A 10 cm pedunculated duodenal Brunner gland hamartoma, case report and literature review

Ziyad Alsugair*, Pierre Marie Lavrut, Lisa Chassagne

Department of Pathology, Institut de Pathologie Est, Groupement Hospitalier Est, Hospices Civils de Lyon, France

ABSTRACT

Introduction: Brunner gland hamartoma is rare duodenal neoplasm. These benign lesions are usually presented by upper gastrointestinal bleeding and sometimes extend to cause intestinal obstruction.

Presentation of the case: We report a case of a 43-year-old male patient manifested with iron deficiency anemia. Upon investigations, computed topography (CT) scan found a dilated first part of the duodenum with presence of large pedunculated polyp. The histopathological examination revealed a submucosal lobular proliferation of duodenal Brunner's gland separated by a fine fibrous septum. No dysplastic signs were observed. Immunohistochemical studies confirmed the nature of the glands and revealed absence of Helicobacter pylori gastritis.

Diagnosis was confirmed.

Discussion: Brunner glands hamartomas are rare tumors. They are commonly presented by upper GI bleeding and intestinal obstruction. The pathogenesis remains unclear. They are usually located in the first part (bulb) of the duodenum. Mucosal irritation and Helicobacter pylori infection are suggested causes. Different surgical and endoscopical modalities are applied in the management depending on the size and location of the mass. In our case, the tumor was removed by Endoscopic submucosal dissection.

Conclusion: Brunner gland hamartoma is a rare usually benign tumor. Presented clinically by upper GI bleeding and obstruction. Histopathologically Brunner gland Hamartoma characterized by lobular proliferation of Brunner gland associated with presence of other mature tissues. Although these tumors are benign it carries a minor risk of malignant transformation.

1. Introduction and importance

Primary intestinal neoplasms are rare and Brunner's gland hamartoma also referred as Brunner's gland adenoma or brunneroma is even rarer. These tumors are benign and represent 10.6 % of benign duodenal tumors [1,2]. These tumors had been found in 0.008 % in a single series of autopsies [1,2]. These lesions manifest clinically in most of cases by upper gastrointestinal bleeding and sometimes by intestinal obstruction. They are usually presented as pedunculated polyp and situated in the first part (bulb) of the duodenum. Endoscopic (surgical) resection is the treatment of choice in these polyps [3].

This work has been reported in line with the SCARE 2020 criteria [4].

2. Presentation of a case

A 43-year-old male patient presented with fatigue and intermittent melena for several months. The investigations revealed iron deficiency anemia (microcytic hypochromic anemia). His hemoglobin was 14 g/l MCV of 73.5 fl and MCH of 22.1 pg. The CT scan found a dilated first part of the duodenum with presence of large pedunculated polyp. The histopathological examination revealed a submucosal lobular proliferation of duodenal Brunner's gland separated by a fine fibrous septum. No dysplastic signs were observed. Immunohistochemical studies confirmed the presence of the glands and revealed absence of Helicobacter pylori gastritis.

Diagnosis was confirmed.

Discussion: Brunner glands hamartomas are rare tumors. They are commonly presented by upper GI bleeding and intestinal obstruction. The pathogenesis remains unclear. They are usually located in the first part (bulb) of the duodenum. Mucosal irritation and Helicobacter pylori infection are suggested causes. Different surgical and endoscopical modalities are applied in the management depending on the size and location of the mass. In our case, the tumor was removed by Endoscopic submucosal dissection.

Conclusion: Brunner gland hamartoma is a rare usually benign tumor. Presented clinically by upper GI bleeding and obstruction. Histopathologically Brunner gland Hamartoma characterized by lobular proliferation of Brunner gland associated with presence of other mature tissues. Although these tumors are benign it carries a minor risk of malignant transformation.
surface by intestinal type epithelium and focally by foveolar gastric epithelium. The submucosa composed of well differentiated homogeneous proliferated lobules of Brunner glands (Fig. 2A). The glands were lined by cylindrical clear mucinous cells with basal semilunar hyperchromatic nuclei. The lobules were separated by fine fibrous septa. The lesion also contained bundles of smooth muscles fibers embedded within the lobules (Fig. 2B). No mitoses were observed. The adjacent connective tissue contained mild lymphocytic infiltration (peptic duodenitis). No other heterogenous tissues were noted within the lesion and no dysplastic changes had been observed. Immunohistochemical studies confirmed the smooth muscles fibers (desmin) separated the brunner gland lobules (AE1/AE3) (Fig. 2C). Brunner glands express MUC6 (Fig. 2D) and focally express MUC5AC (Fig. 2E). Brunner gland did not express MUC2 (Fig. 2F).

