Tumor Thrombus within the Superior Sagittal Sinus Detected on FDG PET Venography

Abstract

Early detection of cereberal venous sinus thrombosis is important to prevent complication. Here we present an interstecting case of tumor thrombsosis of the superior sagittal venous sinus in a follow up case of adenocarcinoma esophagus, highlighting the feasibility for FDG PET venography for detection of the same.

Keywords: *Dynamic, esophagus, fluorodeoxyglucose, positron emission tomography, sinuous, thrombosis, venography, venous*

Piyush Chandra[1], Sheela Chinnappan[2], Ganesan Chandran[1]

[1]Department of Nuclear Medicine, [2]Department of Radiodiagnosis Zydus Hospitals, Vadodara, Gujrat, India

A 60-year-old male, diagnosed with poorly differentiated squamous cell carcinoma of the distal esophagus, presented with diminution of vision in the left eye, 3 months after starting concurrent chemoradiotherapy. Diagnostic computed tomography (CT) venography was done which showed a filling defect in the superior sagittal venous sinus [thin yellow arrow, Figure 1a]. Fluorodeoxyglucose (FDG) positron emission tomography/CT (P) was done subsequently starting with a dynamic PET acquisition of the intracranial vessels immediately after 6.5 mCi of FDG injection (frame-mode acquisition for 2 min, 8 s/frame, reconstruction with Q.Clear algorithm at beta value 500). A filling defect was noticed in the superior sagittal venous sinus in the venous phase of early dynamic PET images [lateral projection of the maximum intensity projection image, bold yellow arrow, Figure 1b], corresponding to the defect in CT venography image. 'Whole body FDG PET/contrast enhanced CT acquisition at 60 min showed residual disease in the esophagus [small yellow arrows, Figure 2a-c] and an FDG avid enhancing lesion in the high parasagittal region of the parietal scalp infiltrating the superior sagittal sinus [green arrow, Figure 1d] without any bone erosions, suggesting possible spread of disease from the scalp into venous sinuous via the emissary veins in the skull. Elsewhere, an FDG-avid enhancing lesion was noted involving the left choroid [red arrows, Figure 2d and e], explaining the diminution of left eye vision with multiple new metastatic skeletal lesions [green arrows, Figure 2f and g].

Cancer patients are at about 5-fold increased risk of cerebral venous thrombosis (CVT), especially within the 1st year of cancer diagnosis.[1] Early detection of CVT and appropriate treatment are important to avoid complications such as hemorrhage and hematoma formation.[2] Owing to its excellent spatial resolution and widespread availability, CT and magnetic resonance (MR) imaging angiography are now established modalities to study vasculature anatomy. However, there is a need for alternative angiography techniques in patients with contrast allergy and renal failure. The feasibility of early dynamic PET/CT angiographyin detecting stenosis of large arteries of the head neck/abdomen has previously been demonstrated by Drescher *et al*.[3] To our knowledge, our report here is the first instance of a CVT detection demonstrated on early dynamic FDG acquisition of the brain. We believe early dynamic PET imaging may be a clinically useful alternative to contrast CT/MR in detecting CVT, especially with next-generation PET scanners on

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Address for correspondence:
Dr. Piyush Chandra, Zydus Hospitals, Vadodara, Gujarat, India.
E-mail: drpiyushchandrak@gmail.com

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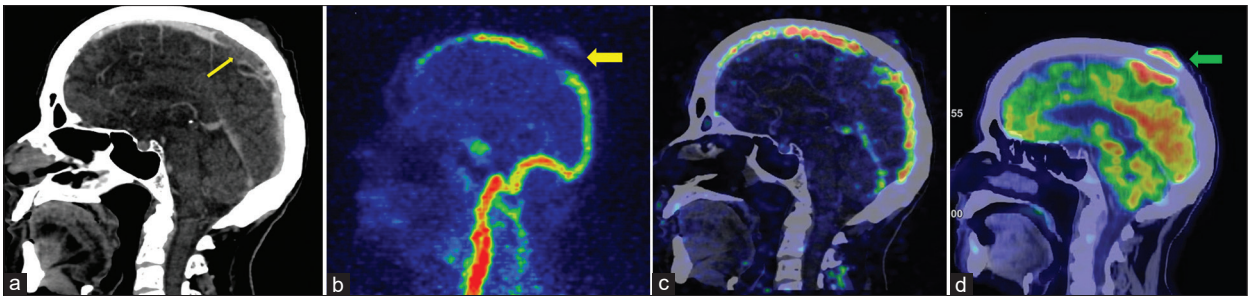

Figure 1:: Filling defect in the superior sagittal venous sinus in in CT venography image [thin yellow arrow, a], on the the venous phase of early dynamic PET images [lateral projection of theMIPimage,boldyellowarrow,b and fused PET/CT images,c]. FDG avid enhancing lesion in the high parasagittal region of the parietal scalp infiltrating the superior sagittal sinus [green arrow, d]

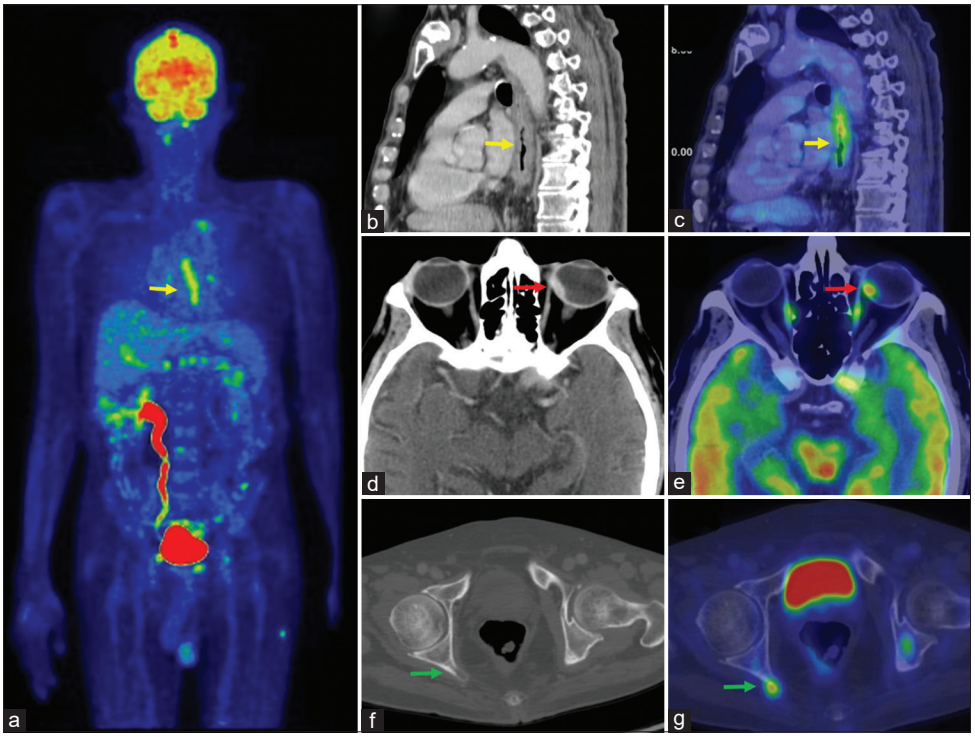

Figure 2: : Whole bodyPETMIPshowing residual disease in the esophagus [small yellowarrows, a-c], an FDG avidenhancinglesion in the left choroid [red arrows, d and e]withmultiplenewactiveskeletallesions [green arrows,f and g]

the horizon with significantly improved sensitivity and spatial resolution.[4]

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient (s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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