

Virchow-Troisier's Node: A Review

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Abstract: Virchow-Troisier's node is an eponymous term referring to the enlargement of the left supraclavicular lymph node. It is a significant physical finding that generally indicates the late manifestation of a variety of malignancies. This review article briefly revisits the historical background, epidemiology, anatomical routes of metastasis, clinical presentation, differential diagnosis, and clinical significance of Virchow-Troisier's node.

Keywords: Virchow-Troisier's node, Troisier's sign, Virchow's node, Metastasis, Eponymous sign, Horner's syndrome.

INTRODUCTION

Virchow-Troisier's node (VTN) represents an enlargement of a left supraclavicular lymph node. This term is used interchangeably with terms including Virchow's node (VN), Troisier's node, and Troisier's sign. The eponyms "Troisier" and "Virchow" serve as acknowledgements to the German pathologist Rudolf Ludwig Karl Virchow and his French colleague Charles-Emile Troisier, who identified this clinical sign [1]. Virchow had linked this node to gastric malignancies, but the works by Troisier and subsequent studies conducted over time have established its association with a wide range of malignancies, including gastrointestinal, pulmonary adenocarcinomas, prostate cancer, and lymphomas [1-3]. This review article briefly revisits the historical background, epidemiology, anatomical routes of metastasis, clinical presentation, differential diagnosis, and clinical significance of Troisier's sign.

METHODS AND MATERIALS

A systematic literature search was conducted through electronic databases, including PubMed, ResearchGate, Semantic Scholar, and Scopus, using the key words "Virchow node", "Virchow-Troisier's node" and "Troisier's sign". The search was carried out by using individual keywords with a combination of Boolean logic (AND). Studies published in English were used, and the studies published in the time frame of 2000–2023 were preferred; the older references were used only if they had historical significance.

Historical Background

Rudolph Virchow (1821-1902) was one of the 19th century's foremost leaders in clinical medicine and

pathology. Founded by him, the Archiv für Pathologische Anatomie und Physiologie (now known as "Virchow's Archives"), still continues to run as a leading journal of pathology [4-6]. At the age of 34, he published his now famous aphorism "omnis cellula e cellula" ("every cell stems from another cell") and launched the field of cellular pathology by stating that all diseases involve changes in normal cells, thereby providing an insight that the diseases could be characterized not merely by a group of clinical symptoms but by typical anatomic changes. Virchow's other significant discoveries include cells in bone and connective tissue and a description of myelin. He was the first person to recognize leukaemia and explain the mechanism of pulmonary thromboembolism. Virchow coined the term "zoonosis" to indicate the infectious disease links between animal and human health [6-8]. Furthermore, Virchow discovered that an enlarged left supraclavicular lymph node is one of the earliest signs of malignancy, affecting mainly the stomach and less commonly the lung.

French clinician, Charles-Emile Troisier (1844-1919) was awarded the Silver Medal from Paris Medical School for his remarkable description of cancers' spread through the lymphatics of lungs in his doctoral thesis [reference]. He was a notable researcher who also contributed actively at National Anatomical and Biological societies [2]. Subsequently, he was appointed Associate Professor in the Chair of Pathology and Therapeutics and elected Member of the National Academy of Medicine, the Anatomical Society, and Vice President of the Biology Society [2]. He described the connection between cancer and the enlarged left supraclavicular lymph node and furthermore published several works on meningitis, pleurisy, hereditary syphilis, rachitis, rheumatismal nodosities, and phlegmasia alba dolens. He was the first to describe including hepatomegaly and diabetes mellitus in hemochromatosis (bronzed diabetes), and

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hence the condition is still referred to as Troisier-Hanot-Chauffard syndrome.

Anatomy and Histology of Virchow's Node

MitZutani *et al.* [8] in 2005, after studies in thirty cadavers, stated that the regional lymphatic system is composed of the first, second, third, and even fourth or much more intercalated nodes along the lymphatic route from the periphery to the venous angle or the thoracic duct, with the third or fourth node being termed an end node. Following a similar pattern, VTN corresponds to the end node along the thoracic duct. The study found an end node in five cadavers macroscopically, and the histological analysis revealed that, on the inferior or distal side of the end node, the thoracic duct divided into three to 10 collateral ducts, and these ducts surrounded the node. The node was aligned parallel to the thoracic duct and communicated with it and its collaterals at multiple sites in two to three hilus-like portions, as well as along the subcapsular sinus. The superficial and deep cortex areas of the end node were fragmented to make an island-like arrangement, creating a short-cut intranodal shunt [8].

