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Scientific paper

Predictive Value of Endoscopic Ultrasound in Diagnosis and Staging of Primary Gastric Lymphoma

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A B S T R A C T

The aim of the paper is to investigate significance of the endoscopic ultrasound (EUS) in diagnostic and staging of gastric lymphoma. Retrospective clinical study was conducted at the Clinic for Hematology and Clinic for Gastroenterology of the University Clinical Center of Sarajevo in the period of years 2002 to 2009. Patients (N=40) with diagnosis of gastric lymphoma confirmed by pathohistological diagnosis were included in the study. Stage of the disease was determined based on EUS, proximal endoscopy, CT and ultrasound of abdomen, and classified according to the Ann Arbor classification. 39 patients had various types of non Hodgkin lymphoma and one patient had Hodgkin lymphoma. Based on morphological characteristics of gastric tumor visualized with EUS in 16 patients a gastric cancer was suspected. In 40% patients EUS finding was not confirmed by pathohistological finding. Compared both to CT and ultrasound of abdomen, EUS showed statistically significant higher frequency of establishing existence of infiltration ($p<0.001$). In patients with primary gastric lymphoma EUS has more significant role in determination of stage of disease spread than for the diagnosis itself. Therefore EUS should be included into algorithm of patient diagnostic protocol when suspected to the malignant gastric disease.

***Key words**: lymphoma, diagnosis, staging, EUS, CT, Ultrasound*

Introduction

Primary gastric lymphoma is the most common localization of gastrointestinal lymphoma and it represents about 70% of all gastrointestinal tract lymphomas[1]. Fast development of understanding pathophysiology of all lymphoma significantly changed approach to this disease both regarding diagnostic and treatment[2]. Surgical procedure, i.e. gastrectomy was one of treatment choices in the past and the one that was most commonly used. Lately, due to good results in the treatment of gastric lymphoma with radiotherapy and chemotherapy, treatment approach is changed and now, gastrectomy is more often avoided, and non surgical methods are recommended[3,4].

Approach to the gastric lymphoma treatment is totally different from treatment of other types of gastric malignancies, where primary position in therapy is held by surgical treatment. In gastric lymphoma, surgical treatment is completely overrun or is used only in diagnostic procedure. It is essential to do endoscopic ultrasound (EUS) of stomach to patients with suspicion to malignant disease of the stomach. Before all, it can establish suspicion to gastric malignant lymphoma and redirect diagnostic course in that direction. Surgical resection of the stomach with regional lymph nodes is highly mutilating method which asks long period of recovery what prolongs start of the treatment and carries certain number of late complications. Taken this into account, if hypothesis is confirmed, the finding of EUS can be used as sufficiently confident diagnostic and staging of stomach lymphoma spread procedure. Based on this a need for total gastrectomy can be determined or timely treatment can be started what improves prognosis.

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Use of EUS findings in diagnostic and staging of primary gastric lymphoma is still controversy. Some authors, based on the results of their investigation, recommend it as a convenient method in the staging process of lymphoma and as a method which can give convenient working diagnosis[5,6]. Certain numbers of papers, which pose a question about value of EUS finding during diagnostic procedure and following treatment outcome, are also published[6].

Considering inconsistent reports, it is questionable in what extent EUS finding is convenient in establishing adequate working diagnosis compared to the proximal endoscopy finding, i.e. its finding which macroscopically describes gastric mucosa lesion. Via proximal endoscopies multiple biopsies of gastric mucosa are sampled for pathohistological analysis, what gives diagnosis and in that manner completes diagnostic procedure for gastric lymphoma[7].

There is no consensus on role of the EUS in staging of the disease and treatment of gastric lymphoma. EUS finding is very important since it affects choice of therapy and evaluation of its success[8]. Consensus would make clinical practice easier and therefore additional investigation to establish precise position of EUS in treatment of this disease.

