

Percentage Changes According to Pathological Findings of Sentinel Lymph Node in Early and Early-like progressive Gastric Cancer

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ABSTRACT

Background: Gastric cancer is considered to take the first place in incidence among visceral cancers in our country. We have studied to solve the problems to contribute gastric surgery practice and the studying aim is to identify appearance of SLN, order of incidence and average amount. We selected 121 early and early-like progressive gastric cancer patients (Male: Female = 2.7:1) who had undergone operations within last 10 years at Tumor Research Station of Medical Research Institute. We gradually injected 1ml of micro-activated charcoal saline liquid centering the gastric cancer lesion throughout four cardinal directions into submucous and subserous tissue of the patients who had been diagnosed as early gastric cancer and confirmed to have the indication for an operation so that we could excise the colored SLNs after 15-20 minutes with the lesion. We measured the size of the lesion pathomorphologically, confirmed the macroscopic findings, took the tissue specimen, stained them with H-E under the general sampling principles and finally observed histopathological findings microscopically to confirm its histological findings, differentiation and microscopic depth. For the test of significance with the appearance of SLN according to pathological indications, we performed χ^2 -test and with the average amount of SLN, we performed t-test.

Conclusion: The percentage changes of SLN presence according to pathological indications of early and early-like progressive cancer are like the following. The average amount of SLN was 1.41, The order of SLN appearances was like this., No5 lymph node (suprapyloric lymph node)-24.0%, No6 lymph node (subpyloric lymph node)-18.2%, No1 lymph node (pyloric lymph node)-11.6%.

Keywords: Sentinel Lymph Node, Early and Early-like progressive Gastric Cancer.

Article Information

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INTRODUCTION

Gastric cancer is considered to take the first place in incidence among visceral cancers in our country. As well as all the other visceral cancers, treatment of gastric cancers also relies on surgery, radiotherapy, chemotherapy, immunotherapy and thermotherapy but the most effective treatment is by far still surgery. It has been regarded as a principle of surgery to excise the tumor tissue in its early stage. However, actually in clinic practice, we are more likely to

face patients with progressive stage rather than early stage and in these cases, it is unavoidable to perform extirpations such as lymphadenectomy. Because of this, it was regarded as a common surgical principle to excise as many lymph nodes as possible to prevent regional and metastatic post-surgical recurrences. Consequently, no matter if there was metastasis or not, all the macroscopically swollen lymph nodes were known to get excised and the number varied up to 26[5,10].

This resulted in excision of lymph nodes which were not metastasized yet or impossible to get metastasized and reduction in immunocompetence and survival rate of the patient after the operation. But the definition of sentinel lymph node and the following surgical principle contrast against this theory. Sentinel lymph node (SLN) refers to the lymph node that communicate lymph flow with the mother lesion and it is so-called sentinel lymph node, profound lymph node and etc[2,4].

After the theory of SLN was published, at the time of endoscopy or laparotomy in clinic practice, several dyes are injected centering the lesion throughout surroundings in order to color and expose the communicating SLNs and the excision is performed[8,14].

According to the survey, the minimum amount of SLN is defined down to 2.6[1,3,11].

As a result, immunocompetence and biological reactivity of patients have increased by protecting the lymph nodes which are not metastasized or impossible to get metastasized and the prognosis has improved[6,7,9,12,13].

We have studied to solve the problems to contribute gastric surgery practice and the studying aim is to identify appearance percentage, order of appearance and average amount of SLN.

PATIENTS AND METHODS

We selected 121 early and early-like progressive gastric cancer patients (Male: Female =2.7:1) who had undergone operations within last 10 years at Oncology Institute, Academy of Medical Sciences.

First, we gradually injected 1ml of micro-activated charcoal saline liquid centering the gastric cancer lesion throughout four cardinal directions into submucous and subserous tissue of the patients who had been diagnosed as early gastric cancer and confirmed to have the indication for an operation so that we could excise the colored SLNs after 15-20 minutes with the lesion.

