EAS Journal of Radiology and Imaging Technology
Abbreviated Key Title: EAS J Radiol Imaging Technol
ISSN: 2663-1008 (Print) & ISSN: 2663-7340 (Online)
Published By East African Scholars Publisher, Kenya

OPEN ACCESS

Volume-1 | Issue-1 | Jan-Feb-2019 |

Case Report

Internal Jugular Vein Thrombosis Due To Carcinoma Thoracic Esophagus

Dr. Sanjay M. Khaladkar[1], Dr. Aarushi Gupta[2], Dr. Ronak N. Savani[2], Dr. Shibani Saluja[2]

[1]Professor Dr.D.Y.Patil Medical College and Research Center, Dr. D.Y. Patil Vidyapeeth, Pimpri, Pune
[2]Post Graduate Resident. Dr.D.Y.Patil Medical College and Research Center, Dr. D.Y.Patil Vidyapeeth, Pimpri, Pune

*Corresponding Author
Dr. Aarushi Gupta

Abstract: Internal jugular vein thrombosis (IJVT) is a potentially life threatening vascular disorder. It is uncommon and caused by various conditions. IJVT can be spontaneous or nonspontaneous. Spontaneous IJVT occurs due to hypercoagulable state which is one of the criteria in Virchow's triad. Non-spontaneous IJVT is uncommon. IJVT occurring in malignant neoplasms occurs from a local tumour mass (primary or metastatic) causing compression of IJV with resultant stasis and decrease in jugular blood flow or direct invasion into the vein. It may also occur due to migratory thrombophlebitis seen in association with malignancies of lung, pancreas, stomach, female reproductive organs and other neoplasms. The main complications of IJVT are pulmonary embolism and post thrombotic syndrome. Modalities for diagnosis are ultrasonography (USG), colour Doppler, CECT and magnetic resonance imaging (MRI). We report a case of left internal jugular vein thrombosis in a 63 – year old male patient caused by carcinoma of upper and middle thoracic esophagus extending into superior mediastinum with direct invasion of left IJV.

Keywords: Internal jugular vein, thrombosis, carcinoma esophagus.

CASE REPORT

A 63- year old male presented with dysphagia to solids and liquids since 9 months. There was a marked weight loss for 6 months. There was hoarseness of voice and cough. There was no history of fever or neck swelling. USG neck (Figure 1) showed an irregularly marginated solid mass of heterogeneous echotexture of size approximately 39 x 39 x 36 mm in craniocaudal, anteroposterior and transverse dimensions was noted inferior to lower pole of the left thyroid lobe just distal to cervical esophagus. Multiple echoreflective foci of air were noted within it. Fat plane between the mass and the posterior wall of left lower internal jugular vein (IJV) was obscured with evidence of left IJV invasion with intraluminal thrombus in lower IJV (Figure 2). A well-defined lymph node of heterogeneous echotexture of size approximately 21 x 10 x 15 mm was noted in left lower jugular chain, suggestive of metastatic lymph node. Contrast enhanced computed tomography (CECT) neck with thorax (Figure 3 to 7) was done which showed left vocal cord palsy. Multiple well defined mixed density predominantly hypodense solid nodules of size 5 -15 mms were noted in mid and lower pole of both thyroid lobes – suggestive of adenomatous nodules. Esophagus at the level of thoracic outlet showed marked circumferential wall thickening (maximum mural thickness 12mm) with luminal narrowing(Figure 3, 5, and 6). The wall thickening involved upper and middle thoracic esophagus over a length of approximately 126 mm extending about 53 mm inferior to the level of carina. Fat plane between the mass and the posterior wall of upper thoracic trachea was obscured with tracheal invasion and narrowing of the tracheal lumen extending over a length of 13mm. Trachea was compressed and displaced anteriorly by the mass. Fat plane between the mass and the proximal portion of left main bronchus was obscured. It appeared encased by the mass with resultant narrowing. There was presence of oral contrast in upper thoracic trachea and both main bronchus – suggestive of tracheal invasion and esophago-tracheal fistula. Fat plane between the mass and medial wall of the aortic arch, medial wall of the left main pulmonary artery and adjoining descending aortic arch was obscured. An irregularly marginated solid mass of size approx. 55 x 47 x 54 mm was noted in the superior mediastinum extending up to the thoracic outlet. Fat plane between mass and left subclavian artery, left common carotid artery, and brachiocephalic trunk, just distal to their origin from

