

Case Report

Abdominal Tuberculosis Diagnosed on Gallium Scintigraphy in a child with Pyrexia of Unknown Origin

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We report a case of an eleven year old girl with pyrexia of unknown origin whose illness remained undiagnosed after extensive investigations. We were able to localize the disease to abdomen with a Gallium Whole Body Scan. In the background of a history of tuberculosis in a family member in an endemic area, empirical anti-tuberculosis treatment was given with clinical success that was also demonstrated on a repeat Gallium scan four months later.

Key words: Gallium Scintigraphy, Abdominal tuberculosis, Pyrexia of unknown origin

Case Report:

An eleven year old girl presented as an outpatient with history of fever, weight loss and night sweats for past three weeks. She had no systemic symptoms or any physical finding of note. Her younger sister had been diagnosed as having pulmonary tuberculosis and had been on anti-tuberculosis treatment (ATT), for three months. The patient had herself received Bacille Calmette Guerin (BCG) as a part of primary childhood immunization.

Initial work up for fever included tests for infective conditions based on local epidemiological patterns, as well as non-infective conditions. Blood counts, baseline renal and liver functions, hepatitis serology, autoimmune markers, abdominal ultrasound, chest x-ray, urine and blood cultures were all negative. ESR was elevated at 70mm/ 1st hour, Mantoux test was negative with 10 units of tuberculin and tuberculosis (TB) serology was negative. The patient was hospitalized and empirical treatment for malaria and enteric fever was given in view of persistent high-grade fever. The fever however continued and further investigations were carried out. Serum immunoglobulin levels were markedly raised, serology for brucellosis was negative, CT scan of the abdomen was unremarkable, echocardiography was negative and a repeat Mantoux test with 20 tuberculin units was positive at 96 hours. A Gallium-67 (Ga-67) Whole Body Scan was then carried out with the aim to localize any infective focus at 24, 48 hours, and day 5 using 60 MBq (1.6 mCi) of Ga-citrate given intravenous. Static and Single Photon Emission Computed Tomography (SPECT) images showed area of intense focal increased radiotracer uptake in the left lumbar region just below the splenic flexure (Fig 1). Abnormal activity was evident on all images and did not disappear on delayed images up to day 5 even after giving laxatives.

With a positive family history of tuberculosis, decision was made to start with empirical trail of ATT with four drugs and then proceed to intestinal biopsy, should this fail. The patient responded favorably to this treatment. There was an improvement in the pattern of

fever within a week and the patient was completely afebrile by the third week of treatment. Her appetite improved and she registered an impressive gain in weight over the next few months while the ESR returned to a normal value. A repeat Ga-67 scan was performed after four months of therapy using 75 MBq (2 mCi) of Ga-citrate given intravenously. The images showed no evidence of abnormal focal increased uptake of the tracer throughout the abdomen (Fig 2). The previously seen abnormal activity in the left lumbar region was no longer evident. The patient continues to do well with plans to complete twelve months of treatment.

Fig 1: Baseline diagnostic Ga-67 scan showing persistent abnormal uptake in left lumbar region at 24, 48 hours and day 5.