Secondly, we measured the size of the lesion pathomorphologically, confirmed the macroscopic findings, took the tissue specimen, stained them with H-E under the general sampling principles and finally observed histopathological findings microscopically to confirm its histological findings, differentiation and microscopic depth. Here, early-like progressive gastric cancer means the cancer which is diagnosed as early stage macroscopically under endoscopy but confirmed as progressive stage during histopathological observation of the sample. For the test of significance with the appearance of SLN according to pathological indications, we performed χ^2 -test and with the average amount of SLN, we performed t-test.

The features for endoscopic diagnosis and pathological confirmation are decided by the guidelines of diagnosis and treatment of gastric cancer published by the Health care Department, DPRK.

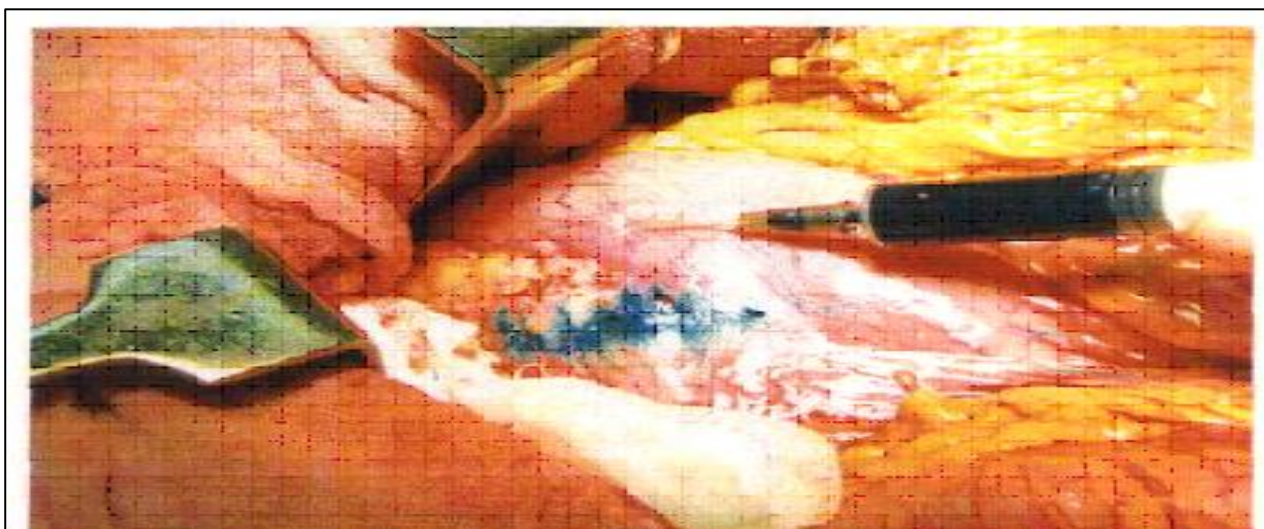


Fig 1. The injection of micro-activated charcoal saline liquid into the lesion.



Fig 2. Colored SLN.

RESULTS

As you can see in **Table 1**, the total amount of SLN were significantly bigger among $<2.0\text{cm}$ in size, III, IIc+III in macroscopic findings and highly differentiated cancer in differentiation. And the average amount of SLN were significantly bigger among $>4.1\text{cm}$ in size, III, IIc+III in macroscopic findings, Muc, sig, Ud in histological findings, poorly differentiated cancer in differentiation and Pm in

microscopic depth. The average amount of SLN was 1.4

As you can see in **Table 2**, SLN appearance of No5 and No6 lymph node with Muc, No5 and No6 and No1 lymph node with poorly differentiated one in differentiation and No5, No6, No1 lymph node with Pm in microscopic depth were significantly higher. And totally, the appearances are No5-24%, No6-18.2% and No1-11.6%.

