SCRIPTA MEDICA (BRNO) – 70 (7): *353–358, October 1997*

USE OF ULTRASOUND FOR THE MUSCULOSKELETAL TUMOURS

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Abstract

Sonography of 153 patients with musculoskeletal tumours confirmed the main contribution of echography, namely the assessment of soft tissue tumour demarcation against surrounding tissues - i.e. the differentiation of the expansive from the infitrative growths. It is suggested introducing sonography as a standard method for both the d iagnostics and the postoperative follow-up of patients with musculoskeletal tumour in the soft tissues of the limbs.

Key words

musculoskeletal tumours, sonography

INTRODUCTION

Timely diagnosis of the musculoskeletal tumour often decides about the future fate of the patient. However, only few orthopedic diseases can be detected so late as tumours of the locomotor apparatus. Quite unambiguously, hidden and nonspecific clinical symptoms of bone and soft tissue tumours play an important role in the delayed diagnoses. General symptoms (fever, weight loss, lassitude, lipothymia) often appear only after the generalization of the malignant tumour. Otherwise, a pathological bone fracture may be the first sign (*Janíček et al.*, 1991). The only clinical clue for detecting this disease may be pain, particularly night pain. Limited joints mobility or swollen soft tissues may also be the only diagnostic indicator. Even the laboratory tests may seem to be normal even with extensive musculoskeletal lesions. Radiodiagnostic examination is still the method of choice among the imaging diagnostic methods (*Unni*, 1996). In addition to scintigraphy and MRI, CT and angiography rank among the standard examinations (*Enneking*, 1983). Sonography and thermography are diagnostic methods less frequently used for detecting of musculoskeletal tumours (*Kotz*, 1984). The uthors' experience in and the possibilities of using echography in the diagnostics of locomotor apparatus are described.

MATERIAL AND METHODS

In the I[st] Orthopedic Department St. Anne Masaryk University Hospital, Pekařská 53, Brno, 853 patients, in whom X-ray documentation, case histories, surgery and histological findings are kept, were treated in the years between 1970 and 1995 (*Table 1*). These patients have been so far, or were until they died, provided with dispensary care in our clinic. Musculoskeletal tumours have prevailed in the lower extremities - in 454 patients (*Table 2*). Echography was started to be used on experimental base in 1990 and has been used as a standard diagnostic method since 1992. The total number of patients examioned by echography amounts to 153 patients (59 men and 94 women) while malignant tumours have been found in 47 patients (21 men and 26 women).

Table 1
Localization and types of musculoskeletal tumours in our group of patients

Musculoskeletal tumours 1970 - 1995				
Localization	Malignant	Benign	Metastases	Total
Vertebral column	31	28	16	75
Pelvis	46	27	30	103
Upper extremity	93	61	35	189
Lower extremity	284	143	59	486
Total	454	259	140	853

Table 2
Composition of malignant musculoskeletal tumours

Malignant musculoskeletal tumours	
Osteosarcoma	103
Myeloma	74
Chondrosarcoma	65
Fibrosarcoma	63
Ewing's sarcoma	37
Malignant fibrous histiocytoma	31
Synovialosarcoma	15
Neurofibrosarcoma	14
Liposarcoma	13
Rhabdomyosarcoma	10
Angiosarcoma	8
Adamantinoma	7
Chordoma	4
Unclassified sarcomas of soft tissues	10
Total	454

RESULTS

Out of the group of 153 patients (59 men and 94 women), musculoskeletal lesions of limbs and tumours in the pelvic region were treated in 141 and 12 patients (*Graph 1*), resp. 27 patients had osteolytic bone lesions, while in 126 patients tumours of soft tissues were found (*Graph 2*). 47 patients of this group (21 men and 26 women) had malignant musculoskeletal lesions (*Graph 3*). In the cases of osteolytic bone lesions, the range of tumour expansion into the soft tissues was determined which correlated with the surgery finding. On the other hand, the extent of the one destruction never corresponded exactly with surgery finding. Sonography of intrapelvic tumours also failed in determining the extent of tumour in all cases. In the area of soft tissues, the tumourous lesions were identified in 126 patients. The tumour location and extent always corresponded with the surgery findings. The infiltration growth of the tumour was always confirmed, though it did not correspond with the degree of malignity of the musculoskeletal lesion (*Fig. 1*).

