EUS-guided fine needle aspiration provides an open view for duodenal obstruction caused by urothelial carcinoma: a case report

Xiaoli Chen1*, Xin Chen1, Xiaoli Yu2 and Xingkang He1*

Abstract

Background: Endoscopic ultrasound-guided fine-needle aspiration (EUS-FNA) is a good alternative and diagnostic tool for gastrointestinal wall thickening with prior negative endoscopic biopsies.

Case presentation: Here we reported a case of a 60-years-old woman admitted with atrophic right kidney and hydronephrosis and intermittent postprandial bloating. Esophagogastroduodenoscopy and small bowel endoscopy revealed wall thickening and stenosis at the junction of the descending and inferior duodenum. Biopsies from endoscopy showed no specific findings. EUS-FNA of the thickened duodenal wall was performed and histopathological examinations revealed poorly differentiated carcinoma. Immunohistochemically staining was positive for pancytokeratin, CK7, CK20, and weakly positive for GATA-3 and P63. These results were highly suggestive of metastatic urothelial cancer.

Conclusions: EUS-FNA played an important role in the diagnosis of unexplained gastrointestinal wall thickening and rare metastases to the gastrointestinal wall.

Keywords: EUS-FNA, Duodenal wall thickening, Urothelial carcinoma, Metastasis

Background

Gastrointestinal wall thickening could be mostly observed in the stomach, esophagus, and rectum [1]. A variety of pathologies, including both benign and malignant causes could lead to the thickening of the gastrointestinal tract [2, 3]. Broadly speaking, benign causes include inflammatory, autoimmune, infectious, infiltrative diseases and malignant causes include cancer, lymphoma, and metastasis [3, 4]. Duodenal wall thickening is a non-specific finding in abdomen imaging. The differential diagnosis of duodenal wall thickening is quite broad and difficult. The accurate diagnosis was mostly based on pathological examination and was essential for treatment options. However, conventional biopsies from endoscopy were always falsely negative, especially for submucosal infiltrating cancer. Therefore, identifying the cause of duodenal wall thickening remains a challenge for clinicians. Recently, with development of endoscopic ultrasound-guided fine needle aspiration (EUS-FNA), it emerged as the important tool to obtain samples to make a definitive diagnosis.

Here we reported a case of a 60-year-old woman with an atrophic right kidney and hydronephrosis. EGD revealed duodenal wall thickening and stenosis. Biopsies from EGD showed no specific findings. Finally, EUS-FNA was adopted and histological results revealed tumor nests in the duodenal wall. The primary diagnosis of urothelial carcinoma was determined based on an immunohistochemical study.

*Correspondence: dr_chenxl@zju.edu.cn; hexingkang@zju.edu.cn
1 Division of Gastroenterology, School of Medicine, Sir Run Run Shaw Hospital, Zhejiang University, Hangzhou, China
Full list of author information is available at the end of the article
Case presentation
A 60-year-old woman with a past medical history of hypertension was admitted to the hospital with complaints of atrophic right kidney with hydronephrosis and intermittent postprandial bloating. A physical examination revealed left lower quadrant abdominal tenderness and no costovertebral angle tenderness. A laboratory examination revealed increased serum levels of creatinine. No other abnormal findings were observed in urine analysis and autoimmune disease tests. Abdominal computed tomography (CT) showed wall thickening of the descending part of the duodenum and left hydronephrosis with atrophic renal parenchyma (Fig. 1A, B). Since the patient was allergic to procaine and iodine, contrast-enhanced CT could not be performed. Consequently, EGD and small bowel endoscopy were performed, and these tests revealed circumferential stenosis at the junction of the descending and inferior duodenum (Fig. 1C, D). Biopsies from EGD and small bowel endoscope were obtained, and histopathological examination only revealed duodenitis. Based on these findings, the underlying cause of the duodenal wall thickening remained unclear since no specific findings. To identify the underlying reason, EUS-FNA of the thickened duodenal wall was successfully performed with a 22 G needle (Cook Medical, USA). EUS of the duodenal lesion showed a thickened duodenal wall (thickness: 15 mm, Fig. 2A, B). On-site evaluation for a poorly carcinoma is made because of increased cellularity and markedly atypical clusters. Further immunohistochemical analysis revealed that the cancer cells were positive for CK-Pan, cytokeratin 7 (CK7), cytokeratin 20 (CK20), and partly positive Ki-67 (Fig. 3). Based on immunohistochemical stating, we suspected that poorly differentiated carcinoma was spread from the urinary system. Due to obstruction of the urinary tract and the duodenum, the patient received a ureteric stent and gastrointestinal bypass surgery. Biopsy specimens were also obtained from the procedure. The final pathological diagnosis of urothelial carcinoma was made based on P63-positive and GATA3-positive
Discussion and conclusion