4. Discussion

Primary intestinal neoplasms are rare, accounting less than 1 % of the gastrointestinal tumors and benign duodenal tumors reaching almost 16 % [5,6]. Cruveilhier has described the first Brunner gland adenoma at the end of the 19th century [7] while Brunner’s glands were first described by Brunner in 1688. These glands are situated in the duodenal submucosa. Most of these glands are seen in the first part of the duodenum and decreases towards its distal parts. The glands proportion also decreases with age as its quantity almost 50 % at birth and reduced to 35 % by 50 years [1]. The Brunner glands function is crucial for preventing ulcers as they secrete mucin and inhibit gastric acid secretions.

The exact pathogenesis of Brunner’s gland adenoma is unknown one hypotheses is related to the chronic irritation of the local mucosa could stimulate the glands and undergo hyperplasia [8]. Another hypothesis suggest that Helicobacter pylori infection may play role in the pathogenesis [9]. A recent study showed that 71 % of Brunner’s glands adenomas was found positive of Helicobacter pylori [10]. In our case no gastric biopsy was performed to detect Helicobacter pylori infection and it was not detected in the duodenal polyp. Although high prevalence of Helicobacter pylori infection in the general population, we cannot correlate this pathogenic relation as a cause due to the extreme rarity of Brunner’s gland adenoma. Another suggested cause of these lesions is chronic pancreatitis as nodular hyperplasia of Brunner glands had been found in 75.5 % of patients with chronic pancreatitis [11]. Gastric foveolar metaplasia is often associated with Brunner gland hamartoma as in our case (Fig. 2E) and its considered as mucosal injury repair mechanism and promotes the occurrence of this lesion [12]. Currently the most approved pathogenetic hypothesis is to be more of dysmembryoplastic lesion or hamartoma [13].

Most patients with Brunner’s gland hamartoma are presented by gastrointestinal bleeding as demonstrated in our case and obstructive intestinal symptoms are reported. Levin et al. found 37 % of these tumors presented by ulcerations and chronic bleeding and 37 % presented by intestinal obstruction [14].

In a histopathological point of view the differentiation between

![Image](image_url)
Brunner’s gland hyperplasia or hamartoma is often difficult [15]. However, it had been described those lesions smaller than 5 mm whether single or multiple are considered as hyperplasia and larger lesions of more than 5 mm as hamartomas [16]. In fact the term Brunner gland Hamartoma and Brunner gland adenoma are often used synonymously, making these lesions difficult to understand but it has been suggested that the presence of other mature tissues such as ciliated microcysts, adipose or muscular tissues within the lesion it might be considered more as hamartoma [17]. It is reported that Brunner's glands hamartomas are benign lesions but it had been associated with malignant and pre-malignant lesions such as epithelial dysplasia, duodenal adenocarcinoma and carcinoid tumors [18,19] prognosis of these tumors is favorable as recurrence after either endoscopic or surgical resection is rare [20,21]. Table 1 summarized the main clinical features of patients with Brunner's gland hamartoma that had been described in the literature.

5. Conclusion

Brunner gland hamartoma is a rare usually benign tumor. Presented clinically by upper GI bleeding and sometimes by intestinal obstruction. The pathogenesis remains unclear, but some hypotheses are suggested as mucosal irritation, *Helicobacter pylori* infection, chronic pancreatitis and mucosal injury. Histopathologically Brunner gland Hamartoma and Brunner gland adenoma used synonymously characterized by lobular proliferation of Brunner gland associated with presence of other mature
Table 1
Main clinical features of patients with Brunner’s gland hamartoma: an overview of literature.

