

J. F. GOODWIN: DISORDERS OF THE OUTFLOW TRACT OF THE LEFT VENTRICLE

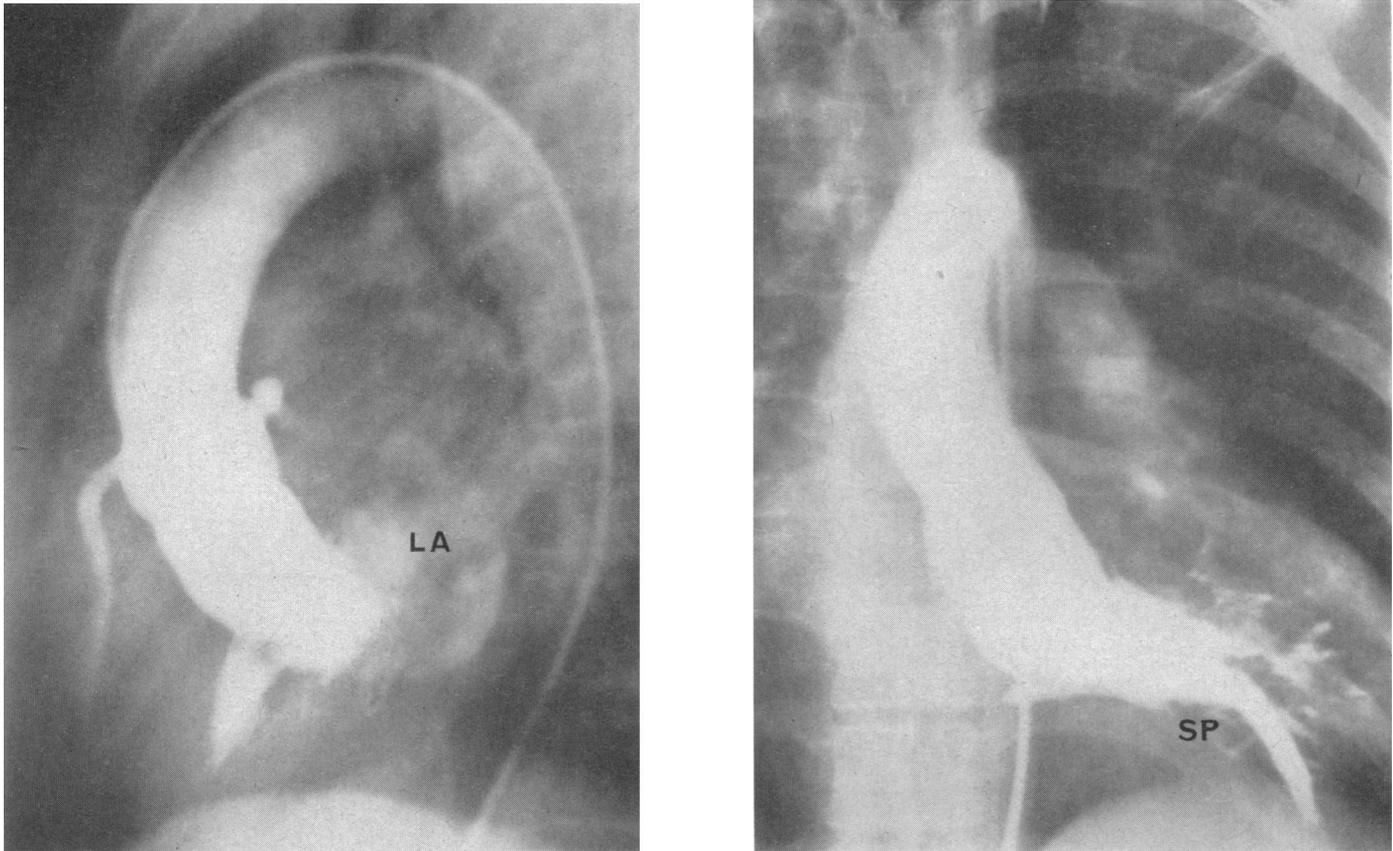


FIG. IV.—Left ventricular angiogram (systolic phase), lateral projection (left) and frontal projection (right), in hypertrophic obstructive cardiomyopathy, showing normal aorta and aortic valve, large coronary arteries, and narrowing of ventricular cavity with intrusion of large muscle masses into the cavity, especially in the region of the septum and papillary muscles (SP). Contrast medium is seen in the left atrium (LA) owing to mitral regurgitation.

