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PRIMARY TUMOURS IN THE SPINE AND PELVIS IN ADOLESCENTS: CLINICAL AND RADIOLOGICAL FEATURES

PER THOMMESEN & JENS O. POULSEN

Department of Radiology, Municipal Hospital and Orthopaedic Hospital, Aarhus, Denmark.

In 34 patients in their two first decades of life with primary bone tumours in the spine and pelvis, the most common benign tumour was histiocytosis X and the most common malignant tumour, Ewing's sarcoma. X-rays were positive in 32 out of 34 cases but of little diagnostic value and primary complaints were without significance. The final diagnosis can only be made after a biopsy.

Key words: bone tumours; Ewing's sarcoma; eosinophilic granuloma; vertebra plana

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Bone lesions in the spine and pelvis in patients in their first two decades of life are very often primary and metastases can, without very great risk, be excluded from the diagnostic considerations (Sharrard 1969). However, it is difficult to make an exact diagnosis on X-ray only (Dahlin 1970, Sissons 1959, Walker 1952) and the X-ray pictures are often regarded merely as a guide for correct biopsy (Dahlin 1970).

The purpose of this work has been to investigate:

1. The nature of primary complaints in patients with malignant or benign tumours.
2. The primary X-ray findings.
3. The histological types and survival rate.

MATERIAL AND METHODS

Thirty-four patients in their first two decades of life were selected from the files in the Department of Radiology, Municipal Hospital and Orthopaedic Hospital, Aarhus. All tumours, except for five cases of spontaneously healed vertebra plana, were verified by biopsy.

The 34 records were reviewed with special reference to duration and nature of the primary complaints and the survival rate, together with

Table 1. Age and sex distribution.

	♂	♀
10 years >	11	6
10 years <	9	8

Table 2. Localisation of 34 bone tumours.

	Benign	Malignant
Cervical column	1	1
Thoracic column	5	1
Lumbar column	5	3
Sacral column and pelvis	6	12
Total	17	17

Table 3. Classification of 34 bone tumours.

Benign		Malignant	
Histiocytosis X	9	Ewing's sarcoma	9
Angioma simplex	1	Reticulum cell sarcoma	2
Aneurysmal bone cyst	2	Endothelial sarcoma	1
Osteochondroma	1	Chondrosarcoma	2
Osteoclastoma	2	Osteosarcoma	2
Osteoblastoma	1	Teratoid tumour	1
Osteoid osteoma	1		
Total	17		17

All except five cases of histiocytosis X in the spine were verified by biopsy. One case of chondrosarcoma had a negative biopsy but the patient died a few months later from the tumour.

Table 4. Primary complaints.

	Benign tumours	Malignant tumours
Fatigue		2
Lump	3	3
Local pain	15	12
Radiating pain	3	11
Paraesthesia	1	4
Weakness		4
Disturbance of motility *	3	6
Fever		2

* Disturbance of motility includes paraplegia in two cases.

the histological classification of the various tumours. E.S.R. and the level of alkaline phosphatase were noted. Finally all X-rays were reviewed in order to evaluate typical or pathognomonic findings.

RESULTS

The age and sex distributions can be seen in Table 1. The site and histological types of the different tumours are indicated in Tables 2 and 3. The most significant primary complaints can be found in Table 4. The mean duration of primary complaints, survival rate and follow-up are shown in Table 5. The most frequent laboratory features are shown in Table 6. Figures 1–11 show some X-rays of various benign and malignant tumours.

DISCUSSION

There was no difference between the duration of primary complaints in patients with benign or malignant tumours

Table 5.

	Mean duration of debut symtoms in months	Mean survival in months	Mean observation time in years
Benign tumour	3.4 (min. 0.5, max. 12)		6.9 (min. 0.25, max. 29)
Malignant tumour	6 (min. 1.25, max. 24)	11.5 (min. 0.5, max. 48)	

Two patients with malignant tumours are still alive. However there was no significant difference between the mean duration of debut symptoms in patients with malignant or benign tumours. T value 273.5 (limits at 5 per cent 240–355) Wilcoxon test.

