ORIGINAL ARTICLE

Role of Surgery in the Management of Carrie's Spine

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ABSTRACT

Objective: *To assess the efficacy of surgical management of carrie's spine along with anti-tuberculous medication.*

Material and Methods: *It is a study of 15 cases of carrie's spien which were treated surgically at the Department of Neurosurgery Quaid-e-Azam Medical College / Bahawal Victoria Hospital Bahawalpur. Study span was two years from January 2007 to December 2008. Age range was 20 to 40 years with average age of 25 years. All were young patients belonging to poor socio-economic class. It was a prospective study.*

Results: *Fifteen patients were enrolled in this study. All were young patients belonging to poor socio-economic class. Different regions of the spine involved were; 2 cervical, 6 thoracic, 3 thoracolumbar region. Most of the patients were having history of illness at least for the last three to six months with the complaints of spinal pain, evening fever, loss of weight etc. In all the patients, some kind of surgical treatment like. Costo-transversectomy, corpectomy, removal of dead bone, pus and granulation tissues etc along with some sort of stabilization procedure was performed. Patients were able to be mobilized early after surgical procedure and ATT plus other supportive treatment was continued for one year along with regular monitoring.*

Outcome: *The result were satisfactory as was desired because aim of surgical management was early mobilization of the patients to speed up the recovery. Almost all the patients improved to different extends regarding their neurological status.*

Conclusion: *Surgical management along with medical treatment is indicated in carrie's spine when the disease is not responding satisfactorily to the chemotherapy alone, when the neurological deficit is appearing or increasing. It is necessary to stabilize the spine in all these cases to halt the damage and enhance the recovery.*

Key Words: *Pott's Disease (Carrie's Spine), Chemotherapy, Spinal Stabilization, Neurological Deficits. Anti-tuberculous Cemotherapy (ATT).*

INTRODUCTION

Pott's disease, also known as tuberculous spondylitis, is one of the oldest demonstrated diseases of humankind, having been documented in spinal remains from the Iron Age and in ancient mummies from Egypt and Peru.[1] In 1779, Percivall Pott, for whom the disease is named, presented the classic description of spinal tuberculosis.[2,1]

It is still a significant cause of disease in developing nations. Tuberculosis involvement of the spine has the potential to cause serious morbidity, including permanent neurologic deficits and severe deformities. Medical treatment or combined medical and surgical strategies can control the disease in most patients.[1]

Pott's disease most commonly involves the thoracic and lumbosacral spine. However, published series have shown some variation.[6-9] The lower thoracic vertegrae make up the most common area of involvement (40 – 50%), followed closely by the lumbar spine (35-45%). In other series, proportions are similar but favour lumbar spine involvement.[10] Approximately 10% of Pott's disease cases involve the cervical spine.

Tuberculosis of the spine is referred to as Pott's disease. The thoracic portion of the spine (shoulders to

mid – back area) is the site most commonly infected in the spine, according to Family Practice Notebook. Symptoms of Pott's disease may include pain localized to the infected area with fever and weight loss, rigidity of the spine and muscle spasm, according to Watts and Lifeso.

Carrie's Spine is still a common problem in the third world especially India and Pakistan (Subcontinent). It can involve any region of the spine, but most commonly thoracic spine. It starts as spondylodiscitis and continues to destroy the bone with formation of pus and granulation tissues if not checked and treated in time. It shows good response to anti tuberculous chemotherapy if diagnosed early. If the destruction of spinal column has been advanced and there is instability of spinal column and progressive neurological deficits, some kind of stabilization procedure has to be performed after debridement of dead tissues, pus and granulation tissues. No doubt anti tuberculous chemotherapy (ATT) has to be continued until the complete resolution of the disease process, for about one year.

The spine is commonly involved by TB and tuberculosis here carries the eponymous description of "Pott's Disease". The vertebral bodies almost always those of two neighbouring vertebrae are involved first. In the spine the diagnosis is rarely made until the bodies of two adjacent vertebrae are significantly affected so the end result at best is the replacement of an intervertebral disc and of diseased bone by the fibrous tissue. If treatment for the spinal disease is delayed, abscess formation occurs and vertebral bodies collapse. The pus tracks along tissue planes to present superficially in places often distant from the involved vertebrae, e.g. pus arising from D_{12}/L_1 may track along the psoas muscle to present in the groin forming a cold abscess. Vertegral collapse produces forward angulation of the spine (a kyphos) and the combination of pus formation and spinal angulation compresses and may damage the spinal cord. The Spinal Cord may also be prejudiced by interference with its blood supply from the anterior spinal arteries. As a consequence paraplegia may develop.[21]

MATERIALS AND METHODS

It is study of 15 cases of Carries Spine which were treated surgically along with ATT. Study span is two years from January 2007 to December 2008 with follow up period of one year. Study was carried out at The Department of Neurosurgery, Quaid-e-Azam Medical College / Bahawal Victoria Hospital Bahawalpur.