B. CORRIN AND J. C. MEADOWS: SKELETAL METASTASES FROM CEREBELLAR MEDULLOBLASTOMA



FIG. 1



FIG. 2

FIGS. 1 and 2.—Osteosclerotic metastases in a vertebral body and acetabulum.

megaly, pigmentation, and cardiomegaly. He was, however, able to work as a diamond setter. An arteriovenous shunt was inserted in September 1966 to enable transfusions to be continued. The shunt clotted in the first few days and recannulation was performed and phenindione commenced. There were no further clotting episodes. He had four transfusions with 9 units of blood in the next two months. He died from heart failure and at necropsy the most significant feature was cardiomyopathy due to haemosiderosis.

METHODS

Infrared Photography.—This has been tried with the object of delineating the superficial venous system, but has not been found to be of value in our cases.

Arteriovenography.—In the first patient radiology of the arteriovenous anatomy was conducted as a secondary procedure when the inadequate venous cannula clotted. At this stage injection of Hypaque along the patent arterial cannula produced good outline of available veins in the venous phase (Fig. 1). This made the subsequent definitive venous cannulation much easier. In the second patient arteriovenography was performed as a first step by retrograde femoral aortography (Seldinger, 1953). Good vessels for cannulation were therefore selected from the outset (Fig. 2).

Surgical Technique.—The standard technique for insertion of these shunts was employed, but without crimp rings or external stabilizers (Quinton, Dillard, and Scribner, 1960). This was made difficult by the amount of bleeding which occurred from the numerous tiny collateral vessels lying in rather rigid fibrous tissue. In addition, the rigidity of the tissues and the thinness of the vein wall meant that wound closure after insertion of the cannula brought about compression of the vein

around the vessel tip and rapid clotting. Careful site selection and extensive and careful undercutting of the skin flaps was found to solve this problem.

Healing.—No clinical diminution of healing rate was noted in our cases.

Transfusion Technique.—For transfusion a Y-shaped sterile connector (manufactured by Capon Heaton Ltd.) is attached to a standard drip set and its other two limbs are inserted between the shunt ends. The drip stand may have to be extended to provide a sufficient pressure head for the transfusion to proceed.

No diminution in blood flow through either cannula occurs and therefore there is no tendency towards clotting.

We would like to thank Dr. C. Hawkins and Dr. A. Paton for allowing us to treat their patients, and Dr. D. Officer and Dr. J. Taylor for their radiological and haematological help respectively; we are also grateful to Mr. T. Dee for the photographs shown here.

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Skeletal Metastases from Cerebellar Medulloblastoma

[WITH SPECIAL PLATE]

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Wohlwill (1930) and Nelson (1936) first drew attention to possible systemic metastases from medulloblastoma of the cerebellum. The authenticity of their cases was contested at the time, but since then a small number of reports (Rubinstein, 1959; Paterson, 1961; Oberman *et al.*, 1963; Drachman *et al.*, 1963; Makeever and King, 1966; Schenk, 1966) have emerged in which there appears to have been unequivocal proof of distant metastases at postmortem examination. Other cases have been described where necropsy has not been performed, or where only radiological evidence is provided, and in these the data are often open to some doubt. To overcome such difficulties, Weiss (1955) formulated four criteria to aid the establishment of a definite relation between primary tumour and metastasis: (1) the proved presence of a single histologically characteristic tumour of the central nervous system; (2) a clinical history indicating that this accounted for the initial symptoms; (3) a complete necropsy to exclude the presence of another primary site; and (4) identical morphology of primary lesion and metastases, with due allowance for differences in degree of anaplasia.