Based on available diagnostic methods and capacities of our center in treatment of primary gastric lymphoma, the aims of this investigation are set as follows: to investigate value and significance of EUS in diagnostic of gastric lymphoma, investigate value and significance of EUS in evaluation of disease stage-staging of gastric lymphoma, compare pathohistological report of biopsy to EUS finding and establish significance of EUS finding compared to abdominal CT and ultrasound findings during staging of the disease

Patients and Methods of Investigation

Inclusion criteria for investigation were patients of both genders with suspicion to gastric lymphoma. Exclusion criteria are patients in whom diagnostic procedure did not confirm gastric lymphoma, those who are due to any cause transferred to other department and those with incomplete medical record. Investigation was done on 54 patients who were diagnosed with gastric lymphoma at the Clinic for hematology and Clinics for Gastroenterohepatology of the University Clinical Center of Sarajevo in period 2002 to 2009. Total sample consisted of 40 patients. Diagnostic team consisted of hematologist, gastroenterologist, radiologist and pathologist. Collected data were analyzed and compared to pathohistologically confirmed diagnosis, values of biohumoral parameters, radiological findings of abdomen and computed tomography (CT), EUS and proximal endoscopy finding. Standard analysis of hematological parameters, complete blood count and differential blood count, biohumoral parameters, protein electrophoresis and serological test to Helicobacter pylori were done (Table 1). Radiological findings are analyzed and compared to results that determine characteristic of tissue, based on which a suspicion is made to gastric cancer of lymphoma, and for evaluation of diagnostic value findings are compared with pathohistological finding. Results of EUS are analyzed, i.e. evaluated for determination of stage of disease spread. A comparison to abdominal ultrasound (US) and CT is done, and stage was determined in accordance to the Ann Arbor classification modified by Musshoff and Radaszkiewics. The depth of gastric wall infiltration, structure of gastric wall and status of regional lymph nodes was analyzed and compared to results gained via EUS, trans-abdominal ultrasound and computerized ultrasound.

For pathohistological methods May Giemsa Grunwald (MGG) staining was used. Immuno-typization included assessment of light chains restriction, CD20, CD5, CD10, cyclin D1, CD22, CD79a, CD30 positive or negative cells, based on which a pathohistological type of lymphoma was classified in accordance to WHO classification. Differences in frequency of certain types of lymphoma, relatively carcinoma between patients with suspicion to cancer and patients with suspicion to gastric lymphoma are investigated via Chi-square test (χ^2) and Fisher exact test (in a case that frequencies were equal or lower than 5). Link of clinical and biochemical parameters with cancer, relatively lymphoma, is determined with one-direction analysis of variance (ANOVA) and Student t test for data that followed normal distribution, relatively with Kruskal-Wallis and Mann-Whitney test for data that were not normally distributed. Program SPSS Statistics 17.0 was used for statistical analysis. P-values of <0.05 were considered statistically significant.

Results

Study included 40 patients, 21 men (52.5%) and 19 women (47.5%). Age ranged from 31 to 78 years at the time of diagnosis. Out of total number of patients, histological analysis of gastric tumor tissue showed that 39 patients suffer from non-Hodgkin lymphoma and one patient had Hodgkin lymphoma. Out of 39 patients with Hodgkin lymphoma, there were 6 different subtypes, with diffuse large cell B lymphoma (DLBCL) in 17 patients, MALT lymphoma 15 patients, follicular non-Hodgkin lymphoma grade I 2 patients, anaplastic variant of diffuse large cell B lymphoma 1 patient, marginal zone lymphoma 3 patients and Burkitt lymphoma 1 patient. Out of total number of patients in first stage of the disease, there were 35 %, while in stages II, III and IV were total of 65% patients, i.e. II stage 25%, III stage 25% and IV stage 15%. Stage was determined by modified Ann Arbor classification, and based on findings obtained via EUS, CT, ultrasound of abdomen, pathohistological finding and biohumoral parameters. Based on positive value of IgM immunoglobulin in serological finding, 21 out of 40 patients with gastric lymphoma, had infection. Data show that out of 21 patients with confirmed infection with Helicobacter pylori, 13 had MALT lymphoma, 6

