Research Paper

Soft Tissue Chondroma—Result of Surgery in a Local Hospital and Review of the Literature

软組織軟骨瘤: 地區醫院之手術治療成效及文獻回顧

Lo Chi-Yin John*, Ip Fu-Keung, Wong Tak-Chuen, Leung Oi-Yee Priscilla, Tsang Wai-Leuk

Department of Orthopaedics and Traumatology, Pamela Youde Nethersole Eastern Hospital, Chai Wan, Hong Kong

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Background/Purpose: This was a retrospective case series that aimed to study the clinical features and results of surgery for soft tissue chondroma, which is a benign extraskeletal cartilage tumour.
Methods: Ten patients with a histological diagnosis of soft tissue chondroma were recruited between 2001 and 2012. Tumours involved the hand and wrist (n = 4), foot (n = 3), popliteal fossa (n = 2), and deltoid (n = 1).
Results: The most common complaints were progressive enlargement of the size of the mass (50%) and pain (50%). Radiographs showed calcified soft tissue mass in 90% of cases. Marginal excision was performed. The mean follow-up duration was 27.6 months. There was one suspected recurrence case with a mass over the index finger. Surgical re-excision was performed and the second histological diagnosis was bizarre parosteal osteochondromatous proliferation. At final follow-up, nine out of ten cases were symptom free. One patient had residual finger joint stiffness and deformity.
Conclusion: The results of marginal excisions for soft tissue chondroma is satisfactory with low complication and recurrence rates.

C O N T E N T S L I S T S A V A I L A B L E A T S C I E N C E D I R E C T

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Introduction

Soft tissue chondroma is a rare disease entity that can demonstrate worrisome radiologic or histologic features confused with malignancy, and therefore may be treated with unnecessary radical surgery. Knowledge of this tumour, with its anatomic predilection and benign clinical course is necessary to provide suitable and reasonable treatment. Soft tissue chondroma, also called extraskeletal chondroma or chondroma of soft tissue parts, generally affects patients in midadult life.1 It is a benign cartilaginous neoplasm that is found most frequently in hands and feet.2–4 In this series 10 patients with soft tissue chondroma were retrospectively reviewed. The clinical presentations and results of surgery for this uncommon disease entity are discussed.

Methods

This is a retrospective case series of patients with a histological diagnosis of soft tissue chondroma with excision done in the Hong Kong East Cluster (Pamela Youde Nethersole Eastern Hospital and Ruttonjee Hospital) from 2001 to 2012. A total of 10 cases fulfilled the following criteria: (1) a cartilaginous proliferation arising...
within or situated in soft tissue identified histologically; (2) no clinical, radiologic, or histologic evidence to support a bony, intra-articular or bursal origin for the process; and (3) patient underwent surgical treatment for the lesion. Follow-up information was obtained by reviewing submitted medical records—records form the Clinical Management System of the Hospital Authority or through written communication with the patients or their clinicians. The clinical and radiological features and result of surgery were reviewed. The average follow up duration was 27.6 months (range, 4–120 months).

Results

Clinical findings

A total of 10 cases of soft tissue chondroma that received surgery in the study period were recruited with clinical details listed in Table 1. There were six male and four female patients, ranging in age from 15 years to 80 years (Figure 1). The average age was 50.4 years. The tumours involved the hand and wrist (n = 4), foot (n = 3), popliteal fossa (n = 2), and deltoid (n = 1; Figure 2). All cases presented with a mass. Five of them (50%) noticed progression of the size of the mass. Five of them (50%) felt mild pain over the mass. Physical examination showed a well-defined mass in nine cases (90%). One case (10%) had an ill-defined swelling over the extensor surface of the right index finger near the distal interphalangeal joint (DIPJ) level. Mobility of the mass was demonstrated in four cases (40%), while tenderness over the mass was noticed in three cases (30%). General daily function was not affected in any of the cases. The average and median duration of symptoms before consultation was 31 months and 24 months, respectively (range, 2–120 months). Trauma history was noted in two cases (20%). One patient had trauma over the left thumb 2 months prior to clinical attendance with a preparative diagnosis of an epidermal cyst. Another patient had a left heel mass with a history of ankle sprain injury 2 years prior to clinical attendance. The working diagnosis was an old avulsion fracture from the insertion of Achilles tendon. The other preoperative diagnoses were nonspecific calcified masses in six patients, ganglion in one patient, and a mucous cyst in one patient.

