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Gastrointestinal Follicular Lymphoma; Single Center 17 Years of Experience Results

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Eleven of the cases were presented orally at the 25th National Pathology Congress in 2015.

Abstract

BACKGROUND/AIMS: Primary gastrointestinal follicular lymphomas (PGIFL) are very rare among gastrointestinal non-Hodgkin lymphomas. In this study, we retrospectively examined the clinicopathological features of PGIFL and nodal follicular lymphoma with secondary gastrointestinal involvement (SGIFL) and to draw attention to these rare cases.

MATERIALS AND METHODS: Slides and blocks from cases of gastrointestinal follicular lymphoma (GIFL) between the years of 2006-2022 were obtained from the pathology archive. Pathology reports, demographic and clinical data, and endoscopic, and other imaging findings were accessed retrospectively from electronic records.

RESULTS: Eighteen of 31 GIFL cases were PGIFL, and 12 of them were SGIFL. In a case, detailed data could not be obtained. The female/male ratio was equal to PGIFL and SGIFL. The median age of PGIFL was 60, which is slightly higher than that of SGIFL. The most common endoscopic finding was polyp (61.1%) in PGIFL, and mass (50%) in SGIFL. Duodenum localization was 44.4% in PGIFL and 33.3% in SGIFL. Multiple lesions were detected 27.7% in PGIFL and 16.7% in SGIFL. 77.7% of PGIFL cases were stage I and low grade. Only one of the low-grade PGIFL cases was stage IV. Follicular dendritic cells (FDC) were pushed to the periphery in 72.2% of PGIFL, whereas this rate was 8.3% in SGIFL. CD20, CD10, bcl6, and bcl2 were positive and CD5, CD3, cyclin D1 were negative in all cases.

CONCLUSION: PGIFL cases are often localized in the duodenum, usually low grade, and extremely rare. Microscopically, the only difference between PGIFL and SGIFL is the pattern of the FDC.

Keywords: Lymphoma, follicular, gastrointestinal tract

INTRODUCTION

About one-third of non-Hodgkin lymphomas (NHL) develop from tissues other than the lymph nodes. These cases are called extranodal lymphoma (ENL). ENL is still a confusing issue, especially in cases where both nodal and extranodal diseases coexist. Primary nodal disseminated disease may have secondary extranodal spread, as well as primary ENL may tend to spread.[1,2] Thus, the rates in studies are more variable compared with nodal lymphomas. In the literature, it was shown that the ENL rate can vary between 20% and 34% depending on the selection of different criteria.[3]

The gastrointestinal (GI) tract is the most common site for ENLs. Different criteria have been proposed in the past by various authors to categorize primary gastrointestinal lymphoma (PGIL). Recently, it

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is widely accepted that cases with a clinically dominant extranodal component, no peripheral nodal component or minor involvement are considered as extranodal.[2] The Lugano system is widely used in staging (Table 1).[4]

Primary gastrointestinal follicular lymphoma (PGIFL) cases are extremely rare and are usually detected incidentally. It has been increasing recently because of the widespread usage of capsule and double-balloon endoscopy methods that make multiple biopsies possible.[5,6] PGIFL accounts for 1-13% of PGIL.[1,6-9]

PGIFL was accepted as a variant of follicular lymphoma (FL) in the 2008 version of the World Health Organization (WHO).[10] In the 2017 WHO classification, it was named duodenal -type follicular lymphoma (D-FL) and defined as a new entity with different clinical and pathological features compared with systemic FL.[11] In the 2022 update, the 5th version of WHO and ICC, it remains an entity of classical FL.[12,13] In the following sections of this article, PGIFL will be referred to as D-FL in accordance with the new terminology.

D-FL is more common in middle -aged adults. The median age is 56, and the age ranging is between 26-81.[1] While some case series of D-FL showed mild female predominance,[7,14,15] an equal gender distribution was observed in other case series.[6,16-20]

Although D-FL can develop from any area of the GI, its localization is the duodenum (especially the 2nd part), ileum, and colon, respectively. The most common endoscopic findings are multiple noduls, small polypoid lesions, white granular appearance, mucosal irregularity, erythema, ulceration, increase in wall thickness, and ulcerovegetative mass.[1,6,21,22]

Multiple lesions are detected in rates between 15% and 46.2%.[1,5-7,15-17,23-25] Furthermore, it has been shown that 85% of D-FL cases have simultaneous jejunal or ileal lesions detected by capsule or double balloon enteroscopy.[19,26]

Although abdominal pain may be prominent in some series,[15] the disease is often asymptomatic and detected incidentally.[1,6,21] In the Yamamato et al.[1] study, they examined 150 previously reported cases, noted 43.3% of the patients were asymptomaticand 28.7% with abdominal pain. In a multicenter study by Takata et al.[26] in Japan in which they summarized 125 patients with PGIFL, it was reported 76.8% of the cases were asymptomatic, and abdominal pain was 8%.