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Journal homepage:
http://www.easpublisher.com/easjrit/

Article History
Received: 10.01.2019
Accepted: 15.02.2019
Published: 25.02.2019

DOI: 10.36349/easjrit.2019.v01i01.005

aortic arch were obscured with resultant encasement. Fat plane between the mass and adjoining left IJV was obscured and IJV invasion with resultant intraluminal thrombus of size approximately 10 x 8 mm (Figure 4 and 7). Multiple homogeneously enhancing mediastinal lymph nodes of size approximately 22 x 16mm, 16 x 10 mm, and 30 x 26mm were noted in prevascular space, 25 x 20mm and 24 x 16 mm were noted in the right paratracheal region, 30 x 27 mm in aorto-pulmonary window, 18 x 14 and 17 x 13 mm in left paraesophageal region, 28 x 20 mm in right paraesophageal region and 13 x 12 mm in retrocrural region. A diagnosis of neoplastic mass arising from upper and middle thoracic esophagus, which spread by contiguity in the superior mediastinum with tracheal invasion and invasion of left IJV with resultant IJV thrombosis and multiple metastatic lymph nodes was given. Persistent adduction of left vocal cord was suggestive of left vocal cord palsy.

Fine needle aspiration cytology was suggestive of poorly differentiated squamous cell carcinoma. Patient was referred for further management to a tertiary cancer hospital.

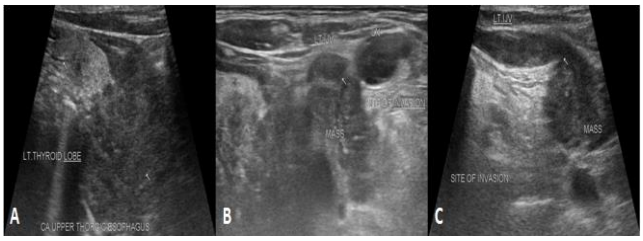

Figure 1: Ultrasonography of lower neck and superior mediastinum with linear 7-12 MHz probe showing well defined solid mass of heterogeneous echotexture (marked by white arrow in A), extending posterior to left IJV (B), and showing direct invasion of left IJV (white arrow demonstrating site of invasion) along its posterior wall (C).

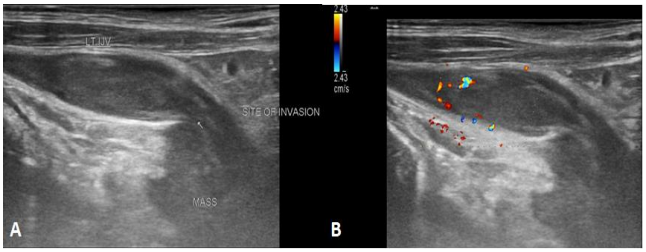

Figure 2: USG neck with linear probe showing a solid mass of heterogeneous echotexture in superior mediastinum extending in lower neck causing direct invasion of posterior wall of left IJV (marked by white arrow in A), causing left IJV thrombosis (seen as a filling defect in left IJV on colour Doppler).

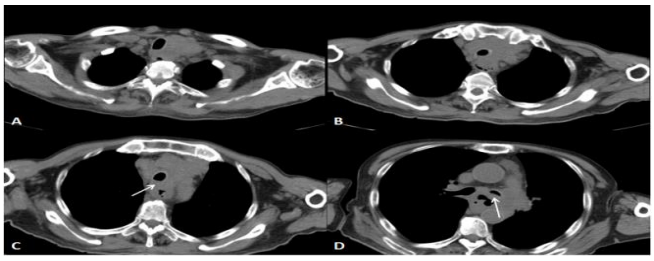

Figure 3: Plain CT scan of thorax (mediastinal window) showing eccentric wall thickening of upper thoracic esophagus causing luminal narrowing with extension in adjoining superior mediastinum (A, B) and causing compression and anterior displacement of upper thoracic trachea with invasion of trachea (C - marked by white arrow) and left main bronchus (D- marked by white arrow).