RESULTS

Age Incidence

Age range was 20 to 40 years with average age of 25 years.

Sex Incidence

Ten (10) patients were female and five (5) were male with male to female ratio of 1:2 (Table 1).

Table 1: *Sex Incidence.*

Sex	Number	Percentage
Male	5	33.7%
Female	10	66.7%
Total	15	100%

Clinical Features

All were young patients belonging to poor socio-economic class. Different regions of the spine involved were; two (2) cervical, six (6) thoracic, three (3) thoracolumbar and four (4) lumbar region. Almost all the patients were having history of illness at least, for the last three to six months with the complaints of spinal pain, evening fever, loss of weight and varying degrees of neurological deficits. Two cases of cervical carries were quardipretic with some sparing of neurological functions. Three cases of thoracic TB were paraplegic with G 0/5 power but with intact sensations, so they were given the chance of surgery. Aim was to decompress the spinal cord and stabilize the vertebral column. Other 3 cases of thoracic carrie's were parapretic. All the remaining 6 cases 3 thoracolumbar and 4 lumbar were also parapretic.

Table 2: *Different Regions of Spinal Column Involved.*

Sr. No.	Region of Spine	No. of Patients	Percentage
1.	Cervical	2	13.3%
2.	Thoracic	6	40%
3.	Thoracolumbar	3	20%
4.	Lumbar	4	26.7%
	Total	15	100%

Investigations

All patients were investigated by Tuberculin Test, Complete Blood Count and ESR, X-rays and MRI of the region involved with other routine investigations.

Surgical Procedure

Surgical procedures (as shown in table 3) performed were; corpectomy, debridement, bone grafting, looking plate and screws in the 2 cases of cervical TB by anterior approach. In 3 out of 6 cases of thoracic carrie's, costotransversectomy was done to get decompression of the spinal cord and in other 3 cases, removal of dead bone, pus, debris and granulation tissues was completed by left anterolateral approach after thoracotomy. Expandable cage (Titanium) filled with bone graft of patients' rib or from iliac crest, applied at corpectomy site and further support was given with lateral plates and screws. In all the remaining 6 cases 3 of thoracolumbar region and 4 of lumbar spine corpectomy, removal of dead bone, pus and granulation tissues etc was done in the same way as mentioned for 3 cases of thoracic spine. And cages (Titanium, expandable) filled with bone grafts from patients' iliac crests were, fixed at corpectomy site and stabilization was reinforced with lateral plates and screws. Patients were able to be mobilized early after surgical procedure and ATT was continued for one year along with regular monitoring for neurological recovery, hardware status, bone graft and for chemotherapy as well.

Table 3: *Area Involved and Surgical Procedure.*

Area Involved	No. of Cases	Surgical Procedure	No. of Cases for Surgical Procedure
Cervical Carrie's	2	Corpectomy bone graft and fixation	2
Thoracic carrie's	6	Costotrans versectomy	3
		Cage fixation	3
Thoracic lumbar carrie's	3	Cage fixation	3
Lumbar carrie's	4	Cage fixation	4
Grand total	15		15

Outcome

All the patients improved to some extent after surgery. Two patients of cervical carries gained power of G 4/5 after surgery from G 2/5. Three cases of thoracic carries with G 0/5 power and being bed ridden improved to G 2/5. Other three (3) cases of thoracic TB were able to walk after few months of surgery while before surgery, they were bed ridden pour 2/5. Three patients of thoraculumbar TB with G 2/5 improved to G 3/5 and other 4 cases of lumbar carries improved to G 4/5 and were able to leave the bed independently. Almost all the patients were relieved from severe pain of spinal origin after decompression of neural elements and stabilization of the spinal column. All the patients were mobilized early from the beds after surgical decompression of the spinal cord and stabilization of the spinal column (Table 2) indicates the different regions of spinal column affected by the Pott's disease.

Complications

Complications of surgery (Table 4) were; transient hoarseness of voice in two cases of cervical TB due to some oedema of recurrent laryngeal nerve. Dysponea and some difficulty in breathing in 3 cases of thoracic carries in which thoracotomy was done due to mild collapse of lung on surgery side. It improved with chest physiotherapy and breathing exercises. Three cases of wound infection, that were cured with dressing and antibiotic therapy. One (6.6%) case of implant infection in the lumbar region in which implant had to be removed. Debridement of corpectomy site done. Infection treated with antibiotics after checking the sensiti-

Table 4: *Complication of Surgery.*

Sr. No.	Name of Complication	No. of Patients	Percentage
1.	Hoarseness of Voice	2	13.3%
2.	Dysponea and Breathing Difficulty	3	20.00%
3.	Wound Infection	3	20.00%
4.	Implant Infection	1	06.66%
5.	Jaundice (Liver Dysfunction)	2	13.33%
6.	Dural Tear	2	13.33%
	Total	13	86.7%

vity and new cage and screws and plates were applied after 3 months. Two (13.37%) cases developed jaundice with ATT, so 2nd line ATT has to be given in these patients. In two (13.3%) patients there was dural tear and CSF leakage during surgery that was repaired at the same time and fibrin glue was applied there to reinforce the repair. Although the number of complications were more but almost all were transients of less severity and easily managed.

