

Prevalence of lymph node and maximum short axis in traumatic patients

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Background: Normal size of mesenteric lymph nodes has not been well evaluated, as these lymph nodes are small but may be seen frequently in computed tomography (CT). The aim of this study is to determine the prevalence of mesenteric lymph nodes at root of mesentery and mesentery itself. **Materials and Methods:** This is a cross-sectional study on traumatic patients with normal multidetector CT (MDCT) referred to Al-Zahra Hospital in 2014–2016. The largest short axis of lymph nodes was recorded. Their location was divided into three groups of mesenteric root, peripheral mesentery, and mesentery of the right lower quadrant (RLQ). Size and number of lymph nodes in terms of locations were recorded. A number of more than 6 nodes in a position was defined as cluster nodes. Data were analyzed using SPSS software version 20. $P < 0.05$ was considered statistically significant. **Results:** Four hundred traumatic patients underwent MDCT scanning. The mean age of these patients was 36.6 ± 13.4 years. The number of lymph nodes was <3 in 49.3%, 52.5%, and 52.2%; 3–6 in 45.8%, 42.8%, and 42.8%; >6 in 5%, 4.8%, and 4.8% of central, peripheral, and RLQ mesentery, respectively. The average size of largest central, peripheral, and RLQ lymph nodes was 4.53 ± 1.33 , 4.37 ± 1.68 , and 4.37 ± 1.68 , respectively ($P = 0.64$). Largest size of short axis in patients with cluster lymph nodes was significantly more than noncluster nodes ($P < 0.001$ for all regions). **Conclusion:** Mean size of mesenteric lymph nodes was similar to the previous study, but the largest nodes were considerably larger. Furthermore, largest short axis of cluster nodes was significantly more than noncluster ones.

Key words: Lymph node, mesentery, multislice computed tomography scan

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INTRODUCTION

Invention of computed tomography (CT) opened a new window for noninvasive imaging of body viscera with better quality in comparison to previous existing devices. Since then, CT scan became a routine method of body imaging. By improvement of body imaging methods and advent of multidetector CT (MDCT), in addition to detection of enlarged lymph nodes due to inflammation, malignancy, or infection, nodes with normal size were detectable as well. Thereafter, a debate about normal size of lymph nodes was created.^[1]

Various studies can be mentioned, in which normal size of mediastinal, retroperitoneal, and upper abdominal lymph nodes is discussed. However, all of these findings have been obtained from single detector CT scan devices.^[2-4]

The numbers of studies that have discussed normal size of mesenteric lymph nodes are rare, as these lymph nodes are small and also not detectable in usual primary CTs. The first study in this manner has presented that normal mesenteric lymph nodes are those not found in CT.^[5] Improvement of MDCT led to easier detection and evaluation of these lymph nodes. Nevertheless, no definitive criteria for normal mesenteric lymph node size have been determined.

Those studies that have assessed mesenteric lymph node size were about cases of inflammation, infection, and malignancy. They reported size of 5–20 mm for these nodes.^[6,7] Furthermore, there are some studies about normal abdominal lymph nodes that reported up to 9–11 mm as normal size or despite previous studies have mentioned that normal nodes may be detectable in CT.^[8-10]

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The aim of this study is to determine the prevalence of mesenteric lymph nodes at both roots of mesentery and mesentery itself. Short axis of the largest lymph nodes is highlighted as well.

MATERIALS AND METHODS

This is a census cross-sectional study on 400 traumatic patients with normal MDCT referred to Al-Zahra Hospital, affiliated to Isfahan University of Medical Sciences, in 2014–2016. This study was approved based on Ethics Committee of School of Medicine of Isfahan University of Medical Sciences (number 396035).

Inclusion criteria included age above 18 years old, normal MDCT in first 24 h after trauma,^[1] no underlying diseases such as infection, malignancy, and inflammation. Furthermore, any abnormality in MDCT such as organomegaly, ascites, or diffuse lymphadenopathy was exclusion criteria.

At first, demographic data consisting of age and gender were extracted from hospital records. Traumatic patients underwent 64-slice MDCT (Medical Healthcare GE Workstation RDW 4.3, GE, USA).

All scans were reported by a university professor. In the current study, all lymph nodes with the largest short axis of ≥ 3 mm were recorded.^[1]

By diagnosis of lymph node, their position was divided into three groups of mesenteric root, peripheral mesentery, and mesentery of the right lower quadrant (RLQ).^[1] Thus, size and number of lymph nodes in terms of locations were recorded.

The prevalence of mesenteric lymph nodes >6 mm and cluster lymph nodes (number of more than six nodes in a position was defined as cluster nodes) of any size, location of these nodes, and demographic characteristics of patients with mentioned nodes were evaluated individually.

Then, data were analyzed with MATLAB. Descriptive data were reported in mean \pm standard deviation (SD). For analytic data, Chi-square test, *t*-test, and ANOVA test were used. $P < 0.05$ was considered statistically significant.

