Ultrasound Obstet Gynecol 2004; **24**: 672–674
Published online in Wiley InterScience (www.interscience.wiley.com). **DOI:** 10.1002/uog.1760

An anatomical fetal brain structure and a normal variant mimicking anomalies on routine neurosonographic imaging: report of two cases

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KEYWORDS: choroid plexus; fetus; neurosonography; prenatal diagnosis; ultrasound

ABSTRACT

We present two cases in which an anatomical structure, the calcar avis, and a normal variant, a bifid choroid plexus, mimicked abnormalities on routine prenatal ultrasound examination. To the best of our knowledge these pitfalls have only been described in neonates. A familiarity with these false images is important to avoid erroneous diagnoses. Copyright © 2004 ISUOG. Published by John Wiley & Sons, Ltd.

INTRODUCTION

Fetal cranial anatomical structures that previously were not visualized can now be clearly delineated by analysis of transvaginal neurosonographic planes[1]. Familiarity with these structures and their normal variants is important for proper interpretation of prenatal ultrasound findings. In this report we describe two cases in which a normal variant, a bifid choroid plexus, and an anatomical structure, the calcar avis, mimicked abnormalities on routine ultrasound evaluation of the fetal brain. These potential pitfalls have been reported in neonates[2] but, to the best of our knowledge, there have been no similar cases described in the fetus.

CASE REPORTS

Case 1

A 36-year-old nulliparous woman with a monochorionic monoamniotic twin pregnancy, who had conceived by artificial insemination, had a normal nuchal translucency scan at 11 weeks' gestation. She underwent a routine anomaly scan at 17 weeks that showed an abnormal right choroid plexus in the second twin, the left plexus appearing normal. The abnormality consisted of a choroid plexus divided into two portions with different location and orientation; this was more marked in the axial plane (Figure 1a). The medial portion simulated a 'dangling' choroid plexus, usually seen in cases of hydrocephaly[3], but no ventriculomegaly was found. It was not possible to rule out the presence of intraventricular hemorrhage or a choroid plexus malformation. No other abnormality was encountered after a meticulous sonographic study of the fetal anatomy, except for an increased fetal heart rate of this twin (185 bpm). Amniocentesis showed a normal 46,XX karyotype.

There were no changes at 21 and 24 weeks, except for the normalization of the fetal heart rate of the second twin. At 26 weeks the ultrasound appearance of the choroid plexus changed, now suggesting a double choroidal pattern with a normal orientation, which was better visualized in the coronal plane (Figure 1b). This pattern was similar to that reported in neonates as being a normal variation of the choroid plexus configuration[4]. The ultrasound examinations performed at 28 and 31 weeks showed no changes. An elective Cesarean section was performed at 33 weeks due to growth restriction of the second twin. Two baby girls were delivered. Both had a normal neurological examination. Transfontanellar ultrasound performed at birth and 1 month later confirmed the bilateral double choroidal pattern in the second twin (Figure 1c).

Case 2

A 33-year-old woman in her first pregnancy had had two normal ultrasound examinations at 12 and 19 weeks of gestation. She underwent a third prenatal ultrasound

