

# SURGICAL TECHNIQUE

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## Posterior Surgical Approach to Tuberculous Spondylitis

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### ABSTRACT

**Objectives:** Foraminotomy is a simple posterior surgical approach useful for treatment of radicular (nerve root) pain in TB spondylitis. It doesn't affect the stability of the facet joint, requires neither fusion nor implants. It is therefore cheap and affordable for patients with low income. We describe a simple form of posterior spinal surgery for patients with tuberculous spondylitis.

**Methods:** Out of the 45 cases of Pott's disease managed from Jan 2006-Jan 2008, three patients had foraminotomy due to failed medical treatment. An additional discectomy was performed in one patient. Foraminotomy involves the removal of lateral half of adjacent laminae and medical half of the facet joint. The ligamentum flavum and the epidural fat are cleared to free the nerve root. No implant or fusion is required.

**Results:** All the three patients improved post operatively. Physiotherapy was started on 7<sup>th</sup> day after surgery. The pain completely resolved in two patients while the third one had a remarkable improvement at discharge. They were all able to walk without support. One patient is still on regular follow up and has a power of 5/5 in both lower limbs while the remaining two were lost to follow up at 5 and 8 months post surgery. They both had power of 4/5 at the time they defaulted.

**Conclusion:** Foraminotomy with or without discectomy is a simple posterior surgical approach to T B spine with good neurological outcome. It is adapted to our environment because no fusion or implant is required.

**Key words:** Tuberculosis, Spondylitis, Posterior approach

### INTRODUCTION

Since its full description in 1977 by Percivall Pott, tuberculosis (T B) of the spine also referred to as Pott's disease or tuberculous spondylitis, has been a therapeutic challenge to the physician, orthopaedic surgeon and neurosurgeons.<sup>1, 2</sup> Despite immense advances in chemotherapy for mycobacterium tuberculosis, difficulties in surgical treatment of tuberculous spondylitis are made more complex by neurological deficit, bony deformities, unaffordability of implants for instrumentation and the technicality of the various surgical approaches used.<sup>1-3</sup>

In developing countries like ours, poverty,

malnutrition and other concomitant diseases (HIV/AIDS) further challenge the outcome. These challenges have necessitated the use of simpler alternative surgeries with good outcome. Such alternatives should be explored, as they are available, affordable and rewarding, requiring short hospital stay. We describe a simple posterior spinal approach consisting of foraminotomy and discectomy for lumbar T B spondylosis. The patients' good response to this simple surgical procedure may make it an alternative to the complex anterior or the conventional posterior fixation/fusion procedures.

### METHODS AND PATIENTS

Three patients out of 45 treated for T B spine from Jan 2006 to Jan 2008 in this centre had foraminotomy for failure of medical treatment. They all had T B spondylitis of L4/5 vertebrae. All had one level foraminotomy, and one had additional discectomy.

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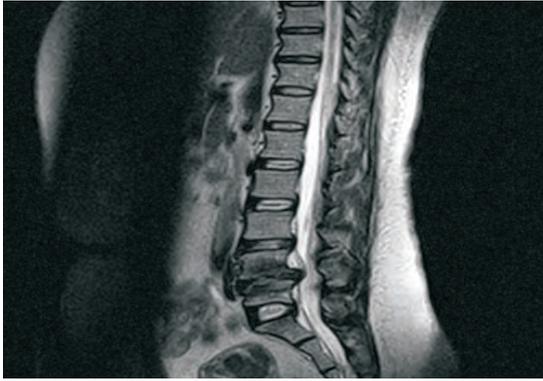


Figure 1: A 38 year old female with bilateral lower limb pain and Para paresis (power=4/5) for 4 months ; Preoperative magnetic resonance imaging (MRI) T2 weighted saggital slide showed kissing of L4/5 lumbar vertebrae, posterior disc bulge at L4/5 with theca compression and partial destruction of the bodies of L4/5 vertebrae.

