Original Article

PORTO BIOMEDICAL JOURNAL
WHERE SCIENCE MEETS KNOWLEDGE

OPEN

Clinicopathological characteristics and prognostic factors of small bowel lymphomas: a retrospective single-center study

Emanuel Dias*, Renato Medas, Margarida Marques, Patrícia Andrade, Hélder Cardoso, Guilherme Macedo

Abstract

Background: There is little information on diagnosis and management of small bowel lymphomas, and optimal management strategies are still undefined. This study aims to describe their main clinical and pathological characteristics and identify poor prognostic factors.

Methods: A retrospective observational study of all patients with histological diagnosis of small bowel lymphoma between January 2010 and December 2020 was performed.

Results: We included 40 patients, with male predominance (60%) and mean age of 60.7 years. The ileum was the most common location, and the most common histological subtypes were follicular lymphoma and diffuse large B-cell lymphoma. Clinical presentation was variable from asymptomatic patients (30%) to acute surgical complications (35%) including perforation, intestinal obstruction, ileal intussusception, or severe bleeding. Diagnosis was established by endoscopy in 22 patients (55%), and the most common findings included polyps, single mass, diffuse infiltration, or ulceration, whereas 18 (45%) required surgery because of acute presentations or tumor resection, and lymphoma was diagnosed postoperatively. Surgery was curative in one-third of those patients. Median survival was 52 months. Acute presentation ($P = 0.001$), symptomatic disease ($P = 0.003$), advanced stage ($P = 0.008$), diffuse large B-cell lymphoma ($P = 0.007$), anemia ($P = 0.006$), hypoalbuminemia ($P < 0.001$), elevated lactate dehydrogenase ($P = 0.02$), elevated C-reactive protein ($P < 0.001$), and absence of treatment response ($P < 0.001$) were significant predictors of mortality.

Conclusion: Small bowel lymphoma is a rare malignancy with diverse clinical and endoscopic presentations that require a high index of suspicion. Primary factors associated with worse outcome included acute presentation, advanced stage, histological subtype, biochemical abnormalities, and absence of treatment response.

Keywords: small bowel, lymphoma, lymphoproliferative disease

Introduction

The gastrointestinal tract is the most common site of extranodal non-Hodgkin lymphoma, accounting for 30%–40% of all extranodal disease. The most frequently involved site is the stomach (50–60%), followed by the small bowel that represents approximately 20–30% of all gastrointestinal lymphomas and 15%–20% of all small bowel malignancies.[1]

Diagnosis can be challenging because they represent a heterogeneous group of disorders with variable and nonspecific clinical manifestations, imaging features, and endoscopic findings, and small bowel is traditionally less accessible for endoscopic examination. Although technical developments of capsule endoscopy and balloon-assisted enteroscopy have significantly improved diagnostic yield for small bowel malignancies, lymphomas are still often diagnosed at advanced stage with high rates of morbidity and mortality.[2]

Past studies evaluated gastrointestinal lymphomas from different gastrointestinal primary sites as a single disease entity. However, treatment strategies and survival rates of lymphomas arising from different sites along gastrointestinal tract can be considerably variable and should be analyzed separately.[3,4] Consequently, few studies specifically addressed small bowel lymphomas,[5-10] and there is little information on their clinical diagnosis and management, and few prognostic factors have been reliably established. As a result, optimal management strategies remain undefined.

Therefore, we retrospectively analyzed all cases of small bowel lymphoma diagnosed in our hospital over a period of 11 years. The aims of this study were to describe their main clinical and pathological characteristics and identify poor prognostic factors.

Methods

A retrospective observational study of all patients with histological diagnosis of small bowel lymphoma between January 2010 and December 2020 at Centro Hospitalar Universitário de São João (Porto, Portugal) was performed. Patients were selected from a database with every histopathological examinations performed in the pathology department, and all adult patients with confirmed histological diagnosis of lymphoma in a small bowel sample obtained from endoscopic biopsy or surgical

Gastroenterology Department, Centro Hospitalar Universitário de São João, Porto, Portugal

** Corresponding author. Address: Gastrenterology Department, Centro Hospitalar Universitário de São João, Alameda Professor Hernâni Monteiro, 4200-319, Porto, Portugal. E-mail address: diasj0310@gmail.com (Emanuel Dias)*

Porto Biomed. J. (2023) 8:3(e217)

Received: 27 April 2023 / Accepted: 21 May 2023

http://dx.doi.org/10.1097/j.pbj.0000000000000217

specimen from duodenum, jejunum, or ileum were included. Subsequently, the hospital electronic medical records were searched to retrieve clinical, pathological, radiological, histological, and endoscopic data. This study was approved by our local ethics committee.

