Introduction

Ultrasonography has gained wide obstetrical use in Japan not only for assessment of fetal growth, but also for diagnosis of fetal malnutrition. Ultrasound is extremely useful because it can be used repeatedly without endangering the fetus while visualizing soft tissues. Here we report two cases in which an abnormal mass within the fetus was diagnosed in utero by ultrasound.

Case 1

Historical note: M. Y. is 27 years old, G2P0A2. Menarche occurred at 13 years and periods were regular at 28-day interval, with 5-7 days of normal flow. The past history and family history were non-contributory. She married nonconsanguinely at 24 years.

Prenatal course: Her last menstrual period was 9/30/80 with 5 days flow. She was first seen at 36th week of gestation on 6/11/81 in the outpatient prenatal clinic, Yame Public Hospital. Her previous doctor had not found any fetal abnormalities. She had no X-ray or drug exposure in the early stage of pregnancy. At the first visit, we measured biparietal diameter and determined fetal and placental position by ultrasound (Aloka ECHO CAMER DX MODEL SSD-250, 3.5 MHz). Biparietal diameter was 8.8 cm (normal growth), fetal position was LOP position and the placenta was positioned on the upper anterior wall. At the same time, we found a globular mass (3.7×4.6 cm) in the lower fetal abdomen near the bladder (Fig. 1). It had relatively high density and was surrounded by a capsule. Its size did not change throughout pregnancy. The patients course was uneventful until term except for anemia. Onset of labor was observed at 39 weeks gestation and she delivered a girl seven hours later.

Postnatal course: The infant weighed 2730 g and was in good condition with Apgar score of 9. Her height was 48 cm, girth of chest was 32 cm and girth of head was 32.5 cm. A walnut-sized smooth mass...
A 3.7 cm cystic mass was discovered within the fetal abdomen in vertex position at 36 weeks gestation. (PL: placenta, OT: ovarian tumor, FB: fetal body, FS: fetal spine)

was palpable through the infant's abdomen. There were no other abnormalities. The infant was transferred to the Department of Pediatric Surgery, Kurume University School of Medicine for further work-up. CT-scan revealed the walnut-sized smooth mass which had relatively high density in the pelvic cavity. There was no evidence of hydronephrosis or polycystic kidney because the findings of excretory urogram were normal. The mass was believed to be an ovarian cyst. Operation was performed 11 days after birth based on ultrasound and CT findings of a high density core not consistent with an ordinary cystic mass, and the risk of torsion of the pedicle or rupture of ovarian tumor. Upon entering the peritoneal cavity, no free fluid, blood or adhesion were noted. Right ovarium was identified and drawn out from the peritoneal cavity (Fig. 2). Tumor size was $2.3 \times 1.8$ cm. The left tube and ovarium, and intestine were normal. Oophorectomy was performed. The tumor weighed 5 g and was light brown. The tumor contents included coagulum. There were no compli-
Pathology: The capsule consists of immature follicles and ovarian medulla. Cystic structure is lined by degenerative granulosa epithelium with phagocyte and calcification. The fluid of the cyst is filled with coagulum (Fig. 3, 4). It was diagnosed as a follicle cyst with hemorrhage and calcification.

Case 2

Historical note: K.O. is 26 years old, G1P1 A0. Previous prenatal and postnatal courses were uneventful. First child is normal. Periods were regular at 30-day intervals, with 5 days of normal flow. There was no kidney disease in her family history and her past history was noncontributory. She was married at 22 years in a nonconsanguineous marriage.

Prenatal course: Her last menstrual period was 9/11/80 with 5 days of flow. She was first seen at 33 weeks gestation on 5/01/81 in the outpatient prenatal clinic, Yame Public Hospital. No abnormalities were noted by previous doctor. Multiple cysts were identified in the fetal abdomen by ultrasound at her first visit (Fig. 5). The patient experienced mild toxemia of pregnancy from which she recovered slowly with bed rest and salt restriction. The size and number of cystic echos did not change.
throughout pregnancy. Other findings from ultrasound showed oligohydroamnios. Onset of labor occurred at 40 weeks gestation and she delivered a girl five hours later. Volume of amniotic fluid was under 200 cc and appeared slightly opaque.

Postnatal course: The infant weighed 3030 g and was in good condition with Apgar score of 9. Her height was 49.5 cm, girth of chest was 30 and girth of head was 29. There were no abnormal findings such as Potter face. We identified a hen-egg sized mass in her right upper abdomen, which was relatively difficult to move.

