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Case Report of a Missed Small Bowel Adenocarcinoma on an Upper Endoscopy-A Review of Small Bowel Diagnostic Modalities

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Abstract

Background: Small bowel neoplasms (SBN) are rare but pose a significant diagnostic challenge. The routine upper endoscopy delays the diagnosis, and most cases require multiple investigations increasing the health care burden.

Case summary: A 74-year-old man presented with two months of progressively worsening postprandial bilious emesis and epigastric abdominal pain. He underwent outpatient evaluation with upper endoscopy and a computed tomographic enterography. The first endoscopy did not enable us to recognize the small bowel mass, leading to a diagnostic delay of two months. He subsequently developed a complete intestinal obstruction. A Second look upper endoscopy done with a push enteroscopy showed an apple core-like mass suggestive of a possible malignant neoplasm at the distal duodenum/proximal jejunum.

Conclusion: Therefore, more sensitive, and specific diagnostic modalities like push enteroscopy, capsule endoscopy, and deep enteroscopy should be considered in case upper endoscopy is not conclusive.

Keywords: Small bowel adenocarcinoma, Push enteroscopy, Capsule endoscopy, Case report, Computed tomographic enterography, Therapeutic and diagnostic challenge

1. Introduction

Small bowel neoplasms (SBN) account for less than 5% of all gastrointestinal tract tumors.¹ They impose a significant diagnostic and therapeutic challenge. Since the 1990s several small new bowel diagnostic modalities have been developed, which have improved both diagnostic yield and improved survival. According to prior data, routine upper endoscopy as a diagnostic modality causes an average delay of 21 weeks, and requires multiple investigations and upgraded techniques, increasing the health care burden.² We report a case of a missed small bowel adenocarcinoma (SBA), and an uptodate literature review on small bowel diagnostic modalities.

2. Case presentation

A 74-year-old male presented with two months of progressively worsening postprandial bilious emesis and epigastric abdominal pain. He also reported an inability to pass stools and flatus for three days before the presentation. He endorsed 4 lbs. weight loss in one month and night sweats. His family history of breast cancer in his mother and sister was significant. He underwent outpatient evaluation with an upper gastrointestinal endoscopy [Fig. 1], which showed gastritis, but the study was suboptimal secondary to food in the stomach and duodenum. Subsequently, he underwent computed tomographic (C.T.) enterography [Fig. 2], that showed a distal third portion of duodenum wall thickening with adjacent fat stranding read as duodenitis.

