

Mesorectum: functional lymphatic anatomy

Today total excision of the mesorectum is considered an essential step in surgery of rectal cancer. Knowledge of its lymphatic apparatus confirms the value of this procedure and explains some characteristics of rectal cancer pathology.

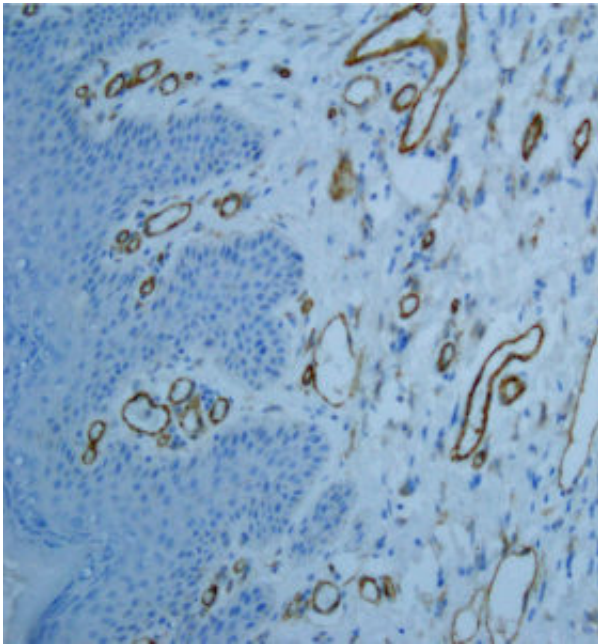


Fig. 1. Numerous lymphatic capillaries proximal to the wall of the ano-rectal junction, immunohistochemical brown stained with podoplanin (Original magnification:20X).

The mesorectum is not a closed space, completely separated from other intra-abdominal structures; on the contrary it is strictly connected with other intra-peritoneal and pelvic organs, and with their lymphatic stations. Its lymphatic apparatus has particular features.

The lymphatic capillaries of the rectal mucosa, largely communicate with equivalent structures placed just outside the rectal wall. This can become a preferred way of diffusion of rectal cancer (Fig. 1).

Inside the mesorectum, the lymphatic network includes capillaries, pre-collector and collector channels, all afferent to tributary lymph nodes (Fig. 2). In particular, the abundant interconnections between all these lymphatic structures, hinders partition of the mesorectum in real segments or zones, impossible also for the absence of corresponding anatomical horizontal or vertical planes. Therefore, the lymphatic apparatus too depicts mesorectum as a single anatomic entity: this agrees with the surgical strategy if it's complete "monobloc" excision in case of rectal cancer.

At the periphery of the mesorectum, just inside and outside its sheath, there are two fine capillary networks, largely intercommunicating. These structures appear equivalent to those found in the parietal peritoneum: this feature aligns with the common embryological origin of the mesorectum and of the primitive colonic mesentery.

Different pathological conditions of the mesorectum can accompany a rectal cancer, when associated with an extended lymph node involvement, or appear after radiotherapy. In particular, a secondary edema or fibrosis favour congestion in the different lymphatic vessels and direct the lymph flow toward the sub-fascial and then to extra-fascial capillaries, which are linked with the pelvic lymph nodes. This explains a possible extension of a tumor from the rectal wall to the mesorectum, then, through its fascia, to the pelvic connective-adipose tissue and to the iliac lymph nodes. A neoplastic involvement of the mesorectal lymphatic capillaries, especially those placed near the external sheath, alert to a concomitant or impending diffusion of the disease to the pelvic spaces and lymph nodes. Therefore, an accurate staging of each rectal cancer should consider also this “microvascular” aspect of the tumor.

From an anatomical point of view we observe that the inferior mesorectum has a tapered fashion, always limited by a continuous sheath, while superiorly continues with the sigmoid mesentery, directly and through abundant lymphatic connections. This explains the possible involvement of the sigmoid mesentery from tumors of the recto-sigmoid junction.

These characteristics of the mesorectal lymphatic apparatus can be better appreciated if compared with those of the mesocolon.