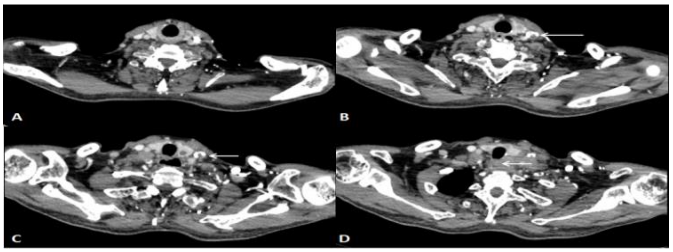

Figure 4: Contrast CT scan of thorax (mediastinal window) showing dense contrast in proximal left IJV due to stasis (A), due to left IJV intra luminal thrombus (B, C – marked by white arrow) secondary to carcinoma esophagus with extension in adjoining superior mediastinum (D – marked by white arrow).

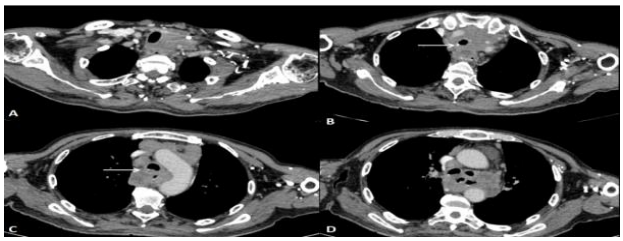

Figure 5: Contrast CT scan of thorax (mediastinal window, A-D) showing eccentric wall thickening in upper and mid thoracic esophagus with luminal narrowing and ulceration causing tracheal invasion with resultant oral contrast in trachea (marked by white arrow), invasion of adjoining superior mediastinum and multiple mediastinal lymph nodes in paratracheal region, pre vascular space and aorto-pulmonary window.

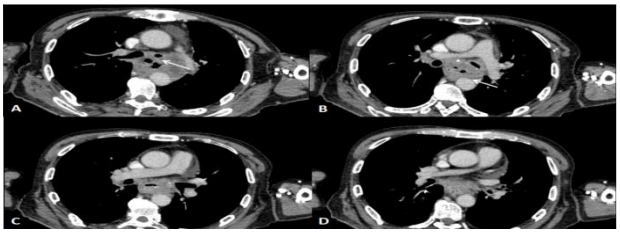

Figure 6: Contrast CT scan of thorax (mediastinal window A-D) showing eccentric wall thickening in upper and mid thoracic esophagus with luminal narrowing with extension in superior mediastinum with invasion of left main bronchus (marked by white arrow in A), obscuring fat plane between mass and left pulmonary artery and descending aorta (marked by white arrow in B).

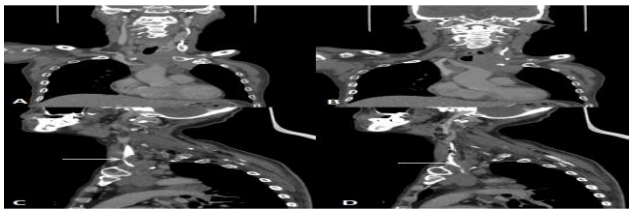

Figure 7: Coronal CECT (A,B) and sagittal CECT (C, D) of neck and thorax (soft tissue window) showing extension of carcinoma esophagus in superior mediastinum causing direct invasion of posterior wall of left IJV in lower neck with intraluminal thrombus (white arrows in C and D).

INTRODUCTION

Internal jugular vein thrombosis (IJVT) is a potentially life threatening vascular disorder. It is uncommon and caused by various conditions. Its pathophysiology is described by Virchow's triad for vascular thrombosis and requires the presence of one or more of the following factors: stasis, hypercoagulability of blood and vascular endothelium or intimal injury (Chowdhury, K. *et al* 1990).

IJVT can be spontaneous or nonspontaneous. Spontaneous IJVT occurs due to hypercoagulable state which is one of the criteria in Virchow's triad. Non-spontaneous IJVT is uncommon. In pre antibiotic era, IJVT was a known complication associated with deep neck infections often secondary to retropharyngeal abscess, tonsillitis, peritonsillar abscess, pharyngitis, molar tooth infection, mastoiditis, and acute necrotizing ulcerative gingivitis (Chowdhury, K. *et al* 1990).

Cancers associated with IJVT are lung (25.6%), pancreas (17.4%), stomach (16.8%), colon (15.2%), prostate (6.5%) and head and neck (2.0%). Rare causes are carcinoma breast, carcinoma lung, carcinoma ovary, mesothelioma, and mediastinal lymphoma (Moriwaki, H. *et al*, 2017). We are reporting the first case of carcinoma thoracic esophagus with IJV thrombosis.

