

Original Research Article

Correlation of lymph node size and their metastatic infiltration in gastric adenocarcinoma

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ABSTRACT

Background: In adenocarcinoma stomach, lymph node involvement is a significant predictor of survival, and a decisive factor in planning management. Size has always been an important criterion while considering the metastatic status of the node, in its radiological evaluation or otherwise. However, to what extent the size of a node can be considered as a reliable criterion for its metastatic potential remains a question.

Methods: The present study is based on retrieving lymph nodes per operatively from patients of carcinoma stomach, measuring each node, evaluating its metastatic status and comparing the results to find a correlation between these two parameters.

Results: The present study, examined a total of 187 nodes from 30 gastrectomy specimens. Among them, metastasis was found in 59 nodes (31.55%). Among these metastatic nodes, 34 (57.62%) were actually less than 5mm in size. Among the total sizes of all the lymph nodes examined, the mean±SD (standard deviation) of the metastasis positive nodes were found to be 6.42±3.86 mm, while that of the non-metastatic nodes were found to be 5.51±1.99 mm. However, it was also observed that larger nodes (>1 cm), tend to have a high chance of being malignant (62.5%).

Conclusions: The above study shows though large nodes tend to be malignant, ignoring small nodes can lead to gross under staging or incomplete clearance while treating patients of adenocarcinoma stomach. Smaller nodes constitute a significant proportion of malignant nodes and must be evaluated. Size is not a reliable criterion of metastasis in lymph nodes of carcinoma stomach.

Keywords: Carcinoma stomach, Lymph node size, Metastasis, Small nodes

INTRODUCTION

In adenocarcinoma stomach, the lymph node involvement is a significant predictor of survival, and a decisive factor in staging, planning management and deciding prognosis of patients.^{1,2} However, the preoperative lymph node staging of gastric cancer by computed tomography (CT) relies mostly on the concept that malignant lymph nodes are larger than benign ones.^{3,4} This approach brings about a question about the importance of considering smaller nodes in terms of being involved in metastatic spread and also questions to what extent can size of lymph nodes act

as a surrogate for its metastatic potential. It is to answer this very question that the present study aims at finding a relation between the size of the lymph node and its metastatic status and to what extent size of a lymph node can be a reliable predictor of its malignant status.

METHODS

The present study was a cross sectional study carried out in the Department of Surgery, Assam Medical College and Hospital, Dibrugarh, within a period of one year from July 2014 to June 2015.

Inclusion criteria

Inclusion criteria were all patients operated for carcinoma stomach with recoverable lymph nodes per operatively.

Exclusion criteria

Exclusion criteria were patients considered inoperable due to age or associated co-morbidities. Patients with suggestive history or features of other associated diseases likely to involve the abdominal lymphoreticular system, e.g. abdominal Koch’s, lymphomas, patient’s refusal or unwillingness.

Study design

The study was to determine how closely lymph node size correlated with its metastatic status, nodes from gastrectomy specimens of patients with carcinoma stomach, treated surgically in the Department of Surgery, Assam Medical College, within the study period were evaluated. These lymph nodes were measured individually for their maximum dimensions and then reviewed histologically for evidence of metastatic infiltration. The data thus recorded, was then evaluated to identify statistically significant results. Thirty specimens were obtained, 18 from men and 12 from women. The subjects ranged in age from 28 years to 83 years (median 52 years). None of the patients had been treated preoperatively with cytotoxic drugs or radiation.

Surgical procedures included partial gastrectomy, subtotal gastrectomy and total gastrectomy with lymph node dissection.

Lymph node analysis

Measurement of lymph node size

On a separate table, all lymph nodes were carefully collected individually from the specimens and measured for their greatest dimension using a standard scale and/or slide calipers. The dimensions of each individual node thus evaluated, was carefully recorded against a serial number which was assigned to that particular node. These lymph nodes were then separately collected in containers bearing the serial number and sent for histopathological examination to evaluate presence of any evidence of metastasis in it along with the gastrectomy specimen.

Classification of nodes for study based on their sizes

For the purpose of the study, all the lymph nodes examined were classified into two groups: the first group assigned “small” nodes were defined as nodes of sizes 5 mm or less. Similarly, nodes which were of sizes more than 5 mm were assigned as “large” nodes. Analysis was then done on both the groups of lymph nodes for finding a correlation of the presence or absence of metastasis in

both groups, as discussed in detail under results and observations.

