



Multi-planar CT Reconstruction to Diagnose Lemierre Syndrome

Mona Shete, MD^a; Jorge Salazar, MD^{a, b}; Merry Sebelik, MD, FACS^{a, b}

^aUniversity of Tennessee Health Science Center Department of Otolaryngology, ^bVeterans Administration Medical Center-Memphis

ABSTRACT

Objective: 1. Review presentation, diagnosis and management of Lemierre syndrome (infectious jugular venous thrombosis). 2. Discuss use of multiplanar reconstruction of contrast CT images to diagnose internal jugular vein (IJV) thrombosis. 3. Learn the indications for obtaining alternative (non-axial) image views and discuss the need for more invasive diagnostic imaging studies such as angiography in detecting IJV thrombosis.

Method: This study is a case report with a review of the literature.

Conclusion: Lemierre syndrome is a rare but potential life threatening condition with high mortality rate (5%-18%). Diagnosis is made by the radiologic finding of thrombosis of internal jugular vein (IJV) associated with oro-pharyngeal infection. This case suggests that advanced imaging using contrast CT with reconstruction in alternate planes may avoid angiography for the diagnosis of Lemierre syndrome. Communication between the clinician and radiologist is essential.

CONTACT

Mona Shete, MD
UTHSC Department of OTOHNS
Email: mshete@uthsc.edu

Merry Sebelik, MD, FACS
UTHSC Department of OTOHNS
Email: msebelik@uthsc.edu

INTRODUCTION

First reported in 1918 by Schottmuller, and further popularized by Andre Lemierre in 1936, Lemierre syndrome (LS) is characterized by a history of recent oropharyngeal infection, clinical or radiological evidence of IJV thrombosis and isolation of anaerobic pathogen, mainly Fusobacterium Necrophorum. ¹ It has also been called post anginal sepsis or necrobacillosis and is seen mostly in healthy teenagers and young adults. ² Infection may result in septic thrombophlebitis of the ipsilateral IJV with subsequent septicemia and septic embolization, which cause metastatic abscesses in the lungs, bones, large joints, liver, kidneys and peritoneum.

Most cases present with a classic progressive triad involving h/o oropharyngeal infection, IJV thrombosis and evidence of fusobacterium necrophorum, the pathogen involved in most cases (81%).⁴ Other pathogens can cause LS including other fusobacterium species, bacteroides and group A, B and C streptococci. Community acquired methicillin resistant staphylococcus aureus has also been reported. ⁵ Fusobacterium necrophorum is an anaerobic gram negative organism which is a part of normal oral flora. It is peculiar in its ability to invade as a primary pathogen without the presence of serious underlying disease. Its lipopolysaccharide endotoxin is capable of causing an intense systemic sepsis.⁶ Infection of the parapharyngeal space occurs as a result of direct spread of infection from the tonsillar bed or by lymphatic or venous dissemination. IJV thrombosis / thrombophlebitis results from adjacent inflammatory process or extension from tonsillar veins. Septic emboli circulate in the blood and cause septicemia or metastatic abscesses.

Since the discovery of penicillin in 1940's and its widespread use for streptococcal pharyngitis, the incidence of LS has dramatically fallen to a degree that it had been called a forgotten disease. ³ However, more recently, there has been a rapid increase in the reporting of LS. According to one review, 121 relevant articles were found between 2001 and 2008 as compared to 6 articles between 1980 and 1990. ² This rapid increase can be attributed to increased antibiotic resistance, changes in the pattern of antibiotic usage or higher detection rate by higher resolution scanning. In the pre-antibiotic era, LS often took a fulminant course with a mortality rate of 90%.¹ More recently, the mortality rate quoted in different studies averages to about 5%. ³ Traditionally, contrast enhanced CT neck or color doppler ultrasound of IJV are the imaging studies of choice in the diagnosis of LS. Contrast CT chest can be added if patient has signs suggestive of septic pulmonary emboli. In the present case report, we present the CT findings of a patient with LS including the use of multiplanar reconstruction from conventional contrast CT images (140 cc/sec with 70 sec delayed imaging and 0.65x0.65 detector acquisition) to diagnose IJV thrombosis. We will review presentation, diagnosis and management of LS and discuss the indications for obtaining alternative (non-axial) image views. We will also discuss the need for more invasive diagnostic imaging studies such as angiography in detecting IJV thrombosis.