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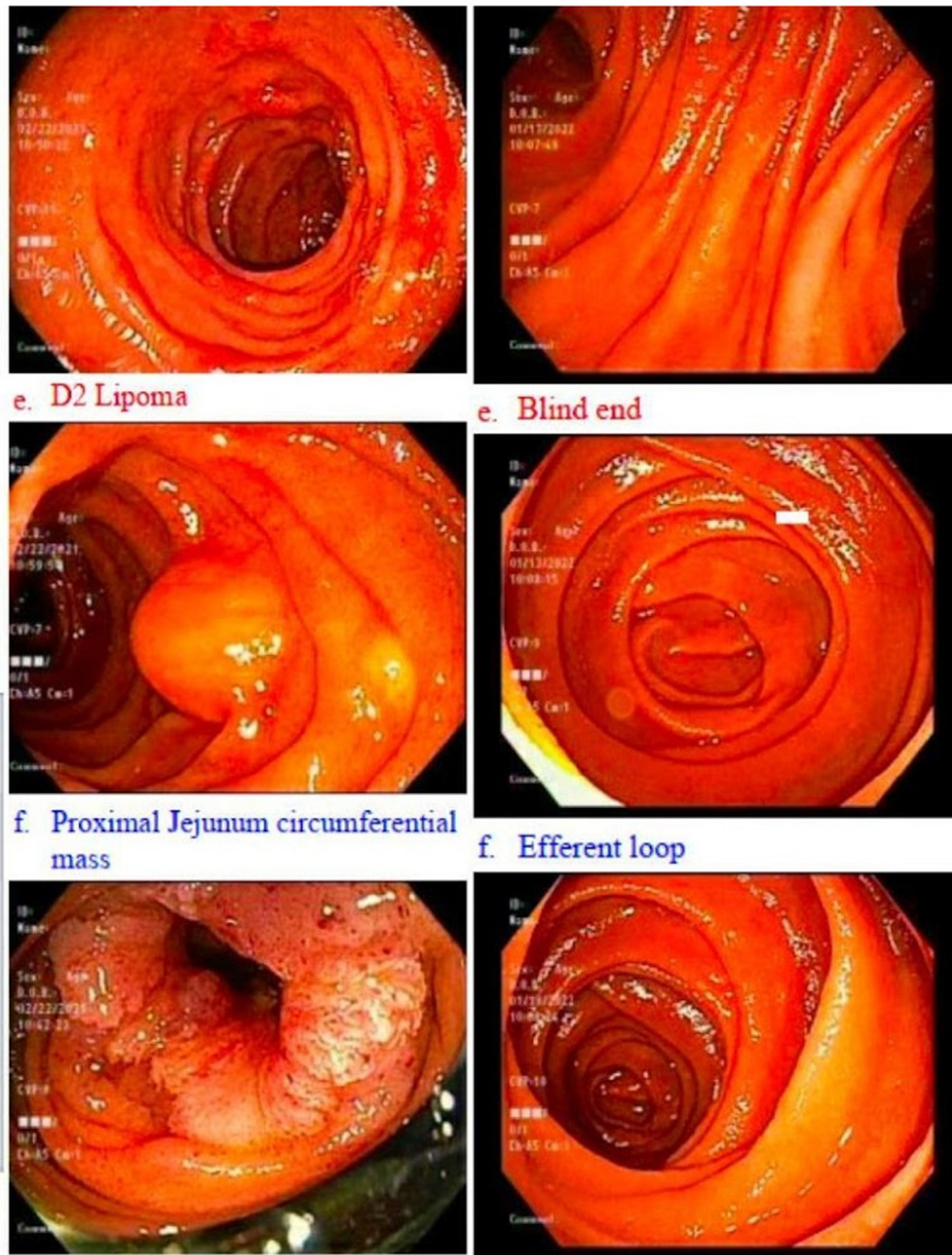


Fig. 1. Left side shows a push enteroscopy illustrating an apple core lesion in the distal duodenum/jejunum junction. The right side shows the surveillance endoscopy at 11 months, showing healed post-surgical anastomosis side.

His blood pressure was 149/79 mm hg and his heart rate was 89 beats per minute when he was examined. The Abdominal examination revealed no abdominal tenderness or palpable mass; the rectal exam showed brown stools. A complete blood examination revealed hemoglobin of 16.7 g/dl and a white blood cell count of 1209/mm³. Liver function tests revealed 1 mg/dl bilirubin and were 4 unremarkable for transaminitis or cholestasis. The

baseline level of tumor markers such as carcinoembryonic antigen (CEA) was 3.1 ng/ml, and carbohydrate antigen 19–9 (CA19-9) was 5.7 U/ml. Repeated upper gastrointestinal endoscopy with pediatric colonoscope to perform a push enteroscopy showed an apple core-like mass suggestive of possible malignant neoplasm at the distal duodenum/proximal jejunum. Computed tomography of the chest and abdomen showed dilated stomach

