

Original Research Article

Institutional experience of tuberculosis of craniovertebral junction

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ABSTRACT

Background: Craniovertebral junction tuberculosis (CVJ-TB) is a rare entity occurring in only 0.3 to 1% of tuberculous spondylitis. It causes severe instability and neurological deficits. Present study includes 16 cases of CVJ tuberculosis with neck pain and progressive quadriparesis. Radiological evaluation showed wide spread disease around clivus, C1, C2, C3 with extensive bony destruction, cord compression, basilar invagination and atlantoaxial dislocation.

Methods: The study included all the cases admitted with cv junction tuberculosis in neurosurgery ward in King George hospital, Visakhapatnam during a period of three years from 2014 to 2016. Four cases were managed conservatively and four cases were treated by only posterior occipitocervical fusion. We performed two stage operation in single sitting i.e. transoral decompression and posterior occipitocervical fusion in 12 cases. The pathological findings confirmed tuberculosis.

Results: Postoperatively all the patients had decreased neck pain and two third of the patients (10 of 16 patients) had improvement in motor power.

Conclusions: In the available literature, the treatment options offered for cvj-tb have ranged from a purely conservative approach to radical surgery without well-defined guidelines. In this study, we followed a radical approach as the patients included in our study presented with extensive TB cv junction. So, we recommend radical surgery for extensive TB of cv junction.

Keywords: Atlanto axial dislocation, Basilar invagination, Craniovertebral junction

INTRODUCTION

Craniovertebral junction tuberculosis accounts for only 0.3 to 1% of tuberculous of spine. Clinical manifestations of CVJ-TB may range from mild or nonspecific symptoms to severe craniovertebral junction instability and neurological compression and complications. The diagnosis and treatment of CVJ-TB are challenging. The treatment options for CVJ-TB are controversial because there are no well-defined guidelines, and it requires different treatment modalities depending on clinical symptoms and radiological findings which may include -

Only anti-tuberculous medication with external immobilisation or a relatively simple surgery like only posterior occipitocervical fusion along with anti-tuberculous medication or a two staged procedure like transoral debridement of granulation tissue with decompression and posterior occipitocervical fusion which can be done in single sitting or two sittings.^{1-4,6-13,15-18,20}

Radiologically craniovertebral junction tuberculosis has been graded by Lifeso et al.¹⁵

Stage 1- Minimal bony and ligamentous destruction without AAD.

Stage 2- Minimal bony and ligamentous destruction with AAD.

Stage 3- Extensive bony and ligamentous destruction with AAD.

Aim of the present study was to assess the outcome in patients operated by transoral decompression with posterior stabilisation in single sitting for CVJ tuberculosis, the morbidity and mortality, the radiological stability in surgically treated patients, the course of disease in patients treated conservatively.

METHODS

Present study consists of 16 cases of CVJ tuberculosis which attended neurosurgery OPD with various clinical manifestations ranging from mild neck pain without any neurological deficits to progressive neurological deficits and radiological changes like basilar invagination, atlantoaxial dislocation, cord compression at cervicomedullary junction, extensive bony destruction who were managed both conservatively and surgically. Diagnosis, treatment, results and follow up are discussed.

Both retrospective and prospective study carried out in Department of Neurosurgery, King George Hospital, Visakhapatnam, Andhra Pradesh, India. Case files of patients who were registered, diagnosed and treated (conservatively /operated) for CVJ tuberculosis from 2013-2016 were retrieved.

The clinical symptoms, neurological status and radiological data in both conservative and surgical group are noted from old records. They were compared with postoperative period and in follow up period.

The preoperative and postoperative imaging studies were also compared. The work up patients included routine investigations like complete blood picture, ESR, mantoux, chest X-ray and sputum for acid fast bacilli. Imaging work up included X ray, CT and MRI of cv-junction.

X-ray, C spine with CV junction showed basilar invagination, erosion of C1 anterior arch and dens, increased atlantodental interval with prevertebral soft tissue shadow.

CT-CVJ showed features like Basilar invagination, erosion of tip of clivus, anterior arch of C1, erosion of base of dens getting detached from C2 causing compression over cervicomedullary junction, increase in atlanto dental interval, Severe narrowing of CVJ spinal canal, eroded bilateral C1 C2 facet joints, even destruction of C2 pars.

MRI of patients showed minimal prevertebral collection without any spinal cord compression to extensive extradural lesion around the clivus and C1, C2 causing

spinal cord compression at cervicomedullary junction with prevertebral soft tissue shadow.