Zdilla *et al.* [9] in 2019 discovered VTN during cadaveric dissection in an individual whose cause of death was, reportedly, chronic obstructive pulmonary disease (COPD). The VTN was found to arise from an otherwise missed pulmonary adenocarcinoma and was located in the lesser supraclavicular fossa, deep to the platysma and clavicular head of the sternocleidomastoid muscle, superolateral to the venous angle, and anterior to the anterior scalene muscle (which forms the anterior border of the scalene triangle through which the brachial plexus and subclavian vessels run), the phrenic nerve, and the transverse cervical artery (Figures 1-2). The report presented a regional study of the anatomy as well as relevant gross pathology and histopathology, and the anatomical findings suggested that the VTN may contribute to compression of thoracic outlet structures [9].

Cervin *et al.* [10] undertook a retrospective analysis with clinicopathologic correlation of 152 fine-needle aspiration biopsies of supraclavicular lymph nodes and concluded that fine-needle aspiration (FNA) biopsy is an excellent initial procedure in the workup of an enlarged supraclavicular lymph node and confirmed that malignancies originating in the pelvis or abdomen were significantly more likely to metastasize to the left supraclavicular lymph node and that the primary site and types of malignancies that involved the left

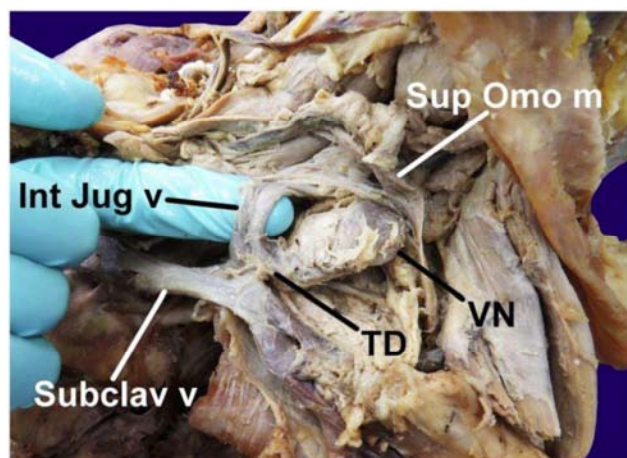


Figure 1: Gross dissection of the left-sided lower anterior cervical region revealing a Virchow node (VN). The node was partially obscured at its superior pole by the superior belly of the omohyoid muscle (Sup Omo m) which has been retracted in this image. The node joined the thoracic duct (TD) which joined together with the internal jugular vein (Int Jug v) to contribute to the subclavian vein (Subclav v). The platysma and sternocleidomastoid muscles are reflected posteriorly and proximally and proximal half of the clavicle was resected to reveal the Virchow node and its surrounding vascular anatomy. The long axis of the VN was oriented parallel to the internal jugular vein and the distal thoracic duct.

Source: Zdilla MJ, Aldawood AM, Plata A, Vos JA, Lambert HW. Troisier sign and Virchow node: the anatomy and pathology of pulmonary adenocarcinoma metastasis to a supraclavicular lymph node. *Autops Case Rep.* 2019 Feb 25;9(1):e2018053. doi: 10.4322/acr.2018.053. ; *Autopsy and Case Reports.* ISSN 2236-1960.



Figure 2: Serial sections of the Virchow-Troisier's node. The cut surfaces are almost entirely replaced by a grossly evident metastatic tumor.

Source: Zdilla MJ, Aldawood AM, Plata A, Vos JA, Lambert HW. Troisier sign and Virchow node: the anatomy and pathology of pulmonary adenocarcinoma metastasis to a supraclavicular lymph node. *Autops Case Rep.* 2019 Feb 25;9(1):e2018053. doi: 10.4322/acr.2018.053. ; *Autopsy and Case Reports.* ISSN 2236-1960.

supraclavicular lymph node were different from those involving the right supraclavicular lymph node. Gupta *et al.* [11], after an audit of two hundred cases of supraclavicular lymphadenopathy, reached a similar conclusion. Nasuti *et al.* [12] stressed the usefulness of

various ancillary techniques such as special histochemical stains (SHC), immunohistochemistry (IHC), and flow cytometry (FCM) in establishing specific diagnoses of supraclavicular lymphadenopathy.

