

Multiple Pulmonary Nodules in a Febrile Patient

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Investigations

A 60-year-old male presented with symptoms suggestive of urinary tract infection with fever off and on. The computed tomography (CT) of abdomen and pelvis showed prostatic abscess. The CT chest identified nodules of various sizes with the feeding vessel sign and the cheerios sign. The blood culture grew *Burkholderia pseudomallei*. He was diagnosed to have septic pulmonary embolism caused by *B. pseudomallei*. He was treated with intravenous ceftazidime along with oral co-trimoxazole and drainage of prostatic abscess. Septic pulmonary embolism requires treatment for four-six weeks whereas *B. Pseudomallei* needs treatment for three-six months. To the best of our knowledge, prostatic abscess due to melioidosis leading to septic pulmonary embolism has not been reported so far.

Case Summary

A 60-year-old male, farmer by occupation, non-smoker, diagnosed as a case of diabetes mellitus and left ventricular dysfunction presented to us with burning micturition, high grade fever, exertional dyspnoea and occasional cough with scanty expectoration of two weeks duration. At the time of initial presentation the respiratory rate, heart rate, blood pressure and saturation were 28/min, 110/min, 120/80 mmHg and 98%, respectively. There was bilateral pedal oedema. On respiratory system examination bilateral basal crepitations were observed. The other system examination was within normal limits. Total leucocyte count was 15,400/mm³, differential showed neutrophilia of 65%, haemoglobin was 7g% and blood sugar fasting was 214mg/dL. The initial urine and blood cultures were negative. Ultrasonography of the abdomen revealed hydronephrosis of the right kidney and prostatomegaly. Computed tomography (CT) of the abdomen showed prostatic abscess (Figure 1) with necrotic iliac lymph nodes, peritonitis and splenic infarcts. Prostatic abscess drainage was done. On chest radiograph (Figure 2), bilateral nodular



Figure 1. Computed tomographic of the abdomen (transverse section) showing hypodense area in prostate suggestive of abscess.

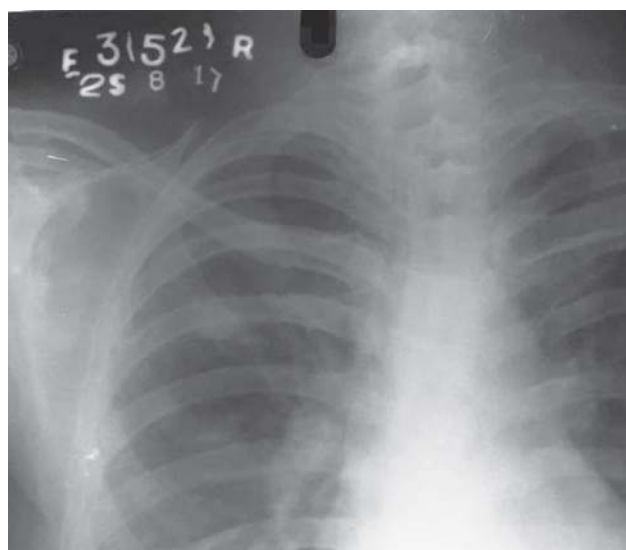


Figure 2. Chest radiograph (postero-anterior view) showing bilateral nodular opacities.

opacities were found, for which opinion from the chest physician was taken. Sputum was negative for acid-fast bacilli. The cartridge based nucleic acid amplification test (CBNAAT) for sputum did not show *Mycobacterium tuberculosis*. High resolution CT (HRCT) of the chest showed multiple nodules of variable sizes in bilateral lung fields with 'feeding vessel sign' (Figure 3). The

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nodules also had cavitation suggestive of 'cheerios sign' (Figure 4). Sub-segmental wedge-shaped consolidation in the sub-pleural region of the right lower lobe was also observed (Figure 4). There was mild non-tappable

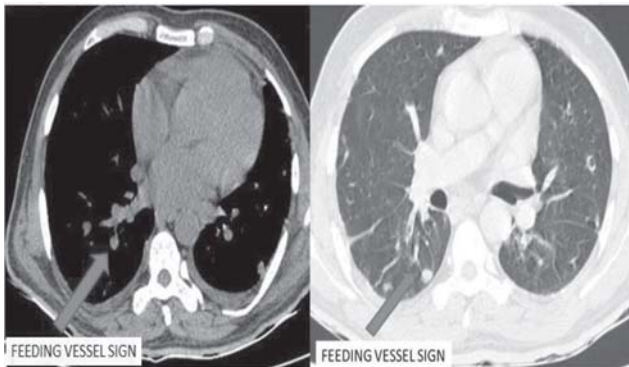


Figure 3. Computed tomographic of the thorax (mediastinal and lung window) transverse section below the level of carina showing the "feeding vessel sign" (arrow).