Urothelial carcinoma (UCC) is the most common type of bladder cancer and common symptoms of UCC are hematuria and back pain [5]. Urine cytology and cystoscopy are the gold standards in the diagnosis of UCC [6]. Approximately 20% of patients with invasive UCC will develop metastatic diseases [7]. Lymph node metastasis and involvement in UCC were quite common and UCC usually metastasizes to distant organs, such as the lung, liver, stomach, skin, and eyes [8–12]. Several case reports have described that UCC could metastasize to the duodenum [13–17]. Duodenal malignant was extremely rare and duodenal adenocarcinoma was a primary tumor for malignant disease. Duodenal metastasis could result from other organs, including the breast, lung, kidney, prostate, liver, colon, and uterus [18–20]. The thickness of the duodenal wall in the current study was quite large and biopsies from conventional endoscopy were negative. Thus the current diagnosis of duodenal wall thickening or stenosis remained a challenge for clinicians when CT did not identify a primary site or endoscopic biopsy revealed no specific findings. The present case highlighted that EUS-FNA might be an indicative, and minimally invasive way to obtain adequate samples for diagnosis of duodenal thickening of unknown cause. EUS-FNA was initially adopted by Vilmann et al. for diagnosis of pancreatic cancer [21] and subsequently became an important diagnostic tool for gastrointestinal lesions. EUS-FNA was considered the gold standard for staging and diagnosis of gastrointestinal malignancies since its high sensitivity and specificity [22]. Furthermore, EUS-FNA could puncture extra-luminal lesions from the gastrointestinal tract to provide additional histological evidence. European society of gastrointestinal endoscopy also suggested performance of EUS-guided sampling after failure of standard biopsy techniques [23]. Actually, the performance of EUS-FNA in diagnosis of unexplained thickening of the esophagogastric and stomach wall had been well established. For the esophagogastric wall, nine of ten patients were diagnosed correctly without complications using EUS-FNA [24]. In cases of stomach disease, the
diagnostic accuracy of EUS-FNA for linitis plastica was 87.5% without severe hemorrhage or perforation [25]. There were no severe complications associated with the procedure in this setting, suggesting the safety of EUS-FNA. EUS-FNA has been well demonstrated to be a safe technique with relatively low morbidity and mortality rates [26]. The majority of complications associated with EUS-FNA included perforation, hemorrhage, acute pancreatitis, and infection [27]. According to a previous systematic review, the complication rate and the mortality rate were approximately 1–0.98% [28].

However, the application of EUS-FNA for duodenal lesions remained rare. One reason might be technically challenging for EUS-FNA. Due to special training and a long learning curve, EUS-FNA was considered a difficult technique to master [29]. Our case showed the usefulness of EUS-FNA in the diagnosis of unknown wall thickening of the duodenum. Previously, five cases reported the diagnosis of UTUC with duodenum involvement [14–17, 30]. Only two of them were diagnosed by EUS-FNA [14, 15], and three cases were made by surgery or autopsy [16, 17, 30]. According to a previous study, EUS-FNA was rarely used to diagnose lesions of duodenal mass [31]. In the current case, samples from EUS-FNA provided important cytological evidence for further diagnoses. However, tissues from EUS-FNA were limited and sometimes were unable to provide enough material for correct diagnosis. To overcome this limitation, EUS-fine needle biopsy (FNB) was developed. Recently, one study reported that EUS-fine needle biopsy (FNB) technique had excellent diagnostic performance and safety in the study of unexplained diffuse gastrointestinal wall thickening [1]. We, therefore, suggested EUS-FNA/FNB should be performed in cases with prior negative endoscopic biopsies for the diagnosis of unexplained thickening of the duodenum.

In conclusion, we reported a case of EUS-FNA that helped to diagnose UCC with duodenal metastasis. For unexplained thickening of the duodenum wall, the accurate diagnosis is necessary for further suitable treatments. In this sense, EUS-FNA can be an effective method for providing clues or achieving a diagnosis.

---

Fig. 3 The immunostaining findings of EUS-FNA specimens are as follows: A, Cytokeratin (CK)-Pan staining (Nikon DS-U3, 20X); B, Ki-67 staining (Nikon DS-U3, 20X); C, Cytokeratin7 (CK7) staining (Nikon DS-U3, 20X); D, Cytokeratin20 (CK20) staining (Nikon DS-U3, 20X)
Abbreviations
EUS-FNA: Endoscopic ultrasound-guided fine needle aspiration; EGD: Esophagogastroduodenoscopy; CT: Computed tomography; UCC: Urothelial carcinoma; EUS-FNB: Endoscopic ultrasound-guided fine needle biopsy.