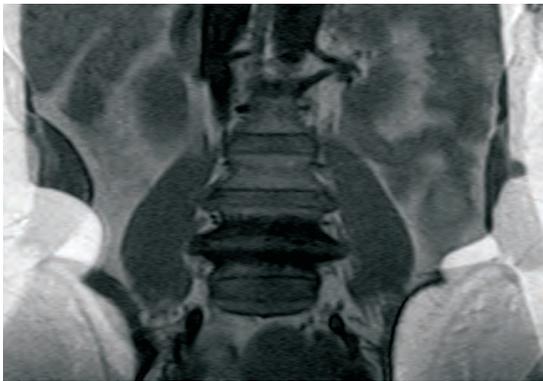


Figure 2: This T1 weighted coronal slide of a 45 yr old man showing fusion of L4/5 with destruction of L4/5 disc. Both vertebral bodies are reduced in height.

### TECHNIQUE OF FORAMINOTOMY

Foraminotomy is one of the posterior spinal surgeries for T B spondylitis. It is used for nerve root decompression. It is very useful especially in patients with compression caused by disc, bony fragments or osteophytes and hypertrophied ligaments. Minimal discectomy or removal of osteophyte can be achieved at the same time.

**Positioning:** We use the prone position with hip and chest support. This position is good for slim patient. However in obese patients and those with accentuated lumbar lordosis, the knee elbow position is better. This makes the spinous processes prominent for easy site identification. Figure 4 and 5.

**Anaesthesia:** Patient is given general anaesthesia with cuffed armoured tube in supine position and turned to the prone position as described above. Intra

venous ceftriaxone 1gram is given at induction.

**Procedure:** Cleaning and draping is done and the operation site is marked. It is then infiltrated with 10 ml of 1% xylocaine + adrenaline. This minimises bleeding. The skin incision is centred at the spinal level with extension one vertebral level above and below. This gives room for extension when needed. The dissection is kept as close to the midline as possible. This reduces bleeding from the para vertebral muscles to the barest minimum. The dissection is carried out in the subperiosteal plane to allow good bony part identification. Occasionally we use diathermy to dissect the para vertebral muscles when morbidly adherent to the bone. The dissection is carried out from the spinous process to the laminae. It is more elaborate at the intended side for foraminotomy. The lamina and the facets joint are then exposed. Rongeurs and punches are used to remove the lateral half of adjacent laminae and the medial half of the facet joint. The ligamentum flavum and the extra dural fat are removed exposing the lateral dural sac and the nerve root. The nerve root is retracted superiorly and any disc fragment or osteophyte is removed. The direction of removal should be away from the nerve and dura to avoid their damage. The wound is closed in layers after securing haemostasis without a drain. It is also our practice to inject 20 mg of bupivacaine in the surrounding muscles to control post-operative pain and muscle spasm.

Post operatively the patient is placed supine for 48 hours and given intra venous ceftriaxone 1gram 12hourly for 2 days, intramuscular( I M) piroxicam 20mg 12hourly and I M paracetamol 300mg 8hourly for 2 days. Early physiotherapy is commenced. All anti TB medications are continued until the full course of the regimen is completed.

Figures 4 to 12 sequentially describe the simple surgical steps in the posterior approach (foraminotomy) to T B spine. The index patient was a 45 yr old Civil Servant. He is obese and has had left L4/5 foraminotomy

### RESULTS

This procedure was carried out on only three out of the 45 cases of Pott's disease. They all had failed medical treatment. In one patient an additional discectomy for disc fragment causing nerve root compression was also performed. No post operative wound sepsis or worsening of neurologic deficit was recorded. They all started physiotherapy by the 7<sup>th</sup> day and had sutures removed by the 14<sup>th</sup> post operative day.



Figure 4: Patient is positioned in knee-elbow position after GA with armoured endotracheal tube. The chest and the pelvis are supported to free the abdomen.

