

Ex Vivo Sentinel Node Mapping in Gastric Cancer

Won Cheol Park, M.D. and Jeong Kyun Lee, M.D.

Purpose: Lymph node analysis is essential for staging gastric cancer. Intraoperative lymphatic mapping and sentinel lymphadenectomy have not yet been investigated for most gastrointestinal neoplasms. The purpose of this study is to evaluate the usefulness of ex vivo lymphatic mapping in patients with gastric cancer.

Methods: 42 patients with gastric cancer underwent ex vivo lymphatic mapping and sentinel lymph node (SN) biopsy after standard surgical resection from March 2002 to September 2002. Within 5 minutes of resection, stomach specimens were injected submucosally around the tumor with isosulfan blue dye. Blue lymphatic channels were identified and followed to the blue-stained SN (s) which were harvested. The specimen was fixed in formalin and subsequently analyzed in the usual fashion.

Results: At least one SN was identified in 39 patients (92.9%). The average number of SNs identified was 2.5 (range, 1-6), and the average number of nodes in each gastric cancer specimen was 23.4 (range, 13-55). 14 patients had lymph nodes containing metastatic disease. 9 patients had metastasis in both sentinel and nonsentinel node. In 5 patients the sentinel nodes was negative for disease, whereas the nonsentinel lymph nodes contained metastatic disease (false negative rate=35.7%). Of these 5 patient, one may have skip metastasis and four had metastasis on same regional lymph node group.

Conclusion: Ex vivo SN mapping of the stomach is technically feasible, but it is too early to provide a useful approach to evaluate lymph node metastasis. (*J Korean Surg Soc* 2003;64:302-305)

Key Words: Ex vivo sentinel node mapping, Gastric cancer

Department of Surgery, School of Medicine, Wonkwang University, Iksan, Korea

H&E

(1)

가

(2)

가

Morton

2002 3 2002 9 42
lymphatic mapping

(Lymphazurin[®], USSC. Norwalk, USA) 1 ml

0.25 ml 1~2ml

3~5

가

H&E

: 344-2
☎ 570-711,
Tel: 063-850-1205, Fax: 063-855-2386
E-mail: rjk@wonkwang.ac.kr
:2002 11 21 , :2003 2 15
2001

가 22, 21, 14, 35, 5, 1, 2 (Fig. 1).

59.3 (35~78) 가 28
 가 14, T1 22, T2 6, T3 13, T4 1, 42
 39 (92.9%)
 23.4 (13~55)
 893, 2.5 (1~6)
 101 (Table 1).
 39, 14 (35.9%)
 가 5 (false negative rate: 35.7%)
 가, T1 3, T2 1, T3 1, 1 (7.1%), 2, 가, 4 (28.6%), 1, 가 (Table 2).

가 22, 21, 14, 35, 5, 1, 2 (Fig. 1).

Table 1. Clinicopathologic features of patients undergoing lymphatic mapping for gastric cancer

Clinicopathologic features	Results (%)
No. of cases	42
Sex	
Male : female	28 : 14
Mean age, year (range)	59.3 (35 ~ 78)
T stage	
T1	22 (52.4)
T2	6 (14.3)
T3	13 (31.0)
T4	1 (2.4)
Total No. of lymph nodes	893
Mean No. of lymph nodes (range)	23.4 (13 ~ 55)
Total No. of sentinel nodes	101
Mean No. of sentinel nodes(range)	2.5 (1 ~ 6)

Table 2. Distribution of metastases in sentinel and nonsentinel lymph nodes

Tumor status of node	No. (%) of lymph nodes	No. (%) of patients
Negative	784 (87.8)	25 (64.1)
Positive	109 (12.2)	14 (35.9)
Sentinel and non-sentinel	102 (11.4)	9 (23.1)
Sentinel only	0	0
Non-sentinel only	7 (0.8)	5 (12.8)
Skip metastasis	2 (0.2)	1 (2.6)
Total	893	39

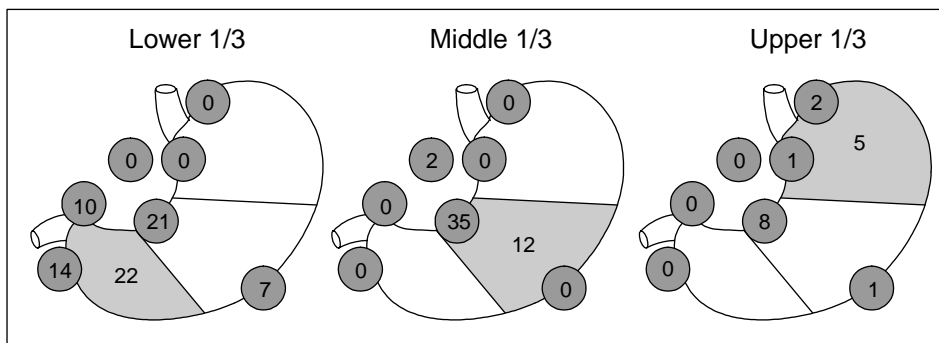


Fig. 1. Location of sentinel lymph node according to the center of gastric cancer Lower 1/3 Middle 1/3 Upper 1/3.

