VIA MEDICA

Original article

NOWOTWORY Journal of Oncology
2023, volume 73, number 2, 68–72
DOI: 10.5603/NJO.2023.0016

ISSN: 0029–540X, e-ISSN: 2300-2115
www.nowotwory.edu.pl

Evaluation of the incidence of splenic hilar lymph node metastasis in patients operated on for esophagogastric junction cancer

Tomasz Olesiński[1], Marek Szpakowski[1], Wojciech Kaźmierczak[1], Urszula Sulkowska[2], Andrzej Rutkowski[1]

[1] *Division I of the Department of Surgery for Tumors of the Gastrointestinal System and Neuroendocrine Tumors, Maria Sklodowska-Curie National Research Institute of Oncology, Warsaw, Poland*
[2] *Mazovian Cancer Registry, Maria Sklodowska-Curie National Research Institute of Oncology, Warsaw, Poland*

Introduction. The purpose of this study is to evaluate the effect of esophagogastric junction cancer (EGJC) staging on the risk of splenic hilar lymph node involvement.

Material and methods. 312 patients with EGJC after R0 surgery were analyzed; 118 (38%) women and 194 (62%) men, median age 58 (29–80) years. In 81 (25.27%) cases, metastases were found in splenic lymph nodes (gr. 10).

Results. in stage I and II A (IA and IB), no metastases were found in splenic hilar lymph nodes (0/42 and 0/18, respectively), in stage IIB 9.61% (5/52), in IIIA 21.74% (15/69), in IIIB 36.36% (16/44), in IIIC 46.83% (37/79), and in stage IV 100% (8/8).

Conclusions. The highest risk of metastasis of esophagogastric junction cancer to splenic hilar lymph nodes exists in caners stage III and IV. Spleen-sparing elective splenectomy or group 10 lymphadenectomy may be of importance in the treatment of patients with stage III and IV gastroesophageal junction cancer, however, the assessment of its usefulness requires further prospective clinical trials.

Key words: gastric cancer, esophagogastric junction cancer, lymphadenectomy, splenectomy

Introduction

The extent of surgery in the radical surgical treatment of esophagogastric junction cancer has been debated for many years [1–13]. For tumours located in the greater curvature, esophagogastric junction and gastric fundus, the extent of elective lymph node removal (station 10 and 11) is the determinant of the extent of surgery. In recent years, the discussion has been revived because more and more centres are performing lymphadenectomies with spleen sparing, rather than extending the operation to include elective removal of additional organs (the spleen, the tail of the pancreas) as before. Elective removal of the tail of the pancreas and/or spleen during radical treatment of esophagogastric junction cancer has been currently abandoned due to the increased risk of postoperative complications, increased postoperative mortality [2, 3, 5, 10–12, 14–16] and the lack of conclusive reports of a positive effect on distant outcomes [1, 3, 6, 9, 11, 12]. In deciding the extent of resection, it is important to assess the risk of splenic hilar lymph node

How to cite:

Olesiński T, Szpakowski M, Kaźmierczak W, Sulkowska U, Rutkowski A. ***Evaluation of the incidence of splenic hilar lymph node metastasis in patients operated on for esophagogastric junction cancer.*** *NOWOTWORY J Oncol* 2023; 73: 68–72.

metastasis [17–19]. In this paper, we present an assessment of the incidence of lymph node metastasis of station 10 in patients operated on for adenocarcinoma of the esophagogastric junction based on our own material from the Department.

Purpose of the work

To evaluate the effect of the stage of esophagogastric junction carcinoma on the risk of splenic node involvement (station 10).

Material and methods

The accepted standard of care for radical surgical treatment of esophagogastric junction cancer (Ziewert 1 and 2) in the Surgical Department of the Oncology Gastroenterology Department is complete removal of the stomach, distal oesophagus with a D2 lymphadenectomy, with access via laparotomy or left thoraco-laparotomy. When performing a D2 lymphadenectomy, the lymph nodes of the initial splenic artery (station 11) and the lymph nodes of the splenic hilum (station 10) were removed electively, in addition to other lymph node stations. In most cases, the preparation was removed *en bloc*, and in all cases, after the operation was completed, the removed tissues were divided into individual lymph node groups in the operating room by the surgeon. In this way, the prepared lymph node groups were sent separately for histopathological examination (fig. 1).