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Accepted: 16 January 2004

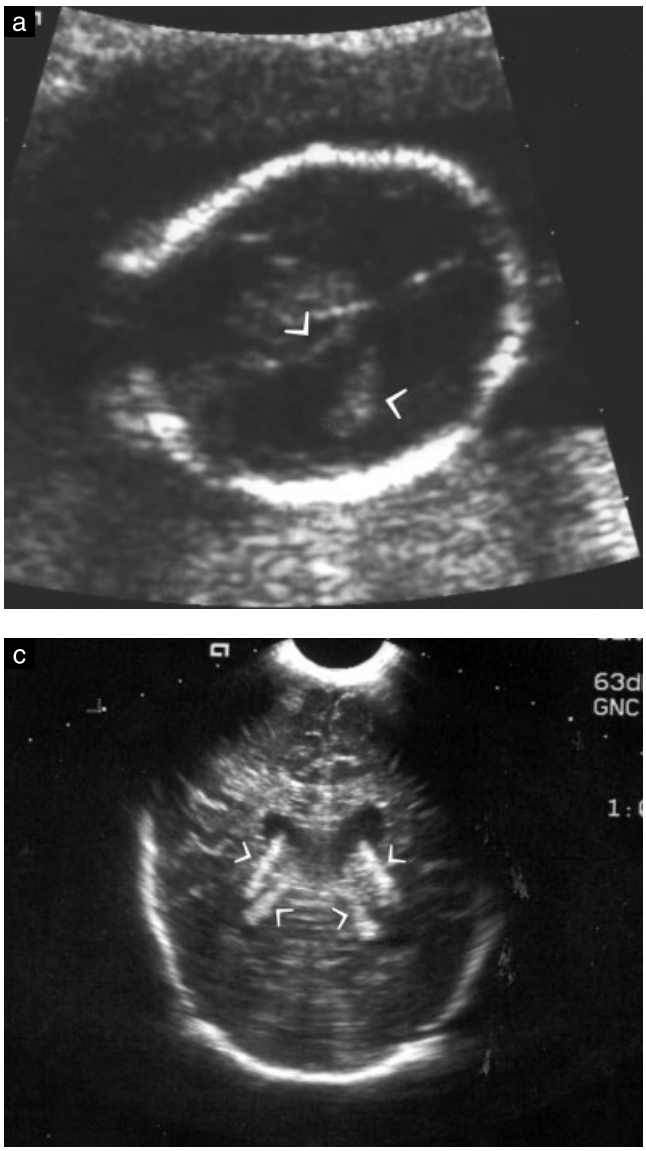


Figure 1 Case 1. (a) Transabdominal axial ultrasound image at 17 weeks of gestation showing an abnormal right choroid plexus divided into two portions (arrowheads), each with a different location and orientation. (b) Transabdominal coronal plane at 26 weeks' gestation: the right choroid plexus exhibited an image suggestive of a double choroidal pattern (arrowheads). (c) Neonatal cranial sonography: the coronal image confirmed the double choroidal pattern (arrowheads) visualized prenatally and revealed it to be bilateral.

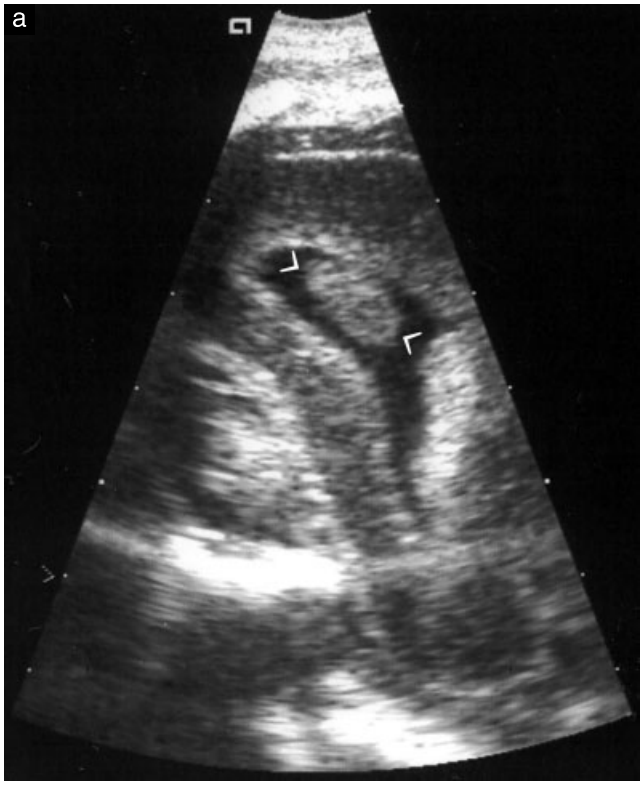
scan at 28 weeks which initially showed, in the cerebral parasagittal plane, an echogenic focus located within the occipital horn of the right lateral ventricle (Figure 2a), suggesting the presence of an intraventricular clot. The rest of the examination was normal. By changing the angle of the transducer, the configuration of the calcar avis was clearly delineated, excluding intraventricular hemorrhage (Figure 2b). The fetal brain coronal scans helped to elucidate the diagnosis (Figure 2c).