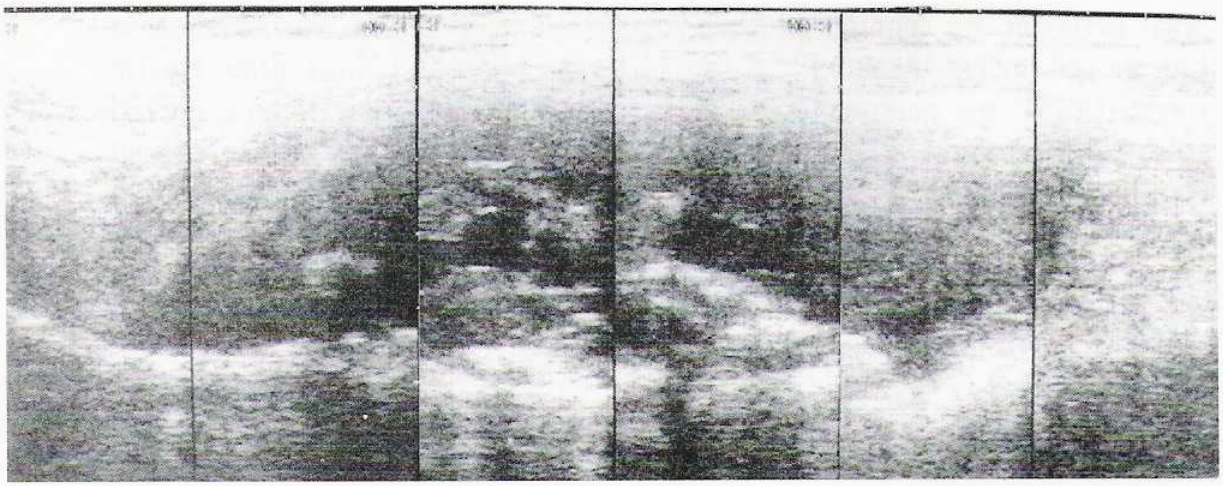
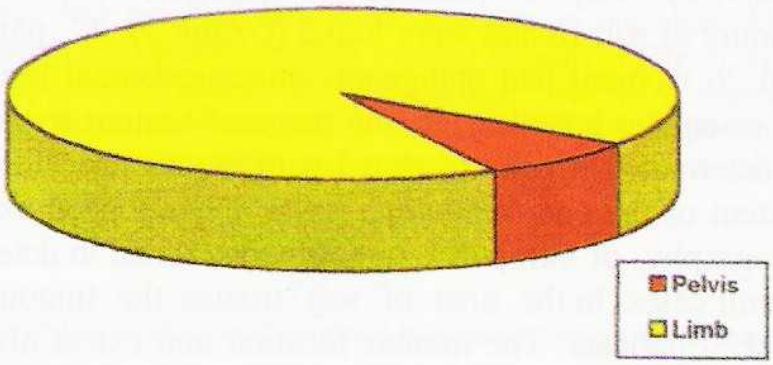


Fig. 1
Infiltrative growths of tumour (malignant fibrous histiocytoma) in the soft tissue (region of the thigh)

