Pomeranian J Life Sci 2022;68(1):5-8 doi: 10.21164/pomjlifesci.782

Distribution, symptomatology and histological analysis of benign tumours within the upper extremity

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ABSTRACT

Introduction: Benign tumours of the hand and upper limb are frequently seen by hand surgeons. The literature in this field is relatively rich, however there are several issues which are not referenced in the literature or are subject to divergent opinions. These concerns complaints caused by the tumours.

The objective of this study was to investigate the distribution, symptomatology and histological analysis of benign tumours within the upper extremity.

Materials and methods: The study group consisted of 346 patients – 234 women (68%) and 112 men (32%) at a mean age of 53 years who were operated on in the authors' institution between 2015–2018. The criteria of inclusion were as follows: the presence of a tumour in the upper extremity which was not a ganglion cyst or malignant tumour, and available results of histopathological examination of the resected tumour.

Results: Most lesions – 231 (67%) were localized in the digits, followed by the metacarpus – 46 (13.3%). The size of most of the tumours – 204 (59%) was 0.6–2 cm. The tumours were present for a mean duration of 2.6 years before surgical excision. For most patients, an unaesthetic appearance of the hand was the primary problem. Most of the tumours – 248 (72%), were symptomatic by means of pain at compression or caused mild dysfunction. In the study group, most tumours were giant-cell tumours of the tendon sheath – 96 (27.7%), lipomas – 44 (12.7%) and rheumatoid nodules – 30 (8.7%).

Keywords: benign tumours; upper extremity; distribution; symptoms and signs.

INTRODUCTION

Benign tumours of the hand and upper limb are frequently seen by hand surgeons. The hand is a complex structure composed of several tissues, each of which can be an origin for a tumour: skin, fat tissue, tendon sheath, muscle, nerve, bone, cartilage, etc. The incidence of particular types of tumours in the upper limb varies, but giant cell tumours of the tendon sheath and lipomas are reported as the most frequent in the majority of studies [1, 2]. Among bony lesions, enchondromas are most commonly reported. Malignant tumours are relatively rare, representing approx. 1% of all upper limb lesions. Data from the literature show that benign lesions are located predominantly in the fingers [3, 4]. The treatment of tumours in the hand is mostly surgical and consists of complete (radical) excision, as their character is not known preoperatively. These procedures are considered straightforward and technically undemanding; however, outcomes of surgery are not uniformly perfect, i.e., regarding hand function and recurrence rates [4, 5].

There are several issues which are not referenced in the literature or are subject to divergent opinions [1, 2, 6]. These concern complaints caused by the tumours: the vast majority are asymptomatic; although when located in the vicinity to the sensory nerve, they may provoke pain, paraesthesiae or sensory disturbances. Lesions located close to the joints (interphalangeal or metacarpo-phalangeal) may reduce the mobility of the fingers and impair the ability to grasp objects. Some tumours such as the glomus tumour, neurofibroma and osteoid osteoma present clinically with characteristic painful symptoms.

The authors' institution is the primary centre of hand surgery for a part of the country that has a population of about 4 million inhabitants, in which the vast majority of hand tumours are treated. The objective of this study was an investigation into the distribution of tumours in the upper limb and their clinical presentation.

MATERIALS AND METHODS

The study group consisted of 346 patients at a mean age of 53 years (range 18–88), including 234 women (68%) at a mean age of 53 years (range 18–88) and 112 men (32%) at a mean age of 53 years (range 20–84), who were operated on in the authors' institution between 2015–2018. Criteria of inclusion into the study were as follows: the presence of a tumour in the upper extremity which was not a ganglion cyst or malignant tumour, and available results of a histopathological examination of the resected tumour. The diagnosis of the lesion was essentially made on clinical grounds: a presence of a palpable mass in the limb. In some cases the diagnosis was completed with ultrasonography examination. For bony tumours, radiological examination was essential for making the diagnosis. All tumours were excised and given a histological examination.

The following data were collected at patient admission: the location of the tumour in the upper limb, time of the tumours' growth, size of the lesion, presentation as a single lesion or with satellite nodules, as well as symptoms and signs caused by the tumour (pain, discomfort, sensory disturbances, reduction of finger/wrist movement).

RESULTS

Distribution and anatomical localization of the tumours

Most lesions – 231 (67%) – were localized in the digits. The specific distribution of the tumours in particular digits was more or less uniform, except for the little finger in which the least number of tumours were present. Forty-six tumours (13.3%) were located in the metacarpus, 22 (6.4%) in the wrist, 33 (9.3%) in the forearm and 15 (4.3%) in the arm (Tab. 1). In 189 (55%) patients, the tumour was located in the right upper limb, whereas in 157 (45%) in the left upper limb.