Radiologic findings

All of the 10 cases had radiologic studies of the affected site prior to the operation. These consisted of radiographs (n = 10), magnetic resonance imaging (MRI; n = 3), ultrasound imaging (n = 2), and computerised tomography (CT; n = 1). X-ray showed the presence of calcified well-defined extrasosseous soft tissue masses over the involved parts in nine cases (90%; Figures 3 and 4). Neither bone

Table 1: Clinical findings for 10 cases of soft tissue chondroma

<table>
<thead>
<tr>
<th>Case no.</th>
<th>Patient sex/age (y)</th>
<th>Location</th>
<th>Preoperative diagnosis</th>
<th>Histology</th>
<th>Size (mm)</th>
<th>Follow-up (mo)</th>
<th>Recurrence</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>M/22</td>
<td>Lt foot dorsum</td>
<td>Ganglion</td>
<td>Soft tissue chondroma</td>
<td>Multiple fragments, Largest piece 4 mm</td>
<td>4</td>
<td>No</td>
</tr>
<tr>
<td>2</td>
<td>M/50</td>
<td>Pulp of Lt thumb</td>
<td>Epidermal cyst</td>
<td>Soft tissue chondroma</td>
<td>16 × 14 × 10</td>
<td>6</td>
<td>No</td>
</tr>
<tr>
<td>3</td>
<td>F/39</td>
<td>Rt delfoid</td>
<td>Nonspecific calcified mass</td>
<td>Soft tissue chondroma</td>
<td>25 × 20 × 10</td>
<td>6</td>
<td>No</td>
</tr>
<tr>
<td>4</td>
<td>F/61</td>
<td>Rt sole</td>
<td>Nonspecific calcified mass</td>
<td>Soft tissue chondroma</td>
<td>45 × 40 × 25</td>
<td>8</td>
<td>No</td>
</tr>
<tr>
<td>5</td>
<td>M/43</td>
<td>Rt popliteal fossa</td>
<td>Nonspecific calcified mass</td>
<td>Soft tissue chondroma</td>
<td>50 × 30 × 20</td>
<td>12</td>
<td>No</td>
</tr>
<tr>
<td>6</td>
<td>M/35</td>
<td>Rt heel</td>
<td>Avulsion fracture of os calcis</td>
<td>Soft tissue chondroma</td>
<td>15 × 15 × 5</td>
<td>18</td>
<td>No</td>
</tr>
<tr>
<td>7</td>
<td>F/67</td>
<td>Ulnar side of Rt wrist</td>
<td>Nonspecific calcified mass</td>
<td>Soft tissue chondroma</td>
<td>35 × 27 × 30</td>
<td>30</td>
<td>No</td>
</tr>
<tr>
<td>8</td>
<td>M/15</td>
<td>Lt popliteal fossa</td>
<td>Nonspecific calcified mass</td>
<td>Soft tissue chondroma</td>
<td>50 × 60 × 40</td>
<td>36</td>
<td>No</td>
</tr>
<tr>
<td>9</td>
<td>M/80</td>
<td>Rt hand dorsum near first metacarpal base</td>
<td>Nonspecific calcified mass</td>
<td>Soft tissue chondroma</td>
<td>20 × 15 × 7</td>
<td>36</td>
<td>No</td>
</tr>
<tr>
<td>10</td>
<td>F/72</td>
<td>Extensor surface of Rt index finger (DIPJ level)</td>
<td>Mucous cyst</td>
<td>First: soft tissue chondroma Second: bizarre parosteal osteochondromatous proliferation (Nora's lesion)</td>
<td>Multiple fragments, Largest piece 10 × 8 × 3</td>
<td>120</td>
<td>Suspected recurrence with re-excision done.</td>
</tr>
</tbody>
</table>
erosion nor periosteal reaction was noticed. Variable calcification patterns were noticed.

MRI films and reports could be traced in three cases and the findings were variable (Figure 3). Two cases were reported to be predominantly T1 isointense and one case was reported to be predominantly T1 hypointense. There were inconsistent findings for T2 imaging. One case was predominantly T2 hyperintense, one case was predominantly T2 hypointense, and one case was mixed T2 hyperintense and isointense in nature.

CT was performed in one case of a calcified soft tissue mass over the right wrist joint. It showed osseous density in the soft tissue lesion without gross bony erosion.

**Treatment and follow-up**

Marginal excision of the lesion was performed in all cases (Figure 4). The histological diagnosis was soft tissue chondroma. The average follow-up duration was 27.6 months (range, 4–120 months). Two cases reported numbness over the surgical sites after surgery, which eventually subsided by the subsequent follow-up.