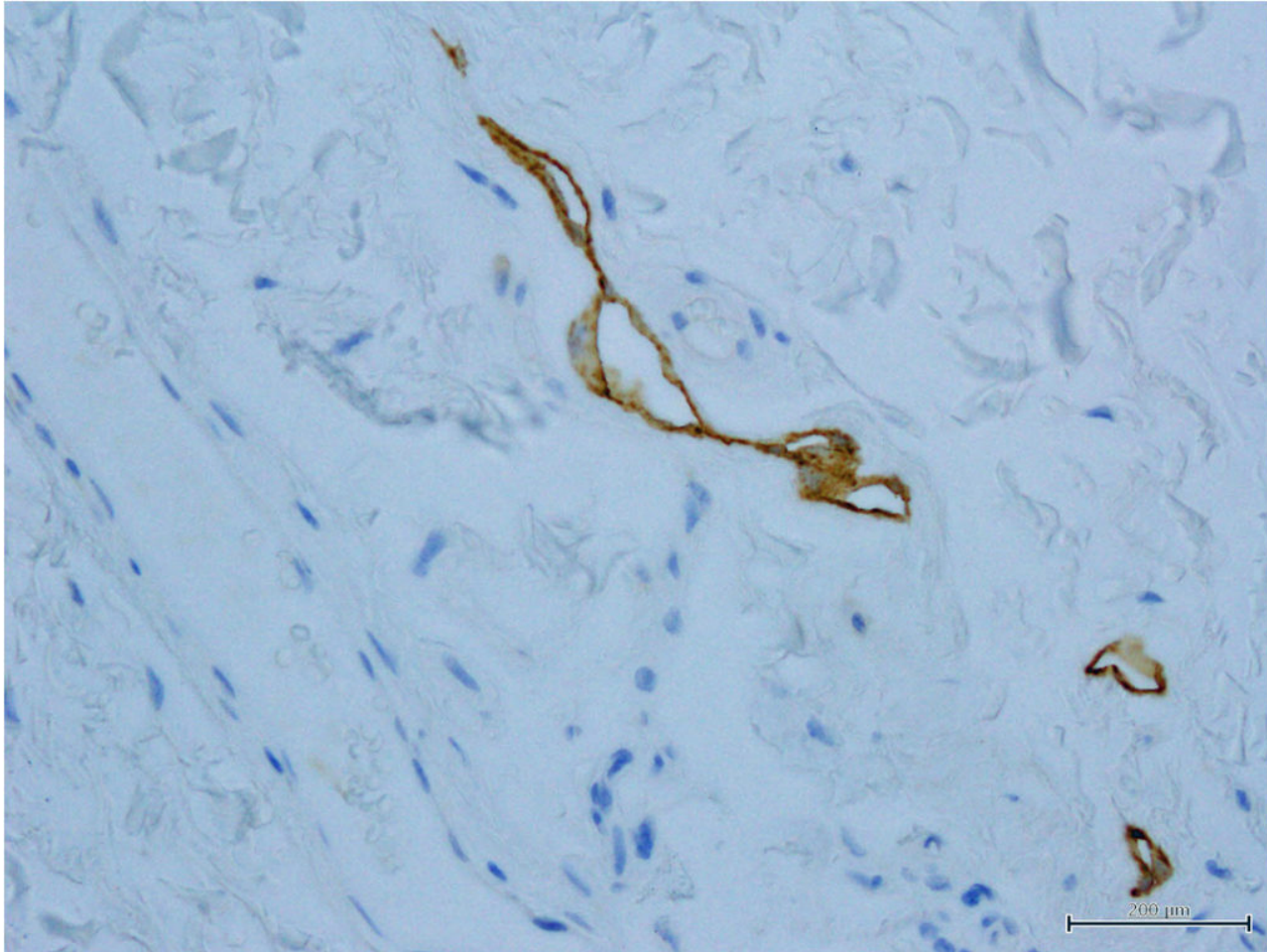


Fig 2. Lymphatic capillaries in the central part of the mesorectum, immunohistochemically brown stained for podoplanin (Original magnification:20X).

In the colonic mesentery the architecture of the lymphatic apparatus is mainly represented by a large network of intercommunicating capillary vessels, directly connected with the lymph nodes, and characteristically not provided of valves. This system amplifies the surface of absorption and exchange with the peritoneal cavity, but also favours trans-migration and colonization of neoplastic cells. Here the lymph flow is promoted by extrinsic mechanisms, as the endo-peritoneal positive pressure, the rhythmic action of the diaphragm, the peristaltic activity of the bowels, the pulsations of the accompanying arteries, etc. On the contrary, the acquired extra -peritoneal position of the rectum and mesorectum, at the end of their complete development, reduces or abolishes the action of these factors; the new dynamic requires more complex structures to regulate lymph flow.

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Publications

[The lymphatic anatomy of the mesorectum helps to understand rectal cancer recurrence.](#)

Manenti A, Bonetti LR, Farinetti A, Sani F

Am J Surg. 2016 Oct

[Radiotherapy-induced mesorectum alterations: histological evaluation of 90 consecutive cases.](#)

Reggiani Bonetti L, Domati F, Farinetti A, Migaldi M, Manenti A.

Scand J Gastroenterol. 2015 Feb