Epidemiology and Etiopathogenesis

Troisier had postulated that the proliferation of a neoplasm in the left supraclavicular lymph nodes occurs by malignant infiltration in the prevertebral ganglion [2]. Over the years, however, numerous studies have shown that in the setting of malignancy, tumor embolization from the primary sites through the thoracic duct eventually involves the Virchow-Troisier's node (VTN), where some of the cancer cells become trapped with resultant enlargement [13]. In a 20-year-old black South African man with hepatocellular carcinoma, as reported by Kew [14], a VTN was evident clinically and confirmed at necropsy. The mediastinal lymph nodes were however not involved by the tumor, and the malignant cells were presumed to have gained access to the thoracic duct by way of lymphatic spread to the hepatic lymph nodes in the porta hepatitis and the celiac nodes, both of which were documented at necropsy to be extensively invaded by the tumor.

Due to its lymphatic function, the VTN is a potential seeding site for 0.1-33% of malignancies from myriad locations, including the gastrointestinal system, urogenital system, hepatobiliary system, the pancreas, and the lungs [15]. Viacava and Pack had investigated 4365 patients suffering from abdominal and thoracic tumors in 1944 and found a Virchow node in 2.8% of the patients [16]. Troisier, in his historical notes, had emphasized that several other etiological factors such as tuberculosis and syphilis can lead to a similar clinical picture [17]. When undifferentiated tissue is found on histopathological analysis, lymphoma is also included in the differential diagnostic list. Duman *et al.* have reported an isolated left supraclavicular hydatid cyst mimicking VTN [18].

Clinical Features

In his writings, Troisier gives a clear description of the left supraclavicular nodes, which holds true even today. He describes them as one or several isolated or fused ganglion-like lumps over the middle third of the clavicle in the supraclavicular triangle or behind the clavicular fascicle of the sternocleidomastoid muscle. These nodes may only be palpable at the beginning, but over time, they tend to form a visible projection,

deforming the supraclavicular fossa (Figure 3). The lymph nodes tend to be mobile, hard in consistency, non-tender, and without any adherence to the skin. These nodes may be the presenting feature of otherwise asymptomatic cancer [19-22] or else be a finding signaling the advanced stage of an already known or otherwise symptomatic cancer.

Potential Complications

Considering its anatomy, Troisier researchers have theorized that VTN can potentially lead to complications secondary to its mass effect. Later research has stressed this possibility, and cases have been reported in the literature [9]. One of these complications is thoracic outlet syndrome with neurogenic and/or vascular compromise as Virchow's node lies on the anterior scalene muscle underneath, which contacts the brachial plexus and subclavian vessel and becomes compressed secondary to its enlargement.

VTN can also result in unilateral phrenic neuropathy with ipsilateral diaphragmatic weakness but is mostly asymptomatic, as the left phrenic nerve runs posterior to it [2]. Horner syndrome is another possible complication due to the proximity of Virchow's node to the cervical sympathetic chain. Maslovsky and Gefel [23] have reported a 50-year-old man suffering from adenocarcinoma of the stomach and complaining of severe, prolonged pain in the left shoulder region and weight loss. Physical examination revealed left Virchow's nodal mass, ptosis, miosis, enophthalmos of the left eye, and dryness of the left side of the face. The planar chest x-ray showed left apical opacity invading the first rib.

Virchow-Troisier's Node and Latest Imaging Modalities

In recent decades, multiple reports have been published wherein the latest imaging modalities have uncovered VTN otherwise not clearly revealed on physical examination [24-26] Cham *et al.* [25] reported a 56-year-old man with a recent diagnosis of distal esophageal carcinoma, in whom whole-body F-18 FDG scintigraphy was performed for staging. The scintigraphy had shown a large primary carcinoma of the mid-to-distal esophagus above the level of the gastroesophageal junction, two normal-size right retrocrural nodes, and left supraclavicular adenopathy (VTN). de la Riva-Pérez *et al.* [26] reported a 75-year-old man with unsuspected involvement of VTN from prostate cancer observed using F-choline PET/CT.



Figure 3: An 82-year-old female who had presented with a 3-month history of epigastric pain, weight loss (30 pounds), and nausea. On examination, she was noted to have two nontender, firm, fixed, left supraclavicular lymph nodes measuring 2.5 by 2.5 cm each. Upper endoscopy revealed an adenocarcinoma of the gastric antrum, of intestinal type.

Source: https://www.gastrointestinalatlas.com/english/Virchow_Node.html

CONCLUSION

Virchow-Troisier's node (VTN) is an important clinical finding in association with metastatic malignancy, certain infections, and even a potential cause of neurovascular pathologies, and hence should merit consideration in clinical practice. Differential diagnosis should be based on the patient's medical history, a detailed clinical examination, imaging, histopathology, and the clinical evolution of the disease.

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