CASE REPORT

45- year-old-man presented to the Veterans Administration Medical Center-Memphis and was evaluated as an inpatient by the Otolaryngology Service. He had a h/o poly-substance abuse and was admitted for agitation and mental status changes. Admission history and physical revealed a history of sore throat for 2 weeks prior to presentation and reportedly, he was prescribed some antibiotic as an outpatient. Admission drug screen was positive for opioids and alcohol. Patient reported using left forearm for drug administration. He was afebrile and white cell count was normal. Ear nose and throat examination was normal.

He developed fever, painful right neck swelling and trismus on the fifth hospital day and our service was involved in his care. No lesions of visible oral and pharyngeal mucosa were found but prominent erythema, tenderness and edema was noted in the submandibular area extending posteriorly to the angle of the mandible and inferiorly to the level of the clavicle. Blood culture was positive for staphylococcus aureus and white cell count was elevated. Contrast-enhanced CT ruled out a deep neck abscess and detected complete absence of IV contrast at the level of the jugular foramen. (Figures 1, 2) Multilevel cervical sub centimeter lymph nodes were also present on axial view. Reconstructed sagittal images delineated a thrombus in the IJV from the jugular foramen to the angle of the mandible with diffuse soft tissue stranding confirming Lemierre syndrome.(Figure 3) Culture-directed IV antibiotics were administered and anticoagulation was instituted. Subsequently, fever and neck swelling resolved and no pulmonary symptoms developed.

