

One year's experience of extra-pulmonary TB in a county/regional hospital in South Sudan

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ABSTRACT

Introduction: Although *Mycobacterium tuberculosis* (TB) is becoming rare in the “first” world, it continues to be a killer in South Sudan. The lungs are the most commonly infected organs but extra-pulmonary TB is not uncommon.

Objective: To determine the value and limitations of the TB diagnostic aids available at the county/regional hospital.

Methods: This paper reports on a series of patients with TB attending a county/regional hospital in one year between 1 September 2020 and 31 August 2021 and alerts clinicians to the more unusual presentations. We also discuss the application of diagnostic techniques that are available in South Sudan or will be available in the near future.

Results: In this 12-month period, 162 patients were diagnosed with TB and 40 with EP TB.

Conclusion: Good clinical evaluation plus ultrasound and widely available laboratory studies can lead to the diagnosis of TB, resulting in a good clinical outcome rather than an ill, consumptive patient who continues to spread the disease prior to an untimely death.

Key words: Extra-pulmonary TB, case histories, South Sudan, ultrasound

INTRODUCTION

Mycobacterium tuberculosis (TB) competes with malaria for being the greatest killer of all time. Much of the first world has TB under control, but that is not true in South Sudan. The first world has the best diagnostic techniques, but where they are most needed, these are lacking. Most TB is in the lungs, but it is certainly not rare in other areas of the body (extrapulmonary) (EP TB).

METHOD

We describe cases of EP TB seen over a year at St Mary Immaculate (SMI) Hospital. SMI Hospital, Mapuordit, Yirol West County, Lakes State, South Sudan is operated by The Comboni Missionary Brothers under the auspices of the Diocese of Rumbek. Although designated as a county hospital, it receives patients from the entire Lakes State and the surrounding regions. Arkangelo Ali Association (AAA) is an NGO dedicated to the treatment of patients with TB and/or HIV in numerous sites throughout South Sudan. SMI and AAA have been working together for over a decade seeking to eradicate TB.

In SMI Hospital we use X-ray, common laboratory tests such as ESR (erythrocyte sedimentation rate), ultrasound and Gen-X PCR to aid in diagnosing pulmonary and EP TB. Below we report our experience between 1 September 2020 and 31 August 2021 to show the value and limitations of these diagnostic aids.

RESULTS

In this 12-month period, 162 patients were diagnosed with *Mycobacterium*

Table 1. Prevalence of HIV in TB by presentation

| Breakdown of TB | Total | HIV (+) | HIV (-) |
|------------------------|------------|-----------|-----------|
| | n | n | n |
| Pulmonary TB (smear +) | 32 | 19 | 13 |
| Pulmonary TB (smear -) | 76 | 28 | 48 |
| Children | 14 | 9 | 5 |
| Extra-Pulmonary TB | 40 | 13 | 27 |
| Total | 162 | 69 | 93 |

tuberculosis (TB) and 40 with EP TB – Table 1.

In this report, we discuss several sites of EP TB and describe patients who demonstrated important features.

TB of the hip (3 cases seen)

AA was a 13-year-old female who presented with left hip pain for 9 months. She used a pole to walk and required the help of a family member. She had marked swelling in her left buttock and substantial pain on rotation of the left hip. The right hip was normal. Her ESR was 93. X-ray showed loss joint space in the acetabulum and markedly atrophied femoral head. After two months of RHZE (Rifampicin, Isoniazid, Pyrazinamide, and Ethambutol), she had gained 5 kg, walked without a limp, though she continued to complain of pain with prolonged walking.

Comment: Isolation of a patient with TB of the hip is impractical unless there is a joint effusion. Typically, TB of the hip is unilateral, and painful with a reduced range of motion. Permanent arthritis of the hip is likely, but some function is often restored. The longer the delay in diagnosis, the poorer the prognosis. Elevated ESR, unilateral disease, and destruction of the hip joint on x-ray assist in making the diagnosis.

TB of the spine (5 cases seen)

KM was a 30-year-old male who presented as an emergency with wound dehiscence. On his right flank, a surgical incision had opened up, though the drainage from the wound was small. He also had a gibbus at L4 and was unable to walk without assistance. On further questioning, he reported hospitalization in Khartoum 5 months earlier where he had an extensive workup including an MRI and plain films of the lumbar region showing erosion of the vertebral bodies in L2-L4 and a paraspinal infection. He had surgical drainage of the paravertebral pus. He had been started on RHZE in Khartoum but left against medical advice. In SMI hospital he was restarted on RHZE and was able to walk alone with the aid of a walker after three weeks of therapy.

