Novel diagnostic procedure

Allantoid cyst in the umbilical cord diagnosed with B-flow ultrasound

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Allantoid cysts are true cysts in the umbilical cord. They arise from persistent structures of allantois, and the cysts are filled with urine because of a connection to the urinary bladder. Allantoid cysts are located centrally in the umbilical cord and separate the umbilical cord vessels. B-flow ultrasound is a new technique illustrating blood flow. This method is independent of the insonation angle and therefore superior to Doppler ultrasound visualising long segments of vessels with a winding course. The authors present a case with allantoid cysts diagnosed with B-flow ultrasound.

BACKGROUND

True cysts in the umbilical cord arise from the omphalomesenteric duct or from the allantois (urachus), and the inside of these cysts is covered with epithelium. Pseudocysts arise from local degeneration or from oedema in Wharton's jelly and the inside is not covered with epithelium.¹ Pseudocysts and omphalomesenteric cysts are associated with chromosomal abnormalities.¹ Allantoid cysts are not associated with chromosomal abnormalities, thus an exact prenatal diagnosis is important.

Allantois is connected with the urinary bladder, but disappears in the 7th embryonic week.^{2–3} A persistent allantois creates a connection between the urinary bladder and the umbilical cord, and the incidence at delivery is from 0.3 to 1.5/100 000, and three times more common in boys than girls.⁴ Urine passing through a patent allantois might create allantoid cysts located centrally in the umbilical cord. These cysts typically separate the umbilical cord vessels. Allantoid cysts usually rupture spontaneously in the third trimester.^{5–8} A patent allantois can be diagnosed with ultrasound.^{2 5 7–9}

B-flow ultrasound is a new ultrasound technique illustrating blood flow. Erythrocytes in flowing blood are imaged by a subtraction mode. Stationary structures such as vessel walls are subtracted and only moving particles are imaged. The brightness of the colour signal corresponds to the flow velocity. B-flow does not use the Doppler principle and therefore this technique is not angle dependent.^{10 11} B-flow is useful in visualising blood vessels with a winding course like the vessels in the umbilical cord. We present a case with an allantoid cyst diagnosed with B-flow ultrasound.

CASE PRESENTATION

A 39-year-old woman, gravida 2, para 1 asked for a first trimester ultrasound examination. Crown-rump length was measured to 75 mm, corresponding to 13–14 weeks gestational age. By combining measurements of nuchal translucency and maternal blood tests the probability for chromosomal abnormalities were calculated to be <1/2000

for trisomi 21, <1/5000 for trisomi 13 and <1/18000 for trisomi 18. The ultrasound examination demonstrated two cysts measuring 22×19 mm and 10×10 mm in the umbilical cord (figure 1). No other abnormalities were seen.

The cysts increased in size during the second trimester and in the 28th pregnancy week they measured 72×49 mm and 24×26 mm. A three-dimensional ultrasound acquisition with B-flow was performed, and separation of the umbilical cord vessels around the cyst was clearly seen (figure 2 and videos 1 and 2). Thus, the cyst could be diagnosed as an allantoid cyst. The ultrasound examinations were performed with Voluson E8 ultrasound scanner (Zipf, Austria) with 3.5–7.5 MHz multi-frequency transducer.

Video 1 STIC (spatio-temporal image correlation) acquisition and B-flow ultrasound illustrating the placenta and the two umbilical arteries separated around an allantoid cyst.10.1136/bcr.03.2012.6064v1

Video 2 Rotation video illustrating placenta and the umbilical arteries.10.1136/bcr.03.2012.6064v2

Figure 1 A transverse abdominal section of a first trimester fetus with cyst in the umbilical cord.

Figure 2 B-flow ultrasound illustrating the placenta and the two umbilical arteries separated around an allantoic cyst.

Figure 3 Umbilical cord with ruptured cyst.

Figure 4 Pathological anatomical image showing endothelium covered inside of the cyst.

INVESTIGATIONS

An amniocentesis was performed and the fetal karyotype was 46, XY.

DIFFERENTIAL DIAGNOSIS

- ▶ Omphalocele
- ▶ Pseudocyst
- ▶ Omphalomesenteric cyst

OUTCOME AND FOLLOW-UP

In the 31st pregnancy week the cysts had disappeared. Because of placenta previa, a caesarean section was

performed in week 38, and a healthy boy was delivered. Ruptured cysts were seen in the umbilical cord (figure 3), and pathological anatomical examination demonstrated epithelium covered inside of the cysts (figure 4).

DISCUSSION

We combined B-flow ultrasound and three-dimensional techniques diagnosing allantoic cysts in the umbilical cord. Allantois is a rudimentary embryological structure placed centrally in the umbilical cord.^{1–3} Allantoic cysts have previously been diagnosed with three-dimensional ultrasound and magnetic tomographic imaging and the relationship between the cysts and vessels can be visualised.^{2,9} Allantoic cysts separate the umbilical cord vessels, while pseudocysts and omphalomesenteric cysts displace the vessels.^{2,5–6,8} Because B-flow is independent of the insonation angle, we could visualise a long segment of the umbilical cord vessels and clearly illustrate the separation of the arteries. The prognosis is usually good, but intrauterine demise following compression of the umbilical cord vessels has been described.¹² After delivery, increased risk of urinary infections exists because of fistula from the umbilicus to the urinary bladder.¹³ Malignancy in a patent intra-abdominal urachus has also been described.^{2,14} In this case, the follow-up was uneventful except for a small leakage of urine through the umbilicus during the first week of life.

Learning points

- ▶ Allantoic cysts separate the umbilical cord vessels.
- ▶ Long segment of the umbilical cord vessels can be visualised with B-flow ultrasound.
- ▶ Allantoic cysts usually rupture spontaneously in the third trimester.
- ▶ The prognosis is usually good.

Competing interests None.

Patient consent Obtained.

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