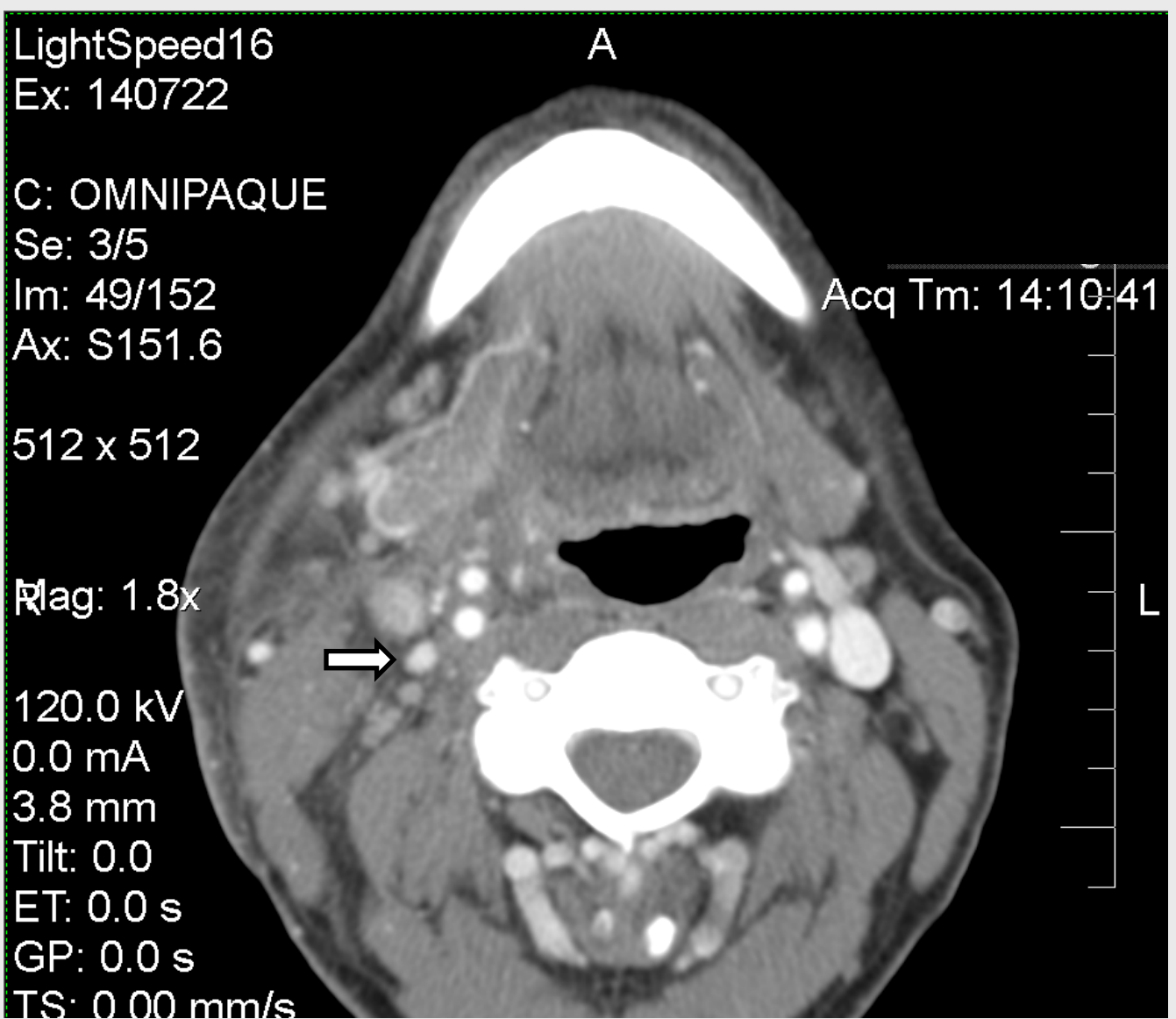


Figure 1 Axial view demonstrating narrowing of the lumen of IJV below the angle of mandible