Laboratory and imaging data were based in the closest blood analysis and computerized tomography (CT) scan to diagnosis, preferentially before starting any chemotherapy regimen. All routine hematoxylin and eosin stains and immunohistochemical stained slides were reviewed by two pathologists. Different histological subtypes of lymphoma were classified according to the World Health Organization classification[11] and staged according to the Ann-Arbor staging system as modified by Musshoff et al.[12] Dawson criteria were used to distinguish primary from secondary gastrointestinal lymphomas.[13]

Statistical analysis was performed using the SPSS 27.0 software package. Categorical variables were expressed as frequencies and percentages and compared using the chi-square or Fisher exact test. Continuous variables were expressed as means and standard deviation for variables with normal distribution or median and interquartile range for variables with skewed distribution and compared using the Student t test or the nonparametric test. Normal distribution was checked using the Shapiro–Wilk test or skewness and kurtosis. Survival analysis was performed using a Kaplan–Meier curve. A two-tailed $P < 0.05$ was considered statistically significant.

Results

A total of 40 patients with small bowel lymphoma were included (Table 1), 24 (60%) male and 16 (40%) female patients, with a mean age of 60.7 ± 13.8 years. The most common clinical manifestations included abdominal pain (37.5%), constitutional symptoms (25%), weight loss (25%), gastrointestinal bleeding (12.5%), constipation (10%), nausea and vomiting (10%), abdominal distension (7.5%), and diarrhea (7.5%). Twelve patients (30%) were asymptomatic, whereas 14 (35%) presented with acute surgical complications, including perforation, intestinal obstruction, intestinal invagination, or severe bleeding. Laboratory studies revealed anemia in 55%, leukocytosis in 10%, thrombocytopenia in 7.5%, hypoalbuminemia in 52.5%, elevated C-reactive protein (CRP) in 42.5%, and elevated lactate dehydrogenase (LDH) in 22.5%. Abdominal CT scan was performed in 35 patients and revealed abnormal small bowel findings in 25 (71.4%) as parietal thickening (80%) or solid mass (20%). Findings related to acute complications such as free air, intraperitoneal fluid, or small bowel distension were also detected when present.

Diagnosis was established by endoscopic biopsy in 22 patients (55%), and all presented endoscopic abnormalities (Fig. 1, Table 2), including polyps/polypoid lesions (54.5%), diffusely infiltrative mucosa (40.9%), ulceration (13.6%), or a single tumor or mass (9.1%). Esophagogastroduodenoscopy (EGD) allowed the diagnosis of 16 duodenal lymphomas, and ileocolonoscopy detected two ileal lymphomas. Additional gastric and colonic involvement was also detected in four (10%) and two (5%) patients, respectively. Capsule endoscopy and/or balloon-assisted enteroscopy were performed in 13 patients, and all presented abnormal findings. Importantly, these techniques detected additional jejunal involvement in five patients which had already small bowel lymphoma diagnosed by upper endoscopy or ileocolonoscopy and were essential for diagnosis in seven patients who had previously underwent negative EGD and/or ileocolonoscopy.