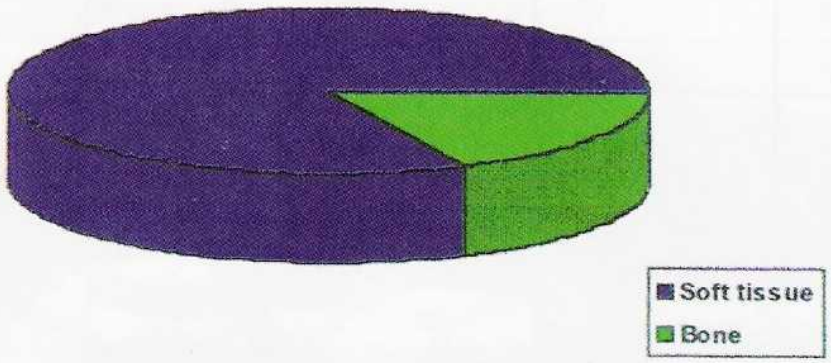
DISCUSSION

Ultrasound examination of the tumour tissue enables the assessment of the tumour size, location, demarcation and relation to the neighbourhood, particularly to the large vessels (*Dornier et al.*, 1990). Sonography enables to assess the internal structure and procedure of the probing puncure monitored by echography. The tumour tissue echogenity differing from the surrounding tissues or the tumour location in a fibrous sheath which is detectable by sonography are the proconditions for a successful diagnosis (*Bruns*, 1993). Sonography is actu-

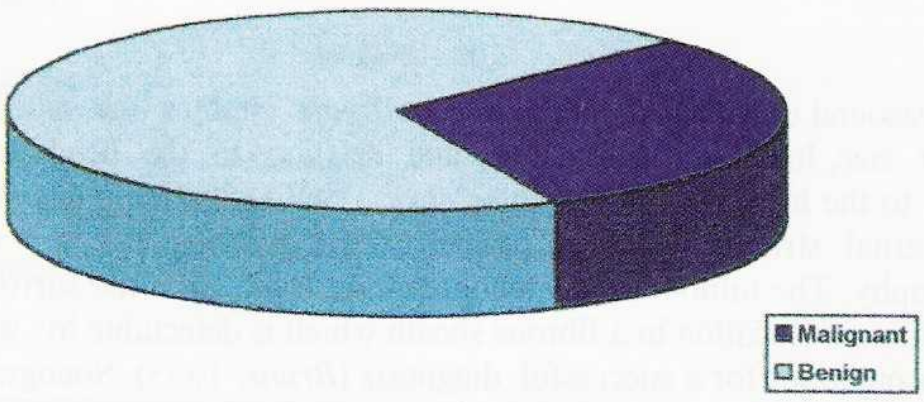
Graph 1: Localization of tumors (pelvis (12) Limb (141))



Graph 2: Typ of tumor (Bone (27) Soft tissue (126))



Graph 3: Typ of tumor (Malignant (47) Benign (106))



ally an examination of soft tissues on the bone surface. Therefore, bone changes can be assessed only if the normal structure of the bone surface has been changed (*Pelnář et al.*, 1992). The ultrasound waves penetrate through the osteolysis focus in the bone cortex into bone depth. On the other hand, the ossified or calcified parts of the soft tissue tumour prevent the ultrasound waves from pentrating which, in turn, makes impossible to assess the tumour relationship to the bone surface (*Hrazdira & Veselý*, 1992). Echography can never determine the tumour diagnosis but it can identify the tumour invasive expansion in the surrounding tissues. This may decide about the degree of radicalism of the surgery. Based on our experience, sonography should be particularly used in the following areas:

1. to assess the extent and size of musculoskeletal tumour infiltration into the surrounding soft tissues
2. to follow up the postoperative condition. Following the resection of a soft tissue tumour the patients are regularly followed up once in three months for the period of two years, and furthermore, twice a year until 5 years postoperatively. Being a noninvasive method, having no negative side effects with time unlimited investigation of musculoskeletal lesions and having a comparatively low price (currently lower than e.g. MRI), sonography represents the method of choice for both postoperative follow-ups and primary diagnostics of tumours of the locomotor apparatus.

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VÝSLEDKY SONOGRAFICKÉHO VYŠETŘOVÁNÍ U MUSKULOSKELETÁLNÍCH TUMORŮ

Souhrn

Autoři vyhodnotili výsledky sonografického vyšetření u 153 pacientů (59 mužů a 94 žen) z 853 nemocných léčených pro muskuloskeletální tumor na I. ortopedické klinice LF MU, FN U sv. Anny v Brně. Sonografie ukázala absolutní přesnost v diagnostice expanzivního či infiltrativního růstu tumoru v měkkých tkání. Není vhodná k odlišení rozsahu postižení kostních osteolytických lézí a je zcela nevhodná u tumorů pánve. Na základě svých výsledků doporučují autoři zavedení sonografie do diagnostické i dispenzární praxe u tumorů měkkých částí končetin.

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