Comment: TB of the spine is a frustrating diagnosis. The patient with back pain and a gibbus may show no

neurological deficit, but obtaining a definitive diagnosis is rare; CT scan or MRI of the spine are virtually diagnostic, but not widely available in South Sudan. A gibbus is a reduction of the normal protrusion of the spinous process secondary to collapse of adjacent vertebral bodies. If untreated, the collapsed vertebrae worsen to become wedge-shaped and result in sharp-angled kyphosis, and the patient may become paraplegic with a neurogenic bladder, and bowel incontinence. An elevated ESR is helpful, but a normal ESR does not rule-out TB of the spine.

Peritoneal TB (4 cases seen)

BM was a 40-year-old female who presented with prostration, abdominal distension, and spiking fever, typically nocturnal. Her weight was 42 kg and standing was difficult. On examination, she had wasting, especially of the extremities, and abdominal distension. Her chest was clear and there was no significant adenopathy. Ultrasonography showed a multi-cystic mass with minimal ascites. 20ml of straw-coloured fluid were aspirated from the cysts. The aspirated fluid failed to demonstrate TB by PCR, but after 2 months' trial of RHZE, her weight increased to 49 kg and her strength was markedly increased. Her abdominal distension had reduced.

AM was a 38-year-old HIV-positive male with ascites that failed to respond to diuretics. Paracentesis yielded purulent and blood-stained fluid. A PCR was positive for TB. Several paracenteses were performed, each yielding 4-6 l of fluid of the same character as the initial aspiration. The patient also had evidence of Kaposi sarcoma of the soft palate and died after three weeks in hospital.

Comment: The presentation of TB in the peritoneum has many forms. We have isolated TB aspirated from a similar appearing multi-cystic mass using the Gen-X PCR machine, and this patient's response suggests she also had TB. TB peritonitis is common, but difficult to diagnose. If the fluid is obviously an exudate (thick, high protein, cloudy or purulent) it is worthwhile to try to isolate TB, particularly with the Gen-X technology. Ascites can be from a multitude of causes, but if the patient with ascites does not have cardiac failure and his screen for Hepatitis B and C are negative, TB should be considered, as either primary TB peritonitis or TB pericarditis may cause ascites. Some have suggested a limited laparotomy with examination of the internal surface of the visceral peritoneum for micronodules.^[1]

TB of the spleen (4 cases seen)

AM was a 50-year-old female with fever, splenomegaly (4 cm below the L costal margin), and anaemia (Hb 3.7 mg/dl). Ultrasound showed multiple cysts in the spleen. Aspiration of one of the cysts yielded blood-tinged fluid, but unfortunately the Gen X PCR was not carried out.

She was tried on RHZE and responded well with weight gain, reduction in the splenomegaly and in the cysts on ultrasound. Two months later she was asymptomatic.

Comment: Multiple ultrasound images suggestive of TB have been reported.^[2] We have treated two children for TB on the basis of multiple micro-abscesses in the spleen, called “starry night pattern” (multiple micro-abscesses showing up white on a dark background) in the literature. The pattern of hypoechoic microcysts in the spleen is not unique to TB, but TB is one of the most common causes.^[2]

TB of the liver (5 cases seen)

RAA was a female who presented with a chronic cough and a large, hard liver reaching 13 cm below the xyphoid process. She also had spiking fever for three months, crackles and signs of consolidation on her chest exam. She had an elevated ESR. Her sputum was positive for *Mycobacterium tuberculosis*. She was negative for Hepatitis B (s ag) and C. Ultrasound showed diffuse infiltration of the liver that was initially diagnosed as liver cancer. The patient was placed on analgesics for the hepatic pain, and RHZE for pulmonary TB. Over the next ten days the liver shrank and became softer. She has continued to improve since discharge. Two months later, she was asymptomatic and had resolution of her hepatomegaly.

Comment: Multiple different ultrasound patterns have been reported.^[3] This picture of diffuse infiltration is probably not unique to TB, but TB should be considered in the patient with hepatomegaly that is firm (hard) to palpation. The prognosis of liver cancer is dismal, particularly in South Sudan. Fever and an elevated ESR are helpful in suggesting TB. Liver cancer is less likely in the absence of Hepatitis B and C. We would suggest a trial of RHZE for those patients with suspected liver cancer, but without a discreet mass in the liver on ultrasound, particularly if the patient is negative for Hepatitis B and C. We have treated two. One did well, suggesting the liver disease was TB. The other died, suggesting the liver disease was hepatocellular carcinoma, though we have no confirmation of that disease.

TB adenitis (8 cases seen)

IMM was a 28-year-old female who presented with high fever for two days and splenomegaly (3 cm below the LCM). On further examination, she had large, bilateral inguinal fluctuant lymph nodes extending above the inguinal ligament. The nodes on the right had been incised two months earlier and the incision had partially dehisced and had not closed completely. After treatment for malaria, she returned for aspiration of the nodes. Gen-X PCR for *Mycobacterium tuberculosis* was positive. The patient responded to RHZE with almost complete resolution of the lymphadenopathy.