RESULTS

In this study, 400 trauma patients admitted to Al-Zahra Hospital underwent MDCT scanning. The mean age of these patients was 36.6 ± 13.4 years (ranged 85–11 years). Two hundred and seventeen (54.3%) patients were male and 183 (45.8%) were female. The average age of men

and women with normal CT scan was 35.5 ± 14.1 and 37.9 ± 12.5 years, respectively ($P = 0.08$).

The number of central mesenteric lymph nodes was <3 in 197 cases (49.3%), 3–6 nodes in 183 patients (45.8%), and >6 in twenty cases (5%). The frequency of peripheral mesenteric lymph nodes was <3 in 210 cases (52.5%), 3–6 in 171 patients (42.8%), and >6 in 19 (4.8%) cases. The number of lymph nodes in RLQ was as following; 210 cases (52.5%) had <3 nodes, 171 patients (42.8%) had 3–6, and 19 (4.8%) had >6 . In Figure 1, the frequency of lymph nodes in patients is shown.

The mean (\pm SD) of largest central, peripheral, and RLQ lymph nodes was 4.53 ± 1.33 (range: 3–10), 4.37 ± 1.68 (range: 2–11), and 4.37 ± 1.68 (range 2–11), respectively ($P = 0.64$). Based on results, the largest size of lymph nodes in terms of >6 nodes and <6 nodes in three mentioned regions had a significant difference. These differences are shown in Table 1.

Figure 2, is showing frequency and percentage of nodes in (a) central mesentery, (b) peripheral mesentery, and (c) right lower quadrant.

In Figure 3, percentiles of lymph nodes in these three regions were assessed as well.

In Table 2, the mean number of lymph nodes and lymph nodes' largest size in three zones according to age and sex is shown.

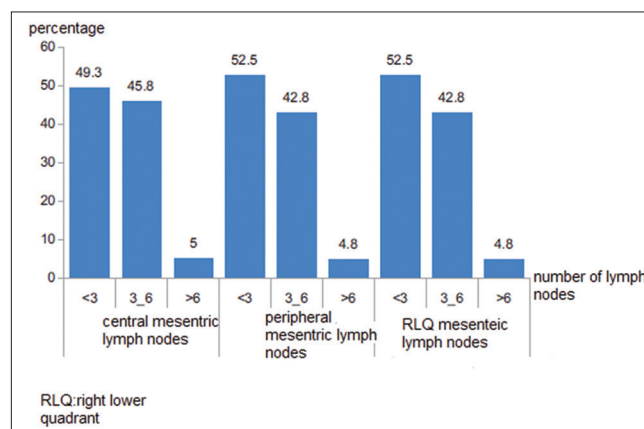


Figure 1: Frequency distribution of lymph nodes based on site

Table 1: Comparing lymph nodes

Region	Mean of maximum short axis		P
	<6	>6	
Central mesentery	4.47 \pm 1.23	5.75 \pm 2.29	<0.001
Peripheral mesentery	4.22 \pm 1.46	7.25 \pm 2.75	<0.001
Right lower quadrant	4.22 \pm 1.46	7.25 \pm 2.75	<0.001

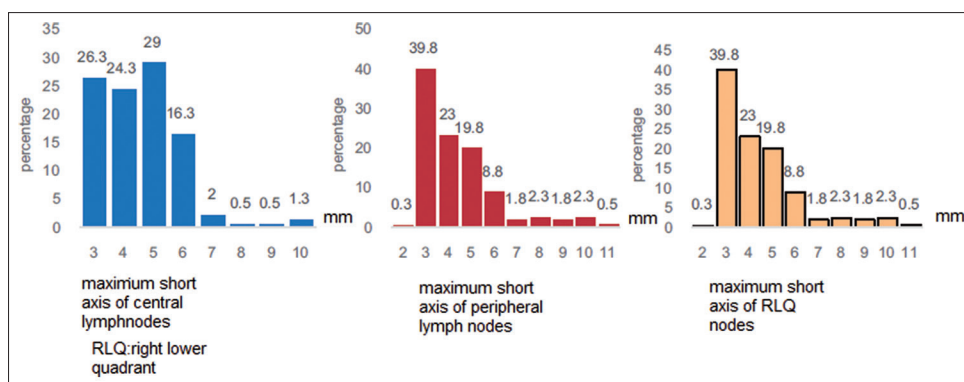


Figure 2: Histogram of prevalence percentage of maximum short axis in different area

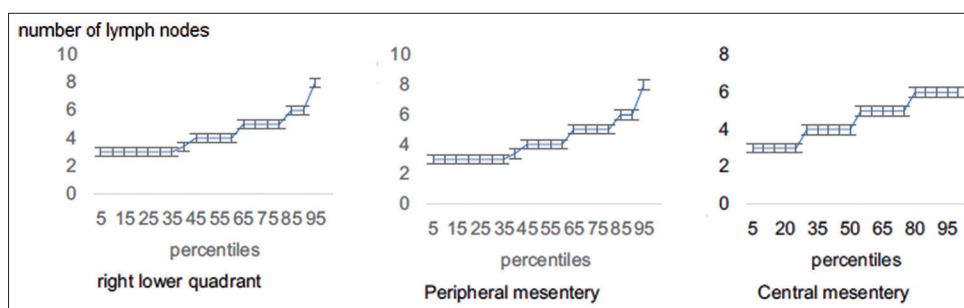


Figure 3: Different percentiles of lymph nodes based on size of nodes

Table 2: The mean number of lymph nodes and lymph node's largest size in three zones (1) according to age and sex

