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Case report

Congenital neuroblastoma in a fetus with multiple malformations

Metastasis in the umbilical cord as a cause of intrauterin death

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Summary. A fetus that died in utero between the 16th and 20th week of gestation exhibited multiple malformations and tumour tissue, retroperitoneally and in both adrenals, histologically compatible with neuroblastoma. In the cord there was a metastasis occluding the vessels, the possible cause of the intrauterin death.

Key words: Congenital neuroblastoma – Multiple congenital malformations – Intrauterin death – Umbilical cord metastasis

Introduction

Neuroblastoma is the most commen solid tumour outside the central nervous system in children (Wells 1940). It has been reported in neonates, as metastases in the infant (Evans 1965) and as spread to the placenta (Smith et al. 1980). A case like the present one, of neuroblastoma in a fetus prior to the 20th week of gestation, and associated with multiple congenital malformations, has not been reported previously.

Case report

The mother was an 31-year-old gravida II who had 4 years previously given birth to a normal boy weighing 3,800 g. During her second pregnancy intrauterine fetal death was diagnosed in the 20th week. After induction with prostaglandin she delivered a macerated fetus whose foot length was 20 mm and crown-rump length 10 cm. It showed agenesis of the kidneys and urinary tract, anal atresia, aplasia of the entire left lower limb, and abscence of the right thumb. There was lack of fusion of the posterior part of the skull, from the occiput to the vertex. In the retroperitoneal space there was illdefined, pale brown tumour tissue at the site of the adrenal glands. In the umbilical cord, which had only one artery and one vein, there was a spindleshaped, brown thickening about 1 cm from the fetus.

Histological examination. Sections of the retroperitoneal tumour, fixed in formalin and embedded in paraffin, showed a small-cell blastic tumour in the medulla of both adrenals with

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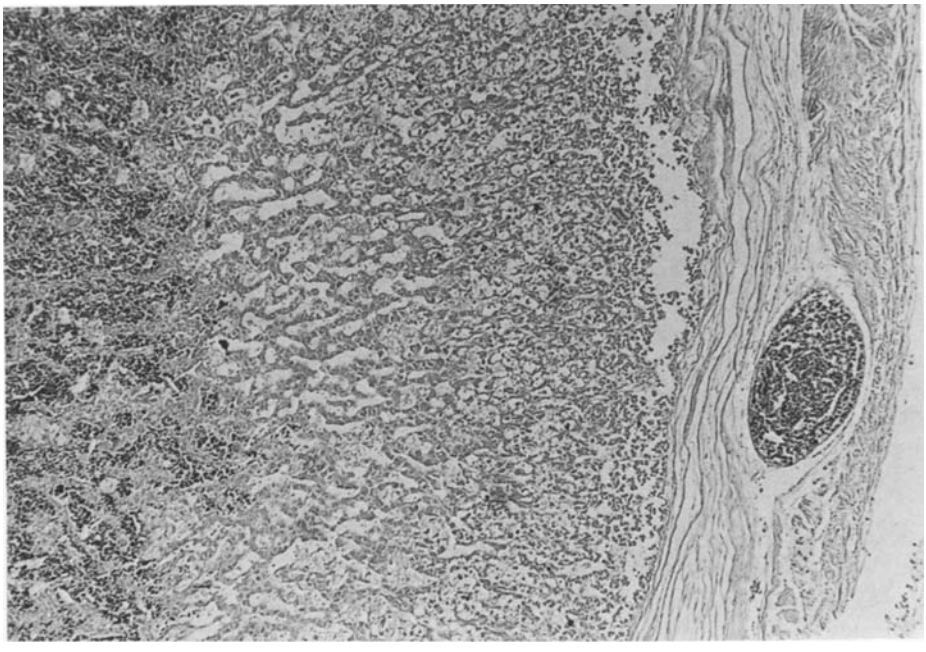

Fig. 1. Segment of the adrenal with tumour infiltration in the medulla (left) and extraadrenal vascular invasion (right). HE × 80