Comment: TB adenitis typically shows large, confluent rubbery nodes. It is the second most frequent presentation but is more common in the cervical area. Staphylococcal adenitis is typically limited to one area and usually shows induration of the overlying skin. Incision of TB adenitis often results in poorly healing wounds, so patients with chronic adenopathy and fluctuance, particularly if present in more than one area, should be aspirated and examined for TB rather than going directly to incision and drainage.

TB pericarditis (11 cases seen)

KJT was a 12-year-old female presenting with substernal pleuritic chest pain Her weight was 21 kg. She had no cardiac murmur, but the cardiac apex beat (PMI—point of maximal impulse) was 5 cm lateral to the mid-clavicular line. Her ASO (anti-streptolysin antibodies) was <200, making Rheumatic carditis unlikely. Her liver was 8 cm below the right costal margin. Ultrasound showed a pericardial effusion and normal mitral valve. The left atrium (LA) measured 6.2 x 5.7 cm. The dilation of the LA is because of restricted filling of the L ventricle secondary to the pericardial effusion. After two months of treatment with RHZE (to treat the TB pericarditis), enalapril, and frusemide (to unload the heart) she had no chest pain or shortness of breath. Her weight was 24 kg. Her PMI was at the mid-clavicular line (normal). Her liver was 3 cm below the right costal margin. On ultrasound, there was minimal fluid within the pericardium, and the left atrium measured 5.8 x 4.5 cm, a 26% reduction in volume, but still minimally dilated.

Comment: TB is the most common cause of pericarditis worldwide, particularly in Africa.^[4] Typically, it presents with substantial liver congestion, though unexplained ascites may also be a sign. Often there is chest pain that worsens with lying down. Steroids help the pain, though they have not been shown to improve survival. Occasionally, there are calcium deposits in the pericardium secondary to long-standing pericarditis that can result in constrictive of the pericardium and cardiac dysfunction.

DISCUSSION

Pulmonary and EP TB are examples of the medical challenges in South Sudan. Sophisticated diagnostic techniques for TB are available in much of the first world, where TB is becoming increasingly less common. Where TB is common, the diagnostic technology is lacking. This report describes diagnostic techniques that are usually available in a regional hospital in South Sudan, though the most important diagnostic tools are available to all—a good history and physical exam. TB tends to be indolent in presentation—slow onset, with sub-acute or chronic symptoms rather than abrupt. This helps differentiate from *Pneumococcus*, the most common “bacterial” pneumonia. (Note: *Mycobacterium* TB is a bacterium,

but acts differently). Pneumococcus tends to be abrupt, with high fevers, prostration, often with more abdominal symptoms. Pneumococcus is almost always localized (in one area of the lungs), whereas TB can be localized or have findings in multiple areas of the lungs. We have had several patients with both acute and chronic symptoms and suspect that the Pneumococcus was a superinfection of the underlying TB. This paper is not designed to be a complete review of TB, but we strongly recommend that in patients with chronic symptoms, no matter where the problem, TB needs to be suspected. The foundation of any investigation begins with a good history and physical examination.

TB is more common in the lungs, but it is often encountered in other areas of the body. In our experience, approximately 25% of the patients had EP TB. A high index of suspicion is necessary to diagnose and treat these patients.

The association of TB and HIV is well known. In total, 43% of our TB patients had simultaneous infection with HIV; 33% of the EP TB patients had HIV; 64% of the children with TB were HIV positive. As the incidence of HIV increases, it is expected that the incidence of TB, in the lungs and elsewhere, will increase.

We suspect that the high incidence of EP TB may be related to the consumption of contaminated milk. The Dinkas (the primary indigenous population of the Lakes State) are pastoralists and commonly consume unpasteurized milk. There has been no consistent programme to eradicate TB in the bovine population of South Sudan. We think a dedicated effort to screen cows for TB and slaughter those that are positive, with some compensation to the owners, would be a worthwhile endeavour.

Gen-X PCR technology is increasingly available in South Sudan. It has substantially increased the number of "smear positive patients," as well as aiding in the diagnosis of patients with EP TB. It is the same technology used to test for HIV patients and Covid-19.

CONCLUSION

Pulmonary and EP TB remain common diagnoses in this regional/county hospital in South Sudan; we strongly suspect that is true in the entire country. We encourage those clinicians dedicating themselves to improving the health of the people of South Sudan to keep a high index of suspicion for patients presenting with unusual features, particularly if the patient has chronic symptoms or HIV. Good clinical evaluation plus ultrasound and widely available laboratory studies can lead to the diagnosis of TB, resulting in a good clinical outcome rather than an ill, consumptive patient who continues to spread the disease prior to an untimely death.

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