D-FL, morphologically similar to nodal FL, shows predominance of small-medium -sized cells (centrocytes) with narrow cytoplasm, indented nuclei, and no nucleoli. It contains medium- large sized cells (centroblasts) with 2-3 nucleoli with few visible cytoplasm, round nuclei, and vesicular chromatin. Neoplastic lymphoid follicles involve the mucosa and may spread to the muscularis mucosa and submucosa. Most of the lesions are low grade.[1,7,16,19,25] It is phenotypically CD20, CD10, bcl6, bcl2 positive, and CD5, CD23, CD43 negative.[1,6,11,15,20]

While the follicular dendritic cells (FDC) are pushed to the periphery in D-FL, FDC is observed scattered within the lesion in nodal follicular lymphoma with secondary gastrointestinal involvement (SGIFL).[7,11,19,27]

Our study analyzes the clinicopathological and endoscopic features of D-FL and SGIFL according to the WHO classification retrospectively.

MATERIALS AND METHODS

All NHL cases in the electronic archive were scanned retrospectively in our department between 2006 and 2022. In 919 FL cases detected among NHLs, 31 cases were diagnosed with GIFL. Demographic, clinical information, biopsy methods, and radiological (endoscopic and other imaging) results of these cases were obtained from electronic records. Macroscopic and microscopic features were recorded from the pathology reports. Pathology reports of bone marrow biopsies were also obtained.

For all biopsies, staining with hematoxylin & eosin and additional immunohistochemical (IHC) methods were prepared in our department from routinely processed formalin-fixed paraffin blocks in standard procedure. Antibodies used in IHC were CD20 [Scytek (L26)], CD3 antibody [Scytek (polyclonal)], CD5 [Scytek (4C7)], CD10 ([Biocare (56C6)], bcl6 [Biocare Medical (PF16)], bcl2 [Scytek (12 4)], CD21 [Cellmarque (2G9)], CD23 [Scytek (MHM6)], Cyclin D1 [Biocare Medical (RBT14)], Ki-67 [Dako (MIB-1)].

The localization of FL, depth of tumoral infiltration, the presence of lymphoepithelial lesions, background reactive inflammatory cells, a pattern of neoplasm (follicular, diffuse), number of centroblasts (0-5/HPF 6-15/HPF, >15/HPF) and grade (1, 2 and 3) were evaluated. All cases were reevaluated by two hematopathologists regarding their microscopic features, especially FDC patterns, according to the current WHO classification.[11-13]

In case of more than one lesion, they were classified as multiple. Patients with prominent nodal lesions and systemic disseminated at the time of diagnosis or before, were accepted as SGIFL. Staging was performed according to the Lugano classification.[4]

The study was approved by the Ethics Committee of Acıbadem Mehmet Ali Aydınlar University (approval number: 2022-19/14, date: 09.12.2022). An informed consent form was not required for this study as this study is made from archive materials.

Statistical Analysis

Descriptive statistics were performed. Quantitative variables were described as median, and qualitative variables were described as percentage of each modality.

Table 1. Lugano staging system for gastrointestinal lymphomas[4]

Stage I	The tumor is confined to the GI without serosal involvement. Single primary site or multiple, non contagious lesions
Stage I-1 Stage II-2	Nodal involvement; -local (paragastric in cases of gastric lymphoma and para-intestinal for intestinal lymphoma) -distant (paraaortic, paracaval, pelvic, inguinal)
Stage IIE	Penetration of the serosa to involve adjacent organs or tissuesand peritonitis
Stage IV	Disseminated extranodal involvement, or a GI lesion with supradiaphragmatic nodal involvement

GI: Gastrointestinal tract.