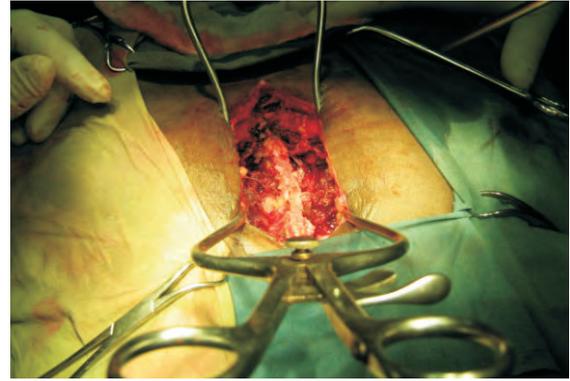


Figure 7: Blunt dissection of the para vertebral muscles is carried from the spinous processes with periosteal elevator. This allows bloodless field as well as identification of the laminae and the facet joint from which the foraminotomy starts.

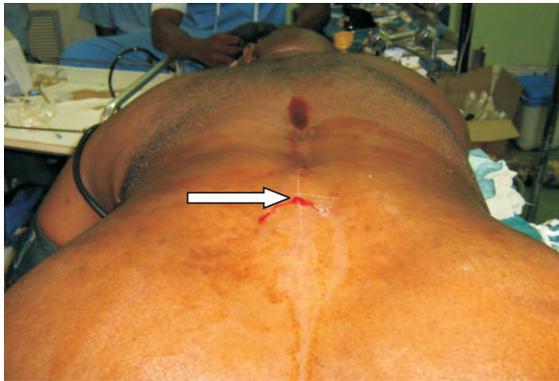


Figure 5: The surgical site is cleaned with povidone iodine. The site of surgery is marked with arrow.

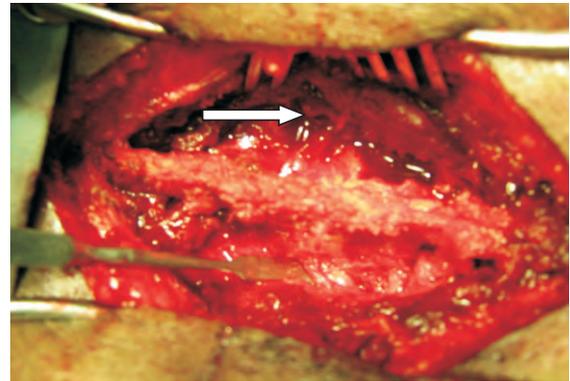


Figure 8: After foraminotomy the widened foramina is indicated with the arrow.

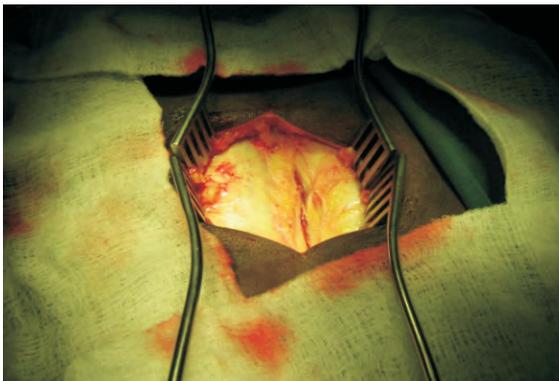


Figure 6: Skin incision is made after local infiltration with 1% xylocaine + adrenaline. This exposes the lumbar fascia which is incised in the midline to prevent bleeding from the Para vertebral muscles.