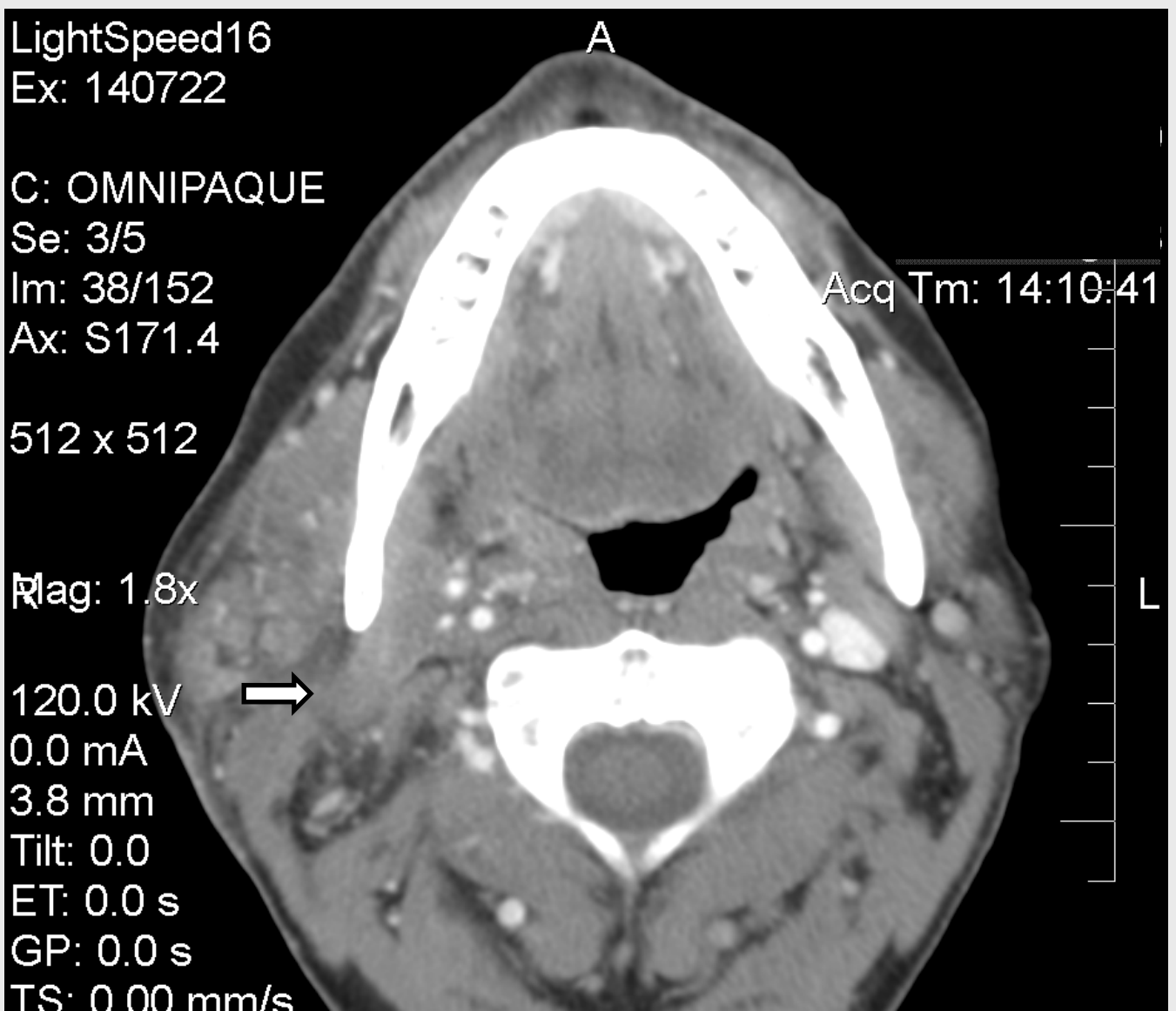


Figure 2 Axial view demonstrating lack of contrast in Right IJV just above the angle of mandible