RESULTS

A total of 5974 NHLs were diagnosed between 2006 and 2022, 405 (6.8%) of which were located in the GI. Thirty-one of them were GIFL. 18 (58.1%) of 31 GIFL was D-FL, and 12 (38.7%) of them were SGIFL. One case, providing insufficient data, is excluded from the study. D-FL constituted 0.3% of all NHL diagnosed in this period and 4.4% of NHL observed in the entire GI. A total of 919 FLs were detected during this period, of which D-FL constituted 1.9%.

The clinicopathological features of D-FL and SGIFL cases are summarized in Table 2, 3. The most common endoscopic and radiological findings were polyp with a rate of 61.1% in D-FL (Figure 1), and a mass with a rate of 50% in SGIFL. Polyposis was observed only in 2 (5.6%) D-FL cases located in the duodenum and gall bladder. The most common symptom was abdominal pain with 33.3% in D-FL and 58.3% in SGIFL. The most common site of the lesion was the duodenum in both groups, with rates of 44.4% in D-FL and 33.3% in SGIFL.

The immunophenotype of neoplastic cells was CD20, CD10, bcl6, bcl2 positive and CD5, CD3 and cyclin D1 negative in all D-FL and SGIFL. The Ki-67 proliferation index was between <5-30% in low grade cases and 60-85% in high grade and diffuse large B-cell lymphoma (DLBCL) transformation cases in both groups (Figure 2).

In 13 (72.2%) D-FLs, FDC was pushed to the peripher; all cases were low grade. In 1 (5.6%) case, FDC was scattered within the lesion, was high grade. In 4 (22.2%) cases, it was observed both as scattered within the lesion and pushed to the periphery (mixed pattern). Of which, 2 were low, 1 was high grade, and DLBCL transformation was observed in 1 (Table 3, Figure 3).

Table 2. Comparison of the clinical features of D-FL and SGIFL cases

Clinical features	D-FL	SGIFL
Number of cases	18	12
Gender		
Female	9 (50%)	6 (50%)
Male	9 (50%)	6 (50%)
Female/male	1/1	1/1
Mean age	56.6	53.4
Median age	60	51
Age distribution (range)	29-73	38-78
Symptom		
Abdominal pain	6 (33.3%)	7 (58.3%)
Nausea vomiting	4 (22.2%)	1 (8.3%)
B symptoms and weight loss	1 (5.6%)	2 (16.7%)
Anemia	3 (16.7%)	5 (41.6%)
GI bleeding	1 (5.6%)	-
Asymptomatic	3 (16.7%)	2 (16.7%)
Place of lesion		
Duodenum	8 (44.4%)	4 (33.3%)
Stomach	-	3 (25%) (2 corpus ,1 corpus & antrum)
Jejunum	-	-
Ileum	3 (16.7%)	3 (25%)
Ileocecal	1 (5.6%)	-
Colon	1 (5.6%)	1 (8.3%)
Gall bladder	1 (5.6%)	-
Multiple lesion	5 (27.7%)	3 (16.7%)
Duodenum and ileum	1	-
Ileum	-	1 (8.3%)
Ileum & jejunum	1	-
Ileum & large intestine	2	1 (8.3%)
Gall bladder	1	-
Stomach (corpus & antrum)	-	1 (8.3%)
- Endoscopic biopsy	14 (77.7%)	8 (66.6%)
- Right hemicolectomy after colonoscopy	1 (5.6%)	1 (8.3%)
- Partial small bowel resection	1 (5.6%)	-
- Partial small and large bowel resection	1 (5.6%)	3 (25%)
- Cholecystectomy	1 (5.6%)	-

Table 2. Continued		
Clinical features	**D-FL**	**SGIFL**
Endoscopic finding		
Polyp	11 (61.1%)	1 (8.3%)
Polyposis	2 (11.1%)	-
Nodule	1 (5.6%)	1 (8.3%)
Ulcer	2 (11.1%)	1 (8.3%)
Mass	1 (5.6%)	6 (50%)
Lymphangiectatic/infiltrating area	2 (11.1%)	-
Duodenal stenosis	-	1 (8.3%)
Wall thickening	-	2 (16.7%)
Paraaortic LAP/involvement	-	3 (25%)
Regional LAP/involvement	3 (16.7%)	5 (41.6%)
Distant LAP/involvement	-	12 (100%)
Bone marrow involvement	1 (5.6%)	3 (25%)
Liver and/or spleen involvement	-	3 (25%)
Other organs (breast, kidney, lung, pancreas)		3 (25%)
Stage		
I	14 (77.7%)	-
II (II1, II2, IIE)	3 (16.7%) (2II-1,1 II-2)	-
III	-	-
IV	1 (5.6%)	12 (100%)
GI: Gastrointestinal tract, D-FL: Duodenal follicular lymphoma, SGIFL: Nodal follicular lymphoma with secondary GI involvement, LAP: Lymphadenopathy.		

