POTT'S DISEASE
THE RESULTS OF 185 CONSECUTIVE CASES

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SUMMARY

Between January 1973 and June 1992 a total of 185 patients with Pott's disease have been operated on using different operative approaches. 99 female and 86 male patients with an average age of 36.2 were operated on. The follow-up period was between 2 to 31 months with an average of 31 months. Most of the patients were lost to follow-up after 2 to 3 years. Extrapleural anterior approach was used in 20 cases. Anterior or posterior instrumentation was performed in 5 cases. 32 of our cases had Pott's paraplegia at admission. Recovery from paraplegia was complete in 19 and partial in 5 and no improvement in 8. Various complications including 7 mortalities were seen in 42 patients.

Key Words: Pott's disease, anterior spinal fusion.

This disease was first described by Sir Percival Pott as a painful kyphotic deformity that results in paraplegia (8, 19). Paraplegia and kyphosis are the most feared complication. Before the development of antibiotics the treatments employed for the prevention of kyphosis consisted of bed rest, cast immobilisation and hyperextension for the correction of kyphosis. In 1911 Albee and Hibbs first introduced posterior fusion into clinical application as a possible treatment of this deformity. The results of this method was first published by Swift in 1940 a ten year follow up; the results showed clinical and radiologic healing in 72% of the children and 53% of the adults, with a 15% mortality and 29% pseudoarthrosis (5). Ito's pioneering work on lumbar extraperitoneal exposure of the lumbar spine and the exposure of the thoracic spine through a costovertebroxectomy incision was published in 1984 (5, 10). Hodgson first published “anterior decompression and spinal fusion” technique in 1956.

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and his remarkable results in 1960; 93% solid fusion and 74% recovery from paraplegia (5, 6, 7, 10). Rau and Mou first performed anterior instrumentation for Pott's disease with good results in 1991 (17). Since the incidence of paraplegia has declined over the years interest has focussed on the prevention of kyphosis.

**MATERIALS AND METHOD**

185 Patients with Pott's disease were admitted to Ankara University Medical Faculty, Department of Orthopaedic Surgery between January 1973 and June 1992. 99 (53.5%) of the patients were female and 86 (46.5%) male, with an average age of 36.2 (range 4-84). The disease affected 1 segment in 119 patients (64.32%), 2 segments in 55 (29.73%) and more than two segments in 11 (5.95%) patients. The distribution of the segments can be seen in Table I. Radiological appearance of a possible abscess was seen in 83 (44.32%) patients but only 3 (1.62%) had draining fistulas. 58 (31.35%) patients had a variety of neurological symptoms, of these only 32 (17.3%) had complete paraplegia at the time of their admission. Patients had an average kyphosis of 16.2 degrees. Those patients that had their lesion localised in the thoracic region had an average kyphosis of 20.68 degrees. The distribution of the severity of kyphosis is seen on Table II. 28 patients (15.13%) had tuberculosis affecting other systems. The diagnosis of tuberculous spondylitis was confirmed by histological examination. The chemotherapy employed is as follows:

- **Streptomycin**: 20 mg/kg/day for the first two months;
- **Rifampycin**: 10-20 mg/kg/day for the first 6 months;
- **Isoniazid**: 10-20 mg/kg/day for one year and;
- **Pyrazinamide**: 30 mg/kg/day for the first three months.

In the operations on the cervical spine the Robinson Technique was utilised. The lesions on the first 4 thoracic vertebrae were approached through the removal of the third rib with thoracotomy. Lesions on the thoracic vertebrae 5 through 11 were reached with the removal of the rib one above the affected segment. Lesions on the thoraco-lumbar junction were reached with the techniques of Fey or Digby. Lesions on the lomber spine were exposed through the flank incision (8, 9, 10, 21). The extrapleural route was employed on patients that had a compromise in their pulmonary function (10). The ribs that were excised for the exposure of the field were used as bone grafts. In the cervical and lumbar spine pelvic grefts were used. 5 Patients (2.7%) received an implant. Of these 2 were posterior instruments of ISOLA type and 3 were ALICI an-
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terior instruments. All the patients received an orthosis for external support, they were allowed out of bed on the 14th day with their orthosis and discharged on the 19th day.