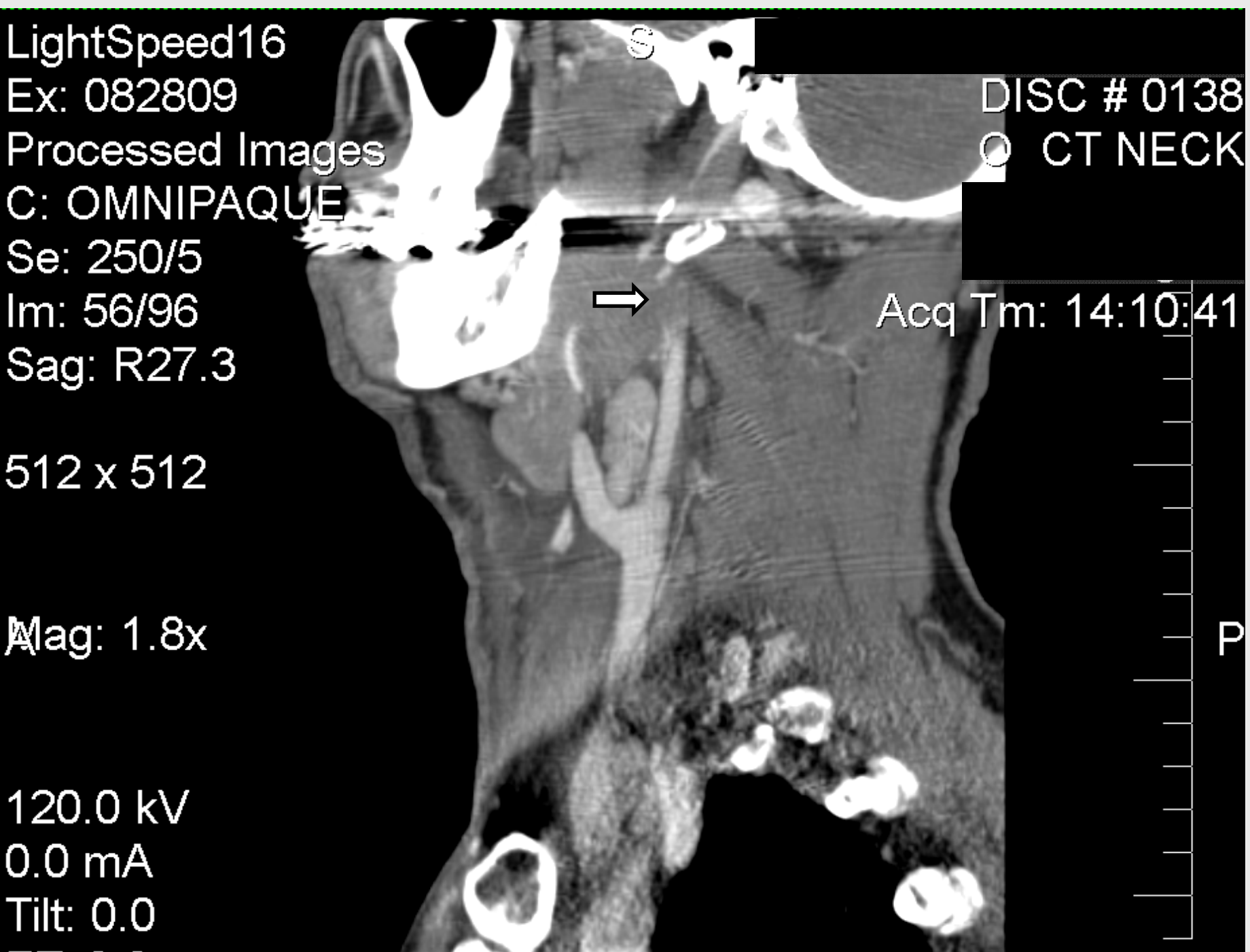


Figure 3 Sagittal view demonstrating Right IJV and common facial vein with lack of contrast in the vein above the angle of mandible

DISCUSSION

Contrast enhanced CT scan of neck is the imaging study of choice to assess for neck pathology including thrombus in the IJV or an abscess in the deep neck spaces. However, to more definitively demonstrate IJV thrombosis, additional imaging studies such as ultrasound or contrast angiography/venography can be done. Ultrasound is noninvasive and avoids ionizing radiation, however, thrombi below the clavicle and above angle of the mandible can be missed. Early thrombi without an organized clot may be overlooked and it is operator dependant. ² Traditional angiography is invasive and requires high doses of contrast. As in our case report, multi-planar reconstruction of CT images including a reconstruction in the sagittal plane delineated a thrombus in the IJV from the jugular foramen to the angle of the mandible with diffuse soft tissue stranding while axial CT images failed to show hypo dense vein. Reconstructed images in sagittal and/or coronal planes facilitate a three-dimensional concept of thrombus extent and relationship to adjacent structures, particularly major blood vessels, thus avoiding any additional imaging to diagnose IJV thrombosis.

CONCLUSIONS

Lemierre syndrome is a rare but potential life threatening condition with high mortality rate (5%-18%). Diagnosis is made by radiologic finding of thrombosis of internal jugular vein (IJV) with oro-pharyngeal infection typically with fusobacterium necrophorum. Variant presentations may include infections with aerobic organisms like staphylococcus, thrombotic occlusion of internal carotid artery instead of IJV and dental infections, parotitis, mastoiditis, otitis media or sinusitis as a primary site of infection. The cause of morbidity and death is septic pulmonary emboli or generalized sepsis. This case suggests that advanced imaging using contrast CT with reconstruction in alternate planes may avoid an angiography for the diagnosis of Lemierre syndrome. Communication between the clinician and radiologist is of essence.

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