In 18 patients (45%), the disease was postoperatively diagnosed after small bowel resection (Table 3). Four patients

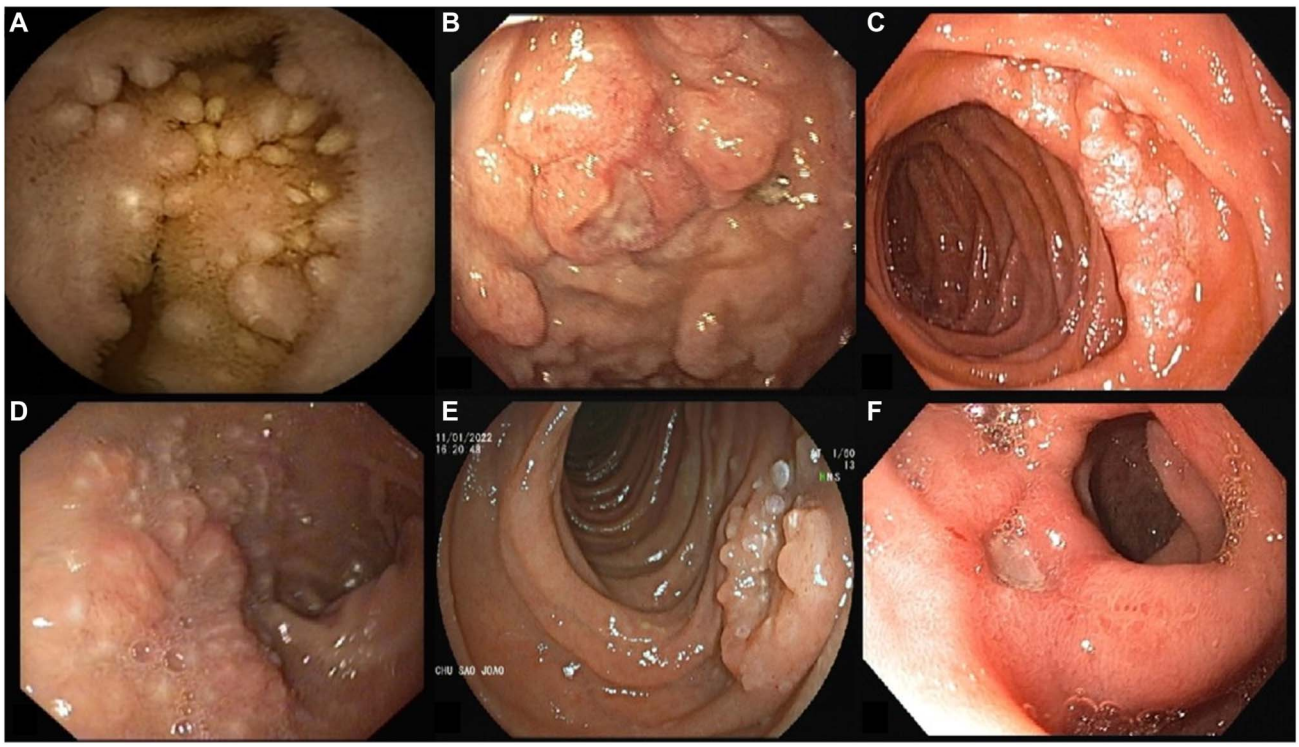

Figure 1. Small bowel lymphomas can have diverse endoscopic presentations including: A, multiple polyps along jejunal mucosa; B, duodenal ulcerated polypoid lesions; C, segments of duodenal mucosa with small whitish nodules giving an infiltrative appearance; D, ileal infiltrative nodular mucosa; E, small whitish nodules along jejunal mucosa; F, single duodenal ulcer.

TABLE 1

Clinical, pathological, and endoscopic characteristics of the patients

	n	(%)
Number of patients	40	
Age, mean ± SD, years	60.7 ± 13.8	
Sex		
Male	24	(60.0)
Female	16	(40.0)
Classification		
Primary	15	(37.5)
Secondary	25	(62.5)
Histological subtype		
Follicular lymphoma	13	(32.5)
Diffuse large B-cell lymphoma	11	(27.5)
MALT lymphoma	6	(15.0)
Mantle cell lymphoma	3	(7.5)
Burkitt lymphoma	3	(7.5)
Plasmablastic lymphoma	2	(5.0)
Small lymphocytic lymphoma	2	(5.0)
Hodgkin lymphoma	1	(2.5)
Anatomical distribution		
Duodenum	13	(32.5)
Jejunum	5	(12.5)
Ileum	17	(42.5)
Duodenum + jejunum	1	(2.5)
Duodenum + jejunum + ileum	4	(10.0)
Disease stage		
I	17	(42.5)
II	5	(12.5)
III	2	(5.0)
IV	16	(40.0)
Endoscopic abnormalities (n = 22)		
Polyps	12	(54.5)
Infiltrative mucosa	9	(40.9)
Ulceration	3	(13.6)
Single tumor/mass	2	(9.1)

