

# Superadded Staphylococcus Aureus Spondylodiscitis on Mycobacterium Tuberculosis Spondylodiscitis Post CT Guided Biopsy: An Iatrogenic Complication?

Suresh S Pillai, Premdeep Dennison\*, Rishin TV, Arjun K, and Amalraj P Nair

Department of Spine Surgery, Baby Memorial Hospital, India

Received Date: October 07, 2022; Accepted Date: November 02, 2022; Published Date: November 13, 2022

**\*Corresponding author:** Premdeep Dennison, Department of Spine Surgery, Baby Memorial Hospital, Calicut, Kerala, India, E-mail: dr.premdeep.dennison@gmail.com

**Citation:** Suresh S Pillai, Premdeep Dennison, Rishin TV, Arjun K, and Amalraj P Nair. Superadded Staphylococcus Aureus Spondylodiscitis on Mycobacterium Tuberculosis Spondylodiscitis Post CT Guided Biopsy: An Iatrogenic Complication? *Clinical Surg.* 2022;1(1):1006.

**Copyright © 2022 Premdeep Dennison.** This is an open access article published under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

## Abstract

**Introduction:** Co-existing tuberculous spondylodiscitis and pyogenic spondylodiscitis at the same site have been reported in literature. But a sequential involvement with a possible iatrogenic component has not been described to the best of our knowledge. Here we present a case of Spinal TB diagnosed with CT guided biopsy, one month later presenting as pyogenic discitis and paraparesis, secondary to superadded Staphylococcus aureus.

**Case Report:** A 55 years old female with diabetes mellitus and Hypertension was investigated elsewhere for sudden onset of upper back ache. Her MRI revealed spondylodiscitis of D6-D7. CT guided biopsy was done which showed only Tubercular granuloma and Antitubercular therapy was started

elsewhere. One month after the biopsy, she presented with progressive weakness and high-grade fever. Repeat MRI revealed increase in abscess size and cord compression. An epidural abscess drainage and posterior stabilization was done. Culture revealed Staphylococcus aureus. Appropriate culture sensitive antibiotics were started along with antitubercular medications. Patient gradually recovered neurologically. She is able to walk independently at one and six months post-surgery.

**Discussion:** Spondylodiscitis could be bacterial, granulomatous or parasitic. Each has distinctive features and patterns which will lead us to a provisional diagnosis even without tissue confirmation. MRI is the investigation of choice. A definite tissue diagnosis is needed before starting patient on medical treatment. CT guided biopsy could give the necessary tissue diagnosis in the absence of neurological involvement. But can it become a source for another infection? With no other focus of infection found, we have to speculate that the invasive procedure was the source by local inoculation.

**Conclusion:** Even after diagnosis of TB or pyogenic infection is made, the possibility of a second co-existing infection should always be entertained. Complete investigations - bacterial, fungal and tubercular cultures, MTB PCR test and biopsy - should be done in all cases of suspected infection. All invasive procedures like CT guided biopsy, should be done under strict aseptic precautions.

**Keywords:** Koch's spine; Staph aureus; CT guided biopsy; Superadded infection

## Introduction

Spondylodiscitis is an infection involving the vertebral body as well as the intervertebral disc. Bacteriologically, Mycobacterium Tuberculosis is the most common causative organism [1]. Second commonest being Staphylococcus aureus [2]. Direct penetration of the disc or vertebra (external inoculation) is one of the main contamination routes of any infection [3]. We discuss a case of Tubercular spondylodiscitis; diagnosed by CT guided biopsy and the patient was on AntiTubercular Therapy. She presented after one month of therapy with pyogenic infection and paraparesis. Initial CT guided biopsy and cultures being negative for pyogenic infection, it could be iatrogenic.

## Case Report

A 53 years old female, with known case of hypertension and Diabetes Mellitus on medications presented in another hospital with history of sudden onset of severe back pain in the thoracic region, radiating anteriorly towards upper abdomen for last two months. Pain aggravated at night. She had no fever. Further evaluation was done with X-ray, MRI and blood investigations. MRI showed peripherally enhancing small collection (18.2 mm × 11.1mm) anterior to D6 to D7 intervertebral disc, which was extending into the disc. Mild epidural contrast enhancement causing very minimal cord compression and contrast enhancement within spinal cord was also noted. A CT guided biopsy was done and Histopathology report showed granuloma formation, suggestive of Tuberculosis (Figure 1). She was started on AntiTubercular Therapy with daily dose of Isoniazid 300 mg, Rifampicin 450 mg, Pyrazinamide 1500 mg and Ethambutol 800 mg, from the previous centre.