Zone	Number of lymph nodes	Age (year), n (%)			Sex, n (%)		
		<50	≥ 50	P	Male	Female	P
Central mesentery	<3	152 (47.8)	45 (54.9)	0.51	129 (59.4)	68 (37.2)	<0.001
	3-6	150 (47.2)	33 (40.2)		81 (37.3)	102 (55.7)	
	>6	16 (5)	4 (4.9)		7 (3.2)	13 (7.1)	
	Size of largest node	4.6±1.32	4.26±1.31	0.034	4.43±1.36	4.65±1.27	0.1
Peripheral mesentery	<3	161 (50.6)	49 (59.8)	0.33	132 (60.8)	78 (42.6)	<0.001
	3-6	141 (44.3)	30 (36.6)		80 (36.9)	91 (49.7)	
	>6	16 (5)	3 (3.7)		5 (2.3)	14 (7.7)	
	Size of largest node	4.39±1.69	4.3±1.66	0.7	4.3±1.6	4.45±1.78	0.36
Right lower quadrant	<3	161 (50.6)	49 (59.8)	0.33	132 (60.8)	78 (42.6)	<0.001
	3-6	141 (44.3)	30 (36.6)		80 (36.9)	91 (49.7)	
	>6	16 (5)	3 (3.7)		5 (2.3)	14 (7.7)	
	Size of largest node	4.39±1.69	4.3±1.66	0.7	4.3±1.6	4.45±1.78	0.36

DISCUSSION

Normal size of mesentery lymph nodes has not been discussed deeply in different studies. In the current study, we have studied mesentery lymph nodes in a large number of patients with normal MDCT for the first time. Limited data on this topic may be due to ethics that X-ray radiation to healthy cases to assess number and size of normal lymph nodes are not logical.

Previous study had reported possibility of finding lymph nodes with the least size of 3 mm in about 40% of patients.^[1] In the current study, mesentery nodes

were found in all cases. This high percent shows that these lymph nodes may be seen but neglected by other radiologists. Furthermore, another important point is the method of CT scanning used in these studies. Previous studies were mostly designed based on incidental finding of hospitals picture archiving and communication system. Another reason for difficulty in lymph node finding in other studies is that a node may be appeared in an image while disappeared in other. Furthermore, these round or oval well-defined areas of soft tissue are well differentiated from intestines and blood vessels in MDCT.

First studies in terms of normal mesentery lymph node assessment were mostly conducted before MDCT advent,^[3] and also it was considered that normal mesentery node should not be detectable.^[5] Other studies have evaluated mesentery nodes in patients with infection, inflammation, or malignancy.^[6,7]

Lucey *et al.* have conducted a similar study in 2005. They reported that half of patients had 5 or more number of nodes.^[1] In the current study, we found that about half of the patients had <3 nodes and also >6 nodes rarely have been detected.

We detect the mean size of 4.5 mm for mesenteric nodes which is in accordance with the previous study,^[1] but the larger nodes were 11 mm that was larger than previous one, in which the largest node accounted for 7 mm.^[1] This size seems logical to be considered normal and not to need any follow-up. In this manner, less MDCT may be needed. Furthermore, further studies in different regions and races should be conducted.

The average size of lymph nodes in different zones was not statistically different but patients who had >6 nodes in their mesentery, in all three assessed zones, had significantly larger nodes than those with a fewer number of nodes. The largest size of nodes was 11 mm. Evaluation of 11 mm node in a range of normal size may not be acceptable, as this size had been considered normal for paraaortic nodes that are remarkably larger. Another noteworthy point is finding a 5 mm mesentery node in a patient with malignancy.^[3] In a recent study, size of ≥ 10 mm has been recommended for pathologic size. Some other studies have mentioned that size of node is not an important factor for prognosis of known malignant case.^[11] Corwin *et al.* followed cases with misty mesentery for 3 years and presented that mesenteric nodes with size of < 10 mm with no other region of lymphadenopathy do not need any additional follow-up.^[9]

Another significant finding of this study that may make it a novel one is assessment of cluster nodes. In all of three regions, largest short axis of lymph nodes in cluster nodes was significantly more than noncluster ones. It shows the importance of more notification in case of finding cluster nodes.

Due to what mentioned above, there is no determined criterion for consideration of mesentery lymph nodes' normal size and range. More important point is lack of protocol for administration of imaging and follow-up for abnormal mesenteric lymph nodes as there is not any

approved range. Thus, we suggest further studies. Use of imaging in unnecessary follow-ups imposes high costs to health system and also X-radiation may be compromising for patients.

CONCLUSION

We found mean size of mesenteric lymph nodes similar to the previous study in healthy cases but the largest nodes were considerably larger. Furthermore, largest short axis of cluster nodes was significantly more than noncluster ones. Further studies in terms of providing a general assessment are recommended.

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Conflicts of interest

There are no conflicts of interest.

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