underwent elective surgery for resection of tumors identified in abdominal CT and not amenable to characterization with enteroscopy because of inaccessible location in distal jejunum/proximal ileum. The remaining fourteen underwent emergent surgery for acute complications, including six cases of perforation (ileal: 5, jejunal: 1), four cases of ileal obstruction by a stenosing tumor, three cases of ileal intussusception, and one case of overt obscure bleeding from an ileal ulcer previously identified by capsule endoscopy.

Overall, ileum was the most commonly involved segment in 21 patients (52.5%), followed by duodenum in 18 (45%) and jejunum in 10 (25%); diffuse involvement along more than one small bowel segment was present in five patients (12.5%). Fifteen patients (37.5%) had primary small bowel lymphoma, whereas in 25 patients (62.5%), the small bowel was secondarily involved. The most common histological subtypes were follicular lymphoma (32.5%) and diffuse large B-cell lymphoma (27.5%), followed by MALT lymphoma (15%), mantle cell lymphoma (7.5%), Burkitt lymphoma (7.5%), plasmablastic lymphoma (5%), small lymphocytic lymphoma (2.5%), and Hodgkin lymphoma (2.5%). Most cases were detected at stage I (42.5%), although patients were also diagnosed at stages II (12.5%), III (5%), and IV (40%). Eighteen patients had lymph node involvement: locoregional in six (15%) and distant in twelve (30%). Bone marrow was involved in eight patients (20%), liver in seven (17.5%), and spleen in four (10%). Other organs, including Waldeyer ring, oral cavity, central nervous system, adrenal gland, and lung, were occasionally involved.

Treatment strategies were selected according to clinical presentation, histological subtype, and disease stage. Seven patients (17.5%) did not receive any treatment because they presented an early-stage indolent lymphoma, and a close surveillance strategy was selected. Surgery was required in 18 patients with variable outcome: Four patients (22.2%) died shortly after surgery because of complications related to a severe underlying condition (intestinal perforation), six (33.3%) were considered cured, and eight (44.4%) required additional chemotherapy. Chemotherapy was administered to 27 patients in total, with complete response in 18 (75%), partial response in 3 (12.5%), and absence of response in 3 (12.5%). The recurrence rate after complete response was 33.3%, after a median of 62 months (range 14–134).

Fourteen patients died during follow-up, which translates into an overall mortality rate of 35%. Median overall survival was 52 months, and the 1-year mortality rate was 32.5%. Acute presentation ($P < 0.001$), symptomatic disease ($P = 0.002$), advanced stage ($P = 0.008$), and absence of treatment response ($P < 0.001$) were significantly associated with higher mortality. Overall, histological subtype was also associated with mortality risk ($P = 0.009$), as revealed by the Fisher-Freeman-Halton exact test. Regarding specific histological subtypes, diffuse large B-cell lymphoma ($P = 0.007$) was significantly associated with increased mortality, whereas follicular lymphoma ($P = 0.001$) was significantly associated with decreased risk. Other histological subtypes did not demonstrate significant association with mortality risk. The presence of anemia, hypoalbuminemia, elevated LDH,

TABLE 2

Frequency of different endoscopic findings at each location in different endoscopic techniques

	Polyps	Diffuse infiltration*	Ulceration	Single tumor	Total
Esophagogastroduodenoscopy					
Stomach	1	—	2	—	3
Duodenum	8	5	3	—	16
Ileocolonoscopy					
Ileum	1	1	—	—	2
Colon	—	1	—	1	2
VCE/balloon-assisted enteroscopy					
Duodenum	2	—	—	—	2
Jejunum	1	—	—	2	3
Ileum	1	—	2	—	3
Duodenum + jejunum + ileum	1	4	—	—	5

* Includes several patterns suggestive of mucosal infiltration including nodular, eryhytematous, or congestive mucosal changes