**Figure 1:** Pre op Xray, at presentation 1 month after CT guided biopsy.

After one month she presented in our department with fever and paraparesis. She was in a trolley, unable to move due to severe pain. Repeat MRI of dorsal spine revealed increase in size of the abscess (Figure 2). There was epidural abscess present which was compressing the cord. She underwent surgical decompression preserving posterior ligament complex, drainage of abscess and pedicle screw fixation. The posterior tension band was kept intact. Biopsy, MTB PCR and Cultures were done. Cultures showed growth of Staphylococcus aureus and biopsy was consistent with osteomyelitis. MTB PCR was negative, as she has been on AntiTubercular Therapy for more than a month. She was investigated for presence of any other sites of possible infection and hematogenous spread. Her blood and urine cultures revealed no growth of organisms. Chest X-ray was normal. Inj. Cloxacillin and Inj. Linezolid were added to the AntiTubercular medications, according to culture and sensitivity reports. Post operatively she completely recovered neurologically (Figure 3). IV Antibiotic therapy was continued for 3 weeks followed by 3 weeks of oral antibiotic therapy. AntiTubercular Therapy was continued.



**Figure 2(a)**



**Figure 2(b)**



Figure 2(c)

**Figure 2:** Pre op MRI, at presentation 1 month after CT guided biopsy. (a) T1weighted images (b) T2weighted images (c) Axial images.

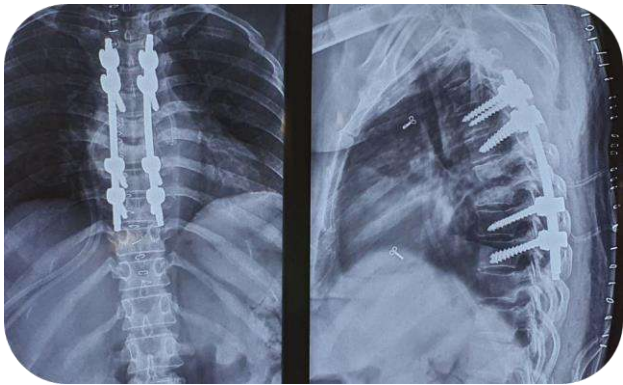


Figure 3(a)

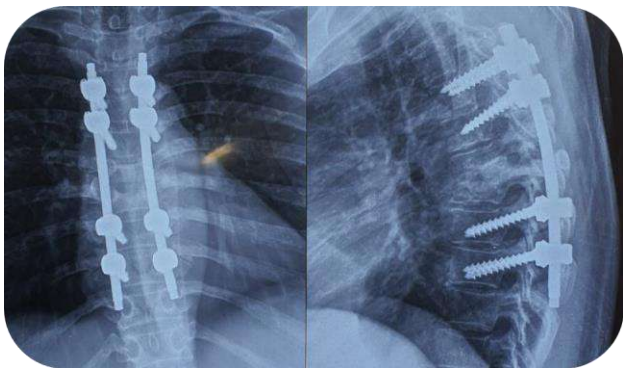


Figure 3(b)

**Figure 3:** Post op X-rays (a) Immediate post op (b) 8 months post op.

## Discussion

Spondylodiscitis can be classified as granulomatous (tuberculosis, brucellosis, or fungal infection), pyogenic, or parasitic. Worldwide the most common cause of spondylodiscitis is Mycobacterium Tuberculosis. Tuberculosis affects mostly the dorsal spine and involves two or more vertebral segments, though other parts can be involved.

Staphylococcus aureus is the most commonly isolated pathogen in pyogenic spondylodiscitis (15% to 84% of non-tuberculous cases), followed by enterobacteria - mainly Escherichia coli, Proteus, Klebsiella, and Enterobacter spp. [4] Lumbar spine is the most commonly affected part in Pyogenic spondylodiscitis; rarely the thoracic and the cervical column. The main contamination routes are

1. Direct penetration of the disc or vertebra
2. Spread from adjacent infected tissue;
3. Hematogenous spread of organisms; or
4. A combination of these [2-5].