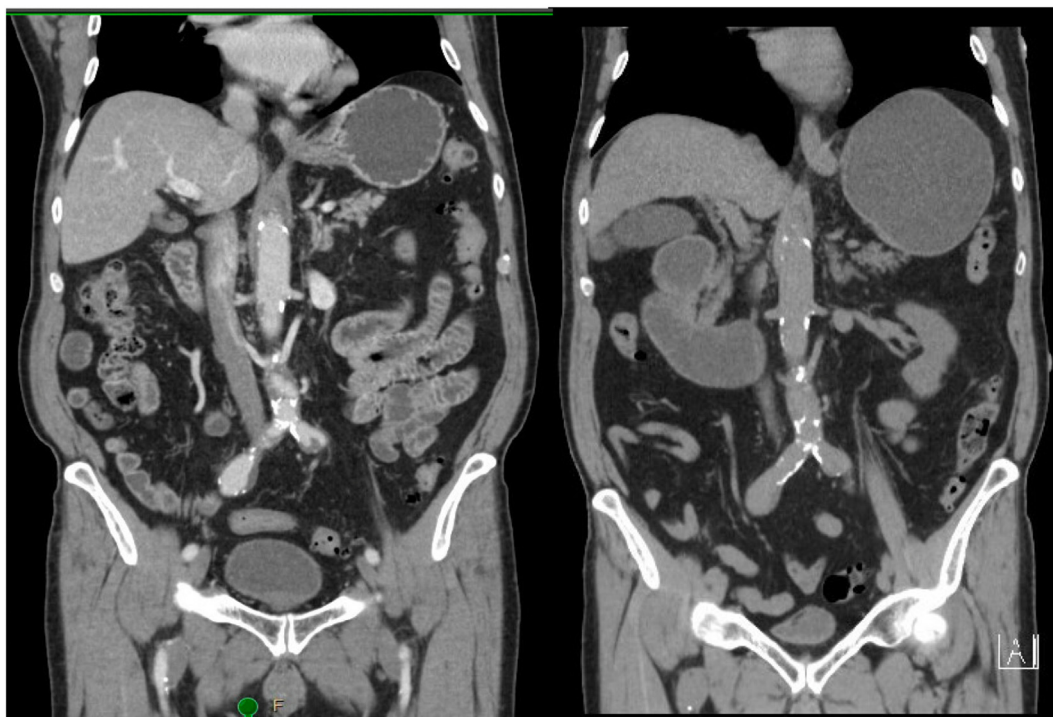


Fig. 2. Right side: Computed Tomographic (C.T.) enterography, with evidence of duodenitis without any evidence of gastric outlet obstruction. Left side: C.T. scan abdomen without oral/IV contrast showing gastric outlet obstruction.

and proximal duodenum above the transverse part of the duodenum, with 10 mm paraaortic lymph nodes and multiple lung nodules.

A preliminary diagnosis suggested small bowel obstruction secondary to a possible small bowel neoplasm. The general surgical team was consulted, and he underwent laparoscopic duodenectomy combined with a duodenojejunostomy. Histology [Fig. 3], of endoscopic biopsy confirmed invasive moderately differentiated small intestinal adenocarcinoma (intestinal type) with resection margins negative for invasion. However, a Perineural and lymph vascular invasion spread to one regional lymph node, which was found. The immunohistochemistry was negative for mismatch repair gene mutations.

The definitive diagnosis was primary adenocarcinoma of the fourth portion of the duodenum, with stage III b, T3N1M0. He remained nothing per mouth. And suctioned with a nasogastric tube to suction. However, on postoperative day four, the upper gastrointestinal series [Fig. 3], showed a mild delay in the passage of contrast at the site of the duodenal jejunal anastomosis.

At one month's outpatient follow-up, a positron emission tomography (PET) scan [Fig. 3] for metastasis workup showed mild fluorodeoxyglucose

(FDG) uptake in the duodenum, likely inflammatory, without enlarged or FDG avid lymphadenopathy. He followed up with an oncologist outpatient two months after the hospital discharge. He was started on FOLFOX (oxaliplatin, fluorouracil, and leucovorin) adjuvant chemotherapy with curative intent for six months.²⁰

3. Discussion

The small intestine comprises 75% of the entire length of the digestive tract. However, SBNs are very rare worldwide.³ According to the United States (US) national cancer database there has been a rapid rise in the incidence of SBN over the last two decades.⁴ The malignant tumors include primarily neuroendocrine tumors (37.4%), followed by SBA (36.9%). The most common site of SBA is duodenum, followed by jejunal and ileal.⁵ Our case revealed a mass at the distal duodenum/proximal jejunum compatible with prior data.