TABLE 1. Distribution and localization of the tumours in the upper limb

Localization of the tumour	Number of cases	Percent
Digits (total)	231	66.8
Thumb	49	14.2
Index	55	15.9
Middle	50	14.5
Ring	48	13.9
Little	29	8.4
Metacarpus	46	13.3
Wrist	22	6.4
Forearm	33	9.3
Arm	15	4.3
Total	346	100.0

Size of the tumours

The size of most of the tumours – 204 (59%) – was 0.6–2 cm (small or moderate). Large tumours, having >3 cm in diameter, were uncommon – 37 cases (11%).

Time of the tumours' growth

The tumours were present for a mean duration of 2.6 years (range from 3 months to 8 years) before surgical excision. The most frequent time of growth was 1–2 years, observed in 20% of cases.

Symptoms and signs

For most patients – 308 (89%), an unaesthetic appearance of the hand with the tumour was the primary problem. Most of the tumours – 248 (72%) – were symptomatic by means of pain and paraesthesia, or caused dysfunction of the hand in daily activity or work; however, this functional impairment was mild in most cases. Only 98 lesions (28%) were asymptomatic and did not impair function. One half of the patients experienced pain from pressing the tumour when grasping objects, particularly when the lesion was localized in the finger. Somewhat less than 18% of the patients reported paraesthesia – feeling numbness and tingling around the tumour.

Presentation as a single lesion or with satellite nodules

The vast majority – 304 (88%) of the tumours presented as a single lesion. In 42 cases (12%) more than 1 lesion was found during the operation and concerned mostly giant-cell tumours of the tendon sheath, rheumatoid nodules and lipomas.

Histological type of the tumours

Soft tissue tumours (85%) were the most frequently found tumour in the study group. The most common histological diagnoses of these were: giant-cell tumours of the tendon sheath – 96 (27.7%), lipomas – 44 (12.7%) and rheumatoid nodules – 30 (8.7%). Vascular-originated lesions (haemangioma, glomus tumour, vascular malformation, haemangiolipoma and haemangioleyomyoma) were also relatively common, representing 49 cases (14%). Nerve-originated tumours (schwannoma and neuroma) were fairly common – 10 cases (2.8%). Dermatokeratosis was the most common diagnosis in skin tumours – 6 (1.7%) cases. In bone tumours the most common lesion was enchondroma – 17 cases (4.9%) – Table 2.

TABLE 2. Histological types of the tumours in this study

Histological type of the tumour	Number of cases	Percent
Soft tissue tumours		
Giant-cell tumours of the tendon sheath	96	27.7
Lipoma	44	12.7
Rheumatiodal nodule	30	8.7
Fibroma	23	6.6
Haemangioma	19	5.5
Glomus tumour	18	5.2
Atheroma (sebaceous cyst)	12	3.5
Neurofibroma	8	2.3
Schwannoma	7	2.0
Vascular malformation	5	1.4
Angiolipoma	5	1.4
Leiomyoma	4	1.2
Neuroma	3	0.9
Organized thrombus	3	0.9
Tumoral calcinosis	3	0.9
Angioleiomyoma	2	0.6
Fibrolipoma	2	0.6
Other (single)	11	3.2
Total	295	85.3
Skin tumours		
Dermatokeratosis	6	1.7
Skin granuloma	9	2.6

TABLE 2. Histological types of the tumours in this study

Histological type of the tumour	Number of cases	Percent
Sebaceous wart	4	1.2
Naevus pigmentosus	2	0.6
Total	21	6.1
Bone tumours		
Enchondroma	17	4.9
Osteochondroma	10	2.9
Osteoid osteoma	2	0.6
Giant-cell tumours of the bone	1	0.3
Total	30	8.7
Total all types of tumours	**346**	**100.0**

DISCUSSION

Tumours localized in the upper extremity constitute a fairly common condition which is treated operatively in most cases. The most common lesion in this study were giant cell tumours of the tendon sheath (Fig. 1, 2, 3, 4, 5). This finding is consistent with results reported in the literature [5, 6, 7, 8, 9, 10, 11, 12]. These lesions are mostly asymptomatic and present mostly on the digits, adjacent to the interphalangeal joints. Treatment consists in local excision but the recurrence rate reported in the literature is relatively high (15% on average, range 4–40%) and is mostly caused by an incomplete excision of the tumour and overlooking residual satellite nodules.