The present case fulfils these criteria, and so joins a small group of fully authenticated medulloblastomas metastasizing outside the central nervous system.

CASE REPORT

A 20-year-old man was admitted to hospital in October 1961 with a month's history of nausea, occipital headache, and unsteady-

ness of gait. Examination showed papilloedema, left-sided cerebellar signs, and nystagmus, and a clinical diagnosis of posterior fossa tumour was made, which was supported by ancillary investigations.

At operation, tumour was found to occupy much of the left cerebellum, reaching the side of the brain stem and well into the vermis. It was removed macroscopically. Postoperatively he received radiotherapy to the posterior fossa, after which his symptoms and signs disappeared. Nine months later he complained of low back pain spreading down the right thigh posteriorly. Meningeal seedlings were suspected, and radiotherapy was given to the entire spinal-cord area.

He remained well for over a year, but in July 1964, while playing tennis, pain recurred abruptly in the same distribution. Bilateral limitation of straight-leg raising was the only abnormal physical sign. Plain x-ray films were normal, but myelography showed lumbar disc protrusion. He improved markedly with bed rest and skin traction, but some months later his legs weakened and sphincter disturbances developed. He became bed-ridden and was readmitted in September 1965 with the signs of a cauda equina lesion. A radiograph of the spine showed a sclerotic lesion in the posterior part of the seventh thoracic vertebra (Special Plate, Fig. 1), and further x-ray films showed a similar focus in the left acetabulum (Special Plate, Fig. 2). Lumbar puncture repeatedly failed, but myelography, performed by the cisternal route, showed a total block opposite the T 11-12 disc-space. A course of palliative radiotherapy was given, but he died in coma in November 1965.

PATHOLOGICAL FINDINGS

1961 Biopsy.—The cerebellar tumour consisted of closely packed small ovoid cells with scanty cytoplasm and irregular nuclei, arranged in interweaving bundles. They showed prominent nucleoli and numerous mitoses (Fig. 1). Unipolar and bipolar cell forms, terminating in short fine fibrillary processes, were common. Rosette formation was not seen, but the appearances of the tumour are thought to be characteristic of medulloblastoma.

Postmortem Examination.—The relevant findings were limited to the central nervous system and skeleton. A thorough search failed to detect any tumour in lungs, adrenals, sympathetic chains,

prostate, or elsewhere. Both cerebral hemispheres showed convolitional flattening and uncal grooving. The left lobe of the cerebellum was adherent to the tentorium, in which there were surgical clips. A cavity occupied much of the cerebellar hemisphere, its medial wall consisting of partly necrotic tumour. The fourth ventricle was occluded by recent haemorrhage and the aqueduct was dilated. Tumour filled the third and lateral ventricles except for the posterior

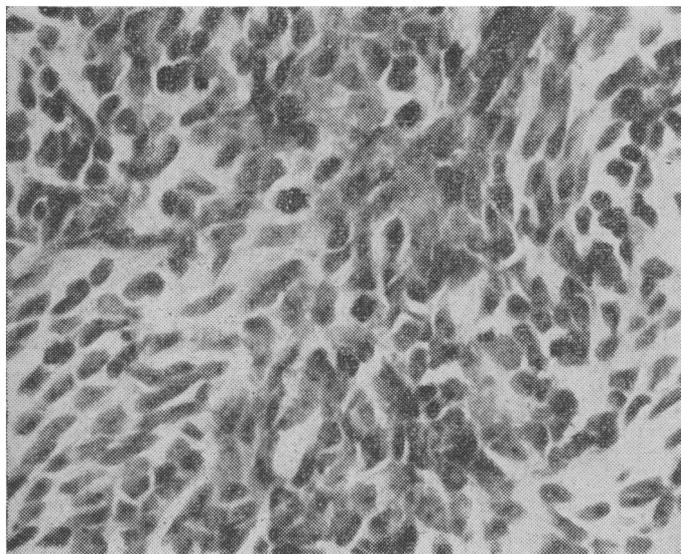


FIG. I.—Tumour consists of closely packed slightly elongated cells, many of which terminate in a short fibrillary process. Three mitoses are seen towards the centre of the field. (Haematoxylin and eosin. $\times 465$.)

