Brunner’s gland hyperplasia (BGH) is a diagnostic challenge where in the pathophysiology and natural history remain poorly understood. This Case Report describes BGH arising at the ampulla of Vater, causing abdominal pain and vomiting in a 46-year-old man. Owing to the inconclusive nature of imaging studies and suspicious intraoperative findings, a Whipple resection was performed without any complications. Histological analysis showed that the obstructing lesion was BGH, with no evidence of malignancy. This is only the second such case of its kind at the ampulla of Vater to be reported. In addition, we present the previously unreported endoscopic ultrasound findings. The subsequent literature review focuses on the pathophysiology, clinical presentation, diagnosis, and management of BGH.

**ABSTRACT**

Brunner’s glands are mucus-secreting acinar glands located in the deep mucosa and submucosa of the duodenum, emptying into the crypts of Lieberkühn. They are most numerous in the duodenal bulb and secrete mucus, pepsinogen, and urogastrone in response to acid stimulation. Hyperplasia of these glands is a rare condition, with only 14 cases being described in the literature. Brunner’s gland hyperplasia (BGH) around the ampulla of Vater is particularly rare, having been described only once in the literature.

Most periampullary tumors are malignant bile duct or pancreatic adenocarcinomas, which are treated with radical excision when possible. In this paper, we present a case of a periampullary BGH.

**Case History**

A 46-year-old man presented with a 3-day history of abdominal pain and vomiting. A limited barium meal indicated a tight stricture at the first and second parts of the duodenum (D1, D2) with a shouldered appearance, suggesting malignancy (Figure 1). An endoscopy showed an obstructing lesion at D2, with a smooth, congested mucosa. However, biopsy of the lesion showed only focal gastric metaplasia with no evidence of malignancy. Abdominal computed tomography (CT) revealed a 2-cm mass closely apposed to the uncinate process of the pancreas. Endoscopic ultrasound (EUS) was performed using a radial scanning echoendoscope. Examination from the first part of the duodenum showed a thickened submucosa and muscularis propria, with hypoechoic pseudopodia extending into the head of the pancreas (Figure 2). The interface between the head of the pancreas and duodenal wall was interrupted by a suspicious mass (Figure 2). EUS-guided fine-needle aspiration was performed via echoendoscope with a curvilinear transducer. Cytological examination showed no evidence of malignancy.

The preoperative differential diagnosis included duodenal adenocarcinoma, leiomyosarcoma, gastrointestinal stromal tumor, or lymphoma. The inconclusive histology and suspicious imaging indicated a surgical resection for the final diagnosis. During the operation, the mass identified with CT appeared as an irregular thickening, which appeared to extend toward the head of the pancreas. A Whipple pancreaticoduodenectomy was performed and the lesion was completely excised.

Macrosopically, the completely excised mass was elevated and irregular, involving the first and second parts of the duodenum. There was an ill-defined periampullary tumor measuring 25 x 21 mm², which appeared to infiltrate the muscle wall of the duodenum. Microscopically, the lesion was composed of Brunner’s glands, diffusely infiltrating the submucosa and muscularis mucosa to a depth of 5 mm (Figure 3). The lesion infiltrated local pancreatic tissue and blood-vessel walls, containing numerous lymphocytes, eosinophils, and plasma cells. There was no evidence of Brunner’s gland hamartoma or adenoma. The patient had an uncomplicated postoperative pe-
Brunner’s glands are mucus-secreting acinar glands located in the deep mucosa and submucosa of the duodenum, emptying into the crypts of Lieberkühn. The glands secrete mucus, pepsinogen, and urogastrone in response to acid stimulation. The pathogenesis of BGH remains poorly understood. Gland stimulation by gastric hyperacidity was originally thought to induce hyperplasia,[4] however, only 45% of patients demonstrate hyperacidity and 20% have low gastric acidity.[5] Other suggested mechanisms include proliferation in response to local irritation or excessive parasympathetic activity.[5]

In 1934, Feyrter[6] classified the abnormal glandular proliferation into three types—type 1, type 2, and type 3. Type 1 has diffuse nodular hyperplasia, in which multiple sessile projections are found throughout the duodenum. Type 2 has circumscribed nodular hyperplasia limited to the duodenal bulb. Type 3 has glandular adenoma with polypoid lesions. It is unclear whether these three histological types are different manifestations of a single disease. The histological similarity between diffuse hyperplasia, hamartoma, and adenoma may indicate a common pathological origin. However, Feyrter’s classification is controversial, and some authors suggest that all forms should be considered.[5] Furthermore, the nomenclature used in the literature is inconsistent. The terms adenoma, brunneroma, and hamartoma have been used interchangeably with BGH. Consequently, there is no consensus regarding the classification of benign pathology of Brunner’s glands.

Histological features favoring hamartoma include lack of encapsulation; admixture of muscular, glandular, and adipose tissues; presence of continuous sheets of Brunner’s glands from the submucosa through the body of the tumor; and lack of any cellular atypia.[7] The presence of both ductal and glandular components is a further evidence of a hamartomatous origin, features which are unusual in hyperplasia or neoplasia. Dysplasia is not seen in Brunner’s gland tumors,[5] suggesting that the term adenoma is a misnomer. Our case does not support these concepts as there was no evidence of hamartoma. It rather suggests that hyperplasia can occur independently from hamartomatous change in Brunner’s glands.

BGH usually presents in middle age with no sex predominance;[5] however, cases have been described from early infancy to 80 years of age.[8] More than half of the patients present with abdominal pain, 43% have melena, and 12% experience hematemesis.[5] Hemorrhage is more likely to occur in distal tumors than those from the first part of the duodenum.[5] Duodenal obstruction and intussusception are less common presentations.[5]

Small-bowel radiological studies have a sensitivity of 92% for detecting BGH.[8] A smooth-walled filling defect in the duo-
denum is the commonest finding. Localized tumors can present as pedunculated or sessile filling defects with a sharp border, typical of submucosal lesions. However, adenocarcinoma arising from Brunner’s gland can also appear as a sessile polypoid lesion; so further investigation is indicated when these features are present. CT scanning may demonstrate fat within the lesion or enhancement after intravenous contrast. Only one previous report describes EUS features of BGH, showing a submucosal mass in the fourth echolayer. Our case is the first to demonstrate EUS findings for BGH. Finding hypoechoic pseudopodia suggested malignancy, hence we were surprised when the histological findings were known.

Whether managed surgically or endoscopically, the outcome is uniformly good. Endoscopic removal offers a safe and cost-effective alternative to open surgery.

In summary, benign pathology of Brunner’s gland is rare and lesions at the ampulla of Vater are even more so rarer. BGH should be considered in the differential diagnosis of mass lesions at the ampulla, once more common conditions are excluded.

References