Osteoarthritis of the costovertebral joints

THE RESULTS OF RESECTION ARTHROPLASTY

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Thoracic back pain caused by osteoarthritis of a single costovertebral joint is a poorly recognised condition. We report a series of five patients who were successfully treated by resection arthroplasty of this joint.

Each had received a preliminary image-guided injection of local anaesthetic and steroid into the joint to confirm it as the source of pain. The surgical technique is described. There were no complications. The pain improved from a mean of 7.0 (6 to 8) on a visual analogue scale to 2.0 (0 to 4) post-operatively. The final post-operative Oswestry disability index was a mean of 19.4 (9 to 38).

Isolated osteoarthritis of a costovertebral joint is a rare but treatable cause of thoracic back pain. It is possible to obtain excellent short- and intermediate-term relief from pain with resection arthroplasty in appropriately selected patients.

Osteoarthritis (OA) of a costovertebral joint is well recognised in conditions such as rheumatoid arthritis (RA), seronegative spondyloarthropathy and diffuse idiopathic skeletal hyperostosis, but is unusual in patients without these disorders. It is characterised by localised thoracic back pain which is aggravated by coughing, deep inspiration or movement of the trunk, and pseudovisceral flank pain. The pain may be disabling.

The surgical treatment of OA may include arthrodesis, soft-tissue interposition arthroplasty, resection arthroplasty or total joint replacement. Resection arthroplasty is commonly performed for painful OA of the acromioclavicular joint, the interphalangeal joints of the toes, and the distal radioulnar joint with good to excellent results in 80% to 100% of patients.

The distal clavicle and distal radio-ulnar joints are both stabilised by extra-articular ligamentous and muscular attachments which make them amenable to resection without creating instability. In the same way, the ligamentous and muscular attachments of the thoracic cage stabilise the ribs independently of the costovertebral joints. It would therefore be reasonable to consider resection arthroplasty for symptomatic OA of a costovertebral joint. However, apart from a single abstract we have been unable to find further descriptions of the surgical treatment of arthropathy of this joint.

In this study we describe the outcome in five patients who were treated by resection arthroplasty for symptomatic OA of a costovertebral joint.

Patients and Methods

We undertook a retrospective review of the clinical records and radiographs of five patients treated by resection arthroplasty for costovertebral OA in our hospital between 1990 and 2002. The information included the clinical presentation, diagnostic tests, pre-operative visual analogue scale (VAS) for pain, operating time, blood loss, and peri-operative complications. There were four men and one woman with a mean age at presentation of 40.6 years (32 to 54; Table I). The most common presenting complaint was unilateral localised thoracic back pain which was aggravated by inspiration (4 of 5, 80%). No patient had a history or radiological appearance of inflammatory arthritis or other systemic spondyloarthropathy.

Each patient was contacted by telephone after at least 3.6 years (3.6 to 15.1). They completed an Oswestry disability index questionnaire (no pre-operative value was obtained) and were asked to score residual pain at the site of operation using a VAS. An Oswestry score of less than 20 (minimal disability) was deemed to indicate a good to excellent result, 21 to 40 (moderate disability) a fair result and 41 or more (severe disability) a poor result.
Diagnostic and operative technique. Each patient underwent MRI of the thoracic spine to exclude intervertebral disc pathology. If this failed to explain their symptoms they then had a CT scan to assess the costovertebral joints. Those with concordant single-level degenerative disease of a costovertebral joint were offered an image-guided injection of lidocaine and steroid. If their pain resolved initially, but then recurred, they were offered a resection arthroplasty. Patients who opted for surgery had a CT scan of the lumbar spine to assist with intra-operative localisation of the appropriate spinal level.

At operation, the lamina, transverse process, and associated rib were exposed on the affected side. The transverse process was then removed with a Kerrison rongeur (Fig. 1a). An approximately 3 cm length of the rib was then dissected subperiosteally with a curved curette, taking care to avoid injury to the neurovascular bundle. After dividing the rib with a Kerrison rongeur (Fig. 1b), its head was held with a towel clip, sharply disarticulated at the costovertebral joint, and gently elevated off of the underlying pleural membrane (Fig. 1c). The wound was closed without drainage.