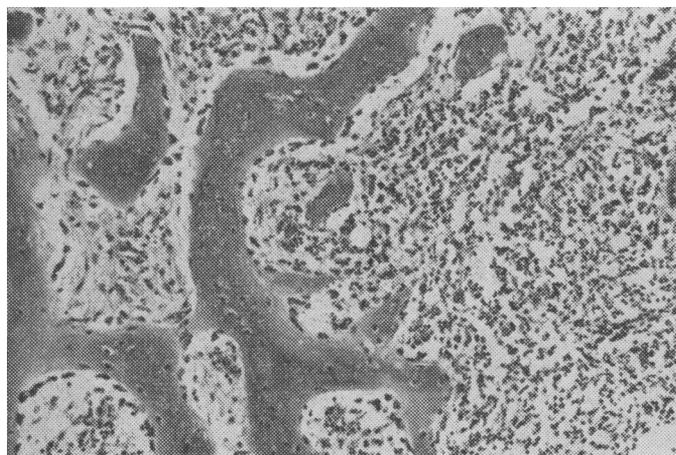


FIG. II.—Acetabular metastasis. Spicules of bone are surrounded by highly cellular tumour tissue. Osteoblastic proliferation is pronounced and there is new bone formation. (Haematoxylin and eosin. $\times 100$.)

horns, which were dilated and contained small ependymal seedlings. The lower part of the spinal cord and the cauda equina were encased in neoplasm. In the skeleton two osteosclerotic foci, each about 2 cm. in diameter, were verified in the body of the seventh thoracic vertebra and the roof of the left acetabulum.

The histology of the cerebellar tumour and its cerebrospinal metastases was similar throughout and closely resembled the original biopsy. Phosphotungstic acid haematoxylin (for neuroglial fibres), Bielschowsky's neurofibril stain, and Foot's reticulin stain were all negative. The tentorium cerebelli was infiltrated with growth, and both skeletal lesions contained tumour cells similar to those seen in the nervous system. The identity of the various tumour deposits was readily apparent and the appearances did not suggest a primary skeletal neoplasm. In the acetabulum the tumour was highly cellular and was associated with much osteoblastic activity and new bone formation (Fig. II). The vertebral deposit showed pronounced osteosclerosis and fibrosis of the marrow cavity, among which were scanty small collections of tumour cells.

DISCUSSION

The primary tumour presented the histological appearances of a medulloblastoma, and the osseous and neural deposits were virtually identical. A full postmortem examination failed to disclose an occult primary growth elsewhere, and the evidence for extradural metastasis from a cerebellar medulloblastoma therefore appeared conclusive.

Review of the few other recorded cases mentioned above shows that distant metastases may be widespread or isolated, and, though commonest in bone, have also occurred in lymph nodes, ovary, liver, kidney, and pancreas. The present case was notable for the dense sclerosis of the metastases. Black and Keats (1964) described a similar radiological appearance, but more commonly the metastases are osteolytic.

It has been suggested that operative intervention and radiotherapy may favour the development of systemic metastases, but as both are the rule this is difficult to assess. Clear evidence of extradural extension at the site of operation with spread to cervical nodes was described by Oberman *et al.* (1963), and in our case there was invasion of the tentorium cerebelli at the operation site. Rubinstein's (1959) case, however, showed that operative intervention is not essential for systemic dissemination. Prolongation of life by radiotherapy might also increase the chances of extradural metastases, but widespread systemic dissemination has been recorded within months of the initial diagnosis (Paterson, 1961; Oberman *et al.*, 1963).

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