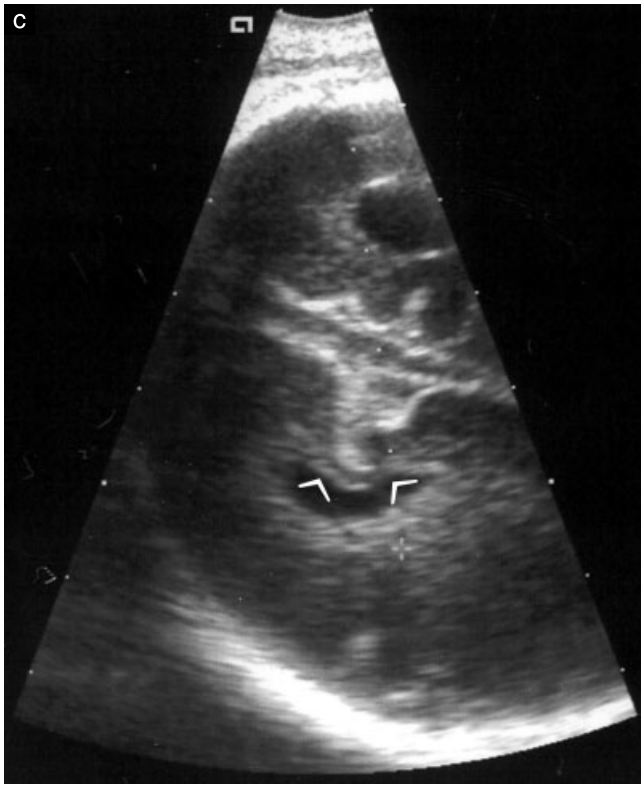
DISCUSSION

The first case referred to a double choroidal pattern (or a bifid choroid plexus) that mimicked a choroid plexus abnormality. Usually, a change in the smooth contour of this structure is suggestive of an intraventricular hemorrhage. The location of the choroid plexus changes throughout pregnancy. Initially it is a more anterior structure, later moving to assume its definitive more posterior site within the ventricular atrium. In cases of fetal ventriculomegaly or hydrocephaly, the choroid plexus is compressed and floats within the dilated ventricle, the so called dangling choroid plexus sign[3]. In our case, the site and contour of both choroid plexuses were initially unusual, suggesting the presence of a hemorrhage as well as incipient ventriculomegaly. Pregnancy follow-up ruled out the presence of a dilated ventricle. The final prenatal and subsequent neonatal cranial ultrasound examinations showed clearly a bilateral double choroidal pattern, excluding the diagnosis of a hemorrhage or any other choroid plexus abnormality.

It is well recognized that the neonatal choroid plexus may have various sonographic appearances[4]. An interesting finding in our case was that the double choroidal pattern initially presented a more marked separation of the two portions, with the medial one simulating a dangling choroid plexus. With advancing gestation, it assumed the double choroidal pattern that is seen in the newborn.

The second case involved a normal anatomical structure, the calcar avis, mimicking an intraventricular hemorrhage. The calcar avis forms the calcarine fissure





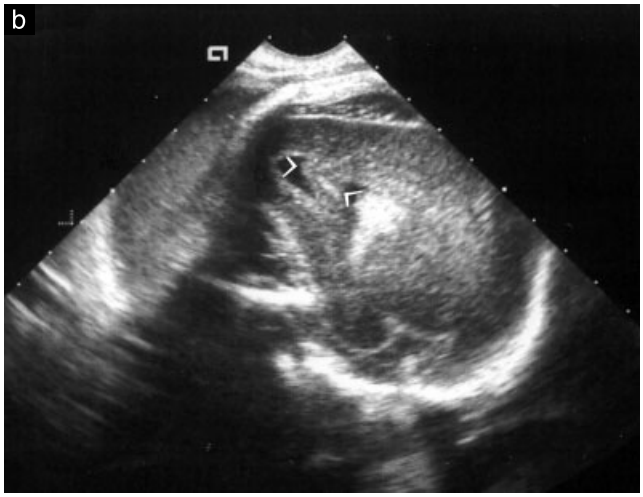


Figure 2 Case 2. (a) Transvaginal ultrasound image at 28 weeks of gestation: parasagittal plane showing an echogenic focus (arrowheads) visualized within the occipital horn of the right lateral ventricle, mimicking an intraventricular clot. (b) In a more medial parasagittal plane the configuration of the calcar avis (arrowheads) could be clearly delineated. (c) The coronal plane showed the right calcarine fissure and the prominent calcar avis (arrowheads).

which develops at 16 weeks of gestation. The fissure may extend deeply from the medial aspect of the occipital lobe towards the occipital horn of the lateral ventricles. As the fissure elongates, it folds and forms a mound of white matter that indents into the medial surface of the occipital horn, the calcar avis[5]. Sometimes it is more prominent, depending on the depth of the infolding at the calcarine fissure. In these situations, since it is isoechoic with surrounding brain tissue, the calcar avis may be confused with a resolving blood clot, particularly on parasagittal scans. The way to differentiate it from an intraventricular clot is to slightly tilt the transducer medially from the cavity of the ventricle. From this view, the calcar avis is properly identified by its continuity with the brain white matter and branches of the calcarine fissure.

In conclusion, we have demonstrated two potential pitfalls in fetal neurosonography and provided clues to differentiate them from true lesions. A familiarity with these prenatal sonographic features is important to avoid equivocal diagnoses and unnecessary invasive tests.

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