Elevated ESR and total count- 10 cases.

MANTOUX +VE- 5 case.

Chest X ray +ve for PTB - 4 cases.

RESULTS

Out of the 16 patients who were included in the present study most of the patients belonged to 20-40 years who were manual labourers by occupation. Most of the patients belong to second and third decades (Figure 1).

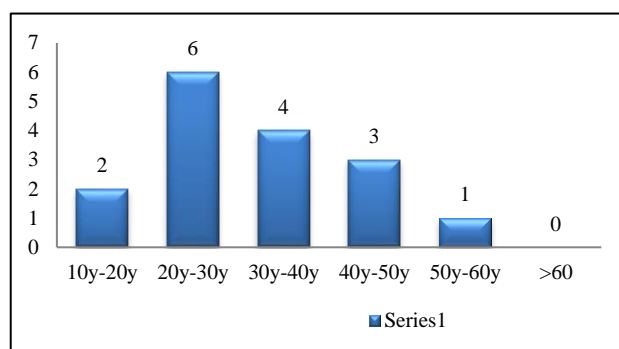


Figure 1: Age distribution.

Most of the patients belonged to Poor educational status from Lower socioeconomic status from tribal and remote areas of Andhra Pradesh, Odisha and Chattisgarh, India. Few of the patients have difficult access for medical care and follow up.

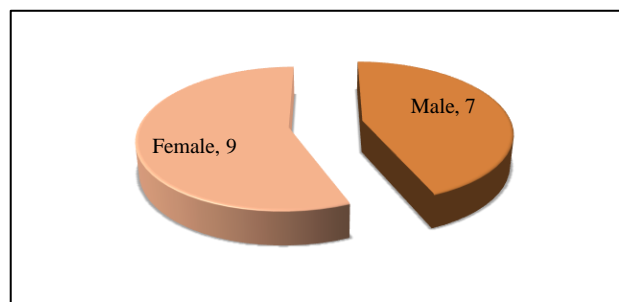


Figure 2: Sex ratio.

Table 1: Clinical presentation.

| Symptoms | No. of patients | % |
|---------------------------|-----------------|------|
| Neck pain | 12 | 75 |
| Quadriparesis | 12 | 75 |
| Restricted neck movements | 8 | 50 |
| Parasthesias- | 6 | 37.5 |
| Drop attacks | 2 | 12.5 |
| cranial nerve palsies | 1 | 6.25 |
| Cerebellar signs | 0 | - |

Radiological findings depicted case 1 (Figure 3), case 2 (Figure 4), Case 3 (Figure 5).

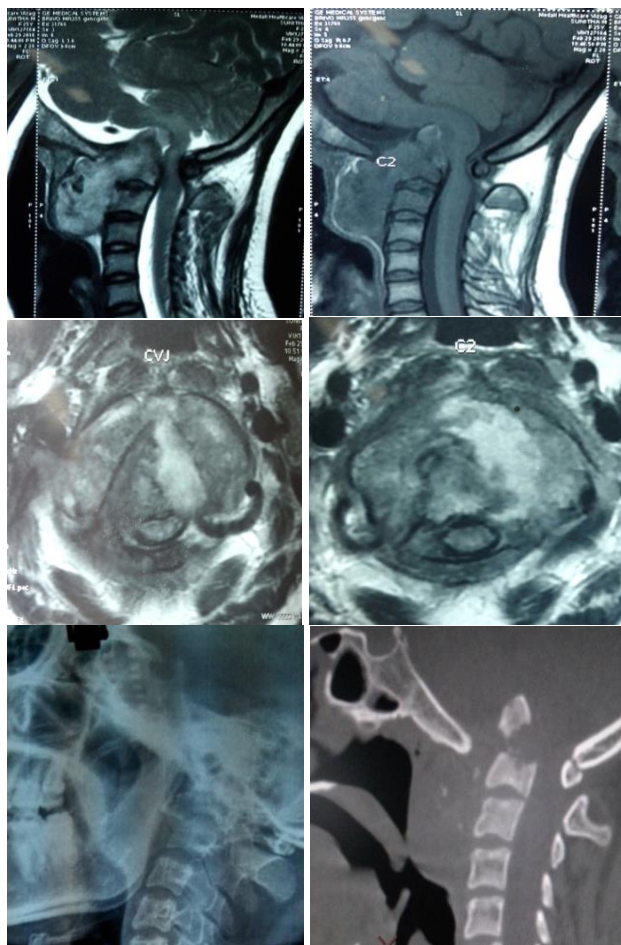


Figure 3: Case 1- MRI sag and axial with X-ray and CT of cv junction.