TABLE 3

Characterization of patients who underwent surgical intervention

	n	(%)
Number of patients	18	
Surgical procedure		
Segmental enterectomy	16	(88.9)
Right hemicolectomy	2	(11.1)
Surgical indication		
Perforation (ileal: 5, jejunal: 1)	6	(33.3)
Tumor resection (ileal: 3, jejunal: 1)	4	(22.2)
Ileal obstruction	4	(22.2)
Ileal intususception	3	(16.7)
Obscure gastrointestinal bleeding (ileal)	1	(5.6)
Outcome		
Short-term mortality	4	(22.2)
Curative (no additional treatment)	6	(33.3)
Required additional chemotherapy	8	(44.4)

and elevated CRP were also associated with increased mortality, with significantly lower hemoglobin count (10.6 ± 2.15 vs 12.8 ± 2.34, $P = 0.006$) and albumin level (40.7 ± 6.36 vs. 28.2 ± 6.93, $P < 0.001$) as opposed to significantly higher LDH (199.7 ± 95.0 vs. 381.6 ± 241.2, $P = 0.02$) and CRP (12.2 ± 28.4 vs. 120.5 ± 91.8, $P < 0.001$) in patients who died compared with patients who survived (Table 4). No significant association was found regarding age, sex, anatomical distribution, or leukocyte count.

Discussion

Although small bowel lymphoma is the second most common small bowel malignancy (after adenocarcinoma), it remains relatively rare.[14] In this study, we describe one of the largest series of small bowel lymphomas to date, which showed a predilection for older male patients and were most commonly classified as follicular lymphoma and diffuse large B-cell lymphoma, consistent with previous studies.[6-9] We described a wide range of clinical presentations, from asymptomatic patients to acute surgical complications. In fact, small bowel lymphomas seem to have a predilection to present in a complicated fashion, as occurred in 35% of patients in our study and supported by previous cases presenting with perforation,[15] intestinal obstruction,[16] ileal intussusception,[17] gastrointestinal bleeding,[18] obstructive jaundice,[19] or acute pancreatitis.[20] However, they are also often detected incidentally in asymptomatic patients[21] or during workup for mild dyspeptic symptoms.[22]

A wide range of endoscopic findings was also reported including polyps, single mass, diffuse infiltration (nodular, congestive, or erythematous mucosal areas), or ulceration (Fig. 1), consistent with the published literature.[23-25] Although we found endoscopic abnormalities in all patients, it is important to note that small bowel lymphomas may also present with normal mucosa[26,27] and may mimic other conditions such as Crohn disease,[28] therefore requiring a high index of suspicion. Endoscopic treatment of complications has also been occasionally described, for example endoscopic

TABLE 4

A comparison of the characteristics of patients who died and remained alive at the end of follow-up

		Death				
		No (n = 26)		Yes (n = 14)		
Variable category	**N**	**n**	**(%)**	**n**	**(%)**	***P***
Sex						
Male	24	13	(54.2)	11	(45.8)	0.08
Female	16	13	(81.3)	3	(18.7)	
Age (years), mean ± SD	40	57.9 ± 13.7		65.8 ± 13.0		0.08
Presentation						
Complicated	14	4	(28.6)	10	(71.4)	**0.001**
Uncomplicated	26	22	(84.7)	4	(15.3)	
Clinical symptoms						
Yes	28	14	(50.0)	14	(50.0)	**0.003**
No	12	12	(100.0)	0	(0.0)	
Origin						
Primary	15	12	(80.0)	3	(20.0)	0.123
Secondary	25	14	(56.0)	11	(44.0)	
Histology						
Follicular lymphoma	13	13	(100.0)	0	(0.0)	**0.009**
DLBCL	11	3	(27.3)	8	(72.7)	
MALT lymphoma	6	5	(83.3)	1	(16.7)	
Mantle cell lymphoma	3	2	(66.7)	1	(33.3)	
Burkitt lymphoma	3	1	(33.3)	2	(66.7)	
Stage						
I	17	14	(82.4)	3	(17.6)	**0.008**
II	5	5	(100.0)	0	(0.0)	
III	2	0	(0.0)	100	(100.0)	
IV	16	7	(43.8)	9	(56.2)	
Hemoglobin (g/dL), mean ± SD	40	12.8 ± 2.34		10.6 ± 2.15		**0.006**
Leukocyte count (x10^{-9}/uL), mean ± SD	40	6.63 ± 2.61		8.16 ± 4,67		0.189
Albumin (g/dL), mean ± SD	40	40.7 ± 6.36		28.2 ± 6.93		**<0.001**
Lactate dehydrogenase (U/L), mean ± SD	40	199.7 ± 95.0		381.6 ± 241.2		**0.02**
C-reactive protein (mg/L), mean ± SD	40	12.2 ± 28.4		120.5 ± 91.8		**<0.001**