Table 1. The amount of SLN according to pathological indications of early and early-like progressive gastric cancer.

Indication	Classification	Number of cases	Amount of SLN	
			Total (%)	Average
Size (cm)	~ 2.0	64	103(60.2) *	1.61±0.14
	~ 4.0	51	51(29.8)	1.00±0.08
	4.1 ~	6	17(9.9)	2.83±0.28 *
Macroscopic findings	I	6	-	-
	IIa	3	-	-
	IIb	2	-	-
	IIc	22	12(7.0)	0.55±0.04
	III	52	85(49.7) *	1.63±0.12 *
	IIc+III	36	74(43.3) *	2.06±0.16 *
Histological findings	Pap	25	19(11.1)	0.76±0.06
	Tub	84	114(66.7) *	1.36±0.11
	Muc	3	12(7.0)	4.00±0.34 *
	sig	7	19(11.1)	2.71±0.14 *
	Ud	2	7(4.1)	3.50±0.31 *
Differentiation	Highly-	67	68(39.8) *	1.01±0.61
	Moderately-	42	57(33.3)	1.35±0.56
	Poorly-	10	33(19.3)	3.30±0.46 *
	Un-	2	13(7.6)	6.50±2.02 *
Microscopic depth	M	43	-	-
	Sm	56	75(43.9)	1.33±0.21
	Pm	22	96(56.1)	4.36±0.29 *
Sum		121	171(100.0)	1.41±0.28

*;P<0.05(Compare by classification).

Table 2. The order of SLN appearance according to pathological indications of early and early-like progressive gastric cancer.

Indication	Classification	Number of cases	Order of SLN appearance					
			First		Second		Third	
			No	%	No	%	No	%
Size (cm)	~ 2.0	64	5	21.9	6	10.9	1	7.8
	~ 4.0	51	5	23.5	6	23.5	1	13.7
	4.1 ~	6	5	40.0	6	40.0	1	40.0
Macroscopic findings	I	6	-	-	-	-	-	-
	IIa	3	-	-	-	-	-	-
	IIb	2	-	-	-	-	-	-
	IIc	22	5	18.2	6	13.6	1	9.1
	III	52	5	28.9	6	21.2	1	13.5
	IIc+III	36	5	27.8	6	22.2	1	13.9
Histological findings	Pap	25	5	20.0	6	16.0	1	8.0
	Tub	84	5	20.2	6	13.1	1	8.3
	Muc	3	5	66.7 *	6	66.7 *	1	33.3
	sig	7	5	42.9	6	28.6	1	28.6
	Ud	2	5	100.0 *	6	100.0 *	1	100.0 *
Differentiation	Highly-	67	5	22.4	6	14.9	1	4.5
	Moderately-	42	5	19.1	6	14.3	1	14.3
	Poorly-	10	5	40.0	6	40.0	1	30.0
	Un-	2	5	100.0 *	6	100.0 *	1	100.0 *
Microscopic depth	M	43	-	-	-	-	-	-
	Sm	56	5	25.0	6	16.1	1	8.9
	Pm	22	5	68.2 *	6	59.1 *	1	40.9 *
Sum		121	5	24.0	6	18.2	1	11.6

*, $P<0.05$ (Compare by classification).

DISCUSSION

It has been reported that the amount of excised lymph nodes has decreased from maximum 26 in the past down to minimum 2-3 after the theory of SLN came up and was introduced to clinic practice[2,4,5,10]. We have estimated the amount of SLN according to pathological indications of early and early-like progressive gastric cancer. Size of the lesion is deeply related to the stage and metastasis of the cancer.

As we figured out the appearance of SLN according to the size of the cancer, the total percentage of SLN was significantly higher as 60.2% with <2.0cm, the average amount of SLN was significantly bigger as 2.83 ± 0.28 with >4.1cm and there was no significant difference in appearance order. The reason why the appearances of No5 (suprapyloric lymph node), No6 (subpyloric lymph node) and No1 (pyloric lymph node) lymph nodes are higher is related with the fact that gastric cancer occurs from pylorus in curvatura gastrica minor region.