Number of patients according to NURICK'S grading is presented in Table 2. Number of patients according to LIFESO'S grading is presented in Table 3.

Of all the 16 patients 4 patients were managed conservatively, 4 patients were treated by posterior occipito cervical fusion and 8 patients were treated by both transoral decompression and occipito cervical fusion in single sitting.

Table 2: NURICK's grading.

| Grade | Number of patients | Percent |
|-------|--------------------|---------|
| 0 | 1 | 6.25 |
| 1 | 1 | 6.25 |
| 2 | 2 | 12.50 |
| 3 | 8 | 50 |
| 4 | 3 | 18.75 |
| 5 | 1 | 6.25 |

Total duration of symptoms ranged from 3 months to 1 year. Patients age group ranged from 19 to 60 years. Out

of the 16 patients which were included in the study 9 were females (56.25%) and males were 7 (43.75%) (Figure 2). Clinical manifestations are presented in Table 1.

Table 3: LIFESO's grading.

| LIFESO grading | Number of patients |
|----------------|--------------------|
| Grade 1 | 4 |
| Grade 2 | 4 |
| Grade 3 | 8 |



Figure 4: Case 2- MRI sag and CT of cv junction.

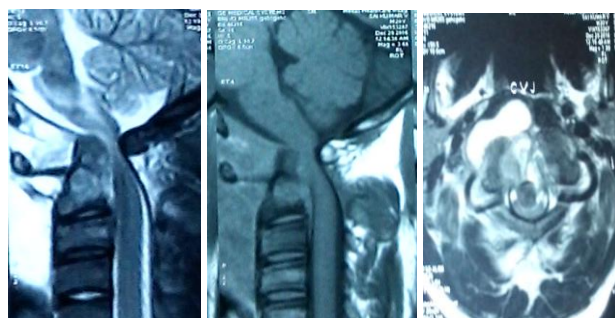


Figure 5: Case 3- MRI sag and axial of cv junction.

Goals of surgery

- Relief of neural compression.
- Maintenance of spinal stability.
- Obtaining tissue for biopsy, targeted drug therapy.
- Thorough debridement.

Anti-tuberculous treatment with external immobilisation.

Surgery

- Single staged posterior occipitocervical fusion.
- Two staged procedure in single sitting i.e.
 - a. Transoral decompression with excision of C1 anterior arch.
 - b. Excision of dens.
 - c. Drilling of clivus in two cases.
 - d. Posterior occipitocervical fusion with autologous iliac bone graft and instrumentation.

Table 4: Clinical outcome.

| Short term | Long term |
|---|--|
| Neck pain relieved in all cases | Rigidity of fixation maintained in all cases |
| Quadripareisis improved in 66.66% cases | No dislodgement of screws |
| No malpositioning of screws | Bony fusion achieved in 50% cases |
| | No bony resorption |
| | No disease progression |

Tissue diagnosis was confirmed by AFB staining, histopathology and culture sensitivity. Patients were kept on antituberculous medication, analgesics and bed rest. Average length of hospital stay was 8-14 days postoperatively.

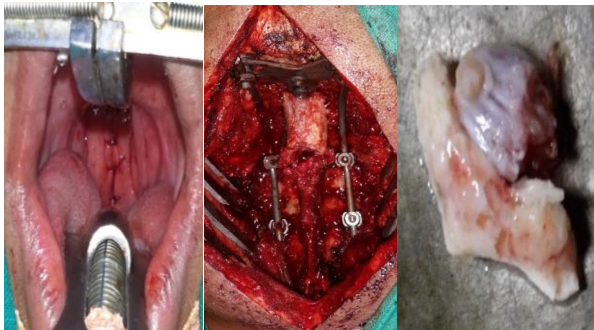


Figure 6: Intra operative.

The intra operative finding along with the operative specimen was shown in Figure 6. The post-operative

imaging is depicted in Figure 7. The pre- and post-operative imaging were compared in Figure 8.