The SBA can arise sporadically; however, it is frequently found in patients with specific genetic syndromes or preexisting gastrointestinal diseases like Crohn's disease. The median age at diagnosis is around 60 years. The most common presenting symptoms include vague abdominal pain and bleeding.⁶ Our patient was not found to have any

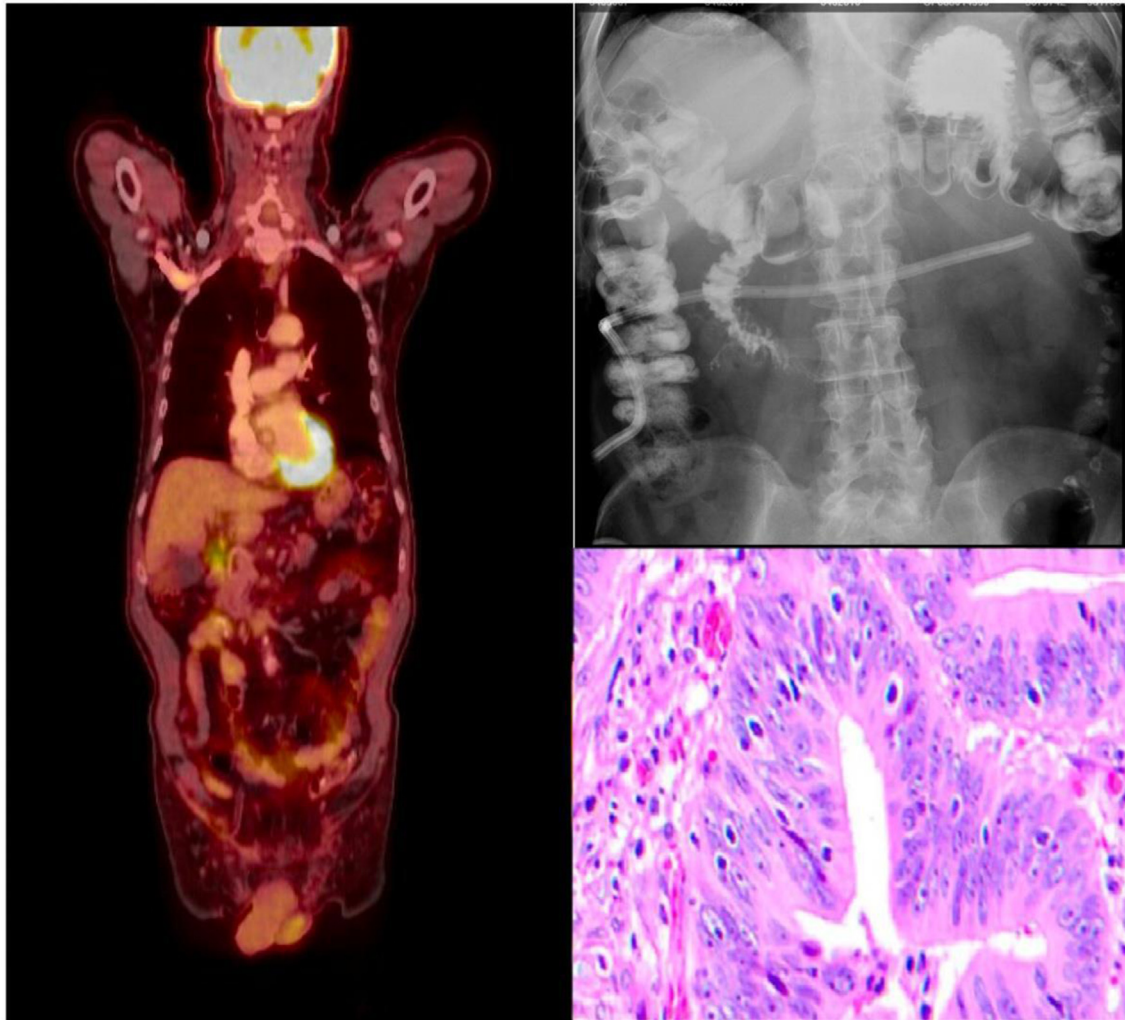


Fig. 3. Right side: Positron emission tomography (P.E.T.) scan after duodenectomy showing no increased fluorodeoxyglucose (F.D.G) uptake in distal sites or lymph nodes. Left upper image: Small bowel series shows resolution of gastric outlet obstruction, contrast seen in the large bowel. Left lower image: colonoscopic biopsy showing invasive moderately differentiated adenocarcinoma.

genetic mutations nor did he have any history of inflammatory bowel disease and presented with worsening abdominal pain and vomiting.