Early cancer can be classified macroscopically into convex type(I), superficial type(II), concave type(III) and mixed type.

As we figured out the appearance of SLN according to macroscopic findings, the total percentage of SLN was significantly higher as 49.7% with IIItype and 4.33% with IIc+IIItype, the average amount of SLN was significantly bigger as 1.63 ± 0.12 with IIItype, 2.06 ± 0.16 with IIc+IIItype and there was no significant difference in appearance order. This result coincides with the documentary record that says the maximum lymphogenous metastasis rate is up to 11% and most of them are recognized in III and mixed type.

Most of gastric cancers are adenocarcinomas histologically and according to histological findings, they can be classified into papillary adenocarcinoma, tubular adenocarcinoma, mucinous adenocarcinoma, signet-ring cell adenocarcinoma, and undifferentiated adenocarcinoma. As we figured out the appearance of SLN according to histological findings, the total SLN percentage was significantly higher as 66.7% with Tub, average amount of SLN was bigger as 4.00 ± 0.34 with Muc, 2.71 ± 0.14 with sig and 3.50 ± 0.31 with Ud and the appearance was significantly higher as 66.7% with No5 and No6 in Muc and 100% with No5, No6, No1 in Ud.

This revealed that the appearance of SLN was higher with mucinous adenocarcinoma in histological findings and it is because both papillary adenocarcinoma and tubular adenocarcinoma have highly, moderately and poorly differentiated carcinoma in differentiation but mucinous carcinoma generally has moderately or poorly differentiated carcinoma.

The differentiation of the cancer has deep relationship with its malignancy since they are in inverse proportion each other.

As we figured out the appearance of SLN according to differentiation, the total percentage of SLN was significantly higher as 39.8% with

highly differentiated cancer, the average amount of SLN was significantly bigger as 3.30 ± 0.46 with poorly differentiated cancer, 6.50 ± 2.02 with undifferentiated cancer and the appearance of SLN was significantly higher as 100% with No5, No6 and No1 lymph node of undifferentiated cancer.

It is obvious that the lower the differentiation is, the higher the metastasis rate is and our research result revealed that the higher the malignancy is, the more SLNs present. According to documentary record, gastric cancer can be classified into early cancer and progressive cancer that border with intramucosal cancer by the microscopic depth and this is deeply related to SLN[1,3,11].

As we figured out the appearance of SLN according to microscopic depth, there was no significant difference in the total percentage of SLN and the average amount of SLN was bigger as 4.36 ± 0.29 with Pm and the appearance of SLN was higher as 68.2% with No5 lymph node, 59.1% with No6 lymph node and 40.9% with No1 lymph node.

As we classify cases of our study by microscopic depth, all the mucosal cancers are early cancers and submucous cancers are mixture of early and early-like progressive cancers while all muscularis cancers are early-like progressive cancers.

Therefore, the research report that says metastasis is recognized in 11% of submucous cancers shows 11% of submucous cancers can possibly metastasize[7,8,9,12,13].

On the other hand, all the cases of muscularis cancers are certain to metastasize.

Consequently, our research result again proved that the appearance of SLN with submucous cancers and muscularis cancers in microscopic depth were high.

To sum up, the average amount of SLN was totally 1.41 ± 0.28 and the appearances of No5, No6 and No1 lymph nodes were 24.0%, 18.2% and 11.6%.

CONCLUSION

The percentage changes of SLN presence according to pathological indications of early and early-like progressive cancer are like the following.

- 1) The average amount of SLN was 1.41.
- 2) The order of SLN appearance was like this. First, No5 lymph node (suprapyloric lymph node)-24.0%, Second, No6 lymph node (subpyloric lymph node)-18.2% Third, No1 lymph node (pyloric lymph node)-11.6%

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