TABLE 1
BIOHUMORAL MARKERS IN PATIENTS WITH SUSPECTED GASTRIC CANCER/LIMPHOMA ACCORDING TO EUS

Laboratory examinations	Patients divided according to suspicion on lymphoma and carcinoma on EUS egzam	Number of patients	Average value	Standard deviation
LDH U/L	Probably cancer	24	412.75	55.145
	Probably lymphoma	16	862.12	465.558
Sedimentation ratio 0 sek	Probably cancer	23	36.48	5.764
	Probably lymphoma	16	33.31	7.143
Leucocytes 10^9/L	Probably cancer	24	8.4592	0.93185
	Probably lymphoma	16	6.5012	0.44205
Haemoglobin g/L	Probably cancer	24	117.12	2.800
	Probably lymphoma	16	103.88	4.237*
Fe in blood μg/L	Probably cancer	24	6.881	1.1118
	Probably lymphoma	16	9.606	1.8642
Beta 2microglobulin	Probably cancer	24	3.2375	0.39722
	Probably lymphoma	16	3.6844	0.45175
Total proteins g/L	Probably cancer	24	69.58	1.359
	Probably lymphoma	16	66.81	2.197
Albumins g/L	Probably carcinoma	24	35.04	1.140
	Probably lymphoma	16	34.94	1.537
Globulins g/L	Probably carcinoma	24	34.04	1.021
	Probably lymphoma	16	31.88	1.581
alfa1globulins g/L	Probably carcinoma	24	0.0404	0.00237
	Probably lymphoma	16	0.0381	0.00306
alfa2globulins g/L	Probably carcinoma	24	0.1129	0.00591
	Probably lymphoma	16	0.1100	0.00791
beta2globulins g/L	Probably carcinoma	24	0.1375	0.00302
	Probably lymphoma	16	0.1338	0.00499
Gama globulins g/L	Probably carcinoma	24	0.2104	0.00854
	Probably lymphoma	16	0.2100	0.01671

diffuse large cell B lymphoma and 2 other type of lymphoma. Out of 19 patients who did not have Helicobacter pylori infection, 4 had MALT lymphoma i.e. 21%, 9 diffuse large cell B lymphoma i.e. 47%, and 6 other types of lymphoma 32%.

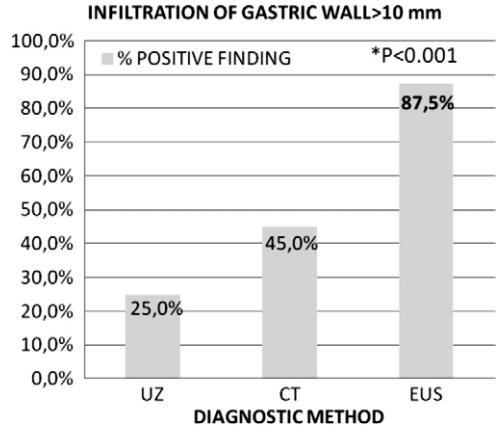

Fig. 1. Infiltration of gastric wall.

Based on EUS finding in 40 patients with malignant gastric disease, a suspicion to gastric cancer was made in 16 patients (40%), and in 24 patients (60%) it was suspected to gastric lymphoma. These working diagnosis are made based on morphological characteristic of gastric tumor visualized with endoscopic ultrasound.

Comparing three diagnostic methods, we established that thickening of gastric mucosa > 10 mm is better detected by EUS compared to CT and ultrasound UZ with statistical significance (35 EUS vs. 18 CT $p<0.001$, 18 EUS vs. 10 UZ $p<0.001$). CT and ultrasound did not statistically differ in establishing of mucosal thickening >100 mm ($p>0.252$). (Figure 1)

We did not prove advantages of one of three compared methods for visualization in detection of enlargement of regional lymph nodes > 10 mm (Figure 2), nor the display of enlarged retroperitoneal lymph nodes > 10 mm (Figure 3).

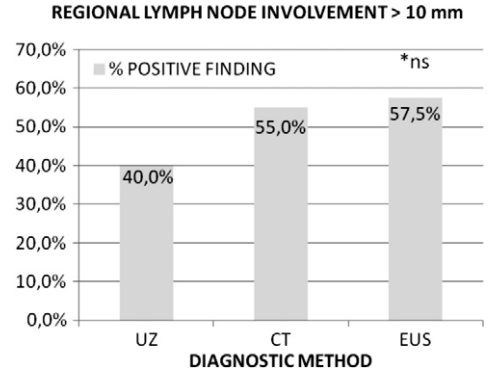

Fig. 2. Regional lymph node involvement established by respective diagnostic method.