The *P* value of those characteristics significantly related to mortality risk is written in bold.
DLBCL, diffuse large B-cell lymphoma.

ultrasound-guided gastrojejunostomy and choledocoduodenostomy for malignant intestinal and biliary obstruction,[29] endoscopic balloon dilation for duodenal stenosis,[30] or placement of covered self-expanding metal stent for duodenal-ileal fistula healing.[31]

Videocapsule endoscopy and balloon-assisted enteroscopy have a high diagnostic yield for small bowel malignancy,[32] and although in our study most cases were diagnosed using EGD or ileocolonoscopy, their importance must be emphasized. First, they demonstrated diffuse involvement along small bowel in five patients already diagnosed with duodenal or ileal lymphoma by EGD or ileocolonoscopy, consistent with a study that revealed a high (50%) prevalence of diminutive small bowel lesions detected by balloon-assisted enteroscopy among patients with primary gastrointestinal lymphoma.[33] Second, they were essential for diagnosis in six patients by detecting small bowel abnormal findings after negative EGD and ileocolonoscopy. Therefore, although many small bowel lymphomas are detectable by EGD or ileocolonoscopy because of diffuse involvement of gastrointestinal tract, capsule endoscopy or balloon-assisted enteroscopy is also often essential for complete staging and diagnosis of localized disease not accessible to conventional endoscopy. The current available diagnostic modalities should complement each other in small bowel investigation, and we suggest that all patients should have a complete small bowel investigation using capsule endoscopy.

Despite their invaluable role, these techniques are not always available and may not be feasible in certain situations, such as obstructive lesions or unstable patients requiring emergent surgical intervention. Besides, balloon-assisted enteroscopy may not always reach the entire length of the small bowel to biopsy the target lesion.[34] Thus, surgery occasionally also plays an important diagnostic role for small bowel neoplasms: In our study, 45% of patients were postoperatively diagnosed either because they required emergent surgery or because the lesion was inaccessible to the enteroscope in distal jejunum/proximal ileum.

Management of small bowel lymphomas is complex and often involves a multidisciplinary approach between gastroenterologists, surgeons, and hemato-oncologists. Although chemotherapy continues to represent the therapeutic mainstay, a high proportion of patients require surgery because of complicated presentations.[10] An important point is whether these patients should undergo additional chemotherapy. Although surgical resection can potentially serve as definitive therapy in cases of localized disease,[7] combined surgery plus chemotherapy seems to be associated with improved survival compared with surgery alone.[7,35] Prospective randomized trials are needed to compare different available treatment modalities and define optimal management strategies.

Advanced stage, no treatment response, symptomatic disease, acute presentation, diffuse large B-cell lymphoma, anemia, hypoalbuminemia, elevated LDH, and elevated CRP were identified as significant predictors of mortality. Previous studies also reported abdominal symptoms, advanced stage, absence of treatment response, hypoalbuminemia, and elevated LDH as poor prognostic factors.[6,8] However, this is the first time an association with acute presentation, histological subtype, hemoglobin, or elevated CRP is shown. By contrast, we did not find association with advanced age, male sex, medical comorbidities, or involvement of multiple gastrointestinal segments, unlike previous studies.[7-9]

The main limitations of our study are related to its retrospective single-center design and absence of long-term follow-up for more recently diagnosed cases. It is possible that information related to subjective parameters (e.g. clinical symptoms) could be underreported in medical records. Nevertheless, we believe our study provides important information related to small bowel lymphomas in a real-life setting that could lead to improved diagnostic and management strategies. As the medical world gets more familiar with small bowel lymphoma, early recognition and timely proper management will certainly result in improved clinical outcomes.