There is however no consensus regarding its diagnostic approach and management strategies due to rare incidences and poor outcomes. In addition, vague clinical signs and symptoms and radiological diagnostic challenges often delay treatment. A limitation of upper endoscopy is that only a portion of the proximal small bowel is visualized up to the duodenum's second portion.⁷ As we see in our case, the CT scan had non-specific findings and the initial EGD was not conclusive. However, advances in imaging technology have made earlier and more accurate diagnoses possible in the last few decades. Recent advances in facilitating this diagnosis, management and monitoring of disease

progression include capsule endoscopy, deep enteroscopy with balloon-assisted or spiral techniques, magnetic resonance enterography and computerized tomography.²¹ The 2015 American College of Gastroenterology (ACG) guidelines for suspected small bowel bleeding recommend a secondlook endoscopy for an incomplete first evaluation and recurrent bleeding.⁸

On the contrary, the European Society of Gastrointestinal Endoscopy (ESGE) guidelines recommends against the routine second looked upper endoscopy and encourage proceeding with capsule endoscopy (CE).⁹ In addition, push enteroscopy (PE) can be performed as a secondlook examination to evaluate suspected small bowel bleeding. In our case, PE was performed for second look evaluation after negative first upper

endoscopy. PE is an extended upper endoscopy performed with either a pediatric colonoscope or a commercially available push enteroscope. It allows a limited evaluation of the proximal small bowel approximately 70 cm distal to the ligament of the trietz. The diagnostic yield ranges from 3 to 70%.¹⁰ If the second look examination is normal, a small bowel evaluation with video capsule enterography (VCE) is recommended as the first-line modality. It allows noninvasive evaluation of the entire small bowel, with a diagnostic yield of 38–83% in patients with suspected small bowel bleeding.¹¹ It has a high positive (94–97%) and negative predictive value (83–100%) for SBN. The diagnostic yield is increased in the setting of hemoglobin 6 months), more than one episode of bleeding, overt bleeding, and performance of VCE within two weeks of the bleeding episode.¹² Even though there are previous reports stating that capsule endoscopy is superior to computer tomography and small bowel follow through, there is a potential to miss a considerable number of tumors, particularly in proximal jejunum.²² The main disadvantage includes a lack of therapeutic interventions, capsule retention, and a lower identification rate of the major papilla and duodenal lesions due to rapid transit through the duodenum. However, this may be improved to 60% if a dual-camera capsule is used.¹³ A randomized controlled trial (RCT) compared the sensitivity and specificity of VCE and PE; it concluded the higher sensitivity of VCE (64% compared with 37% for push enteroscopy). The specificity was 92% for capsule enteroscopy and 97% for push enteroscopy.¹⁴ Other studies reproduced similar results, recommending that the VCE-first approach has a significant diagnostic advantage over PE-first in patients with obscure gastrointestinal bleeding (OGIB).^{15,16} The new magnetic-assisted capsule technology uses an external magnet to control the capsule to achieve targeted views, which might improve small bowel completion rate by reducing gastric transit time.

However, computed tomographic enterography (CTE) should be performed in patients with suspected small bowel obstruction of any etiology. This is because it has a higher detection rate of mural-based SBN. Moreover, according to prior data, MR enteroclysis has been recommended for initial work-up of small bowel tumours – its ability for excellent soft tissue visualization and lack of harm via ionizing radiation makes it suitable as the initial modality.²³ After the small bowel lesion is confirmed, specific management with PE, deep enteroscopy, surgery, or intraoperative enteroscopy

is pursued. The patient mentioned above underwent duodenectomy with duodenojejunal anastomosis. Surgical pathology revealed a node-positive duodenal adenocarcinoma with complete resection, with immunohistochemistry negative for mismatch repair genes.

