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INTRASPINAL TUMOURS IN THE FIRST TWO DECADES OF LIFE

Clinical and Radiological Features

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Twenty-eight patients with spinal tumours (11 malignant and 17 benign) detected in their first two decades of life have been reviewed. Twenty-six of the 28 patients had neurological disturbances, and a significant difference in the duration of debut symptoms in the benign and malignant groups could be demonstrated. X-ray survey was positive in 11 cases in the benign group and in three cases in the malignant group.

Key words: tumour; intraspinal tumour; malignant tumour; benign tumour; tumours in childhood

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Spinal tumours in adolescence are rare and the condition is often overlooked. Early diagnosis and surgery are important to avoid the neurological consequences of growth of an intraspinal tumour. The purpose of this study was to investigate:

1. The diagnostic value of early symptoms and physical signs.
2. The diagnostic value of primary X-ray findings.
3. The histological type and survival rate.

PATIENTS AND METHOD

Twenty-eight patients with intraspinal tumours (17 benign and 11 malignant) detected during their first two decades of life were selected from the files in the Neurosurgical Department of the Municipal Hospital and the Orthopaedic Hospital, Aarhus.

The records were reviewed with reference to the duration of the primary complaints, the survival rate and the histological typing.

Protein content in the spinal fluid was noted.

All X-rays were reviewed. All tumours had been verified by histology. All 17 benign tumours had been operated on, 14 with total removal of the tumour. Nine of the 11 malignant tumours were operated on and in seven cases surgery was followed by irradiation therapy.

RESULTS

The age and sex distribution can be seen in Table 1; the topography of malignant and benign tumours is shown in Tables 2 and 3; the primary complaints and primary findings can be seen in Tables 4 and 5. The histological classification is shown in Table 6 and the mean duration of debut symptoms and the survival rate in Table 7.

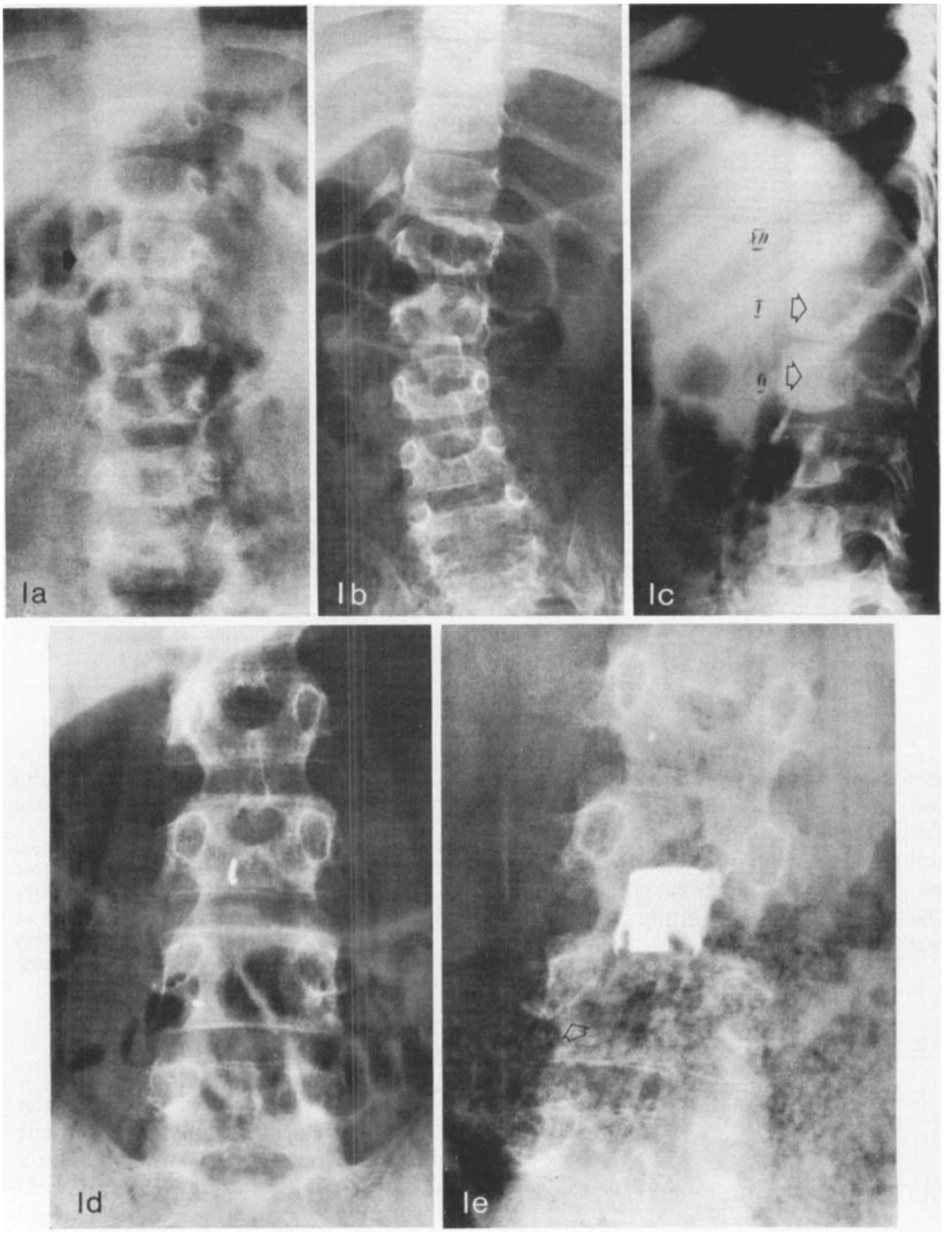
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Table 1. Age and sex distribution.