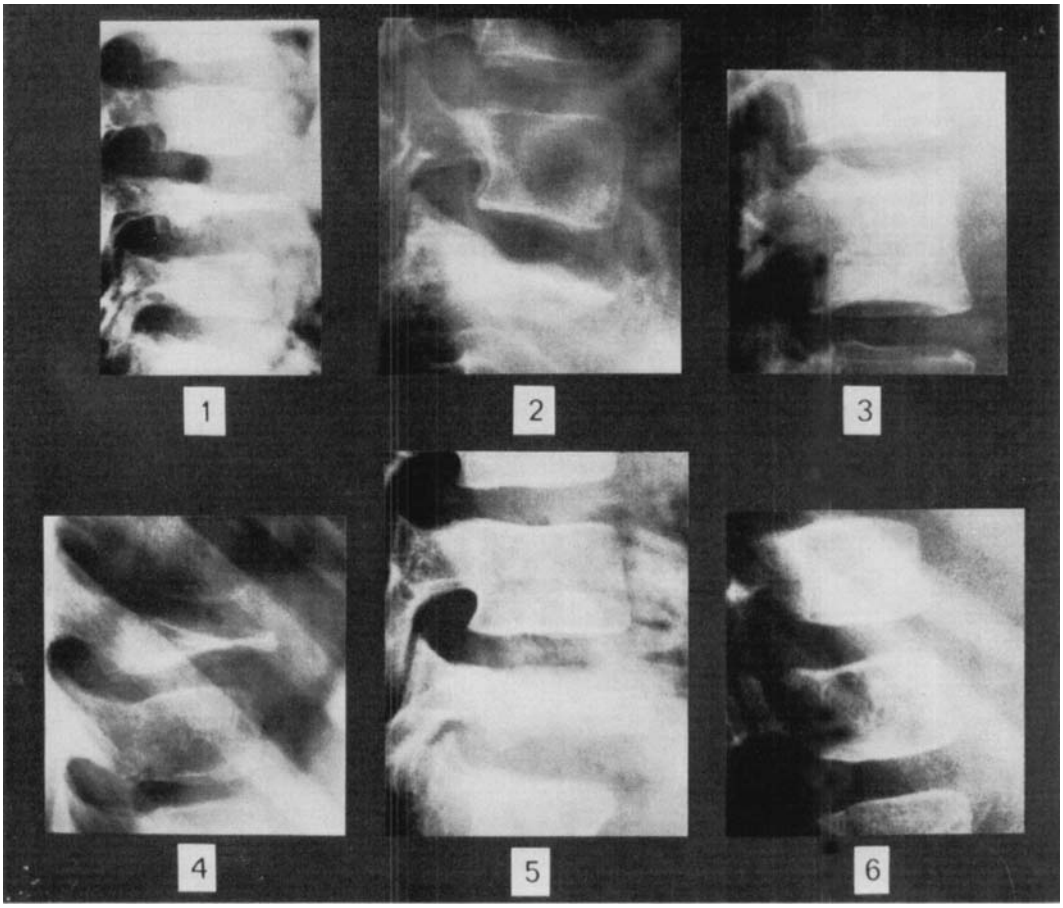


Figure 1. Ewing's sarcoma in the fourth lumbar vertebral body simulating vertebra plana. No soft tissue swelling but some irregularity of the bone structure. This in contrast to Figure 2.

Figure 2. Ewing's sarcoma in the fifth lumbar vertebral body with soft tissue swelling and partial collapse of the body.

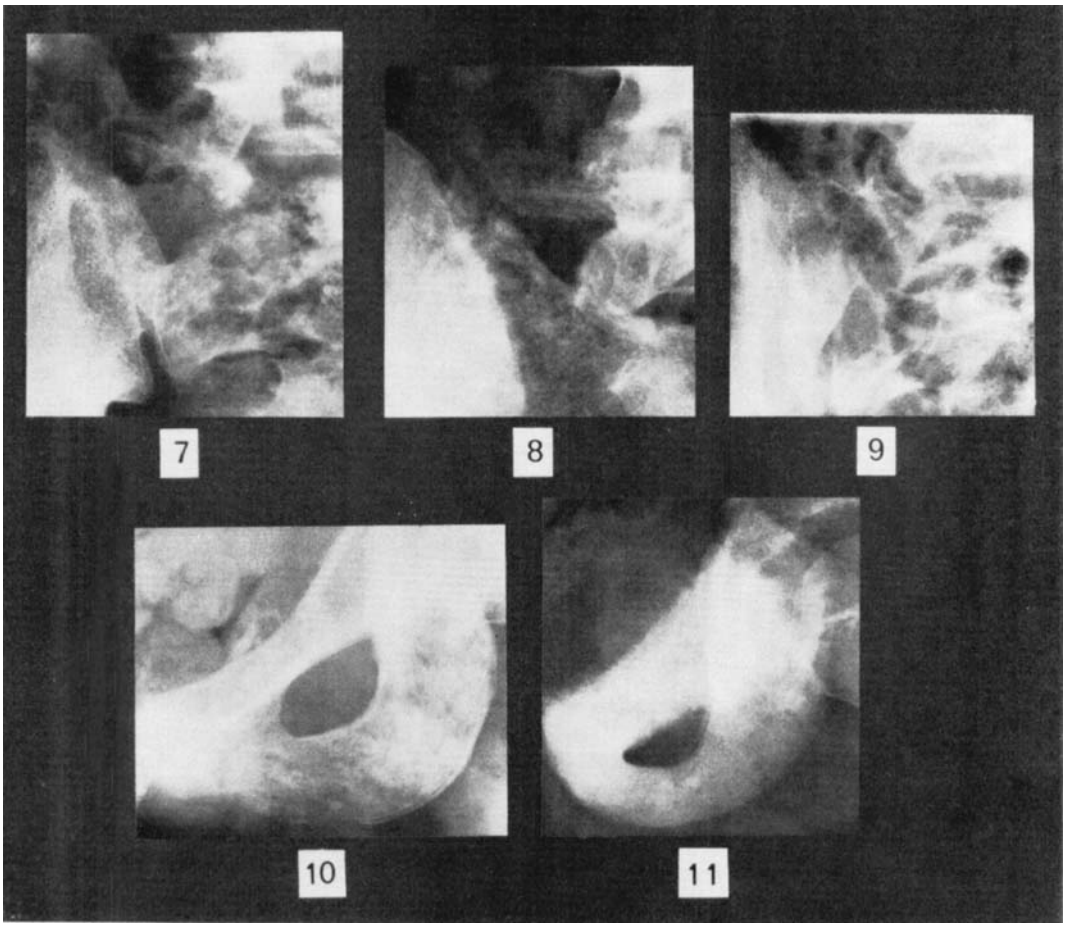
Figure 3. Sclerotic fourth vertebral body due to Ewing's sarcoma.