Between 1996 and 2009, a total of 312 patients with adenocarcinoma of the esophagogastric junction (types I, II and III according to Siewert) were operated on in the Department. In the mentioned group, there were 118 women and 194 men, the median age was 58 (29–80) years. The characteristics of the study group are presented in table I. These patients were not treated with neoadjuvant chemotherapy. All patients underwent surgery with the intention to cure, with no macroscopic tumor tissue being left in the surgical field. In the analyzed group of patients, the total number of lymph nodes removed in the specimen per patient ranged from 16 to 80 (on average, 34 lymph nodes were found in the surgical specimen). The number of lymph nodes found in the splenic hilum ranged from 1 to 18, with an average of 4.2. In all cases, resectability was assessed as R0. For retrospective analysis, the pathological staging of tumors according to TNM-AJCC edition 8 was adopted (tab. II).

Regional lymph nodes for the stomach are: perigastric nodes located along the lesser and greater curvature (stations 1–6; according to Japanese Gastric Cancer Association (JGCA) nodes located along the left gastric artery [7], common hepatic artery [8], splenic artery [11], coeliac trunk [9] and hepatoduodenal nodes [12]. Metastases in extra-regional lymph nodes, such as behind the pancreatic head [13], mesenteric [14, 15] and periaortic [16] lymph nodes, are classified as distant metastases (M1).

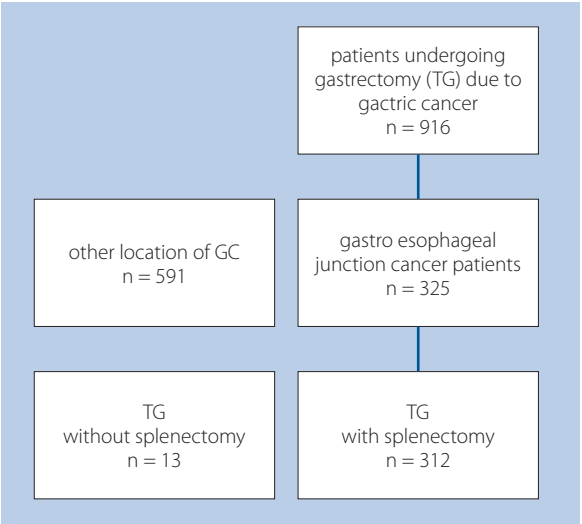

Figure 1. Study flow chart; TG – gastrectomy; GC – gastric cancer

Results

In the analyzed group of patients, pathological stage IA was found in 5.12% of patients (16/312 patients), stage IB was found

Table I. The characteristics of the study group

Characteristic	n
gender	
female (%)	118 (38)
male (%)	194 (62)
age – median (range)	58 (29–80)
BMI – median (range)	25.1 (22.2–28.3)
lymph node resection – median (range)	34 (16–80)
tumor (%)	
T1	48 (15.4)
T2	85 (27.2)
T3	108 (34.6)
T4	71 (22.8)

Table II. Pathological staging of gastric cancer according to TNM-AJCC 8th edition

Clinical stage	TNM
IA	T1N0M0
IB	T1N1M0, T2N0M0
IIA	T1N2M0, T2N1M0, T3N0M0
IIB	T1N3aM0, T2N2M0, T3N1M0 T4aN0M0
IIIA	T2N3aM0, T3N2M0, T4aN1–2M0, T4bN0M0
IIIB	T1–2N3bM0, T3–4aN2bM0, T4bN1–2M0
IIIC	T3–4aN3bM0, T4bN3a–3bM0
IV	T1–4N1–3M1
N N1: 1–2; N2: 3–6; N3a: 7–15; N3b: >16	

in 8.33% of patients (26/312 patients), stage IIA in 5.76% of patients (18/312 patients), stage IIB in 16.66% of patients (52/312 patients), stage IIIA in 22.11% of patients (69/312), stage IIIB in 14.10% of patients (44/312), stage IIIC in 25.32% of patients (79/312), stage IV in 2.5% of patients (8/312).