Local recurrence was suspected in one case after surgery. A 72-year-old woman had a mass over the extensor surface of her right index finger at DIPJ level with a histological diagnosis of soft tissue chondroma. Recurrence of a slow growing mass over the same site was noticed 1 year after surgery. The patient sought medical advice 9 years after initial operation because of pain over the mass and finger DIPJ stiffness. A second excision was then performed 9 years after the initial surgery. There was a bony outgrowth connected with the dorsal bone cortex at the DIPJ noticed intraoperatively during the re-excision. A different histological diagnosis of bizarre parosteal osteochondromatous proliferation (Nora's lesion) was made and, therefore, this should not be counted as a recurrence case. After the second surgery, there was no reported recurrence with a total follow-up of 120 months. However, there was residual corresponding finger joint stiffness and deformity. Progressive degenerative changes and osteophytes over the DIPJ were noticed from serial
X-rays taken at interval medical consultations. It was believed that the symptoms were mainly due to the natural course of osteoarthritis. All other cases were symptom-free at the final follow-up.

Pathologic findings

There were 10 cases with a histological diagnosis of soft tissue chondroma: two of them had surgical specimens in multiple fragments and the other eight cases had masses removed in one whole piece. Specimen size ranged from $10 \, \text{mm} \times 8 \, \text{mm} \times 3 \, \text{mm}$ (smallest) to $50 \, \text{mm} \times 60 \, \text{mm} \times 40 \, \text{mm}$ (largest). Common microscopic features for soft tissue chondroma in the current series included well-differentiated hyaline cartilage arranged in lobules with mild to moderate cellularity arising from the periarticular soft tissue and focal or central enchondral ossification. There was one suspected recurrence case of mass over index finger with re-excision performed. The second histological diagnosis was bizarre parosteal osteochondromatous proliferation (Nora’s lesion), which is another disease entity different from soft tissue chondroma.

Discussion

Extraskelatal cartilage tumour comprises soft tissue chondroma, tenosynovial chondromatosis, and synovial chondromatosis. Although the three disease entities share the common feature of cartilaginous proliferation from soft tissue origin, each of them have their individual clinical presentations differentiating themselves from other subtypes.

Synovial chondromatosis usually present with painful joint swelling with functional impairment. It tends to have multiple intra-articular involvements affecting the large joints, e.g., knee, hip, and shoulder. It is a male-predominant condition usually affecting adults aged around 30–50 years. Surgery is recommended to prevent malignant sarcomatous transformation and metastasis that have been reported in rare forms of the tumour. Recurrences have been reported in up to 60% of patients and in such cases a repeat synovectomy is indicated.

Tenosynovial chondromatosis is an extra-articular lesion arising in the synovial lining of a tendon sheath, most commonly affecting hands and feet in midadulthood. It is a male-predominant condition usually affecting adults aged around 30–50 years. Surgery is recommended to prevent malignant sarcomatous transformation and metastasis that have been reported in rare forms of the tumour. Recurrences have been reported in up to 60% of patients and in such cases a repeat synovectomy is indicated.

Synovial chondromatosis is a disease entity different from soft tissue chondroma.
33–70% of cases, as reported in the literature. Bony changes are infrequent, but in chronic cases the tumour can cause pressure erosion on adjacent bones. In one reported case, bony erosions caused extensive bony destruction. By comparison, the current study shows that 90% of cases had calcification on radiography and none had bony erosion.

The reported common MRI pattern for soft tissue chondroma was intermediate T1 signal intensity and high T2 signal intensity. It is related to the high water content of the mucopolysaccharide component of myxoid changes in the tumour. The presence of dense calcification will reduce T2 signal intensity and, therefore, MRI may show variable patterns due to the variation in amount and pattern of calcification.10

In the present series, none of our cases had a correct preoper-ative diagnosis of soft tissue chondroma. This is because it is a rare disease entity with a nonspecific radiographic calcification pattern. There are many possible differential diagnoses when calcification in soft tissue is encountered, e.g., tumoural calcinosis, gout, chondrocalcinosis, myositis ossificans, periosteal chondroma, synovial chondromatosis, chondrosarcoma, etc. Clinical history and examination is still the mainstay for diagnosis and CT/MRI can be considered as useful adjuncts. For example, tumoural calcinosis is considered as useful adjuncts. For example, tumoural calcinosis is a less well-de ned border and surrounding in nalation may be shown in MRI.

Treatment for soft tissue chondroma is by surgical excision. Complications are not common. Soft-tissue chondromas usually occur singly, as lobulated, well-encapsulated rubbery tumours, easily enucleated at surgery. Malignant transformation has not been reported. Recurrences occur in approximately 20% of cases. When there is a recurrence, repeat excision is usually indicated.

Conclusion

Soft tissue chondroma is an uncommon disease entity with predilection in hands and feet in middle-aged patients. It usually presents with a slow-growing mass sometimes causing pain and functional impairment. Calcification is noted on X-ray in most of the cases. Soft tissue chondroma should be included as a differential diagnosis when an extra-articular calcified soft tissue mass close to the joint is encountered. Surgical outcome of marginal excision is satisfactory with a low complication and recurrence rate.

Conflicts of interest

The authors have no conflicts of interest to declare.

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