MRI is the most sensitive (93% to 96%) and specific (92.5% to 97%) modality for early detection of spondylodiscitis. Spondylodiscitis causes oedematous change within the bone marrow which can be detected with MRI before bone destruction manifests on X-rays or CT. There is a rise in the value of ESR and CRP (90% of patients) and leucocytosis (50%) [1].

In patients with stable haemodynamics and normal neurologic examination, empiric antibiotic treatment should be held until a microbiologic diagnosis is established. Here in this case, a CT guided biopsy revealed presence of granuloma and antitubercular therapy was initiated right away. Later, at one month on AntiTubercular Therapy, during surgery, pyogenic organism was isolated and appropriate antibiotic also added.

Indications for surgery are as follows;

1. Significant spinal cord or radicular compression;
2. Prevention or correction of biomechanical instability and deformity;
3. Management of severe persistent pain;
4. Drainage of abscesses; and
5. Failure to improve while on Anti Tubercular Therapy.

The principal aims of surgery are to debride infected disc tissue, which is avascular. Spinal surgeries can be done with debridement alone or with instrumentation, and ongoing infection is not a contraindication for spinal instrumentation [3].

A minimum of six weeks antibiotic therapy is needed for spondylodiscitis, with a switch from IntraVenous to Oral therapy done at two weeks or three weeks depending on the CRP value. Recommended duration of Tuberculosis treatment is a minimum of one year, with an intensive phase and a continuation phase.

Concomitant spine infection with mycobacterium Tuberculosis and Pyogenic bacteria have been reported previously, one with low virulence organisms (*Nocardia asteroides* and *Moraxella catarrhalis*) and other *Staphylococcus aureus* [6,7]. One report pointed out sequential identification, first pyogenic (MRSA) and then *Mycobacterium tuberculosis* [4]. In our case, the patient did not initially have any neurological deficit or significant compression of the spinal cord. Hence the institute where she was treated initially, refrained from doing surgery, and did a CT guided aspiration and biopsy for microbiological diagnosis. This could be the point where a second organism was introduced, as initially a diagnosis of Tuberculosis alone was made. Later, when the weakness set in, there was associated high grade fever. Evidence points to a second infection with *Staphylococcus aureus*; which could be iatrogenic.

### Conclusion

Tuberculosis and *Staphylococcus aureus* are the most common causes of Spondylodiscitis. In any case of invasive procedures like CT guided biopsy, strict aseptic precautions should be followed and might help in avoiding a second infection. And in such cases an open mind regarding the possibility of secondary iatrogenic infection should be kept by the clinician.

### References

1. Trecarichi EM, Di Meco E, Mazzotta V, Fantoni M. Tuberculous spondylodiscitis: epidemiology, clinical features, treatment, and outcome. *Eur Rev Med Pharmacol Sci.* 2012;16(Suppl 2):58-72.
2. Fantoni M, Trecarichi EM, Rossi B, Mazzotta V, Di Giacomo G, Nasto LA, et al. Epidemiological and clinical features of pyogenic spondylodiscitis. *Eur Rev Med Pharmacol Sci.* 2012;16 Suppl 2:2-7.
3. Pillai SS, Dennison P, Sreekumar U, Aikot S, Deepa KV. Acute spondylodiscitis - A rare presentation of sacrocolpopexy complicated with chronic left iliac fossa discharging sinus. *J Orthop Assoc South Indian States.* 2021;18(1):24-7.
4. Donnarumma P, Tarantino R, Palmarini V, De Giacomo T, Delfini R. Thoracic Spondylodiscitis Caused by Methicillin-resistant *Staphylococcus aureus* as a Superinfection of Pulmonary Tuberculous Granuloma in an Immunocompetent Patient: A Case Report. *Global Spine J.* 2015;5(2):144-7.
5. Turunc T, Demiroglu YZ, Uncu H, Colakoglu S, Arslan H. A comparative analysis of tuberculous, brucellar and pyogenic spontaneous spondylodiscitis patients. *J Infect.* 2007;55(2):158-63.
6. Mousa HA-L. Concomitant Spine Infection With *Mycobacterium Tuberculosis* and Pyogenic Bacteria: Case Report. *Spine.* 2003;28(8):E152-4.
7. Naama O. Concomitant Cervical Spine Infection with *Mycobacterium Tuberculosis* and Pyogenic Bacteria Causing Spinal Cord Compression. *Online Journal of Neurology and Brain Disorders.* 2019;3.



## CLINICALS IN SURGERY

editor@clinicalsinurgery.com | www.clinicalsinurgery.com