The overall incidence of metastasis of adenocarcinoma of the esophagogastric junction to the splenic hilar lymph nodes was estimated at 25.27% (in 81 out of 312 patients), and the probability of their involvement increased with the clinical stage of the tumor. After subdividing according to the pathological stage, the following results were obtained: in stage I and II A (IA and IB), no metastases were found in the splenic hilar lymph nodes (0/42 and 0/18 pts, respectively), in stage IIB 9.61% (5/52 pts), in IIIA 21.74% (15/69 pts), in IIIB 36.36% (16/44 pts), in IIIC 46.83% (37/79 pts) and in stage IV 100% (8/8 pts) (tab. III).

Comparing the correlation between the frequency of splenic hilar lymph node involvement and concomitant metastasis to other perigastric lymph node stations, it was assessed that the most common correlation was between the lymph nodes of the greater curvature (short gastric vessels) and right perigastric lymph nodes (tab. IV).

Table III. Lymph node involvement according to clinical stage

Clinical stage	% of involved lymph nodes in the spleen hilum
IA and IB	0% (0/42)
IIA	0% (0/18)
IIB	9.61% (5/52)
IIIA	21.74% (15/69)
IIIB	36.36% (16/44)
IIIC	46.83% (37/79)
IV	100% (8/8)

Table IV. Correlation of splenic hilar lymph node involvement and other perigastric lymph node stations

Lymph node station	% of simultaneously involved nodes
along the greater curvature – station 4	52%
right cardia – station 1	42%
along the splenic artery – station 11	40%
left cardia – station 2	28%
along the left gastric artery – station 7	26%
around the coeliac trunk – station 9	26%
along the common hepatic artery – station 8	24%
infrapyloric – station 6	16%
along the lesser curvature – station 3	16%
suprapyloric – station 5	4%

Discussion

A splenectomy, according to a lot of the literature data, is considered an independent prognostic factor that significantly increases the number of septic complications and postoperative mortality [5, 10, 11, 14–16]. Chicara et al., analysing the need for an extended lymphadenectomy in the treatment of gastric cancer [6], noted the incidence of metastasis in removed periaortic lymph nodes with concomitant involvement of the splenic hilar lymph nodes. He found that at the time of splenic hilar node metastasis, 46% of patients had concurrent periaortic lymph node metastasis. Csendes et al. analysed a group of nearly 250 cases [9], and attempted to identify predictive factors that can help the surgeon decide whether splenic removal was warranted. No metastasis to the splenic hilum was found in the absence of serosal infiltration (0%), a low rate of metastasis was observed for tumor sizes less than 40 mm in the largest dimension (metastasis in only 1.7%) and for signet ring cell carcinoma histologic stroma (metastasis in 5.3% of cases). The incidence of gr. 10 node metastasis for proximal gastric cancer based on retrospective studies is about 15% [17, 19–21].

Son et al. [19] retrospectively reviewed 602 cases of proximal gastric cancer who had gr. 10 lymph nodes removed with (258) or without a splenectomy (344). In the study group, 14.5% had metastases in the splenic hilar nodes (25% in our group of patients, but we only evaluated EGJC cancer in our group). The authors compared the prognosis of these patients with patients who had metastasis to non-splenic nodes (gr. 9, 11, 12a) and found that the risk of recurrence in both cases was similar (5-year survival of 24.1%), but these patients still had a better prognosis than in the presence of distant metastases ($p < 0.05$). A meta-analysis of 15 papers evaluating the risk of splenic hilar metastasis confirmed that grades 3 and 4 were independent prognostic factors ($p < 0.01$). Other factors included tumor size >5 cm, location on the greater curvature, diffuse type according to Lauren, low tumor differentiation, T3–4 tumor, N2–3, M1 nodes and vascular infiltration [22].

A retrospective evaluation of a group of 995 originally laparoscopically operated patients with proximal gastric cancer, 564 of whom underwent resection of gr 10 nodes with spleen sparing and 431 of whom did not, showed that OS for patients with extended an lymphadenectomy was higher (63.3% *vs.* 52.2%, $p = 0.003$). An analysis of a small group of 39 patients after neoadjuvant therapy in the same study did not confirm such favourable results (50.6% *vs.* 31.3%, $p = 0.150$) [21].

