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Research Letter

Preliminary experience using three-dimensional HDlive-rendered images for antenatal diagnosis in placental chorangiosis

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Dear Editor,

Placental chorangiosis (PC) is a villous capillary lesion characterized by hypervascular villi [1,2]. The relevance of PC is its potential for rendering a prenatal diagnosis [1,2]. Previous reports on PC were mainly postpartum pathological studies [1,2]. The high incidence of adverse neonatal outcomes highlights the importance of antenatal diagnoses [1]. We present our first experience with three-dimensional (3D) reconstruction imaging of PC using HDlive.

A 43-year-old pregnant woman (gravid 2, para 1) was referred to us at 32 + 2 weeks' gestation because of a placental tumor. Her previous anamnesis and perinatal complications were not significant. Additionally, she neither smoked nor drank alcohol. Sonography confirmed a placental cavernous lesion. Conventional ultrasonography (US) revealed no other anomalies or abnormal blood flow (Figure 1A). 3D HDlive rendering mode (curved array transducer, 2–8 MHz, Volson E9; GE Healthcare, Milwaukee, WI, USA) showed detailed spatial structures of the placental lesion with distinctive texture (Figures 2A and 2B). *In vivo* normal villi and PC were clearly shown on reconstructed images. Follow-up examinations during the pregnancy showed no new findings.

A healthy female infant (2850 g; Apgar score 9/9 at 1 minute and 5 minutes; umbilical arterial blood pH 7.236) with no external anomalies was delivered by elective cesarean at 38 + 4 weeks' gestation. The lesion was histologically confirmed to be PC (Figure 1).

HDlive rendering mode clearly showed the PC as a frothy lesion, similar to "cotton wool," between the decidua and normal placental tissue. Thus, HDlive images were coincident with actual placental lesions *in vivo*. They enabled the visualization of detailed morphological features of an intrauterine abnormality [3]. Accordingly, prenatal diagnosis of PC could be useful for evaluating high-risk pregnancies. Numerous reports have shown that placental abnormalities (e.g., chorioangioma, placental lakes, and intervillous thrombi) with specific sonographic findings could indicate antenatal diagnoses [2–4].

Prenatal diagnosis of PC has not been studied extensively, perhaps because conventional US has flawed spatial resolution when investigating intrauterine abnormalities. HDlive is a novel 3D/4D US technique that uses a high-frequency probe with sophisticated software [5]. Although HDlive has an excellent spatial resolution and provides picture-quality 3D/4D *in-utero* images [5,6], only one report has described its efficacy for evaluating antenatal placental abnormalities [3]. In the present case, the "virtual light source" (a functional property of HDlive) provided depth perception and 3D images of normal anatomical features, including normal placental villi and macroscopic images of PC *in utero*. These features are not achievable with conventional US. Our findings suggest the possibility of antenatal morphological examinations of PC using HDlive.

Possible impediments to generating complete images using the HDlive rendering mode include fetal movement, placental location at the uterus, and attenuation dependent on the maternal body mass index [6]. HDlive is a novel technical innovation of US. However, further prospective studies are required to determine the feasibility and validity of using HDlive for prenatal diagnoses of chorangiosis. Close follow-up for fetal surveillance and growth abnormalities with no preterm induced birth is warranted in the presence of placental anomalies, including PC.

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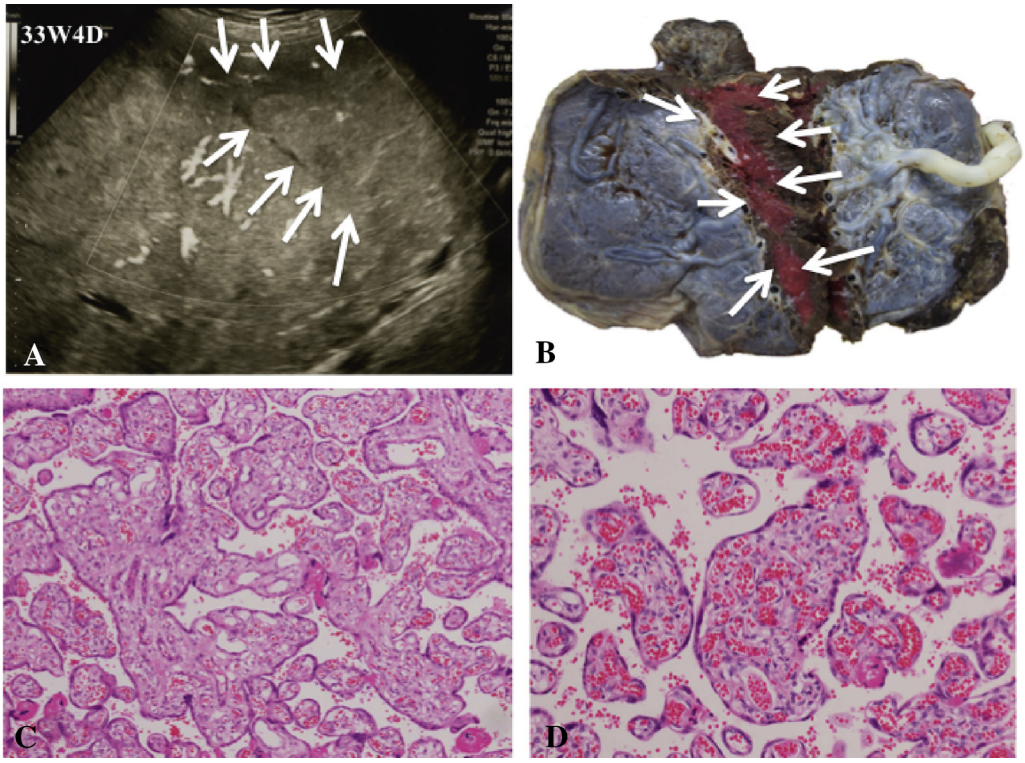