Table 3. Comparison of the pathological features of D-FL and SGIFL cases		
Pathological features	**D-FL**	**SGIFL**
Number of cases	18	12
Follicular dendritic cell network		
- pushed to the periphery	13 (72.2%) (all of them low grade)	1 (8.3%) (low grade)
- Scattered within the lesion	1 (5.6%) (high grade)	6 (50%) (3 low grade, 1 high grade, 2 DBBHL transformation)
- Mixed pattern (both scattered and pushed to the periphery)	4 (22.2%) (2 low grade, 1 high grade 1 DBBHL transformation)	5 (41.7%) (2 low grade 1 high grade 2 DBBHL transformation)
Histological grade		
Grade I	6 (33.3%)	2 (16.7%)
Grade II	1 (5.6%)	-
Grade 1-2	8 (44.4%)	4 (33.3%)
Grade IIIA ve IIIB	1 (5.6%)	2 (16.7%)
DBBHL transfromation	2 (11.1%)	4 (33.3%)
Ki67 proliferation index	**It varies between <5% and 80%**	**It varies between <5% and 85%**
Low (<5% to 30%)	15 (83.3%)	6 (50%)
High (60% to 85%)	3 (16.7%)	6 (50%)
Ulcer		
Existent	3 (16.7%) (all of them low grade)	3 (%25) (1 low grade 1 high grade 1 DBBHL transformation)
Absent	15 (83.3%) (1 high grade 1 DBBHL transformation 12 low grade)	9 (75%) (5 low grade 1 high grade 3 DBBHL transformation)

Table 3. Continued		
Pathological features	**D-FL**	**SGIFL**
Necrosis		
Existent	1 (5.6%) (DBBHL transformation)	1 (8.3%) (DBBHL transformation)
Absent	17 (94.4%)	11 (91.7%)
Inflammatory cells on the background		
Existent	1 (5.6%) (there is also ulceration on the surface)	4 (33.3%) (1 with surface ulceration, 1 with candida hyphae)
Absent	17 (94.4%)	8 (66.7%)
LEL	-	-
Pattern		
Follicular	14 (77.8%)	8 (66.7%)
Follicular & diffuse	4 (22.2%)	4 (33.3%)
IHK		
CD20 (+)	18 (100%)	12 (100%)
CD 10 (+)	18 (100%)	12 (100%)
bcl6 (+)	18 (100%)	12 (100%)
bcl2 (+)	18 (100%)	12 (100%)
CD 5 (-)	18 (100%)	12 (100%)
CD3 (-)	18 (100%)	12 (100%)
cycD1 (-)	18 (100%)	12 (100%)

GI: Gastrointestinal tract, D-FL: Dudenal follicular lymphoma, SGIFL: Nodal follicular lymphoma with secondary GI involvement, LAP: Lymphadenopathy, LEL: Lymphoepithelial lesion IHC: Immunohistochemistry.

FDC was pushed to the periphery in only 1 case (8.3%) of SGIFL, was low grade. In 6 cases (50%) that FDC was scattered within the lesion, 3 were low and 1 was high grade and DLBCL transformation was observed in 1. In 5 (41.7%) cases, mixed pattern was observed, of which 2 were low, 1 was high grade, 2 showed DLBCL transformation (Table 3, Figure 3).

DISCUSSION

The GI is the most common site for ENL and is frequently involved secondary to advanced -stage nodal NHL. PGIL is usually defined as a disease confined to the GI and regional lymph nodes, and this is usually true in cases of D-FL. Because D-FL is usually a localized disease.[1,6,7,15,16,19,21,24,25,27]

D-FL is very rare and has been increasing recently because of the widespread use of capsule endoscopy and double balloon endoscopy, and multiple biopsies taken.[5,6] D-FL accounts for 1-13%[1,6-9] of PGIL. In our study, there were 405 NHL cases located in the GI between 2006 and 2022, and a total of 31 cases were GIFL, 18 (58.1%) of which were evaluated as D-FL and 12 (38.7%) as SGIFL. In the current study, D-FL constitutes 4.4% of NHL observed in the GI.