	Benign	Malignant
> 10 years	9	5
< 10 years	8	6
♂ 13		
♀ 15		

Table 2. Localisation of the 28 intraspinal tumours.

	Benign	Malignant
Cervical	2	2
Thoracic	5	5
Lumbar	8	3
Sacral	2	1
Total	17	11

Table 3. Surgery.

	Benign tumours	Malignant tumours
Operated cases	17	9
Intradural	5	4
Intramedullar	3	1
Extradural	9	6

Table 4. Primary symptoms.

	Benign tumours	Malignant tumours
Local pain	5	5
Radiating pain	7	1
Paraesthesia	2	4
Weakness	6	7
Sphincter disturbances	4	4

DISCUSSION

An early symptom was local or radiating pain, less commonly weakness in a limb or paraesthesia, and there was a significant difference in the duration of debut symptoms in benign and malignant tumours, in contrast to the findings in bone tumours of the spine (P. Thommesen & J. O. Poulsen, personal communication). Neurological signs of intraspinal lesions were found in nearly all cases and corresponded to those found by other authors (Ingraham 1938, da Roza 1964, Stookey 1928).

It is remarkable that so many of the patients had severe neurological damage at the time when the condition was diagnosed and that nine of the eleven patients

Table 5. Physical signs and investigations.

	Benign tumours	Malignant tumours
Minor neurological signs	9	2
Major neurological signs	6	9
Scoliosis	10	3
Positive X-ray survey	11	3
Elevated protein content in spinal fluid	8	3
Myelography performed	14	9

The neurological signs included motor, sensory, tactic and reflex disturbances and were called minor neurological signs when the function of the patient was slightly disturbed and major neurological signs when the patient was severely disabled and confined to bed.

Figure 1.

a. Boy, 1 year of age, with minor neurological signs. Notice the slightly enlarged interpedicular distance in the first lumbar vertebra. The patient was not treated at this time.

b–c. Same case as a. Three years later the boy was readmitted (now 4 years old). Scoliosis was present and there were radiological signs of a large, but slow growing intraspinal tumour in the upper lumbar and lower thoracic region. A ganglioneurinoma was partly removed by surgery.

d. Four-year-old girl with Rechlinghausens Neurofibromatosis suffering from lumbar pain and irradiating pain in the right leg. The surgeon removed a neurofibroma growing in the space under the right fourth pedicle. The postoperative X-ray shows the marked asymmetry of the pedicles of the fourth lumbar vertebra, which might be a sign of the tumour.

e. Same case as d, showing a preoperative myelography which demonstrated the upper border of the tumour.

Table 6. Classification of the 28 intraspinal tumours.