Due to the results of the JCOG 0110 study [11], the latest JGCA 2018 guidelines [12] removed group 10 from the scope of the D2 lymphadenectomy. A randomized evaluation of 505 patients confirmed that a splenectomy in proximal gastric cancer does not affect survival, but rather increases the risk of complications; HR 0.88 (90.7%, confidence interval 0.67–1.16). Many authors debate these guidelines due to the focus of this study on splenectomy rather than lymphadenectomy with spleen sparing [20–25]. Currently, as experience is gained, more and more centres are removing a group of 10 lymph nodes without performing a splenectomy. Based on a retrospective study, Japanese authors [25] suggest that a resection of group 10 with spleen sparing may be beneficial for tumors infiltrating the greater curvature and for patients with cancer in the gastric stump (prior resection of the left gastric t. lymphatic drainage). A phase II study is currently underway to evaluate laparoscopic and robotic methods for resection of a group of 10 lymph nodes with splenic sparing (JCOG1809).

In summary, our own experience, as well as the literature data regarding expanding surgical procedures to include elective splenectomy to remove splenic hilar lymph nodes is still a debatable issue, despite existing surgical treatment recommendations that do not recommend performing elective splenectomy. Particularly problematic is the performance of an elective splenectomy in patients in whom, on staging studies and in the surgeon's intraoperative assessment, we can expect the tumor to be significantly advanced (stage III). The removal of lymph nodes in the D2 range along with a splenectomy or splenopancreatectomy results in increased complications and mortality, and does not improve distant treatment outcomes [11, 26]. Excision of the lymphatic system in the D2 range with spleen sparing only slightly increases expected survival and has little effect on the number of postoperative complications [20, 23, 27]. Extending the lymphadenectomy to include periaortic nodes does not improve outcomes [28]. However, the removal of the spleen when enlarged splenic hilar lymph nodes or splenic infiltration through continuity (elective splenectomy) is found is questionable. Selection of patients for an extended lymphadenectomy in the preoperative period is difficult and inconclusive (only in a few Japanese and Korean studies does a D2+ lymphadenectomy improve patient outcomes). Maruyama's program [29–30] for assessing the risk of nodal lesions (age, sex, Bormann classification, depth of infiltration, lesion diameter, location, WHO classification) may be helpful in decision-making. With all the above-mentioned caveats, "overtreatment rather than undertreatment" is still suggested.

Conclusions

1. The highest risk of metastasis of esophagogastric junction cancer to splenic hilar lymph nodes exists in stage III and IV.
2. An elective splenectomy or group 10 lymphadenectomy with splenic sparing may be of value in the treatment of patients with stage III and IV esophagogastric junction cancer, but evaluation of its usefulness requires further prospective clinical studies.

Conflict of interest: none declared

Tomasz Olesiński
Maria Sklodowska-Curie National Research Institute of Oncology
Division I of the Department of Surgery for Tumors of the Gastrointestinal System and Neuroendocrine Tumors
ul. Roentgena 5
02-781 Warszawa, Poland
e-mail: Tomasz.Olesinski@pib-nio.pl