D-FL is more common in middle-aged adults, similar to nodal FL. The median age was reported in the literature as between 56 and 62 years, while in our study it was 60.[1,6,8,15,19,26] In our D-FL cases, the median age was slightly higher compared with SGIFL (median age 51), similar to the studies of Masih et al.[27].

The female/male ratio was equal in our PGIFL and SGIFL cases. While D-FL was reported to show mild female dominance in some series[7,14,15] it was showed an equal gender distribution[6,16-20,27] in some, as in our current study.

Although D-FL can develop from any area of the GI, the rank of frequency is the duodenum (especially the 2nd part), ileum, and colon.[1,6,7,15,21,22,27] In our study, in accordance with the literature, the most common region was the duodenum in both groups with rates of 44.4% in D-FL and 33.3% in SGIFL. In D-FL, the other regions of frequency were ileum (16.7%), colon (5.6%), ileocecal region (5.6%), and gall bladder (5.6%), respectively, with rates of 25% stomach, 25% ileum, 8.3% colon in SGFIL.

While gastric location was not observed among our D-FL, all of our present 25% gastric localized cases were SGIFL. In a previous study, gastric localization was not observed among D-FL, whereas this rate was 12.5% for SGFIL.[27] The incidence of D-FL in the stomach has been reported as 4.2%[6] and 2.6%[7] in the literature.

The primary FL of the gall bladder is exceedingly rare. The age range reported is between 48-75 years and is usually low grade.[27-32] While most of them are female,[27-31] there are few males.[30,32] Multiple polyps were observed in a few reported.[30,32] Our low -grade case of FL located in the gallbladder was a 79 year old male.

Multiple lesions have been reported with a rate of 15 to 46.2%.[1,5-7,16,17,23-25,27] In the literature, the rate reaches 60%.[15] Jejunal or ileal lesions detected by capsule or double balloon enteroscopy in D-FL have been shown.[19,26] Multiple lesions were detected in 5 (27.7%) of our D-FL cases. In our multiple lesions, one was located in the duodenum and ileum, one in the ileum and jejunum, gall bladder, and the others in the ileum, large intestine.

The most common endoscopic findings are multiple nodul, small polypoid lesions in the descending part of the duodenum, white granular appearance, mucosal irregularity or erythema, ulceration, increase in wall thickness, and ulcerovegetative mass.[1,6,15,21,22,27] In accordance with

the literature, the most common endoscopic and radiological finding was polyp with a rate of 61.1% in D-FL, while in SGIFL a mass with a rate of 50%. Polyposis was observed only in 2 (5.6%) D-FL cases located in the duodenum and gall bladder.

Abdominal pain has been reported at a rate of 48-80% in studies.[15,27] In our series, the most common symptom was abdominal pain, with a rate of 33.3% in PGIFL cases and 58.3% in SGIFL cases.

The rate of asymptomatic and incidental detection has been reported as between 43.3% and 76.8%.[1,6,26] Masih et al.[27] reported the rate of asymptomatic in D-FL as 16.6% and in SGIFL as 12.5%. In our study, the rate of asymptomatic was 16.7% in both D-FL and SGIFL. The high rate observed in the study of Takata et al.[26] may be due to the high rate of endoscopy for screening asymptomatic cases in Japan.

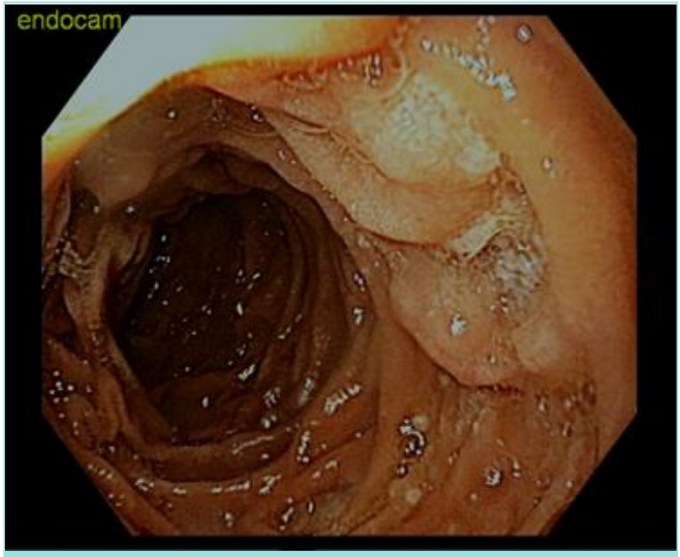

Figure 1. Polypoid lesion in the duodenum in a case with follicular lymphoma.