Results
Each patient had been treated non-operatively for more than six months. Their physical examination was non-specific although each was tender at a site consistent with the abnormality which had been identified radiologically. The mean VAS score at presentation was 7.0 (6 to 8).

Each patient had a CT scan which demonstrated OA of the costovertebral joint at a single level. One underwent a whole-body technetium bone scan which showed increased uptake consistent with costovertebral OA. One refused an injection before the operation. Three had injections under CT-guidance and one under image intensification. Each reported almost complete temporary resolution of their pain.

All five patients underwent resection arthroplasty of a single costovertebral joint. The mean operating time was 89 minutes (72 to 118) with a mean blood loss of 55 ml (25 to 110). Post-operatively, they were allowed to mobilise without restriction. There were no peri-operative complications. One patient was seen in the emergency room five days later for a positional headache which was worsened by upright stance. CT showed no evidence of leakage of cerebrospinal fluid and he was discharged home without further problems.

The mean follow-up was 7.5 years (3.6 to 15.1). The mean final Oswestry score was 19.0 (9 to 38). Four patients had a good or excellent result with an Oswestry score of less than 20 (minimal disability). The mean final VAS score was 2.0 (0 to 4). Table I gives details of the results.

Discussion
The cause of thoracic back pain can be difficult to identify. The differential diagnosis includes thoracic disc herniation, thoracic spinal stenosis, vertebral body compression fracture, intervertebral disc and facet joint OA as well as non-orthopaedic conditions such as renal colic or pleural irritation. Degenerative disease of the costovertebral joints is well described.\(^2\)\(^-\)\(^5\)

The costovertebral joint is formed by the conjunction of the head of the rib with the superolateral surface of the vertebral body, while the costotransverse joint connects the angle of the rib to the anterolateral aspect of the costovertebral joint, and gently elevated off of the underlying pleural membrane (Fig. 1c). The wound was closed without drainage.

Table I. Details and results in the five patients with osteoarthritis of a costovertebral joint

<table>
<thead>
<tr>
<th>Case</th>
<th>Age (yrs)</th>
<th>Gender</th>
<th>Joint involved(^a)</th>
<th>Length of follow-up (yrs)</th>
<th>VAS(^b)</th>
<th>Initial</th>
<th>Final</th>
<th>Final ODI(^c)</th>
<th>Clinical results</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>35</td>
<td>Male</td>
<td>RT5</td>
<td>7</td>
<td></td>
<td>7</td>
<td>4</td>
<td>38</td>
<td>Fair</td>
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<tr>
<td>2</td>
<td>42</td>
<td>Male</td>
<td>LC7 accessory rib</td>
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<td>6</td>
<td>3</td>
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<tr>
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<td>32</td>
<td>Male</td>
<td>RT2</td>
<td>5.9</td>
<td></td>
<td>8</td>
<td>2</td>
<td>18</td>
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<tr>
<td>4</td>
<td>54</td>
<td>Male</td>
<td>LT12</td>
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<td>7</td>
<td>0</td>
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</tr>
<tr>
<td>5</td>
<td>40</td>
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<td>15.1</td>
<td></td>
<td>7</td>
<td>1</td>
<td>12</td>
<td>Good to excellent</td>
</tr>
</tbody>
</table>

\(^a\) RT5, right 5th thoracic; LC7, left 7th cervical; RT2, right 2nd thoracic; LT12, left 12th thoracic; LT5, left 5th thoracic

\(^b\) VAS, visual analogue scale

\(^c\) ODI, Oswestry disability index
are not often thought to be a cause of thoracic back pain. Our experience suggests that OA of a costovertebral joint should be considered in the differential diagnosis of the patient with unexplained thoracic back pain. Our small case series shows that it is possible to obtain excellent short- and intermediate-term results with resection arthroplasty of a costovertebral joint in appropriately selected patients.

Supplementary Material

A further opinion by Mr J. K. O’Dowd is available with the electronic version of this article on our website at www jbjs org uk

No benefits in any form have been received or will be received from a commercial party related directly or indirectly to the subject of this article.
References