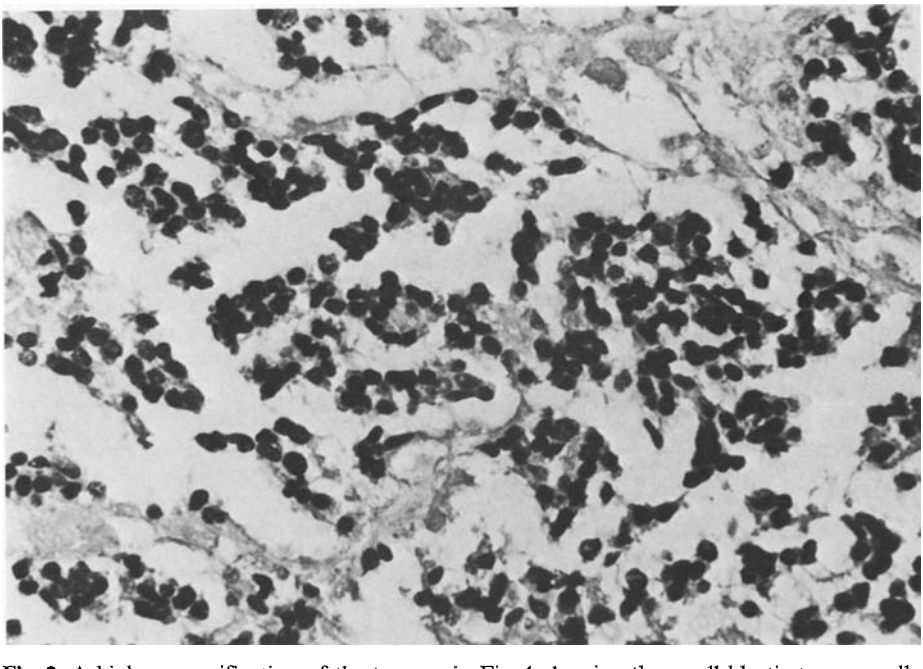

Fig. 2. A higher magnification of the tumour in Fig. 1 showing the small blastic tumour cells with sparse cytoplasm and hyperchromatic nuclei. HE × 320

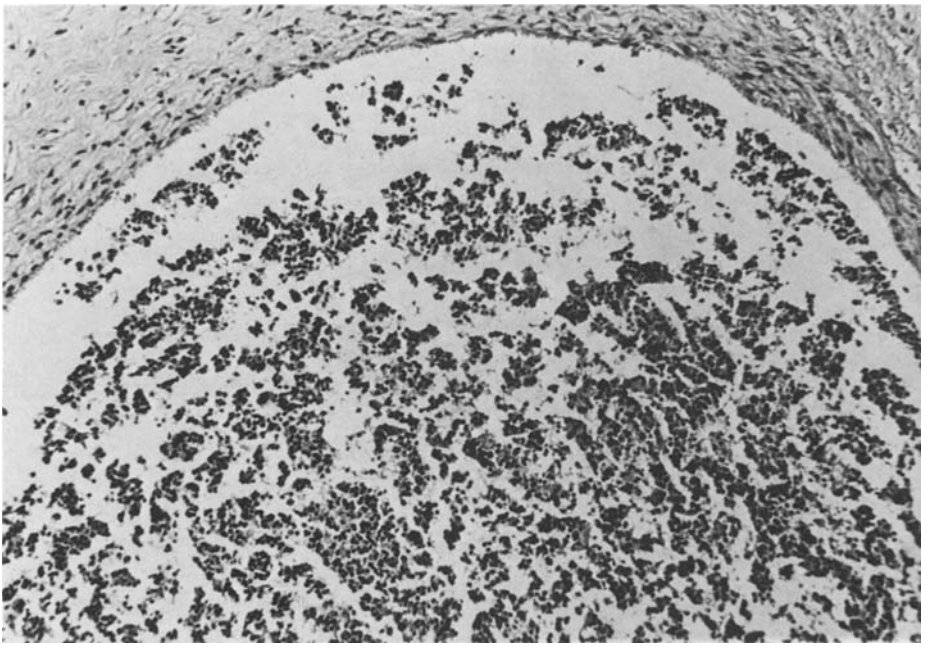

Fig. 3. Intravascular tumour tissue in the umbilical cord. HE × 120

extra-adrenal vascular invasion and infiltration of adjacent striated muscle (Figs. 1 and 2). The tumour was built up of small cells with sparse cytoplasm and uniform, hyperchromatic nuclei. There were no rosettes or tubular formations.

Similar histological appearances, with interstitial infiltration, were found in the umbilical cord, in both the artery and the vein (Fig. 3).