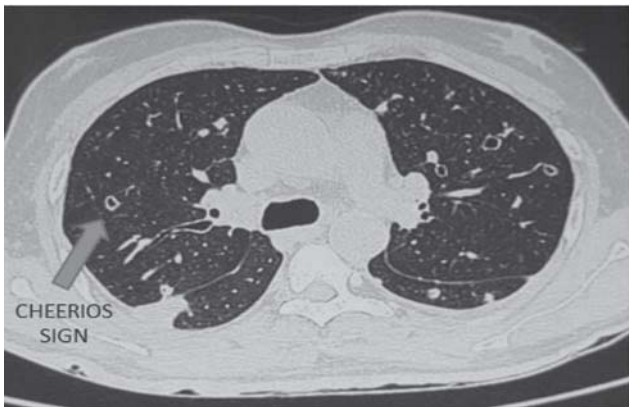


Figure 4. Computed tomographic of the thorax (lung window transverse section) showing "cheerios sign" (arrow).

pleural effusion on the right side. Blood culture grew *Burkholderia pseudomallei*. Patient was treated with intravenous ceftazidime 2g thrice daily and oral co-trimoxazole (400/80) three tablets thrice daily for two weeks. Fever subsided and the patient was advised to continue co-trimoxazole (400/80) three tablets thrice daily for 12 weeks.

Diagnosis

Septic pulmonary embolism due to prostatic abscess caused by melioidosis.

Discussion

Septic pulmonary embolism, a rare clinical entity, occurs when thrombi containing microorganisms in a fibrin matrix get dislodged from an infectious focus to get implanted into the lungs.¹ Tricuspid valve vegetation, septic thrombophlebitis or infected venous catheters are the usual cause for SPE. *Staphylococcus aureus* is the most common microorganism causing SPE.

The clinical presentation and chest radiograph are usually non-specific. Computed tomography is very sensitive for the diagnosis of SPE.² In our case CT showed multiple nodules with cavitation.³ The presence of "feeding vessel sign" and the "cheerios sign" seen in our patient were very useful in narrowing the differential diagnosis. Both these signs can be seen in SPE, fungal pneumonia, parasitic infection, lung malignancy and pulmonary metastasis.^{4,5}

When a discrete vessel leading to a lung nodule or a mass is observed on CT, it is called feeding vessel sign. It is also known as 'fruit on branch' sign.⁴ Its presence indicates that the lesion seen on CT has a haematogenous origin. If the feeding vessel sign is seen with sub-pleural wedge-shaped consolidation, SPE should be considered.⁶ In our case too, there was wedge-shaped peripheral consolidation supporting the diagnosis of SPE.

The 'cheerios sign' is characterised by a pulmonary nodule having a lucency at its centre which resembles the cheerios (breakfast cereal).⁵ It is also called the open bronchus sign. The proliferation of cells around a patent bronchus results in such appearance. The cheerios sign is usually seen in conditions, such as lung adenocarcinoma but can occasionally be seen with SPE.

The SPE in our patient was due to *Burkholderia pseudomallei*, a small, gram-negative, oxidase-positive, motile, safety pin like, aerobic bacillus with occasional polar flagella.⁷ The disease caused by the bacilli is known as 'Melioidosis'. It has a wide spectrum of presentation.⁷ Pneumonia is its commonest presentation; skin ulcer, abscess and fulminant septic shock are the other uncommon forms. Melioidosis has no human to human transmission. Humans are infected by percutaneous inoculation, inhalation, or ingestion of the organism through environment. Our patient had possibly acquired the infection while working in paddy fields.

Melioidosis can involve many different organ systems. Lung is the commonest organ involved.⁸ The pulmonary melioidosis spectrum varies from acute, sub-acute, chronic to sub-clinical melioidosis.² Acute melioidosis presents with high grade fever, dyspnoea, and purulent sputum. Chest radiograph may show multiple nodular opacities, patchy infiltrates or lung abscess. Sub-acute form occurs as a re-activation of a previous infection. It is seen in patients after they have the left endemic area.⁸ The subacute form may be focal (smoldering pneumonia) or disseminated with abscesses in many organs. The presentation is milder than acute form. Chronic pulmonary melioidosis presents with features mimicking tuberculosis, like low-grade fever and upper lobe cavity on chest radiograph. Sub-clinical

melioidosis may produce minimal or no symptoms resulting in a chronic carrier state. The pneumonia can rarely have rapid progression to septic shock and death. Severe systemic manifestations, like septic shock or SPE are usually due to risk factors including diabetes, renal disease, and alcoholism. Our patient had SPE possibly due to diabetes mellitus.

The definitive diagnosis requires a positive culture of *B. Pseudomallei* and the same was observed in our patient. An indirect hemagglutination test and various enzyme-linked immunosorbent assays may be useful in cases with negative culture.⁷ Antibiotic therapy remains the mainstay of the treatment. *B. pseudomallei* is susceptible to antibiotics.^{7,9} The therapy for melioidosis is divided into initial intensive phase for the prevention from relapsing which lasts for 10-14 days followed by eradication phase with oral antibiotics with injectable antibiotics for 3-6 months. Ceftazidime in combination with co-trimoxazole or ciprofloxacin or doxycycline is the treatment of choice for the initial phase.⁹ Supportive therapy is an integral part of management and includes management of acute respiratory distress syndrome, drainage of pus, good diabetic control and good nursing care. Our patient was treated with antibiotics along with drainage of pus.

To the best of our knowledge, prostatic abscess due to *B. pseudomallei* causing SPE has not been reported

so far. Presence of feeding vessel sign and/or cheerios sign is often suggestive of SPE. Causative organism needs to be isolated by culture methods, as sometimes rare microbes, like *B. pseudomallei* may also cause SPE. Melioidosis causing SPE requires treatment for as long as up to six months.

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