Prenatally Diagnosed Cystic Neuroblastoma: A Report of Two Cases

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We report two cases of prenatally diagnosed cystic neuroblastoma (PDCN). In the first case, prenatal ultrasonography (US) at 33 weeks' gestation showed a 30 × 20 mm cyst at the upper pole of the right kidney. The size and content of the mass did not change during pregnancy. Postnatal US showed no change in the cystic mass 4 weeks after birth compared to the prenatal findings. The infant underwent total resection of the tumour at 28 days of age. In the second case, a left cystic mass measuring 50 × 40 mm was detected in a fetus in the 37th week of pregnancy. Postnatal US showed a cystic mass in the left adrenal gland. The US findings showed no change 18 days after birth and the infant underwent total resection of the tumour at 19 days of age. In both cases, pathological examination revealed a neuroblastoma and all of the biological prognostic factors were favourable. Surgical intervention was necessary for a final histological and biological diagnosis to be made. We recommend that prenatally suspected neuroblastomas should normally undergo surgical intervention, unless tumour size decreases within about 1 month after birth. [Asian J Surg 2003;26(4):225–7]

Introduction

Neuroblastoma is an embryonic tumour of sympathetic origin and is known to be one of the most common malignant solid tumours in infancy. The prenatal diagnosis of neuroblastoma has now become feasible owing to recent advances in ultrasonography (US). Prenatally diagnosed neuroblastoma was first reported by Fenart et al in 1983. Since then, approximately 100 cases of prenatally diagnosed neuroblastoma have been described in numerous case reports and a few reviews. Cystic neuroblastomas comprise about 50% of all cases of prenatally diagnosed neuroblastomas, and the incidence of such tumours is far greater than that in the postnatal population. In this study, we report two cases of prenatally diagnosed cystic neuroblastoma (PDCN) and also review the pertinent literature, focusing on the biological findings and clinical course of such cases.

Case reports

Case 1
A circular and homogeneous cyst measuring 30 × 20 mm was identified at the upper pole of the right kidney in a fetus on routine prenatal US at 33 weeks' gestation (Figure 1). The size and contents of the mass did not change thereafter during pregnancy. A female infant was born by spontaneous vaginal delivery at 37 weeks. Postnatal US showed no change in the cystic mass 4 weeks after birth compared to the prenatal findings. Urinary vanillylmandelic acid (VMA) and serum neuron specific enolase (NSE) concentrations increased slightly. The infant underwent total resection of the tumour at 28 days of age. Histological examination revealed a rosette-fibrillary stage I neuroblastoma based on the criteria of the International Neuroblastoma Staging System (INSS). The features were compatible with the favourable group according to Shimada's classification. This case had no MYCN proto-
The detection rate of cystic neuroblastomas is high. Cyst-like lesions are generally easy to detect by US. However, suprarenal cystic masses can also sometimes turn out to be adrenal haemorrhages, extrapulmonary sequestration and hydronephrosis. Sauvat et al reported that a histological analysis of 21 suprarenal localized cystic or mixed masses diagnosed prenatally showed 16 neuroblastomas (76%), two necrotic masses, one adrenal haemorrhage, one bronchogenic cyst, and one sequestration. The prenatal detection and solid appearance of a suprarenal mass makes a diagnosis of neuroblastoma very likely, but the optimal diagnostic modalities and treatments for suprarenal cystic masses have yet to be elucidated.

The literature includes 46 cases of PDCNs, including the two cases in this study. After birth, approximately 50% of PDCNs tended to increase in size, but none of the tumours in the 46 cases decreased in size preoperatively. Approximately 30% of all prenatally detected neuroblastomas demonstrate an elevation in urinary catecholamine levels. However, urinary catecholamines were present in less than 10% of cystic neuroblastomas. In both of our cases, there was no remarkable increase in urinary catecholamine concentrations. On the other hand, metaiodobenzylguanidine (MIBG) scintigraphy has been reported to be helpful in diagnosing neonatal cystic neuroblastomas, with a sensitivity of 70% in the 38 neonatal suprarenal masses tested for MIBG uptake. However, an analysis of the histological findings is necessary to determine the final diagnosis.

Most PDCNs are localized neuroblastomas without poor prognostic factors. Of the 46 PDCNs in the literature, 40 cases were stage I or stage II, five cases were stage IVS, and one case had oncogene amplification and all other prognostic factors [aneuploid, 1p deletion (−), Trk A expression (+)] were favourable. The postoperative period was uneventful and the infant has remained healthy for 2 years after surgery, with no further treatment.

Case 2
A left cystic mass measuring 50 × 40 mm was identified in a fetus on routine prenatal US at 37 weeks' gestation (Figure 2). A male infant was born by spontaneous vaginal delivery at 38 weeks. Postnatal US showed a cystic mass in the left adrenal gland. There was no elevation in either the urinary VMA or homovanillic acid concentrations. US showed no change in the size of the suprarenal cystic mass 18 days after birth and neuroblastoma was deemed most likely. The infant underwent total resection of the tumour at 19 days of age. Pathological examination revealed a rosette-fibrillary stage I neuroblastoma based on INSS classification. This case was considered to belong to the favourable group according to Shimada’s criteria for histology, and all biological prognostic factors [no MYCN amplification, aneuploid, 1p deletion (−), Trk A expression (+)] were favourable. There was no additional treatment. The neonate did well after surgery and no evidence of either metastasis or recurrence has been observed during the 1-year follow-up with US and computed tomography.

Discussion
Neuroblastoma is the most frequent neonatal malignancy. Cystic neuroblastoma is uncommon and its incidence is unknown, but in prenatally detected neuroblastomas, the
was stage IV. MYCN amplification and DNA ploidy were determined in 14 and eight of the 46 resected neuroblastomas, respectively. MYCN amplification was negative in all cases. One case was diploid and seven were aneuploid. In both of our cases, all biological prognostic factors were favourable, as described previously.

Of the 46 PDCNs reported in the literature, tumour extirpations of the primary site were performed in 45 cases, while one case with a stage IV tumour died in the delivery room. The median age at operation was 20.6 days (range, 1 day to 9 weeks). In all cases, no postoperative adjuvant therapies were performed. Follow-up ranged from 2 months to 10 years (mean, 26.4 months). Regarding the outcome, 40 patients were alive and disease-free, three patients were alive with disease, two patients died due to the disease, and the outcome was unknown in one patient. Of the 45 cases undergoing tumour extirpation, four patients had tumour recurrence (3 cases with multiple metastasis, 1 case with local recurrence). However, none of the four cases demonstrated any of the established unfavourable factors. Therefore, the reasons for recurrence are unclear.

In summary, neuroblastoma should be suspected if prenatally detected suprarenal cystic masses increase or do not change in size after birth. However, surgical intervention is necessary to make a final histological diagnosis. It might also be important to further investigate the biological factors and identify other new prognostic factors. We recommend that prenatally suspected neuroblastomas should undergo surgical intervention, unless the size of the tumour decreases within about 1 month after birth. In addition, long-term follow-up for such prenatally diagnosed cases should be conducted carefully.

References