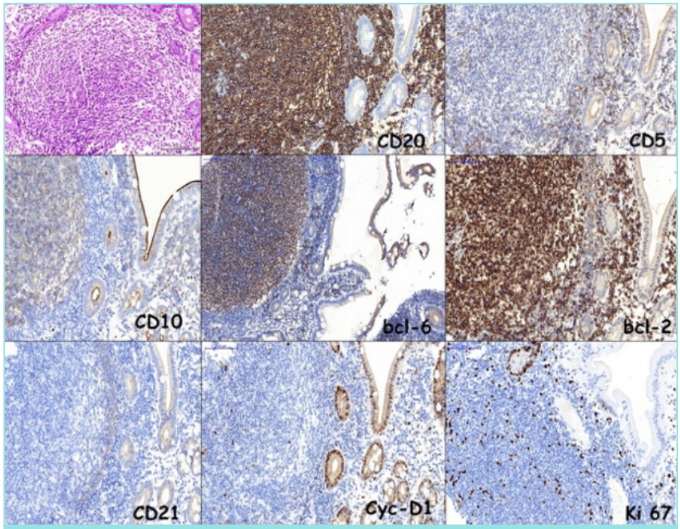

Figure 2. Follicular lymphoma in the duodenum. Presence of neoplastic lymphoid follicles, which are composed of centrocytes with small, narrow cytoplasm and irregular nuclear membrane in the small intestinal mucosa at low magnification (hematoxylin & eosin, x200); CD20 positivity (x200); CD5 negativity (x200); CD10 positivity (x200); bcl6 positivity (x200); bcl2 positivity (x200); weak follicular dendritic cells in the periphery of the neoplastic follicle with CD21 (x200); low proliferative activity observed in neoplasm with ki 67 (x200).

83.3% of our D-FL cases were low grade, this rate was reported as 80-100% in the literature.[1,6,7,15,16,19,20,25,27] 50% of our SGIFL cases were low grade. In our study, high-grade lesions was 5.6% in D-FL and 16.7% in SGIFL, and this rate was reported as 4.3% in D-FL and 20% in nodal FL.[1]

The transformation to DLBCL is uncommon, with a rate of 9.6% from D-FL to DLBCL in the literature.[6] In our study, transformation to DLBCL was observed with a rate of 11.1% in D-FL and 33.3% in SGIFL.

Phenotypically, all of our D-FL and SGIFL cases were CD20, CD10, bcl6, bcl2 positive, and CD5, CD23, and CD43 negative, in accordance with the literature.[1,6,10,11,15,20]

While FDC has been pushed to the periphery in D-FL, it has been observed scattered within the lesion in SGIFL and nodal FL.[7,11,19,27] In studies, the rate of FDC pushing to the periphery in D-FL was reported as 62% and 100%, respectively, and all of them were low grade.[19,27] Masih et al.[27] also did not observe this pattern in any of the SGIFL, whereas Misdraji et al.[7] reported that FDC was pushed to the periphery in 30.8% of the cases, the presence of a scattered pattern in 23.1%, and a mixed pattern in 30.8%. In 13 (72.2%) of our D-FL cases, FDC was pushed to the periphery, and all cases were low-grade in accordance with the literature. In 1 (5.6%) case, FDC was scattered within the lesion and this case was high grade. In 4 (22.2%) cases, a mixed pattern was observed, of which 2 were low, 1 was high grade, 2 showed DLBCL transformation. In 6 (50%) of our SGIFL cases, the FDC was scattered within the lesion. 3 of these were low grade and 1 was high grade and 2 showed DLBCL transformation. In 5 (41.7%) cases, a mixed pattern was observed, of which 2 were low, 1 was high grade, 2 showed DLBCL