A diagnosis of neuroblastoma was made because of the appearance of the tumour and its origin in the adrenal medulla. Electron microscopy was not performed, as the tumour was partially necrotic and autolysed. No tumour infiltration was found in the placenta or other organs. It was not possible to locate the sympathetic ganglia along the spine because of post-mortem changes.

Discussion

According to Wells (1940), neuroblastoma constitutes 25% of congenital malignancies. Its incidence has been reported to be 1 in 10,000 liveborn infants (Bertolone 1977).

Neuroblastoma may arise from the sympathetic nervous system in any part of the body. Schneider et al. (1965) reported that of primary neuroblastomas observed neonatally 47.5% had involved one adrenal, 15% both adrenals, and 12.5% the entire pelvis. At the time of diagnosis 51.7% are stated to have metastases.

In a few cases there seems to be a question of multifocal origin (Birner 1961).

Congenital neuroblastoma has only rarely given rise to intrauterine fetal death. Potter and Parrish (1942) have reported a case of neuroblastoma, ganglion neuroma, and fibroneuroma involving all sympathetic ganglia, the adrenals, and the bladder wall, with multiple tumour foci in the liver of

a stillborn premature infant. Birner (1961) has reported the case of a circumscribed neuroblastoma in the left adrenal and diffuse tumour infiltration in the liver, adrenals, kidneys, and lungs in an infant that died in utero at term.

The cause of the early intrauterine death in our case is most probably the metastasis in the cord with the consequently compromised blood supply to and from the placenta. Owing to the severe malformations and the pronounced maceration of the fetus, however, it is not possible to rule out other causes of death.

Nephroblastoma (Nakamura et al. 1981) and other congenital tumours (Bertolone 1977) are said to be associated with an increased frequency of congenital malformations. This does not appear to apply to neuroblastoma. In their review on neonatal neuroblastoma, Schneider et al. (1965) stated that among 47 cases two had congenital malformations. In one case (Potter and Parrish 1942) it was hydrocephalus, contractures of the fingers, and bilateral pes equinovarus and in the other case (Weinberg and Radman 1943) a patent ductus arteriosus. From a study on congenital malignant tumours based upon death certificates, Fraumeni and Miller (1969) reported that among 27 infants with congenital neuroblastoma that died perinatally one had multiple, congenital anomalies (which type is not stated). Berry et al. (1970) could not in their examination of the records of cases of neuroblastoma, nephroblastoma, hepatoblastoma, and teratoma find a significant association between neoplasia and malformations. In particular, there have not been previous reports of aplasia of limbs in association with congenital neuroblastoma. There does not seem to be any reason to assume that there was a relationship between the malformations and the congenital neuroblastoma in our case.

References

Berry CL, Keeling J, Hilton C (1970) Coincidence of congenital malformations and embryonic tumours of childhood. Arch Dis Childh 45:229–231

Bertolone CR (1977) Neonatal oncology. Pediatr Clin North Am 24:585–598

Birner WF (1961) Neuroblastoma as a cause of antenatal death. Am J Obstet Gynecol 82:1388–91

Evans AR (1965) Congenital neuroblastoma. J Clin Pathol 18:54–52

Fraumeni JF Jr, Miller RW (1969) Cancer death in the newborn. Am J Dis Child 117:186–89

Nakamura Y, Nakashima T, Hakashima H, Hashimoto T (1981) Bilateral cystic nephroblastomas and botryoid sarcoma involving vagina and urinary bladder in a child with mikrocephaly, arrhinencephaly and bilateral cataracts. Cancer 48:1012–15

Potter EK, Parrish JM (1942) Neuroblastoma, ganglioneuroma and fibroneuroma in a stillborn fetus. Am J Pathol 18:141–52

Schneider KM, Becker JM, Krasma IH (1965) Neonatal neuroblastoma. Pediatrics 36:359–66

Smith CR, Chan HSL, DeSa DJ (1981) Placental involvement in congenital neuroblastoma. J Clin Pathol 34:785–89

Weinberg T, Radman HM (1943) Fetal dystocia due to neuroblastoma of the adrenals with metastases to the liver. Am J Obstet Gynecol 46:440–44

Wells HG (1940) Occurrence and significance of congenital malignant neoplasma. Arch Pathol 30:535–601

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