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Anatomy of the retro-crural space (RCS): a potential conduit of infection and metastasis

Adil Asghar[1], Shagufta Naaz[2]

[1]Department of Anatomy, AIIMS Patna, Phulwarisharif, Patna, Bihar, 801507 India, [2] Department of Anaesthesia, AIIMS Patna, Phulwarisharif, Patna, Bihar, 801507 India

Dear Sir

In past reports, researchers have seldom attached importance to retrocrural space. However, investigators have been able to illustrate communications and relationships in the retroperitoneal space by drawing potential routes of infection and metastasis. The retrocrural space (RCS) is defined as a small triangular continuation of the posterior mediastinum bordered by the two diaphragmatic crura (Fig. 1). Normal contents of this space are the aorta, the nerves, the azygos and hemiazygos veins, the cisterna chyli with the thoracic duct, fat, and lymph nodes. Retrocrural space is bounded by diaphragmatic crura and hiatuses antero-inferiorly, mediastinal pleura postero-superiorly and thoracolumbar vertebrae posteriorly. This space is communicated with retrocardiac space cranially. The caudal extension of this extends to the third lumbar vertebra behind right crura and the second lumbar vertebra behind left crura (Xu et al., 2013). Other than aforementioned structures, sometimes normal lung tissue may insinuate in this space and may be identified by retrocrural air in CT-scan (Silverman et al., 1982). The RCS got its entity because diverse pathologies like benign tumors (lipoma, neurofibroma, lymphangioma), malignant tumors (sarcoma, neuroblastoma, metastases), and vascular abnormalities can occur in this space (Restrepo et al., 2008). Communication between the lower thoracic paravertebral region and the celiac ganglion through the retrocrural space was investigated. The dye was injected into the endothoracic fascia in the lower thoracic paravertebral region at the T11 level and it spread to the retrocrural space and celiac ganglion in fifteen cadavers through the crus and along the greater and lesser splanchnic nerves. The radio-opaque dye Iopamide was injected in three living subjects and 3-D computed tomography was done to evaluate the spread. This study confirmed that the radio-opaque dye easily escalates toward the celiac ganglion along the crus of the diaphragm. It also suggested the existence of fluid communication between the lower thoracic paravertebral region and retrocaudal space in cadavers and in living humans, and the clinicians should be aware of this possible route of spread of infection and metastasis (Saito et al., 2002). The advent of new surgical techniques like laparoscopy and thoracoscopy had led to intervention in retrocrural space for tumor surgeries, which was not usual earlier. Damage of minute lymphatic channel, or even cisterna chyli or thoracic duct, is not only a leading cause of chylothorax or chyloperitoneum, but it also leads to local metastasis and persistence of residual tumor cells. Similarly, laceration of blood vessels may produce haemothorax or haemoperitoneum. Currently, this space is used for the celiac ganglion block for pain management and palliative care.

So, we should consider reviewing the detailed anatomy of retrocrural space, and possible variations of lymphatic and vascular channels need to be studied. An embryological aspect should be taken for possible congenital disorders of this region. Such study is only possible by micro-dissection of this region or multi-planar imaging modalities, such as computed tomography and magnetic resonance imaging. We should establish a new imaging anatomy research method for comparisons of the communication and relationships of

Corresponding author: Dr Adil Asghar. Department of Anatomy, AIIMS Patna, Phulwarisharif, Patna, Bihar, 801507 India.
E-mail: dr_adilasghar2003@yahoo.co.in / dradilasghar@aiimspatna.org

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Fig 1. The retrocrural space (RCS): The triangular area bordered by the two diaphragmatic crura. 3D-reconstruction of multiplanar CT image of Retrocrural space (RCS) at first lumbar vertebra (L1) with the help of IDS 7 Sectra virtual dissector. 1- Liver, 2- Inferior Vena Cava, 3- Aorta, 4- Right Crus, 5- Left crus, 6- Azygous Vein, 7- Thoracic Duct, 8- Hemiazygous Vein, 9- Stomach, 10- Esophageal end of Stomach, 11- Vertebral body, 12- Spinal Cord.

the retrocrural space in combination with the Visible Human Project by 3-D reconstruction CT and MRI images and micro-surgical dissection.

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