DISCUSSION

Pott disease most commonly involves the thoracic and lumbosacral spine. However, published series have shown some variation.[6-9] The lower thoracic vertebrae make up the most common area of involvement (40 – 50%), followed closely by the lumbar spine (35 – 45%). In other series, proportions are similar but favour lumbar spine involvement.[10] Approximately 10% of Pott's disease cases involve the cervical spine.[1] In our series thoracic involvement was (40% followed by lumbar 26.66%, thoracolumbar 20% and cervical 13.33%.

Although the thoracic and lumbar spinal segments are nearly equally affected in persons with Pott's disease, the thoracic spine is frequently reported as the most common site of involvement and this was seen in our cases as well. Together, these segments make up 80 – 90% of spinal tuberculosis sites, with the remaining cases of Pott's disease occurring in the cervical spine. Almost all patients with Pott's disease have some degree of spine deformity (kyphosis).[1]

Opinions differ regarding whether the treatment of choice should be conservative **chemotherapy** or **combination** of **chemotherapy and surgery.** Patients with Pott's disease should be closely monitored to assess their response to therapy and compliance with medication. Directly observed therapy may be required. The development or progression of neurologic deficits, spinal deformity, or intractable pain should be considered evidence of poor therapeutic response. This raises the possibility of antimicrobial drug **resistance**, as well as the necessity for **surgery**. The treatment decision should be individualized for each patient, although routine surgery does not seem to be indicated. But the operative decompression can greatly increase the recovery rate, offering a means of treatment when medical therapy does not bring rapid improvement.[1] So we combined medical as well as surgical treatment for our patients of Pott's Disease to speed up the recovery.

Indications for surgical treatment of Pott disease generally include the following:[22,23]

- Neurologic deficit – acute neurologic deterioration, paraparesis, and paraplegia.
- Spinal deformity with instability or pain.
- No response to medical therapy – Continuing progression of kyphosis or instability.
- Large paraspinal abscess.
- Nondiagnostic percutaneous needle biopsy sample.

Resources and experience are key factors in the decision to use a surgical approach. The lesion site, extent of vertebral destruction, and presence of cord compression or spinal deformity determine the specific operative approach (kyphosis, paraplegia, tuberculous abscess).

Several approaches are used in the management of the patients with Pott's disease. These ranges from conservative regimens as bed rest and drug therapy HRZE, for about 12 months, and surgical procedures. Muhammad Reza Ehsae et al reported that medical therapy used in 16 patients but 42 cases had surgical therapy. There was no worsening of the neurologic status in any patient but 42 cases needed surgery because of neurological findings. In all patients, non-surgical and surgical groups, tuberculous lesion began to improve three (3) months after chemotherapy and healed completely within 12 months. The correction rate of kyphotic angle was more in group treated with surgical modality. This rate was also increased more in group with instrumentation than the other group without any instrument in their surgery. We performed instrumenttation in all our patients to get adequate correction of khyphotic angle.[21]

Although surgical treatment of spinal tuberculosis remain controversial, it has been shown that radical debridement surgery produces best results, when compared with other treatment modalities.[5,7] Based on the results from a series of studies[17,18] especially the excellent results from Mc Flain and Hong Kong group, the British medical council recommended that spinal tuberculosis was best treated with appropriate antituberculous chemotherapy and radical debridement surgery if adequate anesthetic and nursing expertise and supportive facilities were available. The surgical treatment provides much earlier healing, quicker pain relief, earlier abscess and sinus tract resolution, better chance of neurologic recovery, as well as lesser degree of spinal deformity than medical treatment. Keeping in view all these advantages of surgery we combined medical and surgical treatment for our patients of pott's disease.

Studies performed by the British Medical Research Council indicate that tuberculous spondylitis of the thoracolumbar spine should be treated with combination chemotherapy for 6 – 9 months.[4] However, the research council's studies did not include patients with multiple vertebral involvement, cervical lesions, or major neurologic involvement. Because of these limitations, many experts still recommend chemotherapy for 9 – 12 months. We used antituberculous chemotherapy in all our patients for 12 months.

CONCLUSION

Surgical management along with medical treatment is indicated in carrie's spine when the disease is not responding satisfactorily to the chemotherapy alone, when the bony destruction is increasing, when the deformity is more pronounced and when the neurological deficit is appearing or increasing. It is necessary to stabilize the spine in all these cases to halt the damage and enhance the recovery.

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