In conclusion, small bowel lymphoma is a rare malignancy that presents important diagnostic and therapeutic challenges. Clinical and endoscopic presentations are variable and nonspecific, requiring a high index of suspicion. Endoscopy is an essential diagnostic tool, and different endoscopic techniques must complement each other. Presentation as acute surgical complications is common, and surgery is occasionally curative in cases of localized disease. Primary factors associated with worse outcome included acute presentation, advanced stage, biochemical abnormalities, and absence of treatment response.

Conflict of interest

The authors declare no conflicts of interest.

References

[1] Olszewska-Szopa M, Wróbel T. Gastrointestinal non-Hodgkin lymphomas. Adv Clin Exp Med. 2019;28:1119-1124.
[2] Yoo AY, Lee BJ, Kim WS, et al. Clinicopathological features of small bowel tumors diagnosed by video capsule endoscopy and balloon-assisted enteroscopy: a single center experience. Clin Endosc. 2021;54:85-91.
[3] Beaton C, Davies M, Beynon J. The management of primary small bowel and colon lymphoma—a review. Int J Colorectal Dis. 2012;27:555-563.
[4] Ghimire P, Wu GY, Zhu L. Primary gastrointestinal lymphoma. World J Gastroenterol. 2011;17:697-707.
[5] Chen CQ, Yin L, Peng CH, et al. Primary non-Hodgkin lymphoma of small bowel: a clinical analysis of 34 cases. Zhonghua Wei Chang Wai Ke Za Zhi. 2007;10:249-252.
[6] Yin L, Chen CQ, Peng CH, et al. Primary small-bowel non-Hodgkin's lymphoma: a study of clinical features, pathology, management and prognosis. J Int Med Res. 2007;35:406-415.
[7] Lu PW, Fields AC, Yoo J, et al. Surgical management of small bowel lymphoma. J Gastrointest Surg. 2021;25:757-765.
[8] Hong YW, Kuo IM, Liu YY, et al. The role of surgical management in primary small bowel lymphoma: a single-center experience. Eur J Surg Oncol. 2017;43:1886-1893.
[9] Takata K, Okada H, Ohmiya N, et al. Primary gastrointestinal follicular lymphoma involving the duodenal second portion is a distinct entity: a multicenter, retrospective analysis in Japan. Cancer Sci. 2011;102: 1532-1536.
[10] Sarkhosh K, Bathe OF, Stewart DA, et al. The role of surgical intervention in the management of duodenal lymphoma. J Surg Oncol. 2009;99: 428-432.
[11] Swerdlow SH, Campo E, Pileri SA, et al. The 2016 revision of the World Health Organization classification of lymphoid neoplasms. Blood. 2016; 127:2375-2390.
[12] Hwang HS, Yoon DH, Suh C, et al. Intestinal diffuse large B-cell lymphoma: an evaluation of different staging systems. J Korean Med Sci. 2014;29:53-60.
[13] Dawson IM, Cornes JS, Morson BC. Primary malignant lymphoid tumours of the intestinal tract. Report of 37 cases with a study of factors influencing prognosis. Br J Surg. 1961;49:80-89.
[14] Cardoso H, Rodrigues JT, Marques M, et al. Malignant small bowel tumors: diagnosis, management and prognosis. Acta Med Port. 2015;28: 448-456.
[15] Nayak SR, Rao GB, Yerraguntla SS, et al. Jejunal perforation: a rare presentation of Burkitt's lymphoma-successful management. Case Rep Oncol Med. 2014; 2014:538359.
[16] Imrani K, Lahfidi A, Belkouchi L, et al. Lymphoma presenting as small bowel obstruction: a case report. Radiol Case Rep. 2021;16:547-549.
[17] Xu XQ, Hong T, Li BL, et al. Ileo-ileal intussusception caused by diffuse large B-cell lymphoma of the ileum. World J Gastroenterol. 2013;19: 8449-8452.
[18] Magalhães-Costa P, Bispo M, Matos L, et al. Jejunal plasmablastic lymphoma presenting as obscure overt gastrointestinal bleeding: diagnosis by wireless capsule endoscopy. Rev Esp Enferm Dig. 2015; 107:567-568.