Acknowledgements
Not applicable.

Author contributions
XLC designed and collected clinical data and wrote the manuscript; XC collected clinical data and managed the patient and drafted the manuscript; XLY provided pathological data and substantively revised the manuscript; XKH made contributions to conception and design of the work and wrote the manuscript; and all authors revised and approved the final manuscript.

Funding
Not applicable.

Availability of data and materials
All data used in current study are included in the published article.

Declarations

Ethics approval and consent to participate
The current study was approved by the Institutional Ethics Committee of Sir Run Run Shaw Hospital. Written consent to participate was obtained from the patient.

Consent for publication
Written informed consent was obtained from the patient for publication of this case report and any accompanying images. A copy of the written consent is available to the Editor if requested.

Competing interests
The authors declare that they have no conflict of interest.

Author details
1 Division of Gastroenterology, School of Medicine, Sir Run Run Shaw Hospital, Zhejiang University, Hangzhou, China. 2 Division of Pathology, School of Medicine, Sir Run Run Shaw Hospital, Zhejiang University, Hangzhou, China.

Received: 20 December 2021 Accepted: 27 July 2022 Published online: 08 August 2022

References
1. Chavarria C, Garcia-Alonso FJ, de Benito-Sanz M, Mata-Romero P, Madrigal B, Sanchez-Ocana R, Diez-Redondo P, Nuñez H, Perez-Miranda M, de la Serna-Higuera C. Endoscopic ultrasound-guided fine-needle biopsy in patients with unexplained diffuse gastrointestinal wall thickening. Endosc Int Open. 2021;9(10):E1466–71.
2. Kawano H, Ishii A, Kimura T, Takahashi T, Hironaka H, Kawano M, Yamaguchi M, Oishi K, Kubo M, Matsui S, et al. IgG4-related disease manifesting the gastric wall thickening. Pathol Int. 2016;66(1):23–8.
3. Sharma V, Rana SS, Bhasin DK. Diffuse gastric wall thickening: appearances can be deceptive. Clin Gastroenterol Hepatol. 2015;13(8):e121-122.

4. Brown BM, Federle MP, Jeffrey RB. Gastric wall thickening and extragastric inflammatory processes: a retrospective CT study. J Comput Assist Tomogr. 1982;6(4):762–5.

5. Sharma S, Khseersagar P, Sharma P. Diagnosis and treatment of bladder cancer. Am Fam Physician. 2009;80(7):717–23.

6. Tetu B. Diagnosis of urothelial carcinoma from urine. Mod Pathol. 2009;22(Suppl 3):S28-31.

7. Svatek RS, Stiefel-Radcke A, Dinney CP. Management of metastatic urothelial cancer: the role of surgery as an adjunct to chemotherapy. Urol Advisor. 2009;3(6 Suppl 4):S28-31.

8. Lehmann J, Suttmann H, Albers P, Vollmer B, Gschwend JE, Fechner G, Spahn M, Heidenreich A, Odenwald A, Seif C, et al. Surgery for metastatic urothelial carcinoma with curative intent: the German experience (AUO AB 30/05). Eur Urol. 2009;55(6):1293–9.

9. Shinagare AB, Ramaiya NH, Jagannathan JP, Fennessy FM, Taplin ME, Van den Abbeele AD. Metastatic pattern of bladder cancer: correlation with the characteristics of the primary tumor. A JR Am J Roentgenol. 2011;196(1):117–22.

10. Wymer KM, Antic T, O’Donnell PH. Case report of a rare presentation of urothelial carcinoma with gastric metastasis. Clin Genitourin Cancer. 2016;14(1):e111-114.

11. Giordano G, Oliveri N, D’Andrea MR, Di Raimo T, Manfrini E, Remo A, Piancone M, Brunelli M, De Santis E, Coppola G, et al. Urethral bladder carcinoma metastasizing to the eye: a systematic review and case report. Oncol Lett. 2019;17(1):462–7.

12. Lees AN. Cutaneous metastasis of transitional cell carcinoma of the urinary bladder eight years after the primary: a case report. J Med Case Rep. 2015;9:102.

13. Matsubayashi H, Ishiwatari H, Tanaka M, Iwai T, Matsui T, Fujie S, Kakushima N, Ino T, Yoshimura R, Abe M, et al. A rare case of ureteral carcinoma with recurrence in the duodenal wall requiring double stenting. Intern Med. 2017;56(22):3077–82.

14. Motoo I, Ando T, Mihara H, Tanaka S, Saji S, Fujinami H, Takahashi K, Yasuda I. Endoscopic ultrasound-guided fine needle aspiration for the diagnosis of duodenal stenosis due to urothelial carcinoma. Intern Med. 2021;60(5):719–24.