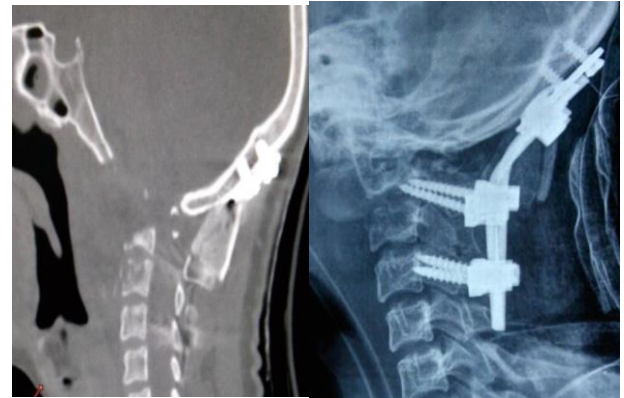


Figure 7: Post operative.

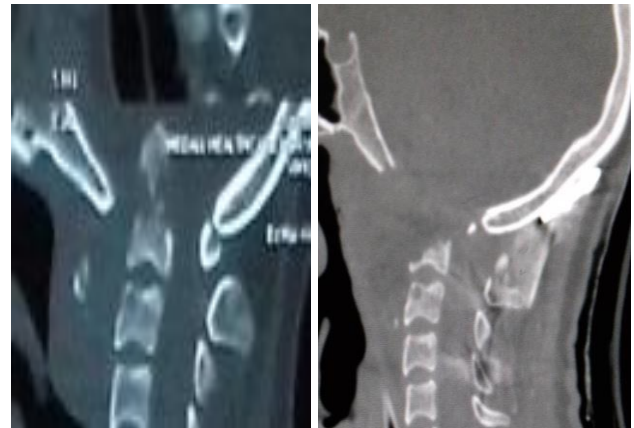


Figure 8: Pre and post operative comparison.

Table 5: Neurological outcome.

| NURICK grade | Preoperative | Static | Improved | Deteriorated | Death |
|--------------|--------------|--------|----------|--------------|-------|
| 0 | 1 | 1 | | | |
| 1 | 1 | 1 | | | |
| 2 | 2 | | 2 | | |
| 3 | 8 | 2 | 6 | | |
| 4 | 3 | | 2 | 1 | |
| 5 | 1 | | | | 1 |
| Total | 16 | 4 | 10 | 1 | 1 |

Table 6: Complications.

| Complication | Number of cases |
|--|-----------------|
| Wound dehiscence | 1 |
| Pressure sore | 1 |
| Neurological deterioration (day 4, probably Tb vasculitis) | 1 |
| Death (aspiration pneumonitis) | 1 |
| CSF leak, Meningitis | 0 |

The clinical and neurological outcome are discussed in Table 4 and Table 5 respectively.

Complications are discussed in Table 6. Present study is compared with the study carried out by Behari S et al in Table 7.⁴

Table 7: Treatment comparison.

| Treatment | Behari s et al ⁴ | Present study |
|------------------------------|-----------------------------|---------------|
| Conservative | 14 | 4 |
| Only Posterior stabilisation | 7 | 4 |
| TOD+ post. stabilisation | 4 | 8 |

DISCUSSION

CVJ-TB is a rare entity but with slight increased incidence in our study.³ Females are more effected than males. Neck pain and quadriparesis were the most common symptoms. 75% patients were in LIFESO grade-2 and grade-3. 50% patients are in Nurick's grade-3. Cord compression is the common cause of death in these patients.

The destroyed bone, ligaments, joints account for abnormal translational, rotational movements leading to instability.^{12,21} This abnormal mobility persists even after ATT. Compression of vital structures in brainstem may lead to death of the patient.

Radiologically, the conventional markers which demonstrate AAD are altered and also the pathological changes lag behind the conventional radiographs as upto 50% of bone loss is required for the pathological changes to be demonstrable on x-rays.

Conservative management can be adopted in cases with minimal tuberculosis of cv-junction and occipitocervical fusion done in cases with instability without significant anterior compression.⁹

Most of the patients in our study presented with extensive disease owing to the fact that most of the patients are residents of TB endemic areas of the country as mentioned above.

In our institute, we followed a two-staged procedure in single sitting with good results in those patients with progressive neurological deficits due to cord compression, significant instability who are poor follow up candidates for conservative management.^{1,2,4,6-13,15-18,20}

CONCLUSION

So, we recommend a definitive procedure in case of extensive TB of CVJ with progressive neurological

deficits for better outcome who have poor access to medical facilities and follow up.

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Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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