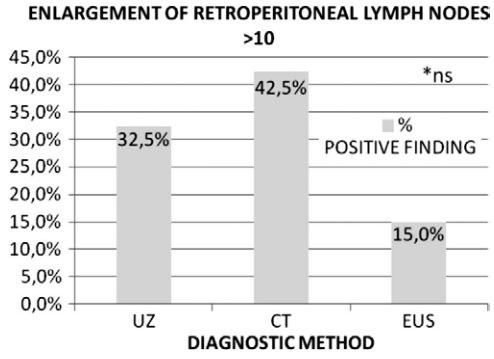

Fig. 3. Enlargement of retroperitoneal lymph nodes diagnosed by respective method.

Discussion

Gastric lymphoma is relatively rare condition. Based on pathohistological type, the most common type is MALT lymphoma, followed by diffuse large B cell lymphoma and other types of B cell lymphoma in less number of cases. Out of 40 patients with gastric lymphoma, included in our study, 39 of them had various types of non-Hodgkin lymphoma, 17 patients with diffuse large B cell lymphoma, 15 patients with MALT lymphoma, 2 patients with follicular lymphoma grade I, 1 patient with diffuse large B cell lymphoma-anaplastic variant, 3 patients with marginal zone lymphoma and 1 patient with Burkitt lymphoma and only one with Hodgkin lymphoma. Out of total number, 48% of patients were infected with Helicobacter pylori. In our investigation, in a group of patients with gastric lymphoma, female patients represented 48% of the sample, while male patients represented 52% of the sample. Average age of the patients was 54.5. These data are completely contrary to the data from other, similar investigations[9]. Prognosis and treatment of primary gastric lymphoma depends of pathohistological diagnosis and stage of the disease[10].

A combination of proximal endoscopy, CT and abdominal ultrasound was used for staging of the disease in the past. Due to technically limited abilities of used instruments, results had poor accuracy (34). New abilities of precise detection and staging of the disease are being investigated in order to start with appropriate therapeutic procedures on time. Appearance of endoscopic ultrasound is followed by numerous studies, which try to determine importance of EUS in diagnostics and staging of gastric lymphoma, especially of MALT subtype. There is a great deal of evidences today which speak in favor of the fact that EUS significantly improved precise staging of gastric lymphoma[11]. In that manner, Jensen quotes that EUS is essential in diagnosis of primary gastric lymphoma[10]. Ruskoe-Formestreaux established that EUS in diagnostic of gastric lymphoma in better in visualization of lymphoma infiltrate than conventional methods like abdominal ultrasound and computerized tomography[12].

Results of our investigation show that stage of the disease and depth of infiltration of the gastric wall assessed by the EUS were significantly more precise compared to computerized tomography and ultrasound of abdomen what is in accordance with results of above quoted authors. EUS detected the gastric wall infiltration in 35 patients while CT reported it in 18 patients, and with abdominal ultrasound in 13 patients. Endoscopic ultrasound did not report infiltration in 5 patients, while CT did not evident infiltration in 22, and abdominal ultrasound in 27 patients.

Nakamura et al. showed detailed evaluation of depth of infiltration of MALT lymphoma in gastric submucosa based on EUS finding and therefore concluded that the stage determined by EUS is more superior that stage determined by the Ann Arbor classification since prognosis of therapy response was more precise[13]. These results show that evaluation of depth of infiltration of first two layers of gastric wall is more important than evaluation of regional lymph nodes involvement. Similar results were obtained by Levy et al. who proved that EUS can differentiate superficial from infiltrative type of MALT lymphoma of gastric mucosa[14].

In the procedure of staging for gastric lymphoma it is essential to evaluate radiologically involvement of perigastric lymph nodes. Zinzanni quotes that EUS is more sensitive method in detection of infiltrated lymph nodes compared to abdominal CT[8]. It is interesting that Zucca, in his results, links depth of gastric mucosa infiltration with lymphoma to its dissemination to perigastric lymph nodes. His quotes are in correlation with our results where we proved applicability of EUS in assessment of depth of gastric wall infiltration. Unfortunately, we did not confirm superiority of EUS compared to CT when decide involvement of perigastric lymph nodes that would confirm results of Zinzanni et al. in our results. Large number of studies analyzed role of EUS in treatment of gastric lymphoma and conclusions are contradictory.