D2+a 가 D2 systemic
 .(4) skip metastasis
 가 14 5 (35.7%)
 가 1 2
 가 skip metastasis
 가 가 , 4
 1 가
 가 가
 .(3,5,6) 99mTc sulfur colloid skip metastasis
 가
 .(7,8) Aikou (9) 99mTc sulfur colloid
 18 17 (94%)
 sulfur colloid 2 99mTc
 99mTc sulfur colloid 가
 .(3,9)
 Wood (10) 75 in vivo LM 64
 lymphatic mapping (LM) Ex vivo LM
 56 (88%)
 8 7 (88%)
 . Wong (11)
 Ex vivo LM 26 24
 5
 가
 .(11)
 가
 가
 .(2,12,13) Kosaka (12)
 가 51 44 perigastric region
 가 7 N2-N3 node (jumping)
 가 가

systemic
 . Maruyama (13)
 skip metastasis
 가 14 5 (35.7%)
 가 1 2
 가 skip metastasis
 가 가 , 4
 1 가

REFERENCES

- 1) Morton DL, Wen DR, Wong JH, Economou JS, Cagle LA, Storm FK, et al. Technical details of intraoperative lymphatic mapping for early stage melanoma. Arch Surg 1992;127:392-9.
- 2) Giuliano AE, Kirgan DM, Guenther JM, Morton DL. Lymphatic mapping and sentinel lymphadenectomy for breast cancer. Ann Surg 1994;220:391-8; discussion 398-401.
- 3) Kitagawa Y, Ohgami M, Fujii H, Mukai M, Kubota T, Ando N, et al. Laparoscopic detection of sentinel lymph node in gastrointestinal cancer: a novel and minimally invasive approach. Ann Surg Oncol 2001;8:86S-9S.
- 4) de Manzoni G, Verlato G, Guglielmi A, Laterza E, Genna M, Cordiano C. Prognostic significance of lymph node dissection in gastric cancer. Br J Surg 1996;83:1604-7.
- 5) Kitagawa Y, Kubota T, Otani Y, Furukawa T, Yoshida M, Fujii H, et al. Clinical significance of sentinel node navigation surgery in the treatment of early gastric cancer. Nippon Geka Gakkai Zasshi 2001;102:753-7.
- 6) Tsioulis GJ, Wood TF, Morton DL, Bilchik AJ. Lymphatic mapping and focused analysis of sentinel lymph nodes upstage gastrointestinal neoplasms. Arch Surg 2000;135:926-32.
- 7) Morton DL, Thompson JF, Essner R, Elashoff R, Stern SL, Nieweg OE, et al. Validation of the accuracy of intraoperative

- lymphatic mapping and sentinel lymphadenectomy for early-stage melanoma: a multicenter trial. *Ann Surg* 1999;230:453-65.
- 8) Choi UJ, Park WC, Lee KM, Yoon KJ. Occult micrometastasis of sentinel lymph node in node-negative breast cancer. *J Korean Surg Soc* 2001;61:379-386.
- 9) Aikou T, Higashi H, Natsugoe S, Hokita S, Baba M, Tako S. Can sentinel node navigation surgery reduce the extent of lymph node dissection in gastric cancer? *Ann Surg Oncol* 2001;8:90S-3S.
- 10) Wood TF, Saha S, Morton D, Tsioulis GJ, Rangel D, Hutchinson WJ, et al. Validation of lymphatic mapping in colorectal cancer: in vivo, ex vivo, and laparoscopic techniques. *Ann Surg Oncol* 2001;8:150-7.
- 11) Wong JH, Steineman S, Calderia C, Bowles J, Namiki T. Ex vivo sentinel node mapping in carcinoma of the colon and rectum. *Ann Surg* 2001;233:515-21.
- 12) Kosaka T, Ueshige N, Sugaya J, Nakano Y, Akiyama T, Tomita F, et al. Lymphatic routes of the stomach demonstrated by gastric carcinoma with solitary lymph node metastasis. *Surg Today* 1999;29:695-700.
- 13) Maruyama K, Sasako M, Kinoshita T, Sano T, Katai H. Can sentinel node biopsy indicate rational extent of lymphadenectomy in gastric cancer surgery? Fundamental and new information on lymph-node dissection. *Langenbeck Arch Surg* 1999;384:149-57.