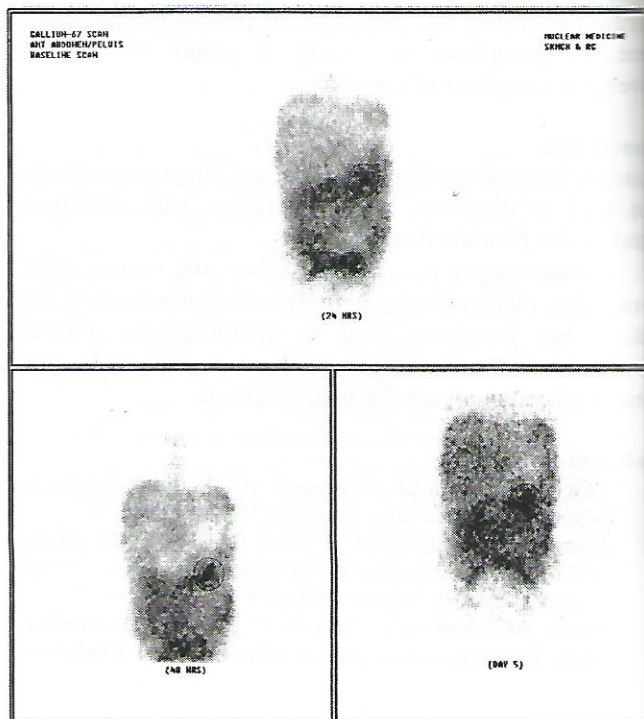
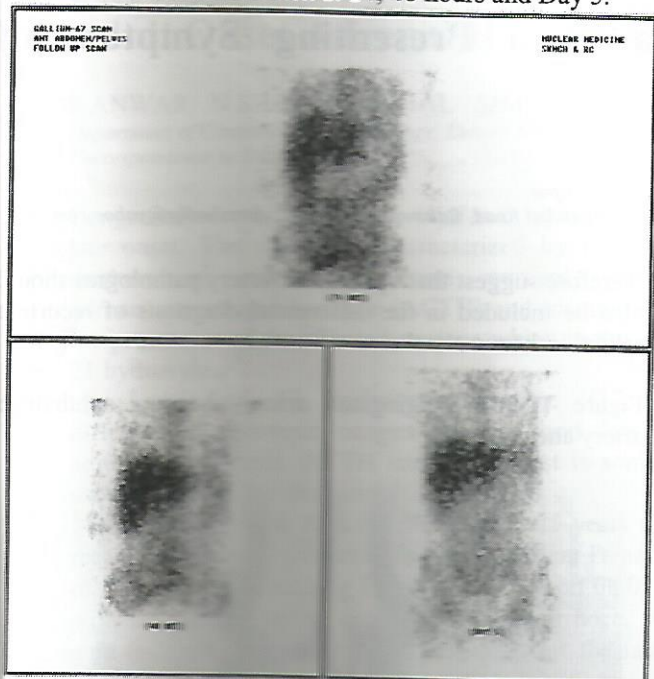


Fig 2: Follow up Ga-67 scan show no evidence of Gallium avid disease in the abdomen at 24, 48 hours and Day 5.



Discussion:

Pyrexia of unknown origin (PUO) is clinically defined as body temperature exceeding 38.3°C for more than three weeks with the patient hospitalized for one week while the fever is under investigation and with no clue as to its cause¹. The proportion of cases of pyrexia of unknown origin due to infection is higher in children and due to malignancy is correspondingly lower². Most fevers of unknown or unrecognized origin result from atypical presentation of common diseases³. If there are no clues in patient's history or on physical examination that suggest a specific infection or area of suspicion, it is unlikely that diagnostic studies will be helpful; however, radionuclide scans may be helpful in detecting abdominal abscesses and especially if the focus cannot be localized to a specific region or multi-focal disease is suspected². This was true in our case as routine diagnostic tests for tuberculosis were inconclusive. Ga-67 citrate is the best radiopharmaceutical agent for pyrexia of unknown origin because of its ability to assess a wide spectrum of causes throughout the body⁴. Ga-67 citrate in inflammation or infection is thought to leak through the vascular epithelium and bind to actoferrin excreted in loco by leukocytes or to siderophores produced by the infecting organism themselves⁵. With a physiological half-life of 78 hours, imaging can be done on the same day and up to five days

to localize infection⁶ as we did in this case. The use of Gallium Scintigraphy for clinical decisions in pulmonary tuberculosis is not recommended⁷, however, it is a convenient and useful method for evaluating extra-pulmonary tuberculosis lesions other than tuberculosis meningitis as the extra-pulmonary focus can be clearly visualized by whole body imaging⁸ as seen on our baseline diagnostic scan. Gallium Scintigraphy can serve as a screening method, when followed by Computed Tomography (CT) and ultrasound for initial detection of occult tuberculosis lesions especially in patients with prolonged fever⁹. It is more helpful than labeled leukocytes when the cause of PUO is intra-thoracic rather than intra-abdominal partly because of physiological excretion of Ga-67 in the gut¹⁰, but it is an acceptable substitute when cell imaging is not possible or available¹ as in our case. Therefore, Gallium Scintigraphy correctly predicts the presence of extra-pulmonary tuberculosis foci, such as abdominal focus as evident in this child. The follow-up correlates well with clinical response to therapy¹¹ as seen in our follow-up scan.

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