An unusual complication of CSOM – Lateral sinus thrombosis with lung abscess: A clinicoradiological study

S. N. Saha · S. Chandra · A. Srivastava · A. Ghosh

Abstract

Aims To present a case report of a child presenting with lateral sinus thrombosis with bilateral multiple lung abscesses as a rare consequence of CSOM with an emphasis on the radiological findings.

Material and methods An 11-year-old male child with a history of pyrexia of unknown origin, right-sided torticollis, cough with expectoration and right ear discharge was referred to us from department of paediatric medicine. Chest examination revealed dull areas on percussion and areas with bronchial breath sounds on auscultation bilaterally. Otological examination revealed right attic retraction pocket filled with cholesteatoma, post-auricular tenderness and Greisinger's sign along with foul smelling muco-purulent discharge.

Results Routine blood investigations revealed normocytic normochromic anaemia, polymorpho-nuclear leucocytosis and raised ESR. Audiological investigations showed a right-sided mixed hearing loss. Digital radiography of chest showed multiple thin walled cavities involving all of the lung zones bilaterally. USG (Ultrasonography) of neck showed thrombosis of right internal jugular vein.

CT scanning of head, neck and thorax showed soft tissue collection within the right mastoid with erosion of posterior wall & presence of gas bubble in the right sigmoid sinus and thrombosis of right internal jugular vein and multiple abscess cavities occupying both lung parenchyma. The patient was initially managed with conservative antibiotic therapy for lung abscess followed by radical mastoidectomy and thromboembolectomy from the lateral sinus.

Conclusion Otogenic lung abscess though rare in this present postantibiotic era, it can occur in underprivileged and poor population like our country.

Keywords Lateral sinus thrombosis · IJV thrombosis · USG · CT and CECT · Otogenic lung abscesses.

Introduction

Lateral sinus thrombosis (LST) is almost exclusively a complication of otologic infections and usually established on clinical and radiological grounds in the presence of an otogenic infection. Modern antibiotic use has decreased the incidence & mortality rate and altered the clinical presentation of suppurative otogenic intracranial complications. But, over dependence on the antibiotics (causing masking effect on the symptoms of chronic inflammation) and decreasing familiarity with the symptoms of otitic complications has resulted in a relative increase in serious complications of otitis media in proportion to the number of cases of surgical mastoiditis. Uncertainty remains about the best ways to diagnose, assess by imaging and also treat the condition when it is suspected, and a lack of understanding of the principles of management may contribute to the continued significant morbidity & mortality from this condition.

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Fig. 1 Digital radiograph of chest showing bilateral multiple lung abscesses; a metallic marker placed over the palpable cord like right Internal Jugular vein.

Methods

Fig. 2 USG of neck showing thrombosed right internal jugular vein.

Fig. 3 Soft tissue collection within the right mastoid with erosion of posterior wall (i.e. sinus plate) with thrombosed sigmoid sinus containing gas.

Fig. 4 CT Scan neck showing thrombosis inside the right internal jugular vein

Fig. 5 CT Scan of thorax showing abscess cavity in lung parenchyma

An 11-year-old male child presented to the paediatric medicine outpatient department of our tertiary referral center with a history of pyrexia of unknown origin over the preceding 2 months along with right-sided torticollis and cough & expectoration for 3 weeks. The fever was of high grade, intermittent and associated with rigors & headache. The torticollis was constant and associated with tenderness along the right sternocleidomastoid muscle. The cough was intermittent, progressive and associated with yellowish foul smelling expectoration. He did not have any chest related symptoms like cough, expectoration, haemoptysis, chest pain etc. before this episode. His parents also gave a history of intermittent, scanty, yellowish and foul smelling ear discharge from right side starting soon after his birth, for which the patient was referred to the department of ENT.

Results

On examination of the chest, dull areas on percussion and areas with bronchial breath sounds on auscultation were found bilaterally. On otological examination, foul smelling muco-purulent discharge was found, which after dry mopping revealed right attic retraction pocket filled with cholesteatoma, post-auricular tenderness and fullness (Greisinger's sign).

Routine blood investigations revealed normocytic normochromic anaemia, polymorpho-nuclear leucocytosis and raised ESR. Audiological investigations showed a right-sided mixed hearing loss of 72 dB pure tone average, with a sensorineural component of 30 dB pure tone average. Gram staining and culture from both sputum and ear discharge revealed mixed flora of gas forming Gram-negative bacilli (*Proteus mirabilis*) with anaerobes (*Bacteroides fragilis*). Repeated Ziehl Nielsen staining from both sputum and ear discharge did not reveal any acid-fast bacilli.