Deep enteroscopy includes double-balloon enteroscopy (DBE) and single balloon enteroscopy (SBE). It allows deeper intubation of the small bowel compared to standard endoscopes. It can be advanced with either an oral or a rectal approach. The intubation is twice as deeper as compared to a push enteroscopy. The main advantage over a VCE is the ability for both diagnostic and therapeutic capabilities, including biopsies, polypectomy, dilation, and foreign body removal (including retained capsules). The diagnostic yield of DBE ranges from 60 to 80% in patients with suspected small bowel bleeding. Studies have confirmed the utilization of DBE in both chronic stable and active urgent bleeding with a lower rate of recurrence in urgent bleeding.¹⁷ The complication rate of DBE is 1.2%, including pancreatitis, perforation, and ileus.¹⁸ SBE has similar indications as DBE and has a similar diagnostic accuracy to DBE for evaluating small bowel bleeding. Two meta-analyses have concluded a comparable diagnostic yield of DBE compared to VCE for all small bowel findings, including vascular, inflammatory, and neoplastic lesions.¹⁹ However, the diagnostic yield of DBE using a combined antegrade and retrograde approach is higher as compared to VCE. The ACG guidelines recommend a VCE-guided DBE approach to increase diagnosis and therapeutic yield.

SBN pose substantial diagnostic and therapeutic challenges. Therefore, more sensitive, and specific diagnostic modalities like push enteroscopy, capsule endoscopy, deep enteroscopy should be considered in case of failed first upper endoscopy. Our case is a reminder for physicians to identify clinical, endoscopic, and radiological signs that prompt further investigation with the above-mentioned evaluations and judiciously use these advanced techniques to prevent diagnostic delay as well as unnecessary health care burden. We want to create an objective thinking process for example, when the EGD initially was non-conclusive, the retained food could have served as the hint for further investigation beyond the duodenal portion visualized. It is important to note that guidelines vary considerably in terms of the best advanced modality however, our case highlights that index of suspicion also plays an important role in choosing the appropriate investigation.

Authorship contributions

Kaur, Avleen: Study idea, data collection, manuscript writing and review.

Baqir, Syed Mujtaba: Manuscript writing and review.

Patel, Kunal: Study idea, manuscript writing and review.

Zaveri, Kaveh: Study idea, manuscript expert review.

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Disclaimer

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Ethics approval

Our institution does not require ethical approval for reporting individual cases or case series.

Informed consent

Written informed consent was obtained from the patient(s) for their anonymized information to be published in this article.

Conflicts of interest

No conflict of interests.

