Azygos continuation of the inferior vena cava in carcinoma of oesophagus.

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ABSTRACT

The azygos system enlarges in cases of obstruction to the superior vena cava or inferior vena cava and result in increase blood flow through the system. Azygos continuation of the inferior vena cava is usually congenital and asymptomatic. The azygos vein is the sole drainage of the blood from the lower half of the body to the heart. It is crucial to identify the anomaly as it might involve in the surgical planning of tumours in the thorax or abdomen. Computed Tomography is a non-invasive technique and provide important information about the tumour and the vascular anomaly.

KEY WORDS: Azygos vein, Inferior vena cava, Computed tomography

CASE REPORT

INTRODUCTION

This is a case of carcinoma of the oesophagus that has incidental finding of azygos continuation of the inferior vena cava (IVC) on Computed Tomography (CT) scan of the neck and thorax during assessment of the tumour.

Case Report

A seventy-two year-old woman with history of dysphagia was scheduled for CT scan of the neck and thorax. She had dysphagia for at least two months with significant loss of weight and appetite. Oesophagus-Gastro-Duodenoscopy (OGDS) was done and there was narrowing of the upper third of the oesophagus by intraluminal mass.

Enhanced helical CT (Siemens Somatom Volume Zoom) of the neck and thorax were performed after intravenous injection of 100 ml of 300 mg I/ml Iohexol (Omnipaque, Amersham Health, Cork, Ireland) at a rate of 2.0 ml/sec. The neck and thorax axial images were obtained in 5mm and 10mm slice thickness respectively and 2.5mm collimation. The axial images were reconstructed to obtain the sagittal and coronal images.

The CT scan images revealed irregular circumferential soft tissue mass of the upper oesophagus with narrowing of the oesophageal lumen. There was ill-defined soft tissue mass on the right side of oesophagus which obliterated the normal fat plane between the trachea and oesophagus [Figure 1].

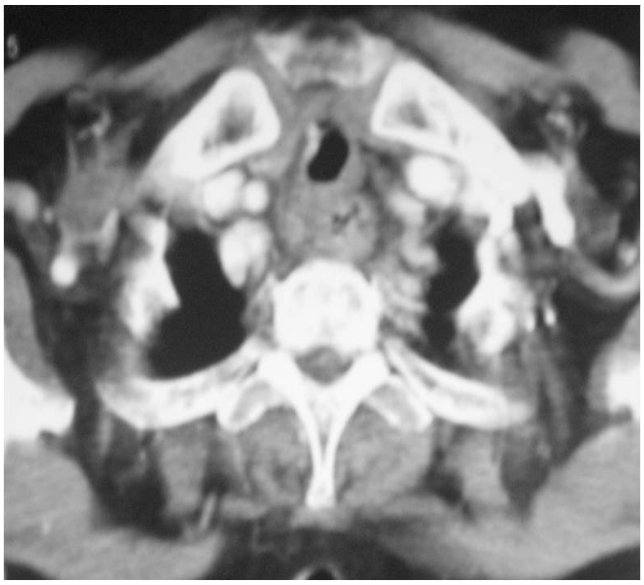

Figure 1: Contrast enhanced axial CT image of the upper oesophageal mass.

In the upper abdomen, there was a dilated vessel at the right retrocrural location [Figure 2].

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Figure 2: Contrast enhanced axial CT image at the level of the liver. There were dilated retrocrural vessels on the right and left sides which were the azygos vein and hemiazygos vein respectively.

It ascended into the thoracic cavity at the prevertebral location and united with the superior vena cava (SVC). The diameter of this vessel was 1.4cm to 1.8cm and was identified as dilated azygos vein [Figure 3, 4].