| Author (year)                      | Sex | Age | Site                     | Size (CM) | Shape                    | Management                     |
|-----------------------------------|-----|-----|--------------------------|-----------|--------------------------|--------------------------------|
| Gourroyanni et al. (1990) [22]     | Male| 74  | Descending duodenum      | 5         | Pedunculated polyp       | Surgical resection             |
| Walden et al. (1998) [23]          | Male| 28  | Duodenal bulb            | 4         | Pedunculated polyp       | Endoscopic resection           |
| Hizawa et al. (2002) [24]          | Female| 71   | Duodenal bulb            | 1.8       | Broad based lesion       | Endoscopic resection           |
|                                  | Female| 36   | Duodenal bulb            | 2         | Pedunculated polyp       |                                |
|                                  | Male | 63  | Duodenal bulb            | 1.5       | Sessile polyp            |                                |
|                                  | Male | 65  | Duodenal bulb            | 1.5       | Sessile polyp            |                                |
|                                  | Male | 34  | Duodenal bulb            | 2         | Sessile polyp            |                                |
| Tan et al. (2002) [25]            | Male| 70  | Descending duodenum      | 2         | Pedunculated polyp       | Laparoscopic approach Laparotomy |
| Gao et al. (2004) [13]            | Male| 32  | Duodenal bulb            | 3.5       | Pedunculated polyp       | Surgical resection             |
| Rocco et al. (2006) [26]          | Female| 58   | Duodenal bulb            | 4         | Pedunculated polyp       | Endoscopic resection           |
| Petersen et al. (2008) [27]       | Female| 56   | Pylorus-Descending duodenum | 8.5     | Submucosal longtubular mass | Bilroth I procedure          |
| Jung et al. (2013) [11]           | Male| 45  | Pyloric ring              | 4.8       | Pedunculated polyp       | Endoscopic resection           |
| Akaki et al. (2014) [12]          | Male| 26  | Gastrroduodenal junction | 6.4       | Pedunculated polyp       | Distal gastrectomy             |
| Martinez et al. (2014) [20]       | Male| 60  | Duodenal bulb            | 4         | Subepithelial mass       | Surgical resection             |
| Takeuchi et al. (2015) [28]       | Female| 52   | Duodenal bulb            | 5         | Pedunculated polyp       | Laparoscopic partial duodenectomy |
|                                  | Female| 52   | Duodenal bulb            | 3.5       |                     | Laparoscopic partial duodenectomy |
|                                  | Male | 67  | Duodenal bulb            | 6         |                     | Laparoscopic tumor resection    |
| Kontalas et al. (2016) [29]       | Female| 52   | Duodenal bulb            |           | Solid mass              | Pancreatoduodenectomy          |
| Peluso et al. (2017) [30]         | Male| 72  | Descending duodenum      | 4         | Broad based lesion       | Surgical resection             |
| Kitagawa et al. (2018) [31]       | Female| 64   | Duodenal bulb            | 7         | Pedunculated polyp       | Endoscopic resection           |
| Rau et al. (2019) [32]            | Male| 76  | Descending duodenum      | 12        | Pedunculated polyp       | Endoscopic resection           |
| Bakheet et al. (2020) [33]        | Male| 55  | Duodenal bulb            | 3.2       | Pedunculated polyp       | Endoscopic resection           |
| Naito et al. (2021) [34]          | Female| 69   | Duodenal bulb            | 4         | Submucosal longtubular mass | Surgical resection          |
| Zhang et al. (2022) [35]          | Male| 53  | Duodenal bulb            | 6         | Submucosal oval mass     | Endoscopic resection           |

Declarations of competing interest
No conflicts of interest.