FIGURE 1. Typical presentation of a giant-cell tumour of the tendon sheath in the little finger

FIGURE 2. Encapsulation of the tumour; note well-defined capsule

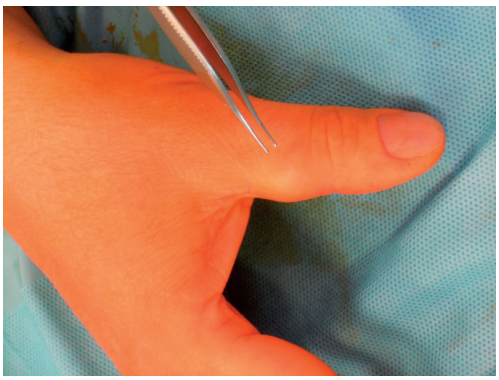

FIGURE 3. Typical presentation of a giant-cell tumour of the tendon sheath in the thumb

FIGURE 4. Appearance of the resected tumour; note poorly-defined capsule

FIGURE 5. Another example of a giant-cell tumour of the tendon sheath in the thumb

Lipomas were the 2nd most common tumour in our study. They are mostly asymptomatic but may cause complaints if present near the nerves (i.e., in the carpal tunnel) [1, 2, 13]. Diagnosis of most lipomas is possible on clinical grounds only (palpable soft, subcutaneous mass) – Figure 6. If localized superficially, they are easy to excise, as the majority have a well-defined capsule. In a deeper location, i.e., in the palmar space, carpal tunnel or intramuscularly (Fig. 7), they may require some investigation (USG, MRI) to make the diagnosis and may be technically more demanding to remove. The risk of malignant transformation is low, but it increases with the size of the tumour (so called "giant lipomas") – Figure 7. Recurrence rate after excision is relatively low, less than 5% [1, 2, 13].

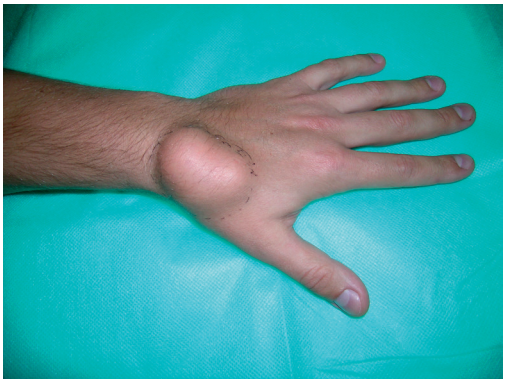

FIGURE 6. Typical presentation of lipoma in the metacarpus

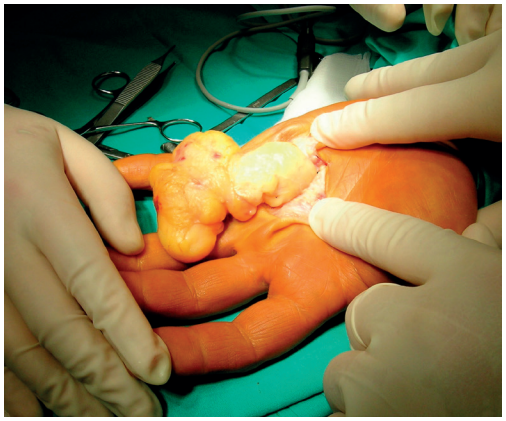

FIGURE 7. "Giant" lipoma encapsulated in the metacarpus and carpal tunnel

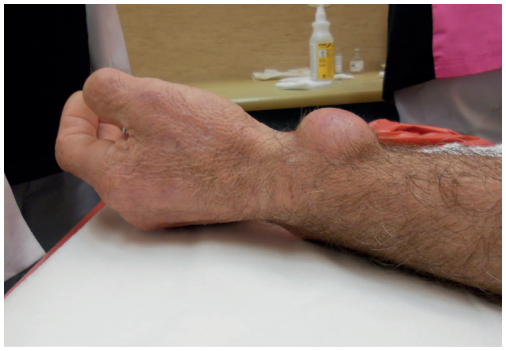

FIGURE 8. Big atheroma localised in the wrist

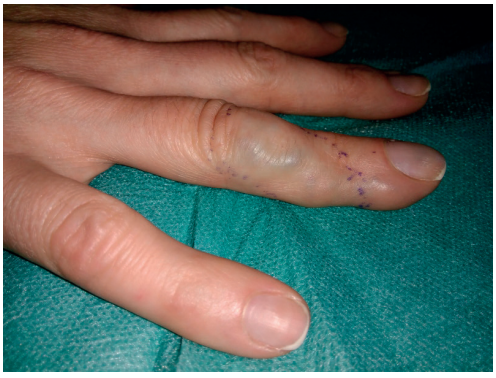

FIGURE 9. Subcutaneous haemangioma in the middle finger

Figures 8 and 9 illustrate presentation of other tumours in this study: atheroma and subcutaneous haemangioma.

The main findings from this study are consistent with those reported in the literature. They concern the incidence of particular histological types of tumour, their localization and distribution in the upper limb and the time of the tumours' growth before surgery. Some findings are inconsistent, including symptoms and problems caused by the tumours. In our series, the cosmetic defect alone was the primary problem for the patients, followed by mild dysfunction, pain and paraesthesia which were considered less troublesome by the patients. A review of the literature shows that the presence of the tumour and neoplasm anxiety were the primary concerns for most patients, prompting them to seek medical advice; clinical features were rarely reported [1, 2, 4, 9].

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