[19] Wang J, Han J, Xu H, et al. Primary duodenal papilla lymphoma producing obstructive jaundice: a case report. BMC Surg. 2022;22:110.
[20] Simkova I, Urbanek K, Prochazka V, et al. Acute pancreatitis as the first manifestation of duodenal MALT lymphoma. Biomed Pap Med Fac Univ Palacky Olomouc Czech Repub. 2015;159:688-694.
[21] Abe T, Kodama K, Nagai T, et al. Follicular lymphoma Grade 1 of the minor duodenal papilla successfully diagnosed by endoscopic papillectomy. Endoscopy. 2021;53:e35-e37.
[22] Nehme F, Rowe K, Palko W, et al. Primary duodenal follicular lymphoma with late disseminated nodal relapse responsive to rituximab monotherapy: a case report. Mol Clin Oncol. 2017;7:911-914.
[23] Yamada S, Koshikawa Y, Minami N, et al. Ileal follicular lymphoma with atypical endoscopic findings. Endosc Int Open. 2016;4:E323-E325.
[24] Carvalho JR, Carrilho-Ribeiro L, Zagalo A, et al. A rare case of Burkitt's lymphoma of the duodenal bulb. Ann Gastroenterol. 2016;29:230-232.
[25] Santos-Antunes J, Ramalho R, Lopes S, et al. A rare cause of melena: gastric and duodenal diffuse large B-cell lymphoma. J Gastrointestin Liver Dis. 2013;22:373.
[26] Linnik Y, Rand J, Kaur P, et al. Intravascular large B cell lymphoma diagnosed in random duodenal biopsies. A case report and a literature review. Virchows Arch. 2017;471:429-431.
[27] Gjeorgjievski M, Makki I, Khanal P, et al. Early, isolated duodenal mucosa-associated lymphoid tissue lymphoma presenting without symptoms or grossly apparent endoscopic lesions and diagnosed by random duodenal biopsies. Case Rep Gastroenterol. 2016;10:323-331.
[28] Chugh R, Kröner PT, Farraye FA, et al. Small-bowel lymphoma Mimicking Crohn disease: a case series. Inflamm Bowel Dis. 2021;27:e61-e62.
[29] Raiter A, Szełemej J, Kozłowska-Petriczko K, et al. Simultaneous endoscopic ultrasound-guided treatment of intestinal and biliary obstruction due to massive lymphoma of the duodenal papilla. Endoscopy. 2022;54:e51-e52.
[30] Rodríguez Jiménez C, Tolín Hernani MDM, Sánchez Sánchez C. Endoscopic balloon dilation in duodenal stenosis secondary to intestinal lymphoma in a heart transplant patient. Rev Esp Enferm Dig. 2019;111:890.
[31] Milburn JA, Leeds JS, White SA. Endoscopic management of duodeno-ileal fistula secondary to diffuse B-cell lymphoma. J Surg Case Rep. 2017; 2017:rjx249.
[32] Pérez-Cuadrado Robles E, Pinho R, González-Suárez B, et al. Small bowel enteroscopy - a joint clinical guideline by the Spanish and Portuguese small-bowel study groups. Rev Esp Enferm Dig. 2020;112:309-318.
[33] Matsumoto T, Nakamura S, Esaki M, et al. Double-balloon endoscopy depicts diminutive small bowel lesions in gastrointestinal lymphoma. Dig Dis Sci. 2010;55:158-165.
[34] Marques M, Santos-Antunes J, Coelho R, et al. Single-balloon enteroscopy efficacy and degree of concordance with noninvasive evaluation of small bowel. Endosc Int Open. 2017;5:E96-E102.
[35] Li B, Shi YK, He XH, et al. Primary non-Hodgkin lymphomas in the small and large intestine: clinicopathological characteristics and management of 40 patients. Int J Hematol. 2008;87:375-381.