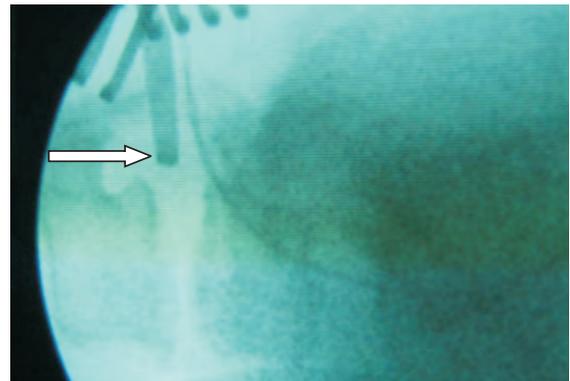


Figure 9: Where discectomy is required, C-arm localization of the disc space is carried out with metals. Here Mc Donald dissector is used to localise L4/5 disc. The discectomy is carried out with curette (scoop).

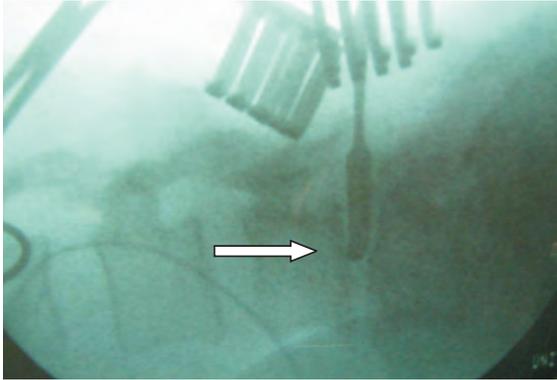


Figure 10: The dept of the discectomy is assessed with C-arm using the same localizer.

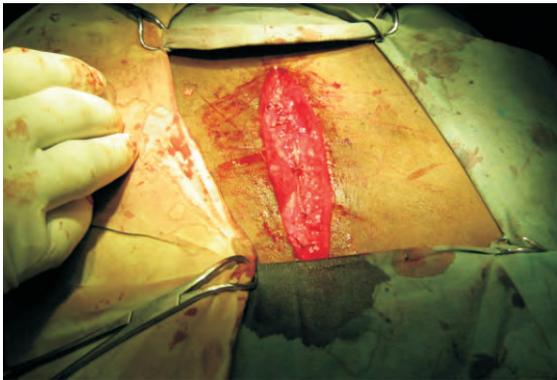


Figure 11: Wound is closed in layers after securing haemostasis.

The post operative period of stay varied from 27 to 49 days. Two patients had their pain completely resolved while one still had residual pain, which improved at the time of discharge. All the patients walked without support. . One patient is still being followed, he has no neurologic deficit. Two patients were lost to follow up at 5 and 8 months post surgery. At the time they defaulted there was no worsening of neurologic symptoms.

## DISCUSSION

Pott's disease is the most common granulomatous bacterial infection of the spine and the most common bone T B with 50-60% of cases.<sup>1,2,4</sup> It is usually secondary to pulmonary or other forms of T B. The course of the disease may be influenced by H I V infection, diabetes mellitus, multiple myeloma, old age, malnutrition, and cancer treatments.<sup>4</sup>



Figure 12: Skin is closed with interrupted nylon 0 suture.

Patients usually ignore or rather underestimate the early symptoms. They usually present to the neurosurgeon or orthopaedic surgeon with neurological deficits and or spinal deformities. While physicians are involved in treatment of early diseases, the surgeons are rather confronted with the challenging task of correction of deformity and improving neurological deficits.<sup>1,3</sup>

Important symptoms for surgical consultations include paraplegia, Para paresis, complete spinal cord involvement, gibbus, myelopathy and radiculopathy. Neurological deficits can be early, usually as a result of abscesses, granulation tissues, caseation, and venous thrombosis in the active phase of the disease. Late onset deficits result from fibrosis after cure or surgical treatment. There may be other forms of T B, such as pulmonary T B in the same patient.

Pott's disease is becoming easy to diagnose with almost near perfection. Conventional X-rays are helpful. Computed tomography scan and magnetic resonance imaging (M R I) give higher resolution with good tissue differentiations. They can diagnose abscesses, caseation, disc herniation, cord pathology, and nerve root compression.<sup>4</sup> Other important supportive lab tests include: erythrocyte sedimentation rate (ESR), C reactive protein, haemogram and Mantoux test.