Figure 4. Vertebra plana in the sixth thoracic vertebral body. Calvé's four criteria are fulfilled. Follow-up after 12 years, complete regeneration.

Figure 5. Another case of vertebra plana in the fifth lumbar vertebral body in the regeneration phase. This picture is quite different from Figure 4.

Figure 6. This case of eosinophilic granuloma of the lytic type (Kaye & Freiberger 1969) in the first lumbar vertebral body was erroneously diagnosed as a metastasis from a haemangioma sarcoma because the 5-year-old girl previously had undergone operation for a tumour of this type situated on the back. Complete regeneration after one year.
Compare 1–3 with 4–6.

and only pain (local or radiating) was of any significance. The physical signs available from the notes were of little diagnostic help except in two cases where a paraplegia developed, one patient having a haemangioma simplex and the other a teratoid tumour. This is in contrast to the findings in primary tumours of the spinal cord where neurological disorders were frequent (Jørgensen et al.



Figures 7 and 8. Illustrates lytic lesions in the sacral and iliac bones, one due to Ewing's sarcoma (7) and the other (8) caused by osteogenic sarcoma. Both lesions appeared quite similar and permitted no safe diagnosis based on these X-rays even though scanty calcification and new bone formation were seen in the soft tissue in Figure 8.

Figure 9. An osteoclastoma in a typical localisation. The discreet lesion is primarily lytic and expansive in the right side of the sacral bone.

Figures 10 and 11. Two examples of Ewing's sarcoma in the pubic bone. In Figure 10 mostly sclerotic and in Figure 11 the sunburst appearance (Dahlin 1970) which is normally characteristic of osteogenic sarcoma.

1975). Of the more constant registered physical signs (Table 6) only the X-ray picture was positive in all except two cases (one Ewing's sarcoma and one osteoblastoma) and with a high frequency of malignant tumours (Table 2) localised in the sacral column and pelvis. However, even though a bone lesion on X-ray was seen in almost every case and sometimes was quite characteristic, the X-ray picture of the most common benign (histiocytosis X) and malignant (Ewing's sarcoma) tumours was quite confusing (Figures 1–6) and it was often difficult to separate these two conditions from each other (Poulsen et al. 1975) and also to some extent from other malignant conditions (Figures 7–11). The most

Table 6. Primary laboratory findings.

	Benign tumours	Malignant tumours
E.S.R. 10 mm/h	10	10
Elevated alkaline phosphatase	4 (8)	4 (5)
Positive X-ray findings	16	16

Figures in brackets indicate the number of patients whose alkaline phosphatase level was not available.

common benign lesion in this material was histiocytosis X, including five cases of vertebra plana without biopsy, but the completely benign course and primary X-rays fulfilling Calvé's (1926) four criteria, used by Compere et al. (1954) in the diagnosis of eosinophilic granuloma, made the classification reasonable.

Taking into consideration the poor survival rate of our patients with malignant tumours (compared with malignant tumours localised to the extremities where a more radical therapy is possible: 35 per cent 5-year survival rate (Kaae 1975)), it is essential to have a quick and exact diagnosis and this can in our view only be achieved by biopsy. Surgical biopsy in the pelvis and spine is very often an extensive procedure and therefore aspiration biopsy has been used with great success for many years in differentiating between malignant and benign lesions (Dahlin 1970, Ottolenglhi et al. 1964) and aspiration biopsy should perhaps be the diagnostic method of choice in many cases.

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Correspondence to: Jens O. Poulsen, Orthopaedic Hospital, Randersvej 1, DK-8200 Aarhus N, Denmark.