Acknowledgement

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References

- Barsouk A, Rawla P, Barsouk A, Thandra KC. Epidemiology of cancers of the small intestine: trends, risk factors, and prevention. *Med Sci*. 2019 Mar 17;7(3):46.
- de Latour RA, Kilaru SM, Gross SA. Management of small bowel polyps: a literature review. *Best Pract Res Clin Gastroenterol*. 2017 Aug 1;31(4):401–408.
- Gay G, Delvaux M, Fassler I. Outcome of capsule endoscopy in determining indication and route for push-and-pull enteroscopy. *Endoscopy*. 2006;38(1):49–58. <https://doi.org/10.1055/s-2005-921176>.
- Bilimoria KY, Bentrem DJ, Wayne JD. Small bowel cancer in the United States: changes in epidemiology, treatment, and survival over the last 20 years. *Ann Surg*. 2009;249(1):63–71, 9.
- Halfdanarson TR, McWilliams RR, Donohue JH, Quevedo JF. A single-institution experience with 491 cases of small bowel adenocarcinoma. *Am J Surg*. 2010 Jun 1;199(6):797–803.
- Sakae H, Kanzaki H, Nasu J. The characteristics and outcomes of small bowel adenocarcinoma: a multicenter retrospective observational study. *Br J Cancer*. 2017;117(11):1607–1613.
- Descamps Schmit, Gossu V. „missed” upper gastrointestinal tract lesions may explain „occult” bleeding. *Endoscopy*. 1999;31(6):452–455. <https://doi.org/10.1055/s-1999-151>.
- Zaman A, Katon RM. Push enteroscopy for obscure gastrointestinal bleeding yields a high incidence of proximal lesions within reach of a standard endoscope. *Gastrointest Endosc*. 1998; 47(5):372–376. [https://doi.org/10.1016/s0016-5107\(98\)70221-4](https://doi.org/10.1016/s0016-5107(98)70221-4).
- Pennazio M, Spada C, Eliakim R, et al. Small-bowel capsule endoscopy and device-assisted enteroscopy for diagnosis and treatment of small-bowel disorders: European Society of Gastrointestinal Endoscopy (ESGE) Clinical Guideline. *Endoscopy*. 2015;47(4):352–376. <https://doi.org/10.1055/s-0034-1391855>.
- Hayat M, Axon ATR, O'Mahony S. Diagnostic yield and effect on clinical outcomes of push enteroscopy in suspected small-bowel bleeding. *Endoscopy*. 2000;32(5):369–372. <https://doi.org/10.1055/s-2000-900310>.
- Rondonotti E, Villa F, Mulder CJ. Small bowel capsule endoscopy in 2007: indications, risks, and limitations. *World J Gastroenterol*. 2007;13(46):6140–6149.
- Singh A, Marshall C, Chaudhuri B. Timing of video capsule endoscopy relative to overt obscure GI bleeding: implications from a retrospective study. *Gastrointest Endosc*. 2013;77(5): 761–766.
- Lepileur L, Dray X, Antonietti M. Factors associated with diagnosis of obscure gastrointestinal bleeding by video capsule endoscopy. *Clin Gastroenterol Hepatol*. 2012;10(12): 1376–1380.
- Appleyard M, Fireman Z, Glukhovskiy A, et al. A randomized trial comparing wireless capsule endoscopy with push enteroscopy for the detection of small-bowel lesions. *Gastroenterology*. 2000;119(6):1431–1438. <https://doi.org/10.1053/gast.2000.20844>.
- Segarajasingam DS, Hanley SC, Barkun AN. Randomized controlled trial comparing outcomes of video capsule endoscopy with push enteroscopy in obscure gastrointestinal bleeding. *Canadian J gastro Hepatol*. 2015;29(2):85–90.
- Marmo R, Rotondano G, Piscopo R, Bianco MA, Cipolletta L. Meta-analysis: capsule endoscopy vs. conventional modalities in diagnosis of small bowel diseases. *Aliment Pharmacol Ther*. 2005;22(7):595–604. <https://doi.org/10.1111/j.1365-2036.2005.02625.x11>.
- Mönkemüller K, Neumann H, Meyer F, Kuhn R, Malfertheiner P, Fry L. A retrospective analysis of emergency double-balloon enteroscopy for small-bowel bleeding. *Endoscopy*. 2009;41(8): 715–717. <https://doi.org/10.1055/s-0029-1214974>.
- Möschler O, May A, Müller M, Ell C. Complications in and performance of doubleballoon enteroscopy (DBE): results from a large prospective DBE database in Germany. *Endoscopy*. 2011; 43(6):484–489. <https://doi.org/10.1055/s-0030-1256249>.
- Teshima CW, Kuipers EJ, van Zanten SV, Mensink PBF. Double balloon enteroscopy and capsule endoscopy for obscure gastrointestinal bleeding: an updated meta-analysis: meta-analysis: DBE versus CE for OGIB. *J Gastroenterol Hepatol*. 2011; 26(5):796–801. <https://doi.org/10.1111/j.1440-1746.2010.06530.x>.
- André T, Boni C. Multicenter international study of oxaliplatin/5-fluorouracil/leucovorin in the adjuvant treatment of colon cancer (MOSAIC) investigators. *N Engl J Med*. 2004; 350(23):2343–2351.
- Aktas H, Mensink PB. Small bowel diagnostics: current place of small bowel endoscopy. *Best Pract Res Clin Gastroenterol*. 2012 Jun 1;26(3):209–220.
- Han JW, Hong SN, Jang HJ, et al. Clinical efficacy of various diagnostic tests for small bowel tumors and clinical features of tumors missed by capsule endoscopy. *Gastroenterology Research and Practice*. 2015 Jul 2:2015.
- Masselli G, Casciani E, Poletti E, Laghi F, Gualdi G. Magnetic resonance imaging of small bowel neoplasms. *Cancer Imag*. 2013;13(1):92.