DISCUSSION

The causes of IJVT are iatrogenic trauma to veins due to central venous access lines, neck dissection surgery, hemodialysis, external trauma to neck, and injection into large veins by intravenous drug abusers. Other causes are local or distant malignancy. Nonmalignant causes are hypercoagulability as seen in pregnancy, oral contraceptives, and hyperlipidemia (Type II) (De Casso, C. *et al* 2005).

IJVT occurring in malignant neoplasms occurs from a local tumour mass (primary or metastatic) causing compression of IJV with resultant stasis and decrease in jugular blood flow or direct invasion into the vein. It may also occur due to migratory thrombophlebitis seen in association with malignancies of lung, pancreas, stomach, female reproductive organs and other neoplasms (Lieberman, J. S. *et al* 1961). This occurs due to elevated levels of Factor VIII and accelerated production of thrombophlebitis with

resultant hypercoagulable state (Chowdhury, K. *et al* 1990).

Symptoms of IJVT are pain and swelling in the neck and the palpable cord beneath the sternocleidomastoid. Complications can be pulmonary edema, intracranial hypertension, cerebral edema, superior sagittal sinus thrombosis, septic emboli, chylothorax, superior vena cava syndrome, laryngeal and lower airway edema, facial edema and, jugular foramen syndrome. Lemierre syndrome is infected IJVT caused by extension of oropharyngeal infection (Leci-Tahiri, L. *et al* 2018). The main complications of IJVT are pulmonary embolism and post thrombotic syndrome. Pulmonary embolism occurs in 0.8% of patients with IJVT (Chowdhury, K. *et al* 1990).

IJV can be compressed by extrinsic tumour or abscess. Malignancy is associated with the coagulation disorders. 90% of patients with metastatic disease and 50% of patient with tumour usually have coagulation abnormality. Tumour induced coagulopathy mechanism is not well understood and may involve a direct increase of circulating levels of clotting factors, inhibitors of fibrinolysis or platelet numbers and production of coagulation activators like tissue thromboplastin and platelet activating factors (Carrington, B. M., & Adams, J. E. 1988).

A relationship that a malignancy and a thromboembolism disorder was first described by Trousseau in 1865. Tumour cells express tissue factors that activates tumour pro-coagulant, clotting cascade, fibrinolytic proteins, and receptors for these factors and promote interaction between tumour cells, platelets and endothelial cells via tumour antigens and cytokines and their immune complex to cause thrombogenesis (Moriwaki, H. *et al* 2017).

Malignant neoplasms can cause IJVT due to compression of IJV by primary or metastatic tumour causing reduction in blood flow with resultant stasis and/ or direct invasion into the vein. It can cause migratory thrombophlebitis due to the hypercoagulable state due to increased production of thromboplastin and elevated levels of Factor IX (Trousseau's syndrome) (Chowdhury, K. *et al* 1990).

Modalities for diagnosis are USG, colour Doppler, CECT and magnetic resonance imaging (MRI). USG is extremely useful in diagnosing IJVT. It is easily available, cost effective, and non-invasive without radiation and is rapid. Its disadvantages are its inability to detect acute thrombus which is usually anechoic and has limitations in imaging ability beneath the clavicle and under the mandible. CT findings in IJVT are hypodense intraluminal thrombus within the vein encircled by a sharply defined brighter vessel wall which occurs due to contrast uptake by Vasa vasorum. Normal IJV shows homogeneous enhancement in contrast study. MRI has the advantages of superficial soft tissue contrast resolution, avoidance of IV contrast, lack of radiation exposure and sensitivity to blood flow. Disadvantages are cost and availability (Chowdhury, K. *et al* 1990).

Anticoagulation is needed for symptomatic patients. IJVT is usually treated with heparin, but it is usually unsuccessful. Long term oral anticoagulation therapy is usually needed. Definitive treatment is treatment of underlying cause or malignancy (Moriwaki, H. *et al* 2017).

CONCLUSION

Non-spontaneous IJVT due to malignancy is uncommon. Carcinoma of upper thoracic esophagus, causing invasion of IJV with resultant thrombosis is rare and should be ruled out in a patient presenting with unexplained IJVT.

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