Gastric lymphoma is a separate entity since there is no general consensus on classification system for staging of the disease. Three classifications are currently used for staging gastric lymphoma. These are modified Ann Arbor system, Lugano Staging system for gastrointesti-

nal lymphoma and TNM staging system. According to Zucca it is questionable which system is the best to do staging[14,15]. Zucca used Lugano staging system.

Calletti et al. recommend TNM system of staging for solitary tumor since the prognosis is analogue to prognosis of gastric cancer compared to stage. Same authors recommend use of EUS in evaluation of depth of gastric wall infiltration since it is in correlation with treatment outcome[11]. In our study we used modified Ann Arbor system with which we discovered that 65% patients were in clinical stages II, III and IV, while 35% of them were in clinical stage I. Raderer et al. obtained similar results in analysis of newly discovered MALT lymphoma using modified Ann Arbor system and evidenced percentage involvement of advanced clinical stage 43%. Compatibility of these data can be explained with the fact that both studies used method, modified Ann Arbor system in diagnostic procedure. Large number of published studies used different systems to stage the gastric lymphoma. Their results cannot adequately be compared. Multi--centric studies with large sample and use of uniform system for staging of the disease are needed to expect more precise and convenient data.

According to Janssen, MALT lymphomas make largest part of primary gastric lymphomas which develop during chronic infection with Helicobacter pylori[10]. We found same conclusions in paper of Hancock et al who found prevalence of Helicobacter pylori infection in patients with MALT lymphoma higher than 90 % [16]. Agency for investigation of cancers in 1994, based on different investigation results, listed Helicobacter pylori into first class of carcinogens, relatively triggers in process of gastric carcinogenesis[17].

When it comes to gastric lymphoma there is no consensus on role of Helicobacter pylori in their ethiopathogenesis. Even though MALT lymphoma is not extremely rare, it accounts to 7.6% of 1 378 non Hodgkin lymphoma in international study for evaluation of importance of REAL classification. The highest incidence of gastric MALT lymphoma was recorded in northern Italy, 13.2 to 100 000 people a year, 13 times higher than in appropriate communities in Great Britain. This suggests that there is a significant variability in geographic distribution. It was speculated that uncommon high incidence of primary gastric lymphoma is connected to extremely high percent of Helicobacter pylori infection in investigated population. In the United States incidence is evaluated between 1:30 000 and 1:80 000 in population with Helicobacter pylori infection. However, additional unknown hereditary factors or nutritional habits can also have significant role. In some cases of primary gastric lymphoma Helicobacter pylori infection is not detected at all[15].

Hussel et al. in their investigation claim that growth of MALT lymphoma depends on antigen stimulation of gastric mucosa by Helicobacter pylori[18].

Despite numerous studies which link appearance of MALT and presence of Helicobacter pylori[19–22]), there are data of certain percent of MALT lymphoma infected with Helicobacter pylori which do not respond to eradication therapy of Helicobacter pylori[8,13,23], and that its connection with onset of MALT still does not have enough scientific proofs. Montalban in his study states that Helicobacter pylori infection cause MALT in a form of follicular gastritis and that its infection is present in most of indolent gastric MALT lymphoma. Now is known that MALT lymphoma, which are not associated with Helicobacter pylori infection, do not respond well to eradication antibiotic treatment. In certain number of these cases it clearly depends on probably present but not detected component of high grade malignant lymphoma[22]. Recent investigations from year 2010 on pathogenesis of MALT lymphoma draw special attention. They are based on inclusion of genetic aberration of oncogenic pathway of nuclear factor B (English nuclear factor kappa B – NF kappa B), which is the best investigated route in immunology and oncogenesis. It is quoted that gastric MALT lymphoma is extraordinary example of close tie between chronic inflammation and tumor development. It is described that gastric MALT lymphoma is one of the best models how genetic disorders lead to oncogenesis, determine biology of tumor, dictate its clinical behavior and present potential therapy target[24]. Calletti et al points out that most likely Helicobacter pylori has a role in transformation of MALT to diffuse large B cell lymphoma, with note that all listed lymphoma do not develop form existing MALT in presence of Helicobacter pylori[11]. Other study established large correlation between presence of Helicobacter pylori and gastric lymphoma[25].