Received: 16 Feb 2023
Accepted: 31 Mar 2023

References

1. Kasakura Y, Fujii M, Mochizuki F, et al. Is there a benefit of pancreaticosplenectomy with gastrectomy for advanced gastric cancer? Am J Surg. 2000; 179(3): 237–242, doi: 10.1016/s0002-9610(00)00293-2, indexed in Pubmed: 10827328.
2. Sasako M. Risk factors for surgical treatment in the Dutch Gastric Cancer Trial. Br J Surg. 1997; 84(11): 1567–1571, doi: 10.1111/j.1365-2168.1997.02842.x, indexed in Pubmed: 9393281.
3. Degiuli M, Sasako M, Ponzetto A, et al. Extended lymph node dissection for gastric cancer: results of a prospective, multi-centre analysis of morbidity and mortality in 118 consecutive cases. Eur J Surg Oncol. 1997; 23(4): 310–314, doi: 10.1016/s0748-7983(97)90696-x, indexed in Pubmed: 9315058.
4. Hansson LE, Ekström AM, Bergström R, et al. Surgery for stomach cancer in a defined Swedish population: current practices and operative results. Swedish Gastric Cancer Study Group. Eur J Surg. 2000; 166(10): 787–795, doi: 10.1080/110241500447425, indexed in Pubmed: 11071166.
5. Yasuda K, Shiraishi N, Adachi Y, et al. Risk factors for complications following resection of large gastric cancer. Br J Surg. 2001; 88(6): 873–877, doi: 10.1046/j.0007-1323.2001.01782.x, indexed in Pubmed: 11412261.
6. Chikara K, Hiroshi S, Masato N, et al. Indications for pancreaticosplenectomy in advanced gastric cancer. Hepatogastroenterology. 2001; 48(39): 908–912, indexed in Pubmed: 11462954.
7. Csendes A, Burdiles P, Rojas J, et al. A prospective randomized study comparing D2 total gastrectomy versus D2 total gastrectomy plus splenectomy in 187 patients with gastric carcinoma. Surgery. 2002; 131(4): 401–407, doi: 10.1067/msy.2002.121891, indexed in Pubmed: 11935130.
8. Schmid A, Thybusch A, Kremer B, et al. Differential effects of radical D2-lymphadenectomy and splenectomy in surgically treated gastric cancer patients. Hepatogastroenterology. 2000; 47(32): 579–585, indexed in Pubmed: 10791243.
9. Takahashi M, Fujimoto S, Kobayashi K, et al. Indication for splenectomy combined with total gastrectomy for gastric cancer: analisis of data on 249 gastric cancer patients. Hepatogastroenterology. 1995; 42(3): 230–233, indexed in Pubmed: 7590570.
10. Griffith JP, Sue-Ling HM, Martin I, et al. Preservation of the spleen improves survival after radical surgery for gastric cancer. Gut. 1995; 36(5): 684–690, doi: 10.1136/gut.36.5.684, indexed in Pubmed: 7797117.
11. Sano T, Sasako M, Mizusawa J, et al. Stomach Cancer Study Group of the Japan Clinical Oncology Group. Randomized Controlled Trial to Evaluate Splenectomy in Total Gastrectomy for Proximal Gastric Carcinoma. Ann Surg. 2017; 265(2): 277–283, doi: 10.1097/SLA.0000000000001814, indexed in Pubmed: 27280511.
12. Japanese Gastric Cancer Association. Japanese gastric cancer treatment guidelines 2018 (5th edition). Gastric Cancer. 2021; 24(1): 1–21, doi: 10.1007/s10120-020-01042-y, indexed in Pubmed: 32060757.
13. Pierzankowski I, Dmitruk A, Rybski S, et al. The influence of surgery quality on the longtime results of gastric cancer combination therapy.