Statistical analysis

All the data thus received from the entire study, was tabulated and analyzed on microsoft word excel and graph pad prism version 6. Variables were expressed as a mean ±SD and analyzed using students t test. Frequencies were analyzed using chi square test and a p value of <0.05 was considered significant.

RESULTS

A total of 187 lymph nodes were examined in the present study. Among the total 187 nodes, metastasis was found to be present in 59 nodes (corresponding to 31.55%) while 128 nodes (corresponding to 68.45 %) were free of metastasis.

Tables 1: Distribution of lymph nodes with their status of metastasis.

Lymph nodes	Number	Percentage
With metastasis	59	31.55
Without metastasis	128	68.45
Total	187	100

For the purpose of the study, all the lymph nodes examined were classified into two groups: the first group assigned “small” nodes were defined as nodes of sizes 5 mm or less. Similarly, nodes which were of sizes more than 5 mm were assigned as “large” nodes. Among the total of 187 lymph nodes examined, 96 (51.34%) nodes were found to be ‘small’, defined as ≤5 mm while 91 (48.66%) nodes were found to be “large” defined as >5 mm.

Tables 2: Distribution of lymph nodes classified according to their sizes.

Lymph node size	Number	Percentage
≤5 mm	96	51.34
>5 mm	91	48.66
Total	187	100

Tables 3: The distribution of metastasis among “small” nodes.

Status of lymph node	Number of nodes ≤5 mm	Percentage
With metastasis	34	35.42
Without metastasis	62	64.58
Total	96	100

In order to find out as to what extent metastasis was present among the “small” nodes, all nodes of sizes ≤5 mm were examined for evidence of metastasis. It was

seen that among a total of 96 nodes of sizes 5 mm or less, metastasis was seen in 34 nodes, corresponding to 35.42% while 64.52% of small nodes were non-metastatic.

Similarly, on examining all the large nodes (n=91), for evidence of metastasis, it was found that 25 nodes (27.47%) had evidence of metastasis, while 66 nodes (72.53%) were found to be free of metastasis.

Tables 4: Distribution of metastasis among “large” nodes, nodes of sizes >5 mm.

Status of lymph nodes	Number of nodes of sizes >5 mm	Percentage
With metastasis	25	27.47
Without metastasis	66	72.53
Total	91	100

Tables 5: Frequency of small and large nodes among the total nodes containing metastasis.

Size of node	No. of nodes with metastasis	Percentage
≤5 mm	34	57.62
>5 mm	25	42.38
Total	59	100

As seen above, among the total number of 187 lymph nodes under study, metastasis was found in 59 nodes. The present study further tried to find out the percentage of “small” and “large” nodes within these 59 metastatic nodes. It was seen that 57.62% of the total metastatic nodes under study were comprised of nodes of sizes 5 mm or less (small nodes) while the other 42.38% of the metastatic nodes were of sizes >5 mm (large nodes).

Mean sizes of metastatic and non-metastatic nodes

In the present study, the mean sizes of all the metastatic and non-metastatic nodes were calculated separately and the results were compared to find out whether there exists any statistically significant difference between the average sizes of metastatic and non-metastatic nodes.

Among the total sizes of all the lymph nodes examined, the mean±SD of the metastasis positive nodes were found to be 6.42±3.86 mm, while that of the non-metastatic nodes were found to be 5.51±1.99 mm, and the difference was found to be statistically significant with p value of 0.0354 (p value significant at <0.05).

Taking 10 mm as criterion the lymph nodes under study were divided into two groups, and then evaluated for the presence of metastasis in both groups. It was seen that 16 nodes had sizes of 10 mm or more while 171 nodes were less than 10 mm. It was further recorded that metastasis was present in 10 out of the 16 nodes which were of sizes

10 mm or more while among the rest 171 nodes of sizes less than 10 mm, metastasis was found in only 49 of them.

Table 6: Frequency of metastasis among nodes considering 10 mm as cut off criterion.

Variables	Total no of nodes	Nodes having metastasis positive N (%)	Nodes with metastasis negative N (%)	P value
<10 mm	171	49 (28.65)	122 (71.35)	0.005
≥10 mm	16	10 (62.5)	6 (37.5)	

P significant at <0.05.

These data were compared statistically to find out the frequency of metastasis in both the groups. Statistical analysis showed that nodes of sizes 10 mm or greater exhibited significantly higher rates of metastasis than those of less than 10 mm (p value=0.005) p significant at <0.05.

