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CASE REPORT

Antenatal three-dimensional sonographic diagnosis of persistent cloaca

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Abstract We present a case of fetal persistent cloaca diagnosed by two- (2D) and three-dimensional (3D) sonography and the HDlive rendering mode. 2D sonography revealed a bicornate uterus with hydrometra, bilateral hydrosalpinx, a single umbilical artery, and ascites. 3D sonography and the HDlive rendering mode clearly showed these intra-abdominal structures. To the best of our knowledge, this is the first report of persistent cloaca employing antenatal 3D sonography and the HDlive rendering mode.

Keywords 3D ultrasound · 2D ultrasound · HDlive · Antenatal diagnosis · Persistent cloaca

Introduction

Persistent cloaca is rare, with its incidence being 1 in 50,000 live births [1]. Persistent cloaca is characterized by a single perineal opening for the urinary, gastrointestinal, and reproductive tracts [2]. There have been numerous reports of antenatal two-dimensional (2D) sonographic diagnosis of persistent cloaca [1–4]. However, the correct antenatal diagnosis rate of persistent cloaca was reportedly only 3 of 50 cases (6 %), and its antenatal diagnosis by 2D sonography is difficult [2]. To the best of our knowledge, there have been no reports of antenatal three-dimensional (3D) sonographic diagnosis of persistent cloaca. We present our experience with persistent cloaca reconstructed employing both 3D surface rendering and HDlive rendering modes.

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Case report

A 33-year-old pregnant woman, gravida 2, para 1, was referred to our outpatient clinic due to a fetal cystic pelvic mass with ascites at 28 weeks and 1 day of gestation. 2D sonography (Voluson E8, GE Healthcare, Milwaukee, WI, USA) revealed fetal ascites, bicornate uterus with hydrometra, bilateral hydrosalpinx, and a single umbilical artery (Fig. 1a, b). 2D sonographic biometric measurements (biparietal diameter and femur length) were consistent with 28 weeks of gestation. Doppler ultrasound fetal velocimetry (umbilical artery pulsatility index, middle cerebral artery pulsatility index, and peak systolic velocity) was normal. There were no other fetal abnormalities. 3D surface rendering and HDlive rendering modes (Voluson E8, GE Healthcare, Milwaukee, WI, USA; curved array transabdominal transducer, 4–8.5 MHz) clearly depicted a bicornate uterus, bilateral hydrosalpinx, and ascites (Figs. 1c, d, and 2). Moreover, the spatial relationship between the bicornate uterus, bilateral hydrosalpinx, bladder, intestine, and liver was clearly visualized and easily discernible by both techniques. Amniocentesis was performed at 29 weeks and 2 days, and chromosomal analysis showed 46XX.

Intrauterine fetal death occurred at 30 weeks and 1 day of gestation, and delivery was induced. The female stillborn baby was delivered with a body weight of 1,273 g, and a body length of 37 cm. Autopsy confirmed the prenatal findings of persistent cloaca.