	Benign	Malignant
Primary tumours:		
Meningeoma	1	
Neurinoma	8	1
Dermoids	7	
Teratoid tumour		1
Sympathicoblastoma		3
Glioma		1
Astrocytoma	1	
Secondary to other CNS tumours:		
Plexuspapilloma		1
Retinoblastoma		1
Medulloblastoma		1
First manifestation of systemic diseases:		
Lymphosarcoma		1
Leukaemia		1
Total	17	11

Figure 2.
a. Thoracic hourglass-shaped neurinoma with calcification and deplacement of structures in the mediastinum.
b. Same case as a. Tomography clearly demonstrates the erosion of the seventh left pedicle indicating intraspinal distribution of the tumour.
c. Typical hourglass-shaped neurinoma at the sixth thoracic segment with a marked scoliosis.
d. same case as c. A tomogram demonstrates the deformation of pedicles and the extraspinal extension.

in the malignant group were confined to bed because of severe neurological symptoms at the time of admission to hospital.

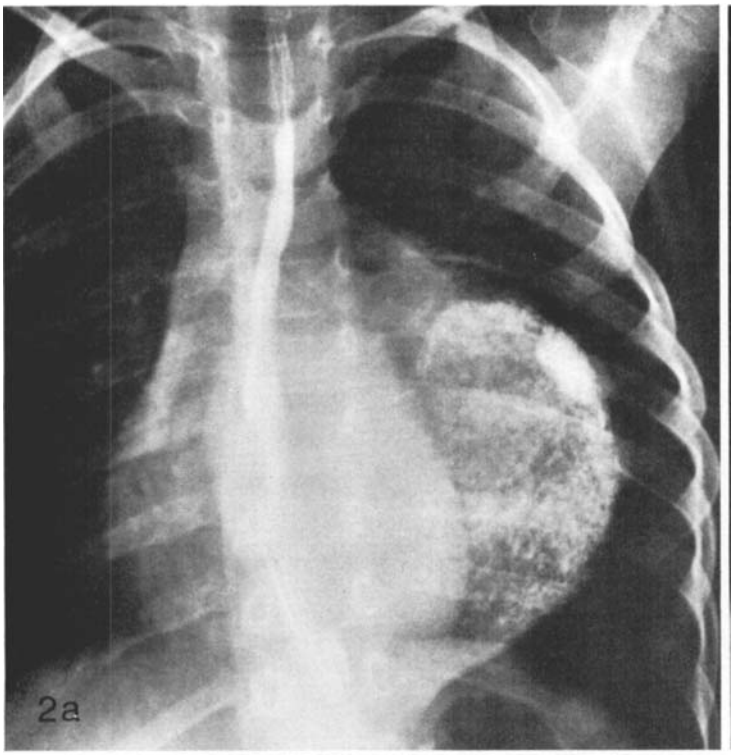
Scoliosis was a rather common sign but was mostly found at the X-ray survey (Banna & Gryspeerdt 1971). Positive X-ray findings were seen in half of the cases showing characteristic signs of intraspinal space occupying lesions as desribed by Friedmann et al. (1972) and Hinck et al. (1966). The radiological signs were most frequent in the group of benign tumours.

In cases where the spinal fluid was analysed, this was of diagnostic value. Often the radiological and clinical features were so characteristic that no spinal fluid was taken. When myelography was performed it showed the location and in some cases the extent of the tumours.

In contrast to other studies (Friedmann et al. 1972, Hamby 1944, Lombardi & Passerini 1961) there is a rather high frequence of neurinomas and a rather low frequence of gliomas in this material. The dermoids were the most frequent tumour type in the first decade of life, often following previous meningitis. The survival rate was rather high for the benign group. The survival rate in the malignant group was reasonable follow-

Table 7. Mean duration of debut symptoms and survival rate.

