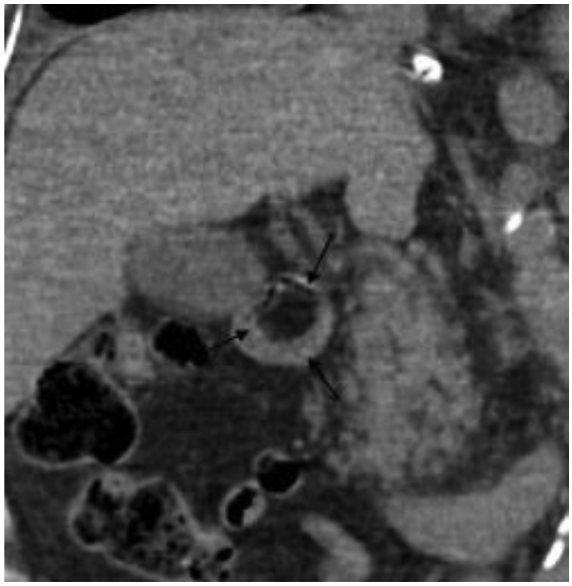

Fig 3 – Coronal view: oval shaped formation with sharp and smooth margins (black arrow).

following contrast injection [12]. Homogeneity is a key feature that helps differentiate lipomas from liposarcomas. In some cases, liposarcoma may contain thin septa or nonfatty areas, and differentiation can often only be confirmed by histology (Figs. 1-3).

A duodenal GIST typically presents as a well-circumscribed, heterogeneous mass on CT and MRI, without fatty tissue. Large tumors often have necrotic or hemorrhagic foci [13]. Teratomas appear as complex tumors with elements such as bone, cartilage, teeth, hair, calcifications, muscle, and dermal appendages, which are easily recognizable on CT and MRI [12].

On endoscopic ultrasound (EUS), duodenal submucosal hyperechoic lesions are not always indicative of lipoma. Pedro C. Figueiredo reported, in addition to Brunner's gland hamartoma, 4 other diagnoses that could present with similar features on EUS: renal cell carcinoma metastasis, ampullary carcinoma, hamartomatous duodenal polyp, and gangliocytic paraganglioma. Given these findings, endoscopists may need a low threshold for pursuing a definitive pathological diagnosis [14].

Asymptomatic duodenal lipomas can be monitored [4]. However, in symptomatic cases, DL must be treated either endoscopically or surgically, depending on the location and size of the lesion [15]. The treatment of choice is endoscopic polypectomy. However, for sessile or larger lesions, endoscopic excision may be more challenging and may increase the risk of complications such as perforation and bleeding. In these cases, surgery may be preferred [4,13].

Conclusion

Duodenal lipoma is a rare tumor. Patients may be asymptomatic or may present with complications. A CT scan can reveal the tumor without the need for endoscopic investigation. Imaging, combined with endoscopy, are key elements in reaching a diagnosis. Given that DL is a benign tumor, endoscopic excision should be the treatment of choice, although surgical resection may be necessary in some cases.

Patient consent

Informed consent for publication was obtained from patient.

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