RESULTS

The patients were examined every three months for the first year, every six months the next and then yearly thereafter. Most of the patients failed to come back for examination two years after their operations. For this reason the average follow up time was 31 months (range 2-51 months). 32 paraplegic patients had anterior decompression. Postoperative full recovery was seen in 19 patients (59.37%), 5 patients (15.63%) showed some improvement but no change was seen in 8 patients (25.00%).

<table>
<thead>
<tr>
<th>Table I: Distribution of affected segments</th>
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<tr>
<td>Cervical</td>
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<td>Thoracic</td>
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<td>Thoracic</td>
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<td>Lumbar</td>
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<tr>
<th>Table II: The severity of Kyphosis.</th>
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<tr>
<td>Light Kyphosis (0-30 degrees)</td>
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<td>Medium severity (30-60 degrees)</td>
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<td>Severe deformity (&gt;60 degrees)</td>
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<th>Table III: Instrumented cases.</th>
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<td>Level</td>
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<td>T 7-8</td>
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<td>T 10-12</td>
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Early post-operative mortality was seen in 7 patients (3.82%). The fatalities were due to pulmonary embolism in three, one from myocardial infarction. Since the permission for autopsy was not granted by the patients relatives we do not know the reason of mortality in the other three patients.

4 patients had superficial infection that resolved with appropriate antibiotic treatment. 1 patient had a post-operative neurologic deficit that resolved spontaneously. 1 iliac vein laceration was done intraoperatively without any further complications. 2 patients in which an extrapleural approach was utilized had pleural effusion that resolved with drainage. A total of 34 graft related complications were seen. In 19 patients it was graft resorption. 11 graft compression and 4 migration of graft. The average correction of kyphosis was 9.7 degrees but the correction was better in the thoracic region with an average of 11.21 degrees. At the last follow-up examination the average kyphosis was 19.29 degrees. This is 3.09 degrees worse than the preoperative values and 12.16 degrees worse than the early postoperative values. When considering thoracic and lumbar regions separately the degree of kyphosis was 20.68 degrees in the thoracic region. The correction attained after surgery was 11.21 degrees. At the last follow up examination average kyphosis was found to be 25.84 degrees. When considering these we see an increase in kyphosis of 5.16 degrees when compared before surgery and 16.37 degrees when post-surgery kyphosis was considered.

DISCUSSION

The most feared complications of Pott’s disease are paraplegia and kyphosis. Both of these generally occur in the thoracic in the thoracic region. Kyphosis is the result of compression of the vertebral body. Paraplegia is the result of numerous factors such as (3, 15): 1- Mechanical pressure of the epidural abscess, 2- Granulative tissue of tuberculosis, 3- Bone and disk sequestra, 4- Subluxation and dislocations, 5- Vascular trombosis, 6- Spinal cord oedema, 7- Fibrosis of the dura, 8- Interstitial gliosis of the spinal cord (2, 5, 7, 8, 18, 19). The incidence of paraplegia is reported to be between 6-35% (5, 19).

In our series we have been 31.35% neurologically affected patients with paraplegia consisting of only 17.30%. We can evaluate our series in two main groups:

1- Cases that were seen before 1988 & which were published elsewhere (10). At that time there were 108 cases with 32 paraplegias on ad-
The healing of patients with anterior extirpation + decompression + fusion + chemotherapy is about 100%. But the chemotherapy alone heals about 95% of patients. Given the chances of misdiagnosis due to lack of definitive diagnostic criteria (8). But can be accepted as an alternative treatment method where the operative treatment seems unlogical.