15. Nakai Y, Isayama H, Takahara N, Hamada T, Mohri D, Kogure H, Matsubara S, Yamamoto N, Tada M, Koike K. Endoscopic ultrasound-guided fine-needle aspiration for duodenal obstruction without a discrete mass. Dig Dis Sci. 2015;60(5):1502–4.

16. Stromman LA, Sharma N, Sullivan M. Upper ureteric transitional cell carcinoma, extending to the renal pelvis, presenting as duodenal obstruction. BMJ Case Rep. 2015. https://doi.org/10.1136/bcr-2015-210028.

17. Ando T, Watanabe K, Takashashi K, Mizusawa T, Sakai T, Katagiri A. Duodenal and rectal obstructions due to urothelial cancer infiltration from recurrent renal pelvic cancer in the bladder wall: an autopsy case. Urol Case Rep. 2019;27:100903.

18. AlSaheed EF, Tunio MA, AlSayari K, AlDandan S, Riaz K. Duodenal metastasis from lung adenocarcinoma: a rare cause of melena. Int J Surg Case Rep. 2015;13:91–4.

19. Iwamuro M, Uetsuka H, Makihata K, Yamamoto K. Metastatic tumors in the duodenum: a report of two cases. J Cancer Res Ther. 2015;11(3):648.

20. Leitao C, Caldeira A, Banhudo A. A rare cause of intestinal bleeding: duodenal metastasis from endometrial cancer. Rev Esp Enferm Dig. 2017;109(8):596.

21. Vilmann P, Jacobsen GK, Henriksen FW, Hancke S. Endoscopic ultrasonography with guided fine needle aspiration biopsy in pancreatic disease. Gastrointest Endosc. 1992;38(2):172–3.

22. Costache MI, Iordache S, Karstensen JG, Saftoiu A, Vilmann P. Endoscopic ultrasound-guided fine needle aspiration: from the past to the future. Endosc Ultrasound. 2013;2(2):77–85.

23. Dumonceau JM, Deprez PH, Janssen C, Iglesias-Garcia J, Larghi A, Vanbrievet G, Athal GP, Arcidiaceno PG, Bastos P, Carrara S, et al. Indications, results, and clinical impact of endoscopic ultrasound (EUS)-guided sampling in gastoenterology. European Society Of Gastrointestinal Endoscopy (ESGE) clinical guideline - updated January 2017. Endoscopy. 2017;49(7):695–714.

24. Athal GP, Anagnostopoulos GK, Kaye P. EUS-guided Trucut mural biopsies in the investigation of unexplained thickening of the esophagogastric wall. Gastrointest Endosc. 2005;62(4):624–9.

25. Ye Y, Tan S. Endoscopic ultrasound-guided fine-needle aspiration biopsy for diagnosis of gastric limits plastic with negative malignant endoscopy biopsies. Oncol Lett. 2018;16(4):4915–20.

26. Ge N, Zhang S, Jin Z, Sun S, Yang A, Wang B, Wang G, Xu G, Hao J, Zhong L, et al. Clinical use of endoscopic ultrasound-guided fine-needle aspiration: guidelines and recommendations from Chinese society of digestive endoscopy. Endosc Ultrasound. 2017;6(2):75–82.

27. Mizuide M, Ryozawa S, Fujita A, Ogawa T, Katsuda H, Suzuki M, Noguchi T, Tanisaka Y. Complications of endoscopic ultrasound-guided fine needle aspiration: a narrative review. Diagnostics. 2020;10(11):964. https://doi.org/10.3390/diagnostics10110964.

28. Wang KX, Ben QW, Jin ZD, Du YQ, Zou DW, Liao Z, Li ZS. Assessment of morbidity and mortality associated with EUS-guided FNA: a systematic review. Gastrointest Endosc. 2011;73(2):283–90.

29. Paquin SC. Training in endoscopic ultrasound-guided fine needle aspiration. Endosc Ultrasound. 2014;3(1):12–6.

30. Takuchi D, Morimoto O, Wada R, Higashiguchi M, Nonoshita T, Nishida K, Wada N, Sakata K, Akamari Y, Ota H, et al. A case of urothelial carcinoma who underwent pancreaticoduodenectomy and was diagnosed with groove pancreatitis and preoperatively suffered from duodenal stenosis. Gan To Kagaku Ryoho. 2017;44(12):2003–5.

31. Anand D, Barroeta JE, Gupta PK, Kochman M, Baloch ZW. Endoscopic ultrasound guided fine needle aspiration of non-pancreatic lesions: an institutional experience. J Clin Pathol. 2007;60(1):1254–62.

Publisher’s Note
Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.