Nowotwory. Journal of Oncology. 2022; 72(4): 219–225, doi: 10.5603/njo.a2022.0025.
14. Lo SS, Wu CW, Shen KH, et al. Higher morbidity and mortality after combined total gastrectomy and pancreaticosplenectomy for gastric cancer. World J Surg. 2002; 26(6): 678–682, doi: 10.1007/s00268-001-0289-8, indexed in Pubmed: 12053218.
15. Budisin N, Budisin E, Golubovic A. Early complications following total gastrectomy for gastric cancer. J Surg Oncol. 2001; 77(1): 35–41, doi: 10.1002/jso.1063, indexed in Pubmed: 11344481.
16. Cuschieri A, Fayers P, Fielding J, et al. Postoperative morbidity and mortality after D1 and D2 resections for gastric cancer: preliminary results of the MRC randomised controlled surgical trial. The Surgical Cooperative Group. Lancet. 1996; 347(9007): 995–999, doi: 10.1016/s0140-6736(96)90144-0, indexed in Pubmed: 8606613.
17. Ding P, Gao Z, Zheng C, et al. Risk evaluation of splenic hilar or splenic artery lymph node metastasis and survival analysis for patients with proximal gastric cancer after curative gastrectomy: a retrospective study. BMC Cancer. 2019; 19(1): 905, doi: 10.1186/s12885-019-6112-4, indexed in Pubmed: 31510966.
18. Zhong Q, Chen QY, Xu YC, et al. Reappraise role of No. 10 lymphadenectomy for proximal gastric cancer in the era of minimal invasive surgery during total gastrectomy: a pooled analysis of 4 prospective trial. Gastric Cancer. 2021; 24(1): 245–257, doi: 10.1007/s10120-020-01110-3, indexed in Pubmed: 32712769.
19. Son T, Kwon InG, Lee JHo, et al. Impact of splenic hilar lymph node metastasis on prognosis in patients with advanced gastric cancer. Oncotarget. 2017; 8(48): 84515–84528, doi: 10.18632/oncotarget.18762, indexed in Pubmed: 29137444.
20. Zheng G, Liu J, Guo Y, et al. Necessity of prophylactic splenic hilum lymph node clearance for middle and upper third gastric cancer: a network meta-analysis. BMC Cancer. 2020; 20(1): 149, doi: 10.1186/s12885-020-6619-8, indexed in Pubmed: 32093683.
21. Lin JX, Wang ZK, Huang YQ, et al. Clinical Relevance of Splenic Hilar Lymph Node Dissection for Proximal Gastric Cancer: A Propensity Score-Matching Case-Control Study. Ann Surg Oncol. 2021; 28(11): 6649–6662, doi: 10.1245/s10434-021-09830-1, indexed in Pubmed: 33768400.
22. Du J, Shen Y, Yan W, et al. Risk factors of lymph node metastasis in the splenic hilum of gastric cancer patients: a meta-analysis. World J Surg Oncol. 2020; 18(1): 233, doi: 10.1186/s12957-020-02008-1, indexed in Pubmed: 32873315.
23. Liu K, Chen XZ, Zhang YC, et al. The value of spleen-preserving lymphadenectomy in total gastrectomy for gastric and esophagogastric junctional adenocarcinomas: A long-term retrospective propensity score match study from a high-volume institution in China. Surgery. 2021; 169(2): 426–435, doi: 10.1016/j.surg.2020.07.053, indexed in Pubmed: 32950240.
24. Bencivenga M, Torroni L, Verlato G, et al. Lymphadenectomy for gastric cancer at European specialist centres. Eur J Surg Oncol. 2021; 47(5): 1048–1054, doi: 10.1016/j.ejso.2020.10.013, indexed in Pubmed: 33092970.
25. Kinoshita T, Okayama T. Is splenic hilar lymph node dissection necessary for proximal gastric cancer surgery? Ann Gastroenterol Surg. 2021; 5(2): 173–182, doi: 10.1002/ags3.12413, indexed in Pubmed: 33860137.
26. Bonenkamp JJ, Hermans J, Sasako M, et al. Dutch Gastric Cancer Group. Extended lymph-node dissection for gastric cancer. N Engl J Med. 1999; 340(12): 908–914, doi: 10.1056/NEJM199903253401202, indexed in Pubmed: 10089184.
27. Wu CW, Hsiung CA, Lo SS, et al. Nodal dissection for patients with gastric cancer: a randomised controlled trial. Lancet Oncol. 2006; 7(4): 309–315, doi: 10.1016/S1470-2045(06)70623-4, indexed in Pubmed: 16574546.
28. Sasako M, Sano T, Yamamoto S, et al. Japan Clinical Oncology Group. D2 lymphadenectomy alone or with para-aortic nodal dissection for gastric cancer. N Engl J Med. 2008; 359(5): 453–462, doi: 10.1056/NEJMoa0707035, indexed in Pubmed: 18669424.
29. Peeters KC, Hundahl SA, Kranenbarg EK, et al. Low Maruyama index surgery for gastric cancer: blinded reanalysis of the Dutch D1-D2 trial. World J Surg. 2005; 29(12): 1576–1584, doi: 10.1007/s00268-005-7907-9, indexed in Pubmed: 16317484.
30. Hundahl SA. Low Maruyama Index Surgery for Gastric Cancer. Scand J Surg. 2016; 95(4): 243–248, doi: 10.1177/145749690609500406.