While investigating presence of Helicobacter pylori via serological test we established that it was positive in 52.5% patients. Out of that number 61.1% were MALT lymphoma, 28.5% diffuse large cell B lymphoma and 9.5% other types of lymphoma. Our data suggest that Helicobacter pilory is possible etiological factor in onset of gastric lymphoma, firstly MALT type of lymphoma. Less number of patients with DLBCL was Helicobacter pylori positive and the association with its onset is still questionable. However relation of MALT and diffuse large B cell lymphoma and the role of Helicobacter pylori infection remain controversial. Previous studies demonstrated significant percent of complete remission of DLBCL following eradication therapy for Helicobacter pylori in patients who had concomitant MALT lymphoma[20]. These data suggest that bacteria Helicobacter pylori is in certain percent linked to progression to DLBCL. Nakamura et al. established that only 50% of gastric MALT lymphoma is of high risk in clinical stage I with infiltration of mucosa found on EUS responded favorably to eradication therapy for Helicobacter pylori[26].

Large number of studies is dealing with issue of primary gastric lymphoma and infection with Helicobacter pylori. It is necessary to point out to the fact that there is a certain number of patients who do not have infection with Helicobacter pylori, and have primary gastric lymphoma. In our study we found that out of total number of patients 52% were negative to Helicobacter pylori infec-

tion. Out of total number of Helicobacter pylori negative patients, 47% were patients with DLBCL lymphoma, while 21 % of them were with MALT lymphoma. Significantly higher number of DLBCL patients is Helicobacter pylori negative compared to MALT lymphoma Helicobacter pylori negative patients. Our results are in favor of investigations which do not connect DLBCL with Helicobacter pylori infection[25].

In a study by Zucca et al. small number of patients with MALT lymphoma has clinical B symptoms. In some patients values of lactate dehydrogenase and beta 2 microglobulin were not elevated[27], what is in correlation with our results. The presence of B symptoms which would be statistically significance is not established. We did not established elevated values of LDH and beta2 microglobulin in this group of patients. According to investigation of Lepicard in most patients with B symptoms difficulties are linked to disturbance in upper gastrointestinal tract. That group of patients did not have elevated values of LDH and beta2 microglobulin, what confirms result of our investigation[15,28]. Two listed laboratory parameters are one of prognostic markers for aggressive and indolent lymphoma[29]. Beta2 microglobulin together with LDH, is important prognostic parameter of therapeutical response and survival, and both are included into IPI prognostic index. Elevated values of both parameters demonstrate very fast relapse of the disease and only one third of patients lives longer than two years.

Results of our investigation showed that anemia was more expressed in group of patients with MALT lymphoma compared to group of patients with diffuse large B lymphoma, where there was statistically significant difference. Zucca et al. quote microcytic sideropenic anemia, in some cases only microcytosis without anemia and lack of iron[15] what correlates with findings of our investigation. Differences in hemoglobin values may be connected with indolent nature of MALT lymphoma, because the disease last longer to onset of all symptoms. Due to slow progression of the disease, appearance of occult hemorrhage lasting for long time is possible. Other cause of anemia is chronic anemia. It is specific due to characteristic in iron metabolism, where repeated utilization of iron from tissue to serum is blocked, firstly by monocyte-macrophage system. Appearance of subclinical form of hemolysis, due to shorter lifetime of erythrocytes and relative insufficiency of bone marrow, is also possible. It is usually caused by the inhibition of erythrocytes production in adequate number, necessary to compensate its enhanced destruction. Lowered values of serum iron were maybe caused by the reduced absorption due to loss of appetite[46]. Unlike MALT, diffuse large cell B lymphoma is aggressive lymphoma and constitutional symptoms appear earlier what might affects earlier diagnosing and in shorter period do not develop anemia of chronic disease or the occult bleeding last long.

In literature there are no data on controversial issue if the EUS is more sensitive from proximal endoscopy with targeted and mapped biopsies of gastric mucosa for early diagnostics and relapse of gastric lymphoma. In our study group of 40 patients, in whom there was a suspicion to malignant gastric tumor and in whom histopathology verified primary gastric lymphoma, was analyzed. EUS analyzed tumor mass in gastric mucosa, which was described based on its radiological characteristics and depth of its infiltration. Finding of EUS compared to pathohistological finding of tissue sample from gastric wall is in 40% cases directed that it is cancer. In those patients EUS finding was not in correlation to pathohistological diagnosis so it is concluded that EUS is not sufficient in making diagnosis of gastric lymphoma. These results are not in correlation with findings of Capelle et al who quote that endoscopic ultrasound can confine benign lymphoid infiltration from lymphoma with high percent, what we did not confirm in our investigation[25].