Treatment of Pott's disease is primarily medical, consisting of combination chemotherapy. The drugs are started as soon as the diagnosis is made and while preparing for surgery. After surgery, it varies from a short course of 6-9 months to a longer period of 12-18 months.<sup>1</sup> Various combinations with isoniazid (INH), pyrazinamide (PZ), rifampicin (RP) and ethambutol (ETB) give good results. However tri

therapy with I N H, PZ and RP has best outcome when compliance and tolerability are assured. Success of therapy is monitored with serial X-rays, E S R, Mantoux test, sputum smear conversion (in those with pulmonary T B) and M R I. These allow early detection and treatment of Complications such as abscesses, spinal instability, neuropathy and deformity.

Surgery is reserved for cases of failed medical treatment; or for spinal cord or nerve root compression or spinal deformities. Surgical treatment conventionally uses anterior, posterior or combined anterior and posterior approaches. Each is composed of series of delicate and highly skilled surgeries. The combined surgery gives a better result.<sup>5, 6</sup> A patient may undergo this in one or two stages with the 2<sup>nd</sup> stage usually two weeks after the 1<sup>st</sup> surgery. However in some cases only one approach may be all that is required. Surgery goes along with anti tuberculous combination chemotherapy which may vary in drug combinations as well as duration of treatment.

Anterior interventions are more radical and elaborate and require great skills; they are associated with higher morbidity and mortality especially in the thoracic and cervical regions where structures in the mediastinum and root of the neck can be injured and have to be preserved and cared for.<sup>2, 8</sup> There is need to create soft tissue patch to prevent injury to the lungs as well as pleural cover for normal lung functions. The need for drain is another issue when one considers complications associated with drain (infection, irritation) as well as its care. The anterior route also has limited exposure while the graft used can fracture, get absorbed or slip. Generally the anterior spinal surgeries are aimed at debriding necrotic tissue or bone, debris or cheesy materials. Anterior decompressions include corpectomy, anterior interbody fusion with vascularised rib or autogenous bone grafting and supplemented with posterior instrumentation.<sup>7-9</sup> However new techniques of anterior fixing have gained ground with good results. . Anterior intervention may be indicated in patient with neurological deficit or during the acute phase of the disease, where conservative treatment have failed, fast onset of symptom, recurrent paraplegia, painful paraplegia with or without spasticity and instability of the spine.<sup>1,7</sup> They may not benefit patient with posterior arch involvement, and spinal tumour syndrome.

The stability is achieved by synthetic graft, expandable cage, titanium spacers filled with ceramic bone, synthetic plate with locking. These make them so tasking and difficult to afford in our environment.

On the other hand posterior surgeries to spine are relatively easy and straightforward.<sup>2</sup> They allow good exposure to site; retraction of the strong of muscle of the back may be very difficult. These are usually carried out after the anterior approaches as from 2 weeks depending on patient fitness. They are of 3 subgroups; posterior osteotomy, fusion and instrumentations (stabilization). Harrington's rods, rush nail, Steinmann pins and wires and Texas Scottish ride hospital instruments are commonly used to maintain stability of the spine. The osteotomies are still the simplest of which we described the foraminotomy above. Others are laminectomy, laminotomy and laminoplasty. In our cases minimal posterior surgeries were adopted. They included foraminotomies and discectomy. They are simple, less elaborate and easy to perform and no stabilization is required. They also eliminate cost for the poor patient and above all they improve patient clinical state. They should be adapted where availability and affordability of implants is a problem.

## CONCLUSION

Foraminotomy with or without discectomy is a simple posterior surgical approach for treatment of T B spine. It is easy to perform and gives a quick resolution of pain without causing instability of the spine..

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