

EVALUATION OF NORMAL MESORECTAL LYMPH NODES BASED ON THE DATASET OF THE VISIBLE HUMAN



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Background and Purpose:

Despite the frequent application of the total mesorectal excision (TME), very few data regarding the location, number and distribution of lymph nodes within and around the mesorectum exist.

The scope of this study was to describe the number, size and anatomical topography of mesorectal lymph nodes in the "visible human" (VH) male dataset.

Results:

A total of 27 mesorectal lymph nodes were identified (Table 1). The majority 17 of 27 (63%) of the lymph nodes were above the peritoneal reflection and 10 of 27 (37%) below it (Table 2). The topographical distribution of the pelvic and mesorectal lymph nodes is shown in figure 1. The majority of the nodes were located in the left lateral and posterior mesorectum (Fig. 2). The majority of the lymph nodes were 3 mm or less in diameter. Twenty lymph nodes were 1 mm or 2 mm in size, 5 nodes were 3 mm, and only 2 were 4 mm. The lowest situated lymph node was 2.8 cm from the anal sphincter (Fig. 1d). The identified 4 paramesorectal lymph nodes are shown in figure 3. A cranial view of the 3D representation of the pelvic and mesorectal lymph nodes is shown in figure 4.

Table 1. The distribution by size of the longest diameter of the 27 mesorectal lymph nodes identified in the visible human male.

Nodal diameter	Number of nodes
1 mm	8
2 mm	12
3 mm	5
4 mm	2
Total	27

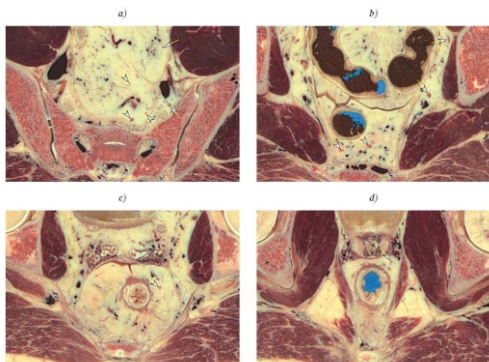


Figure 1. The topographical distribution of the pelvic and mesorectal lymph nodes (indicated with arrows) identified in four selected slices at the levels:

a) below the bifurcation of the arteria iliaca communis (sacral hole), **b)** at the level of the peritoneal reflection, **c)** below the peritoneal reflection and **d)** in the lower part of the mesorectum, 2.8 cm above the end of the mesorectum (the lymph node shown was 2 mm in size).

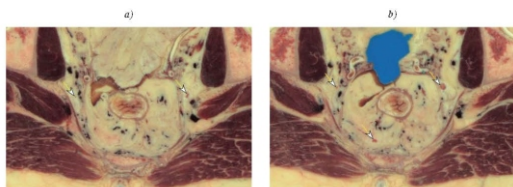


Figure 3. The identified paramesorectal lymph nodes on each side:

a) the upper two and **b)** the lower two lymph nodes. One mesorectal lymph node in the dorsal part of the mesorectum is also visible. Arrows indicate the identified lymph nodes.

Conclusions:

Twenty-seven lymph nodes belonging to the mesorectum were identified. The majority of the mesorectal lymph nodes were smaller than 3 mm. There were few lymph nodes located in the distal part of the mesorectum and few nodes in the right lateral and ventral part of the mesorectum. These data are of importance for the definition of quality of the pathological examination of the mesorectal nodes. These data are of importance for the clinical target volume delineation in radiation oncology.

Materials and Methods:

The dataset from the visible human male was studied. The male whose body was used as visible human was 38 years old at the time of death. The cadaver was perfused with 1% formalin and anticoagulant. Optical anatomic microtome produced slices at 1 mm interval and with a resolution of 2.8 pixels per mm were carefully examined. The region between the common iliac bifurcation and the anal sphincter was investigated.

Table 2. The location of the investigated mesorectal lymph nodes identified in the VH male dataset in relation to the peritoneal reflection.

Part of the rectum	Number of nodes (%)
Above the PR*	17 (63 %)
Below the PR*	10 (37 %)

*PR peritoneal reflection

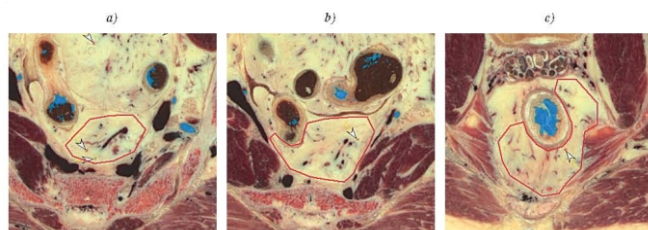


Figure 2. The topographical distribution of all 27 mesorectal lymph nodes (all within the area delineated in red): **a)** at the recto-sigmoid transition, **b)** at the peritoneal reflection and **c)** below the peritoneal reflection. Arrows indicate the identified lymph nodes.



Figure 4. Cranial view of the 3D representation of the identified presacral, laterosacral and mesorectal nodes (red dots), pararectal (pink dots), and internal iliac nodes (blue dots). The rectum is coloured in light yellow, the prostate in grey and the lateral wall of the mesorectum in dark yellow.