	Mean duration of debut symptoms	Mean survival	Mean observation time
Benign tumours (17 patients)	18 months (min. 1.5 months, max. 10 years)	1 patient died after 9 months	16 patients alive: 4 years (min. 1 year, max. 10 years)
Malignant tumours (11 patients)	1.8 months (min. 0.5 months, max. 6 years)	6 patients have died: 12 months (min. 0.25 months, max. 4.8 years)	5 patients alive: 3 years (min. 1 year, max. 5 years)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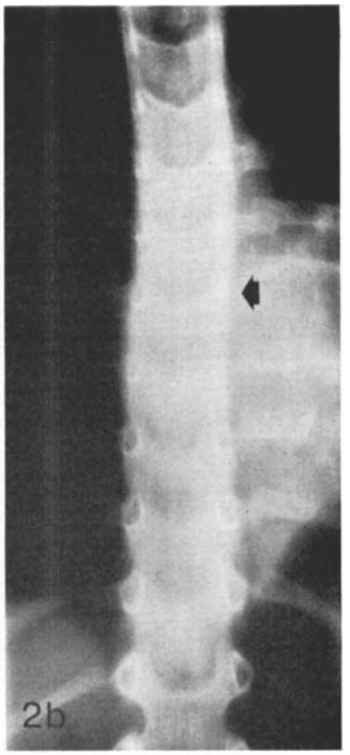
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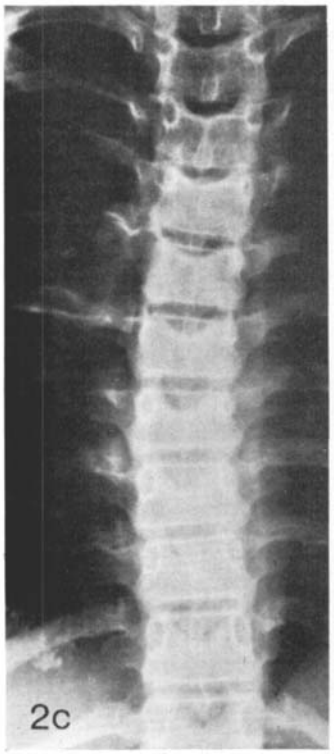
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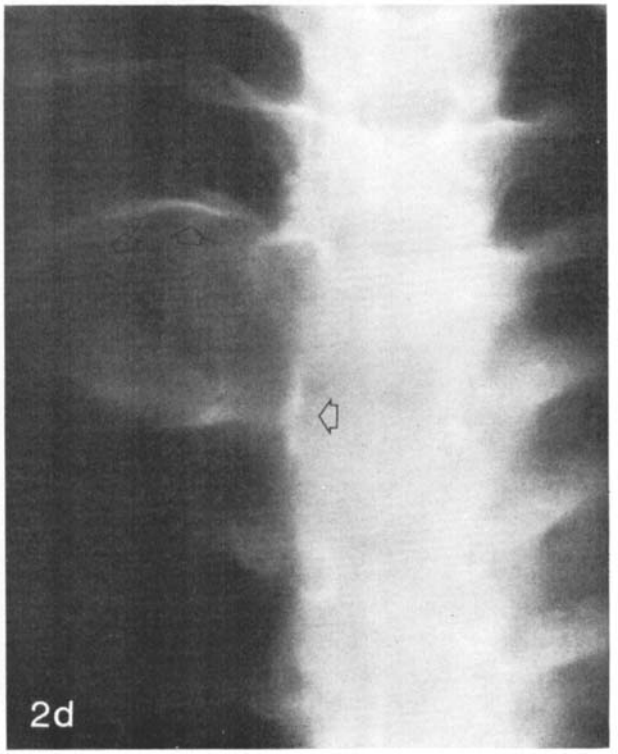
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ing surgery combined with irradiation therapy and chemotherapy depending on the histological diagnosis.

REFERENCES

Banna, M. & Gryspeerdt, G. L. (1971) Review article. Intraspinal tumours in children (excluding dysraphism). *Clin. Radiol.* **22**, 17.

Friedmann, G., Thun, F. & Bützler, H.-O. (1972) Röntgendiagnostik raumfordernder, intraspinaler Prozesse im Kindesalter. *Fortschr. Röntgenstr.* **117**, 408.

Hamby, W. B. (1944) Tumours in the spinal canal in childhood. *J. Neuropath. exp. Neurol.* **3**, 397.

Hinck, V. C., Clark, W. M. & Hopkins, C. E. (1966) Normal interpediculate distances (minimum and maximum) in children and adults. *Amer. J. Roentgenol.* **97**, 141.

Ingraham, F. D. (1938) Intraspinal tumours in infancy and childhood. *Amer. J. Surg.* **93**, 342.

Lombardi, G. & Passerini, A. (1961) Spinal cord tumours. *Radiology* **76**, 381.

Roza, A. C. da. (1964) Primary intraspinal tumours: their clinical presentation and diagnosis. *J. Bone Jt Surg.* **46**-B, 8.

Stookey, B. (1928) Tumours of the spinal cord in childhood. *Amer. J. Dis. Child.* **36**, 1184.

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