References

[1] Y. Jung, I.K. Chung, T.H. Lee, Y.S. Cho, Y.G. Jo, S.H. Park, H. Cho, S.J. Kim, Successful endoscopic resection of large pedunculated Brunner’s gland hamartoma causing gastrointestinal bleeding arising from the pylorus, Case Rep. Gastroenterol. 7 (2013) 304–307, https://doi.org/10.1159/000354138.
[2] T. Nakabori, S. Shinzaki, T. Yamada, T. Nishida, H. Iijima, M. Tsujii, Y. Kurokawa, M. Mori, Y. Deki, E. Morii, T. Takehara, Atypical duodenal ulcer and invagination caused by a large pedunculated duodenal Brunner’s gland hamartoma, Gastrointest. Endosc. 79 (2014) 679–680, https://doi.org/10.1016/j.gie.2013.11.002.
[3] L. Lu, R. Li, G. Zhang, Z. Zhao, W. Fu, W. Li, Case report Brunner’s gland adenoma of duodenum: report of two cases, (accessed March 20, 2022), . 8 (2015) 7565-7569, www.ijcep.com/.
[4] A.R. Agha, T. Franchi, C. Sohrabi, G. Mathew, A. Kerwan, SCARE group, the SCARE guidelines, Int. J. Surg. 84 (2020) 226–230, https://doi.org/10.1016/j.ijsu.2020.10.034.
[5] P. van de Walle, B. Dillemans, M. Vandelanotte, L. Proot, The laparoscopic resection of a benign stromal tumour of the duodenum, Acta Chir. Belg. 97 (1997) 127–129.
[6] R. Ohba, M. Otaka, M. Jin, M. Odashima, T. Matsuhashi, Y. Horikava, N. Hatakeyama, N. Mimori, N. Kinoshita, S. Koizumi, T. Takahashi, S. Watanabe, Large Brunner’s gland hyperplasia treated with modified endoscopic submucosal dissection, Dig. Dis. Sci. 52 (2007) 170–172, https://doi.org/10.1007/s10620-006-9607-1.
[7] J. Cruvellier, Anatomy of the Human Body, Harper and Bros, 1844 new york.
[8] M.E. Peet, H.S. Moseley, Brunner’s gland hyperplasia, Am. Surg. 55 (1989) 474–477.
[9] R.R. Kurella, H.R. Ancha, S. Hussain, S.A. Lightfoot, R. Harty, Evolution of Brunner gland hamartoma associated with Helicobacter pylori infection, South. Med. J. 101–104 (2008) 648–650, https://doi.org/10.1097.SMJ.0b013e318172415a.
[10] I. Kovacevic, N. Ljubicic, H. Cupic, M. Doko, M. Zovak, B. Trokot, M. Kujundzic, M. Bani, Helicobacter pylori infection in patients with Brunner’s gland adenoma, Acta Med. Croatica 55 (2001) 157–160.
[11] M. Stolte, H. Schwabe, H. Prestebel, Relationship between diseases of the pancreas and hyperplasia of Brunner’s glands, Vircovs Arch. A Pathol. Anat. Histol. 394 (1981) 75–87, https://doi.org/10.1007/BF00431666.
[12] M. Akaki, S. Taniguchi, K. Hatakeyama, R. Kushima, H. Kataoka, Duodenal mucosal damage is associated with proliferative activity of Brunner’s gland hamartoma: a case report, BMC Gastroenterol. 14 (2014) 14, https://doi.org/10.1186/1471-230X-14-14.
[13] Y.P. Gao, J.S. Zhu, W.J. Zheng, Brunner’s gland adenoma of duodenum: a case report and literature review, World J. Gastroenterol. 10 (2004) 2616–2617, https://doi.org/10.3748/wjg.v10.i17.2616.
[14] A.J. Levine, L.J. Burgart, K.P. Batts, K.K. Wang, Brunner’s gland hamartomas: clinical presentation and pathological features of 27 cases, Am. J. Gastroenterol. 90 (1995) 290–294.
[15] R. Sen, V. Gupta, N. Sharma, N. Chawla, S. Kumar, S. Malik, Brunner gland hamartoma masquerading as malignancy: a rare case report., Middle East. J. Dig. Dis. 6 (2014) 237-240.

[16] J.P. Gaspar, E.B. Stelow, A.Y. Wang, Approach to the endoscopic resection of duodenal lesions, World J. Gastroenterol. 22 (2016) 600-617, https://doi.org/10.3748/wjg.v22.i2.600.

[17] D. Chatelain, E. Maillet, L. Boyer, G. Checoury, N. Mourra, J.-F. Flejou, Brunner gland hamartoma with predominant adipose tissue and ciliated cysts, Arch. Pathol. Lab. Med. 126 (2002) 734-735, https://doi.org/10.5858/2002-126-0734-BGHWPA.

[18] M. Itsuno, K. Makiyama, K. Omagari, T. Tanaka, K. Hara, N. Tsuda, Y. Ajioka, M.A. Martinez, N.J. Zyromski, L.P. Luz, An unusual case of large symptomatic Brunner gland hamartoma diagnosed via endoscopic mucosal resection: a case report and literature review, World J. Gastroenterol. 471 (2008) 7-8, https://doi.org/10.1016/j.ajg.2018.08.004.

[19] N. Bakheet, A. Cordie, M. Nabil Alkady, I. Naguib, Brunner gland adenoma: a case report and literature review, World J. Gastroenterol. 19 (2013) 129-130, https://doi.org/10.3748/wjg.v19.i6.130.

[20] J. Zhang, Y. Tan, Y. Wang, D. Liu, Successful endoscopic removal of a giant duodenal bulk mass, Rev. Esp. Enferm. Dig. 114 (2022) 298-299, https://doi.org/10.17235/reed.2022.8595/2022.