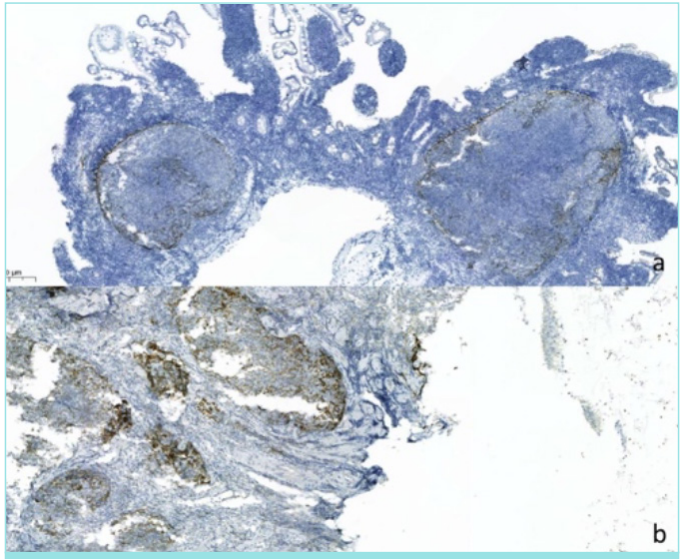

Figure 3. (a) Weak follicular dendritic cell network observed in the periphery of the neoplastic follicle with CD21 in D-FL case (x200); (b) Follicular dendritic cells, which is observed scattered in the neoplastic follicle with CD21 in a case of SGIFL (x200).

SGIFL: Nodal follicular lymphoma with secondary gastrointestinal involvement.

transformation. Only 1 (10%) FDC was pushed to the periphery and it was low grade.

D-FL cases are neoplasms progressing very slowly and tend to remain regional, mostly in the early stage (48-100% stage I).[6,7,15,16,19,24,25,27] According to the Lugano classification, 77.7% of our D-FL cases were stage I. Only 3 (16.7%) of our D-FL cases had regional lymph node involvement around the intestine and were stage II. One of the D-FL (5.6%) had bone marrow involvement and it was stage IV. In the literature, the rate of stage IV in D-FL has been reported as 5.1-16.6%.[6,7,15,20,27]

Masih et al.[27] reported that all SGIL cases had radiological paraaortic and other intraabdominal lymphadenopathy. In our study, distant lymph node involvement in all SGIFL, bone marrow in 25%, paraaortic lymph nodes in 25%, regional lymph nodes in 41.6%, liver, and/or spleen in 25%, breast, kidney, lung, and other organs such as the pancreas in 25% were detected. In 11.1% of these cases, the neoplasm exceeded the serosa and all were stage IV.

CONCLUSION

In this study, we compared the demographic, clinical, histopathological features of D-FL and SGIFL considering literature information. D-FL is follicular neoplasm in middle-aged adults, usually low grade, the most frequent involvement of the duodenum and terminal ileum, tending to remain regional, mostly early stage. The most significant difference between D-FL and SGIFL that the FDC pattern detected by CD21 and CD23 in IHC. FDC meshwork is usually pushed and restricted to the periphery of the follicul in D-FL and these are generally low grade. However, the meshwork of FDC is usually sparser and more irregularly disturbed in SGIFL and nodal FL.

MAIN POINTS

- D-FL is follicular neoplasm in middle-aged adults, usually low grade.
- D-FL is the most frequent involvement of the duodenum and terminal ileum, tending to remain regional, mostly early stage.
- The most significant difference between D-FL and SGIFL that the FDC pattern detected by CD21 and CD23 in IHC. FDC meshwork is usually pushed and restricted to the periphery of the follicul in D-FL, and these are generally low grade. However, the meshwork of FDC is usually sparser and more irregularly disturbed in SGIFL and nodal FL.

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ETHICS

Ethics Committee Approval: The study was approved by the Ethics Committee of Acıbadem Mehmet Ali Aydınlar University (approval number: 2022-19/14, date: 09.12. 2022).

Informed Consent: An informed consent form was not required for this study as this study is made from archive materials.

Peer-review: Externally and internally peer-reviewed.

Authorship Contributions

Concept: N.B., T.T., Design: N.B., T.T., Data Collection and/or Processing: N.B., Analysis and/or Interpretation: N.B., Literature Search: N.B., Writing: N.B.

DISCLOSURES

Conflict of Interest: No conflict of interest was declared by the authors.

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