Figure 1. (A) Two-dimensional ultrasonography shows the placental lesion with abnormal texture in comparison with normal placenta (arrows). (B) Gloss section represents a reddish, discolored area (arrows). (C, D) High-power view shows more than 10 capillaries per terminal villi. [Hematoxylin and eosin stain: (C) 100×, (D) 200×].

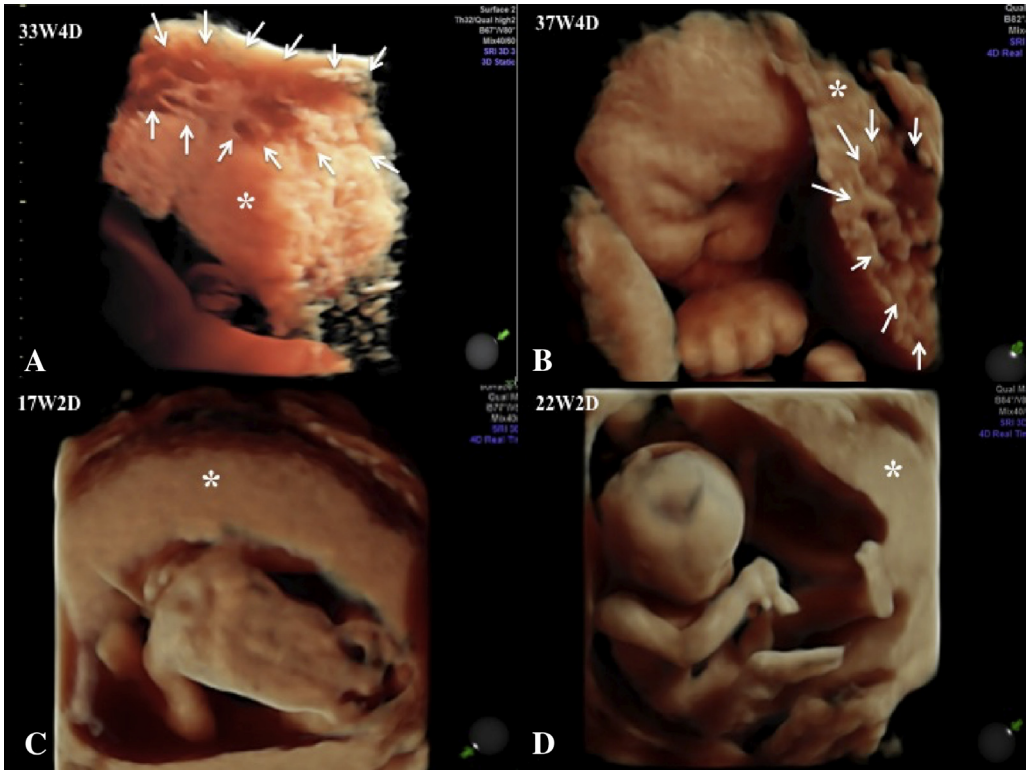

Figure 2. Placenta including villi are clearly depicted in their *in vivo* state (asterisk). (A, B) Chorangiosis in normal placenta is vividly shown by the HDlive rendering mode (arrows). (C, D) Normal cases.

Conflicts of interest

The authors have no conflicts of interest relevant to this article.

Ethical standards

All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Declaration of Helsinki, 1975, as revised in 2008. Informed consent was obtained from the parents of the patients for inclusion in this report.

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