Digital radiography of chest showed multiple thin walled cavities (pyogenic lung abscess) involving all of the lung zones bilaterally (Fig. 1). USG of neck showed thrombosis of right internal jugular vein (Fig. 2). CT scanning of head, neck and thorax showed soft tissue collection (cholesteatoma) within the right mastoid with erosion of posterior wall (i.e. sinus plate) & presence of gas bubble in the right sigmoid sinus with thrombosis. Thrombosis with gas formation extended upto right internal jugular vein & the thoracic inlet (Figs. 3 & 4). CT scan thorax suggestive of thin walled cavity in lung parenchyma (Fig. 5).

The patient was treated with 3rd generation cephalosporin, which was found to be sensitive to the particular organisms along with intravenous metronidazole & amikacin for 7 days, and the condition was stabilized and was subjected for canal wall down mastoidectomy with thrombo-embolectomy; which was followed by 3 weeks antibiotic therapy. Following this treatment schedule, the patient recovered from the otogenic sepsis as well as from lung abscess.

Discussion

Otogenic lung abscess is an extremely rare complication of both acute and chronic otitis media in the present days. In the Pubmed search from 1957 onwards only three cases were recorded [1]. The striking evidence of septicaemia and pyaemia due to CSOM complicated by LST (lateral sinus thrombosis) may be accompanied by the embolic abscesses of the lung, other viscera, subcutaneous tissues, pleuro-peritoneal and joint cavities [2]. Lateral sinus thrombosis is a serious complication of both acute and chronic otitis media with a significant mortality rate. Besides its rarity, non-specificity of the signs & symptoms and the masking effect of antibiotic therapy make diagnosis of LST difficult. The widespread use of systemic antibiotic therapy has changed the clinical presentation of the LST. Otogenic intracranial complications including LST have been reported with an intact tympanic membrane [3] and also with masked mastoiditis [4]. As the lateral sinus thrombophlebitis extends lower down the jugular, the level of tenderness gets lower, and the localized oedema follow the progressive thrombosis even to the root of the neck or across the middle line- phlebitis

migrans [2]. Even the thrombus can extend and occlude the superior vena cava [5].

Investigations such as polymorphonuclear leucocytosis of greater than 20,000/dl and progressive anemia are of limited help. A lumbar puncture can be dangerous because of the risk of brainstem herniation, and the Tobey-Ayer test is unreliable [6].

Routine radiograph of the mastoids can only show an inflammatory temporal bone disorder. Although carotid arteriography is highly specific in the recognition of LST in the venous phase, they are invasive procedures carrying the risk of dislodging loose infected thrombus. However, digital subtraction angiography has gained importance as a relatively low risk procedure in the recognition of the LST [6]. Ultrasonography of the neck with high frequency transducer is a very useful tool to detect the vessels, blood flow, luminal narrowing, status of the wall and presence of any thrombus as found in our case.

Plain CT scan can itself reveal the increased density of fresh clots within the lateral sinus [7]. When the diagnosis is delayed, the thrombus becomes organized demonstrating the full extent of the thrombus and surrounding soft tissue. Contrast enhanced CT (CECT) scan is often regarded as the radiologic study of choice for such diagnostic purposes. Plain CT scan can identify extradural, subdural & cerebral abscess and provide supportive evidence of sigmoid sinus thrombosis and cerebritis [6]. Filling defect on CECT gives more definitive evidence of the diagnosis [8]. However, the detection of dural sinus thrombosis requires strong clinical suspicion, precise orientation of thin cuts, concentrated contrast medium, multiplanar reconstruction, and special window settings. In the present case, presence of the gas shadow in the infected sinus lumen favours aetiological origin by gas forming organism.

MR may show abnormal signal from the sinus and high signal intensity on T1 and T2 weighted images. Gadolinium enhancement of MR images may also show a radiological picture comparable to that seen on CT scanning [8]. MR angiography is quite sensitive to blood flow and it distinguishes thrombosis from slow flow. It has several advantages; it is a non-invasive technique and does not require the use of intravenous contrast agent, it can be performed rapidly and does not use ionizing radiation. So, MR imaging supplemented by MR venography may be sufficiently suggestive for angiography to be avoided [6].

Management of LST with lung abscess requires intensive pre-operative antibiotic therapy according to the culture & sensitivity of the ear discharge and sputum as done in the present case. Mastoidectomy with exposure of the lateral sinus and removal of the thrombus from the sinus remains the mainstay of treatment till date. Ligation of internal jugular vein may be required in some cases of descending thromboembolus, which does not respond to conservative therapy. It was not done in present case as the thrombus was extending down up to the root of the neck.

Conclusion

The widespread use of systemic antibiotic therapy has changed the clinical presentation of the LST; so unusual presentations like lung abscesses are being found nowadays. That is why we should more careful during clinical examination and radiological interpretation of LST.

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