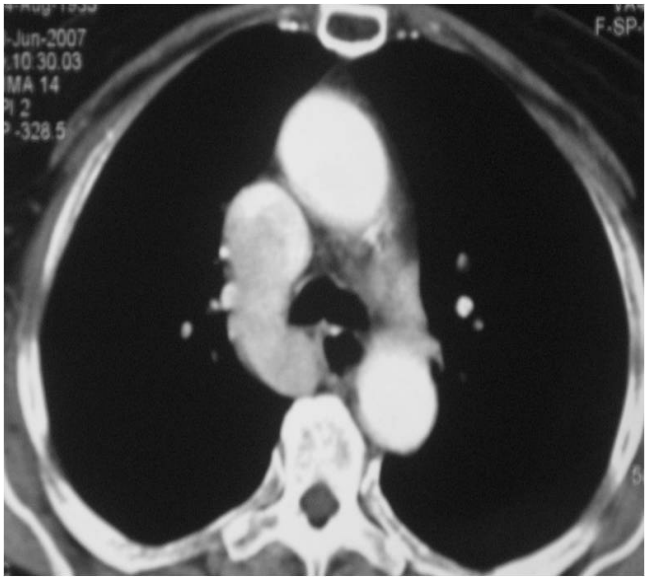

Figure 3: Contrast enhanced axial CT image at the level of SVC. The dilated azygos vein united with the SVC at the normal anatomy position.

Figure 4: Sagittal reconstruction CT image of the thorax. The IVC from the liver to the right atrium was seen. The azygos vein was seen as dilated vessel anterior to the thoracic spine.

The normal inferior vena cava at the renal level to the hepatic level was not visualized. The hepatic IVC to the right atrium and the IVC inferior to the kidney were normal. The right renal vein drained into the dilated azygos vein. The left renal vein drained into an enhanced left retrocrural vein which was the hemiazygos vein [Figure 2]. The hemiazygos vein was dilated and crossed prevertebrally posterior to the descending thoracic aorta and united with the dilated azygos vein.

DISCUSSION:

Congenital interruption of the IVC is a rare anomaly. The prevalence of IVC interruption in general population is 0.3% to 0.6% with majority being asymptomatic. The anomaly has been associated with asplenia, polysplenia and congenital cardiovascular diseases.[1] It has also been reported as a risk factor for the development of iliofemoral deep venous thrombosis in young adult.[2]

The IVC can be divided into four segments: hepatic, prerenal (subcardinal), renal and postrenal (supracardinal). In the foetus, the IVC develops from the progression and regression of three pairs of vein. These are the posterior cardinal, supracardinal and subcardinal veins. The prerenal segment cephalic to the kidney derives from the subcardinal vein. The postrenal segment is derived from the supracardinal vein. There is anastomosis between the prerenal and postrenal segments by the renal segment at the level of the kidney. The hepatic segment derives from the vitelline vein within the liver.[3,4]

During embryonic life the hepatic venous system and the right subcardinal vein join to form the prerenal segment. Common type of IVC interruption is failure of the fusion of hepatic and prerenal segments. There is persistence of right supracardinal vein and leads to azygos and hemiazygos continuation. The azygos vein is inevitably enlarged and becomes the main venous drainage from the lower half of the body to the heart. The azygos vein travels in its normal right retrocrural location and joins the SVC. The hemiazygos vein is also enlarged and unites with the azygos vein at prevertebral location usually at about the ninth thoracic vertebra. The postrenal segment of IVC remains and directly continuous with the azygos or hemiazygos system. The hepatic segment of the IVC usually independently drains into the right atrium.[4]

In this reported case, contrast enhanced CT scan of the neck and thorax was able to detect the primary oesophageal tumour and the vascular anomaly in the thorax and abdomen. CT scan is able to produce information about the involvement of the mediastinal structures. CT scan also provides important and crucial information of mediastinal and abdominal vessels prior to surgery. Generally in oesophagectomy the primary tumour is removed after ligating the azygos

system and thoracic duct. However ligation and division of the azygos vein will cause interruption of IVC thereby disrupting the venous return from the lower half of the body. This can result in venous hypertension and death.[5] In this patient, she was given radiotherapy and supported with entero-jejunostomy feeding.

Previously, frontal and lateral chest radiographs have been used to diagnose azygos continuation of the IVC. The absence of the IVC shadow on the lateral chest radiograph was thought to be an important sign associated with this anomaly. However, the normal IVC shadow was not always seen in normal population.[6] Ultrasound (US) scan and more invasive procedures such as femoral vein puncture and venocavography have also been used. With the rapid development of CT scan, it has replaced many invasive procedures. Furthermore it has the advantage of reconstructing the axial images into thinner slices to produce sagittal and coronal images for better delineation of the anomaly.

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