The advantages of anterior intervention are as follows:

1- The lesion can be visually inspected,

2- Definitive diagnosis (with the histologic examination of surgical material). There is no pathognomonic criteria for the diagnosis of Pott’s disease. Positive bacteriological examination is possible only in 50% of cases (4). Histologic examination is the main definitive diagnostic tool. This prevents the patient from a miss diagnosis and the administration toxic drugs for a prolonged period. 3- During anterior intervention in addition to biopsies; débridement of necrotic material, decompression and grafting can also be performed. 4- The positive results of surgery can be seen earlier than the conservative treatment that requires two years. 5- This method is more acceptable by the patients. 6- Debridement and grafting prevents paraplegia and the advance of the kyphotic deformity, recurrency and amyloidosis (8, 16). Because of the aforementioned reasons we prefer surgical treatment.

The overall mortality rate in Hodgson’s series of 412 cases was 2.9%. This rate is reported differently in a wide range of series up to 23% (7, 11, 14, 20). Our overall mortality is 3.82%.

Extrapleural intervention was performed mostly in children in the lower thoracic region. The experience we have gained in this intervention is as follows: 1- The extrapleural intervention is not appropriate for upper thoracic segments. An absorb that drains into the mediastinum can cause severe complications. Two patients that were treated extrapleurally in the upper segments had post-operative pleural effusions that required closed drainage. 2- Patients that have a compromised pulmonary
reserve as a result of tuberculosis or chronic obstructive pulmonary disease benefit from this approach. 3- Surgical exposure is sufficient to visualise the retropleural vascular structures. 4- It is less traumatic than the classic intrapleural technique. 5- Without the need for a chest tube the postoperative rehabilitation was easier and no pulmonary complications were seen. 6- Since the pleura is thin and brittle in old and thin patients we do not advise this method on them. 7- The end of excised rib can perforate the pleura, so caution must be exercised during closure. 8- A suction drainage placed into the extrapleural space can be removed at 36-48 hours.

KYPHOSIS

One of the most important problems in the treatment of Pott's disease is the correction of the kyphotic deformity. The increase of kyphosis after 5 years is reported to be 10 degrees in conservatively treated patients, but varies between 0-22.2 in surgically treated patients (2, 13, 16). Rajasekaran has reported his preoperative kyphotic deformity to be 21.1 degrees with an average increase of 8.4 degrees (16) In our series our preoperative deformity was 16.20 degrees, and at the last controls an increase of 3.09 degrees was found. When considering the 9.07 degrees of correction attained at surgery then our loss of correction is 12.16 degrees.

Preoperative kyphosis angle was 20.68 degrees in the thoracic and thoracolumbar region. The increase of the kyphosis angle in this region was 5.16 degrees at the last follow-up examination but the loss of correction was 16.37 degrees if the 11.21 degrees of intraoperative correction was mentioned.

The increase in kyphosis in the thoracic regions seems to be the result of predisposition of this area for a kyphotic deformity or as a result of the extirpated ribs which were used as bone grafts (16).

INTERNAL FIXATION

Rao et al has treated a total of 88 patients with their anterior instrumentation device. Of these 24 were of Pott's disease with an average follow-up of 24 months. They have decreased the pre-operative kyphosis of 44 degrees to 25 degrees with a correction of about 19 degrees. At the last follow-up examination they have seen a loss of correction of about 5 degrees. This means they have a correction of 14 degrees according to pre-operative values. They had not seen any complication regarding the instrumentarium or any infection (17).
We have used anterior instrumentation in three and posterior instrumentation in two patients (Table III). Due to the number of cases and the average amount of follow-up we are unable to reach a conclusion. But the addition of instruments in our opinion brings these advantages:

1. More correction at the time of operation.
2. Better maintenance of correction,
3. Stable fixation of the anteriorly placed graft,
4. Elimination of external support,
5. Easier and earlier patient rehabilitation (1, 12, 16).

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