Jensen notes that EUS is not suitable for detection of locus of lymphoma which are not detected via endoscopy[10]. Diagnostics of gastric lymphoma is based to proximal endoscopy which is used to sample tissue from different locations of gastric mucosa and pathohistological analysis of tumor tissue samples[31].

In recently published literature we had access to, it is quoted that EUS is generally accepted as the most precise method to assess local stage of gastric lymphoma, including detection of involved regional lymph nodes. Data from literature are still scarce and contradictory. They are results of studies published between 1992 and 2002 while the standard treatment for gastric lymphoma was surgical resection. In accordance to this staging of the disease with EUS could be compared to the results of pathohistological findings in these studies[10,31,32]. At this point prospective studies with technically improved EUS and more experienced specialists for endoscopy, which would resolve opposing attitudes, are not expected since gastrectomy following pathohistological verification are avoided[33].

Outcome of primary gastric lymphoma treatment for MALT and DLBCL treated with chemotherapy, radiotherapy or surgical resection in I and II clinical stage, in study by Schramm et al. was not different since there was no difference in length of survival[34]. Analyzes of quality of life established that patients with preserved stomach had significantly better quality of life than gastrectomy patients.

These data are important for planning treatment of patients with primary gastric lymphoma what also shows significance of adequate diagnostic procedure. It is clear, from quoted discussion that optimal diagnosis and treatment of MALT lymphoma, asks for integration of morphological, immunohistochemical and molecular data by pathologist in close cooperation with clinician. Diagnosis of MALT lymphoma ask also for molecular analysis of translocation t(11,18)(q21,21)/API2-MALTl1. Due to clinical implication some authors recommend detection of DLBCL lymphoma, which coexists with MALT lymphoma, and to detailed endoscopies, in order to sample tissue for biopsies from more locations[28]. Above mentioned is

necessary to confirm or exclude presence of transformation in DLBCL. Endoscopy can be supplemented with EUS in order to obtain detailed data on stage of the disease.

Future studies should direct importance to the defining value of EUS in process of diagnostics and precise determination of gastric lymphoma stage.

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PREDIKTIVNA VRIJEDNOST ENDOSKOPSKOG ULTRAZVUKA U DIJAGNOSTICI I *STAGINGU* PRIMARNOG LIMFOMA ŽELUCA

SAŽETAK

Cilj rada je bio istražiti značaj endoskopskog ultrazvuka u dijagnostici i utvrđivanju stadija bolesti u limfoma želuca. Proveli smo retrospektivnu kliničku studiju na Klinici za hematologiju i Klinici za gastroenterologiju Kliničkog bolničkog centra Sarajevo u razdoblju od osam godina. Uključeni su bolesnici (N=40) s patohistološki potvrđenom dijagnozom limfoma želuca. Stadij bolesti se određivao na temelju nalaza EUS-a, endoskopije gornjeg dijela probavnog sustava, kompjuterizirane tomografije i abdominalnog ultrazvuka, a klasifikacija se vršila prema Ann Arbor sustavu. Samo jedan bolesnik je imao Hodgkin limfom, a 39 njih su imali ne-Hodgkin limfom. Prema morfološkim karakteristima vizualiziranim s EUS-om, u 16 bolesnika bila je postavljena sumnja na karcinom želuca. U 40% bolesnika nalaz na EUS-u nije potvrđen i patohistološki. U usporedbi s kompjuteriziranom tomografijom i abdominalnim ultrazvukom, EUS je pokazao statistički signifikantno višu učestalost otkrivanja infiltracije tkiva ($p<0,001$). U bolesnika s primarnim limfomom želuca, EUS ima značajniju ulogu u utvrđivanju stupnja širenja bolesti nego postavljanja same dijagnoze. Stoga bi EUS trebalo uključiti u algoritam dijagnostičkih pretraga bolesnika kada se sumnja na malignu bolest želuca.