The above table shows the distribution of metastasis in lymph nodes when 10 mm size was taken as cut off criterion. It shows that among 171 nodes of size <10 mm, 49 nodes (28.65%) were found to be metastatic while a majority of 122 nodes (71.35%), were found to be non-metastatic, while among a total of 16 nodes which were of size ≥10 mm, 10 nodes (62.5%) were found to be metastatic while 6 nodes (37.5%), were found to be non-metastatic implying that nodes of sizes 10mm or greater exhibited significantly higher rates of metastasis than those of less than 10 mm (p value=0.005) p significant at <0.05.

DISCUSSION

Considering, preoperative clinical lymph node staging relies on the supposition that malignant lymph nodes are larger than benign ones as well as the available imaging techniques, (CT and MRI) rely substantially on the lymph node size, establishing a reliable correlation between the size of the lymph nodes and its possible metastatic status becomes imperative.

In the present study, it was seen that a considerable percentage of the small nodes were found to be metastatic. Conversely, it was also seen that, a large percentage of metastatic nodes were actually small nodes which might otherwise seem clinically insignificant and radiologically undetectable.

Also, despite acknowledging the fact that there exists a significant difference in size between metastatic and non-metastatic lymph nodes statistically, the difference is narrow and may not be helpful in differentiating the two in clinical aspects. While comparing the present study

with similar studies, the following observations could be made.

Frequency of small and large nodes among the total nodes containing metastasis

In the present study, out of the total 187 nodes examined 59 nodes were found to have evidence of metastasis. Among these 59 nodes found to be malignant, 34 nodes were of sizes ≤ 5 mm in their greatest dimension, which corresponds to 57.62% of all malignant nodes. Hence, it can be seen that 57.62% of all malignant nodes are actually “small” nodes.

Similar results were found by Monig et al, in his study on patients with carcinoma stomach where he found that 55% of all the malignant nodes were ≤ 5 mm in size.⁴

In a similar study conducted by Kotanagi et al on patients with rectal cancer, he found that around 50% of all metastatic nodes were ≤ 5 mm.⁵

Bjelovic et al, in his prospective study of, 46 patients with rectal and sigmoid adenocarcinoma, found that 46% of all metastatic nodes were ≤ 5 mm.⁶ In another study, on gastric cancer, by Noda, found that 37.8% of all the metastatic nodes under his study were actually ≤ 5 mm in size.⁷

Mean sizes of metastatic and non-metastatic nodes

In the present study, the mean sizes of all the metastatic and non-metastatic nodes were calculated separately and the results were compared to find out whether there exists any statistically significant difference between the average sizes of metastatic and non-metastatic nodes.

Among the total sizes of all the lymph nodes examined, the mean \pm SD of the metastasis positive nodes were found to be 6.42 \pm 3.86 mm, while that of the non-metastatic nodes were found to be 5.51 \pm 1.99 mm, and the difference was found to be statistically significant with p value of 0.0354 (p value significant at <0.05).

In the study on gastric cancer conducted by Monig et al, the average sizes of metastatic and non-metastatic nodes were found to be 6 mm and 4.1 mm respectively, with the difference being significant statistically.⁴

In a similar study by Prenzel et al on patients with lung cancer, the mean \pm SD diameter of the non-metastatic lymph nodes was 7.05 \pm 3.75 mm, whereas infiltrated nodes had a diameter of 10.7 \pm 4.7 mm (p=0.005).⁸

In another study by Monig et al in cases of colon carcinoma, the mean diameter of the lymph nodes free of metastases was 3.9 mm, whereas those infiltrated by metastases averaged 5.9 mm in diameter, the difference being significant statistically (p<0.0001).⁹

Limitation of study

The duration of study and the paucity of sample size is a limitation in the present study and the potential for strengthening the observation is possible by expanding the same.

CONCLUSION

The present study conclusively shows that to provide a reliable staging of gastric carcinoma, lymph node sampling based on nodal size or modalities which rely on nodal size alone, is not sufficient. Although large nodes tend to be malignant, ignoring small nodes can lead to gross under staging or incomplete clearance while treating patients of adenocarcinoma stomach. Smaller nodes constitute a significant proportion of malignant nodes and must be evaluated. Size is not a reliable criterion of metastasis in lymph nodes of carcinoma stomach.

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