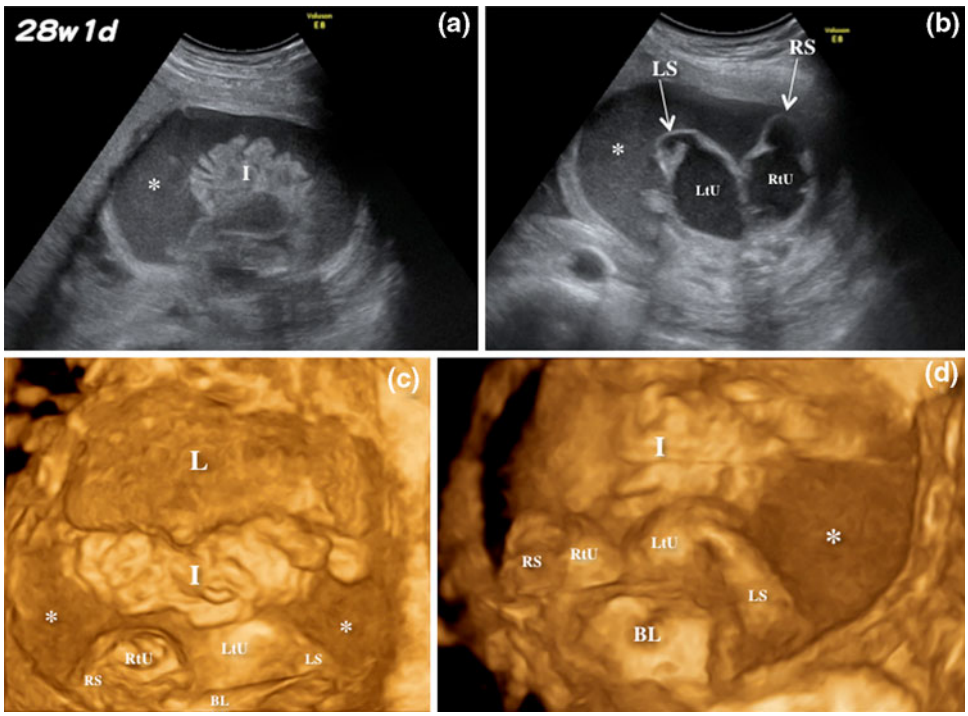

Fig. 1 Two- (**a**, **b**) and three-dimensional (**c**, **d**) surface rendering images of persistent cloaca at 28 weeks and 1 day of gestation. *BL* bladder, *I* intestine, *L* liver, *LS* left hydrosalpinx, *LtU* left-sided bicornate uterus, *RS* right hydrosalpinx, *RtU* right-sided bicornate uterus, * urinary ascites

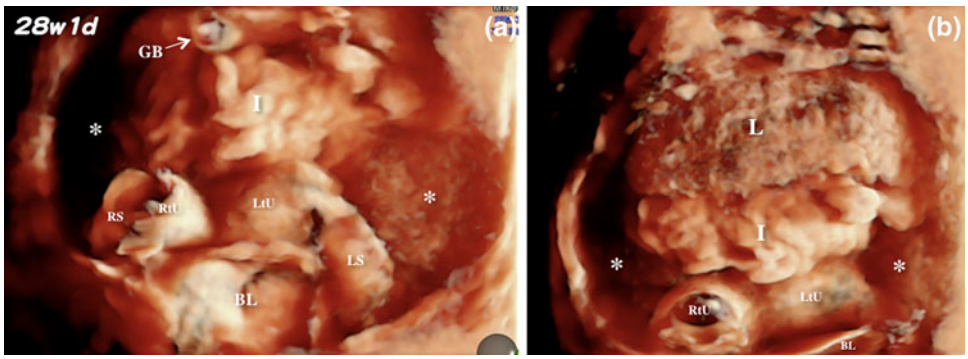

Fig. 2 Three-dimensional HDlive rendering images of persistent cloaca (**a**, **b**) at 28 weeks and 1 day of gestation. *BL* bladder, *GB* gallbladder, *I* intestine, *L* liver, *LS* left hydrosalpinx, *LtU* left-sided bicornate uterus, *RS* right hydrosalpinx, *RtU* right-sided bicornate uterus, * urinary ascites

Discussion

The most common sonographic findings of persistent cloaca are a cystic pelvic mass, urinary tract abnormalities, and dilated bowel loops [2]. Accurate prenatal diagnosis of cloacal malformations is possible in cases in which a central cystic pelvic mass with uterine and vaginal duplication is present [5]. In the present case, cystic pelvic masses with uterine duplication and ascites were noted, whereas there was no bladder outlet obstruction, oligohydramnios, or dilated bowel loops. 3D surface rendering and HDlive rendering modes clearly showed these cystic pelvic masses as a bicornate uterus and bilateral fallopian tubes. In particular, "HDlive uses an adjustable light source, giving the operator the opportunity to create lighting and shadowing effects, and thereby increasing depth perception" [6]; "HDlive provides the physician and parents with a natural and anatomically realistic appearance of normal and abnormal fetuses, and intrauterine abnormalities during pregnancy" [7–12]. In our case, the 3D HDlive rendering mode also provided new, realistic sensations for visualization of the bicornate uterus with hydrometra and bilateral hydrosalpinx in the diagnosis of persistent cloaca. However, 3D surface rendering and HDlive rendering modes may not provide unique information on the antenatal diagnosis of persistent cloaca if there is no ascites. As both techniques can be used to visualize intra-abdominal organ structures with the existence of ascites or fluid-rich lesions, these techniques help us diagnose persistent cloaca correctly.

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Conflict of interest The authors have no conflict of interest.

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