According to abdominal roentgenogram at 5 days, intestine was displaced to the left side by the right posterior mass. As a result, renal dysplasia or hydronephrosis was suspected and the infant was transferred to the Department of Pediatric Surgery, Kurume University School of Medicine for further work-up. CT-scan (Fig. 6a) performed after birth and ultrasound (Fig. 6b) obtained at 39 weeks gestation are shown. Both showed five cysts in her upper abdomen. Their density on CT-scan did not change after using contrast medium. Only the left renal pelvis and ureter were identified by excretory urogram (Fig. 7). Urine catecholamine and its metabolites (HVA, VMA) were normal. Congenital hydronephrosis or multicystic kidney was suspected. Operation was performed at 26 days after birth. Right kidney showed various sized cysts. The kidney measured 7.5 x 5.8 x 5.3 cm and weighed 45 g (Fig. 8). Right ureter was

Fig. 6. CT-scan at 16 days after birth (a) and ultrasound obtained at 39 weeks gestation (b). Both show five cysts in her upper abdomen.

Fig. 7. Excretory urogram finding in case 2 showed only the left renal pelvis and ureter.
Fig. 8. Multicystic kidney. The ureter at the renal hilus was atretic (1 cm). The cysts are predominantly peripheral in location and the central core contains sparse metanephric derivatives.

Pathology: There is abundant fibrous connective tissue with complete loss of normal renal architecture. Only an occasional piece of solid tissue is found, which on section shows some infantile tubules, glomeruli and cartilage (Fig. 9, 10). It is diagnosed as multicystic dysplasia of the kidney with atretic ureter.

Discussion

High-resolution ultrasound equipment makes it possible to diagnose certain fetal anomalies before birth, especially cystic diseases or standing water from obstruction.

Follicle ovarian cysts commonly occur in newborn females. According to Desa’s report (1975), a review of the histology of 332 ovaries from stillbirth and neonatal deaths within 28 days of life showed that follicular cysts, lined by granulosa epithelium and having a diameter greater than 1 mm on a microscopical section, were present in 113 infants (34%). Doshi, et al. (1977) also reported similar rates of infantile ovarian cysts. Desa reported that cysts, whether single or multiple, are more common with increasing gestation, and possibly occurred more commonly in infants of diabetic mothers and in infants where pregnancy has been complicated by rhesus isoimmunization. Morison (1970) ascribed increasing rates of ovarian cysts in infants to excessive stimulation by gonadotrophin.
During pregnancy, the most likely source of gonadotrophin is the placenta. Although most cysts are small and clinically insignificant because they disappear within a few months, enlarged cysts lead to complications of respiratory distress, intra-peritoneal bleeding, rupture of the cyst (Monson, et al. 1978) and presentation as an abdominal mass. Prenatal diagnosis of fetal ovarian cysts by ultrasound is invaluable to postnatal management decisions as in Crade’s report (1980) and this report.

In the past, a variety of classifications and definitions of renal dysplasia have been made (Tsuji, 1975). Histological indications of multicystic kidney are primitive ducts, lined by tall columnar epithelium and surrounded by fibrous muscular collars, and rest of metaplastic cartilage derived from metanephric blastema (Bernstein, 1971). As multicystic kidney is a typical dysplasia resulting from anomalous metanephric differentiation, it was named multicystic dysplasia. Potter (1972) classified 4 types of cystic kidney by periods and types of formation and differentiation of uretral bud ampulla-metanephric blastema. In multicystic kidney, renal pelvis, tubules and nephron are not formed because of early failure of development of the ampulla. Cysts come from dilation of the tip of ampulla. Multicystic kidney was classified as Potter II type. Polycystic kidney (Potter III type), however, differs from multicystic kidney in that it has both normal and abnormal nephrons. It also has cysts of various sizes in the tissue which become collecting tubules and nephron parts.

The rate of incidence in the general population of multicystic kidney is not known, but unilateral multicystic kidney is reported to be the most common cause of palpable abdominal masses in newborn infants in Europe and America (Greene, 1971). Diagnosis in infants can usually be made by palpation of a flank or abdominal mass. But it becomes difficult to discover by palpation with the passing of time. Thus, obstetricians should examine newborns carefully after birth.

We have shown that multicystic kidney is possible to be diagnosed in utero. Prenatal diagnosis of polycystic kidney has also been reported using the same method (Garrett, 1970).

Ultrasonography can give obstetricians much information about the fetus. It should be used on all pregnant women in the second trimester, not only for the assessment of fetal growth and placental position, but also for prenatal diagnosis of fetal malformation and fetal abdominal masses.

References


