PICTURE OF THE MONTH

Slow*flow*HD for Detection of Small Fetal Peripheral Vasculature

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Abstract

Slow*flow*HD (GE Voluson E10, BT 19) is a new Doppler technology, which can visualize blood flow of smaller vessels in the branching vascular bed of the fetus and placenta. Its main characteristics are a high-display frame-rate, high-line density (high-resolution), and good sensitivity. In this article, we present our first experience of using Slow*flow*HD for the detection of small fetal peripheral vasculature.

Keywords: Color Doppler, Fetus, Slow*flow*HD, Small peripheral vessels.

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Introduction

Slow*flow*HD (GE Voluson E10, BT 19, GE Healthcare Japan, Tokyo, Japan) is a new Doppler technology, which can visualize slow flow of smaller vessels in the branching vascular bed of the fetus and placenta. Its unique characteristics are a high-display frame-rate, high-line density (high-resolution), and good sensitivity. On applying it, we can detect slow-velocity flow of fetal peripheral small vessels. In this article, we present our first experience of using Slow*flow*HD for the detection of small fetal peripheral vessels in various organs.

Fetal Head

Small intracranial vessels can be clearly identified using Slow*flow*HD during pregnancy (Figs 1 to 3). The orbital vasculature can also be clearly visualized using this technique (Fig. 4).

Fetal Body

Small fetal thoracic and intra-abdominal vessels can be clearly identified using Slow*flow*HD (Figs 5 to 14). Especially, the adrenal artery can be visualized using this technique (Figs 9 and 13).

Fetal Extremities

Arm and leg arteries can be clearly noted using Slow*flow*HD (Figs 15 and 16).

Discussion

Superb microvascular imaging (SMI) is a new color Doppler technology which can detect slow-velocity blood flow in the fetus and placenta.[1–8] Superb microvascular imaging with Doppler luminance is the latest Doppler technology. It generates a gray-scale image (two-dimensional) to show SMI data (three-dimensional) utilizing shading to represent amplitudes of signals.[9] Slow*flow*HD is almost the same technology as SMI with Doppler luminance.

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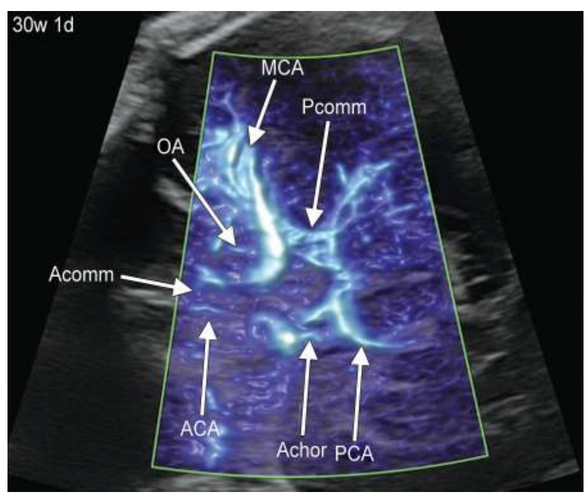


Fig. 1: Circle of Willis depicted by Slow*flow*HD at 30 weeks and 1 day of gestation. ACA, anterior cerebral artery; Achor, anterior choroidal artery; Acomm, anterior communicating artery; MCA, middle cerebral artery; OA, ophthalmic artery; PCA, posterior cerebral artery; Pcomm, posterior communicating artery

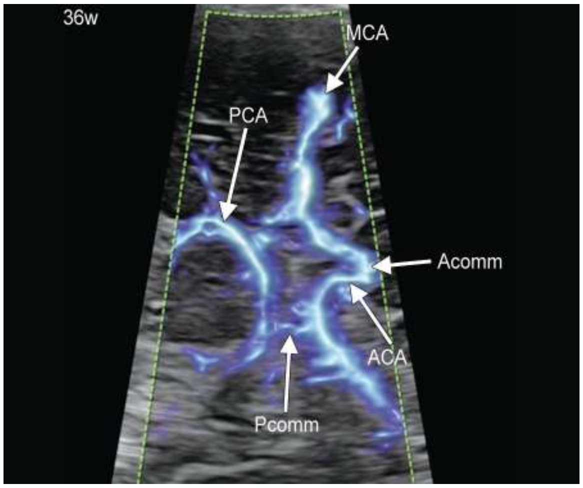


Fig. 2: Circle of Willis depicted by Slow*flow*HD at 36 weeks of gestation. ACA, anterior cerebral artery; Acomm, anterior communicating artery; MCA, middle cerebral artery; PCA, posterior cerebral artery; Pcomm, posterior communicating artery

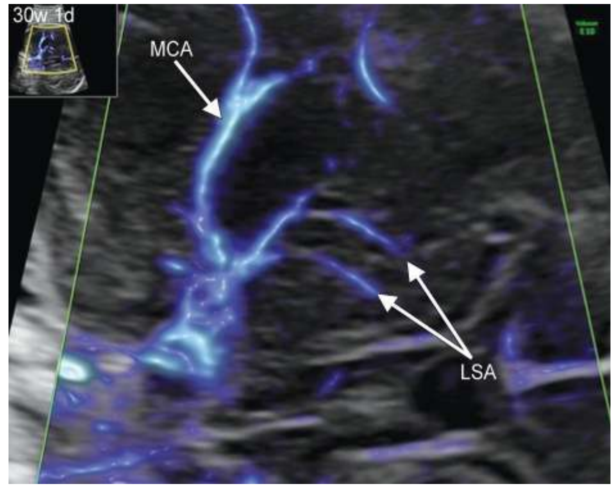


Fig. 3: Intracranial vessels depicted by Slow*flow*HD at 30 weeks and 1 day of gestation. LSA, lenticulostriate artery; MCA, middle cerebral artery

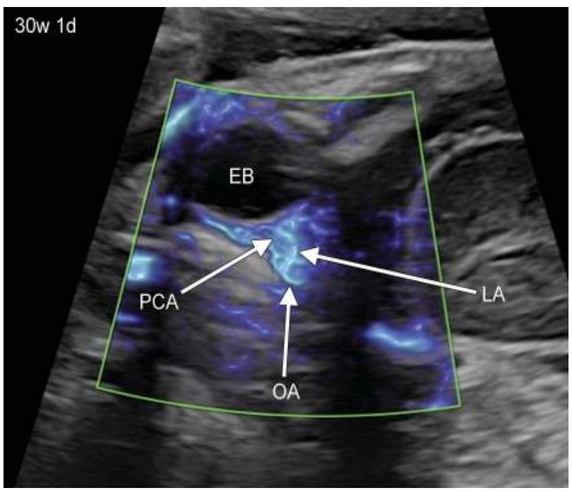


Fig. 4: Fetal orbital vasculature depicted by Slow*flow*HD at 30 weeks and 1 day of gestation. EB, eyeball; LA, lacrimal artery; PCA, posterior ciliary artery

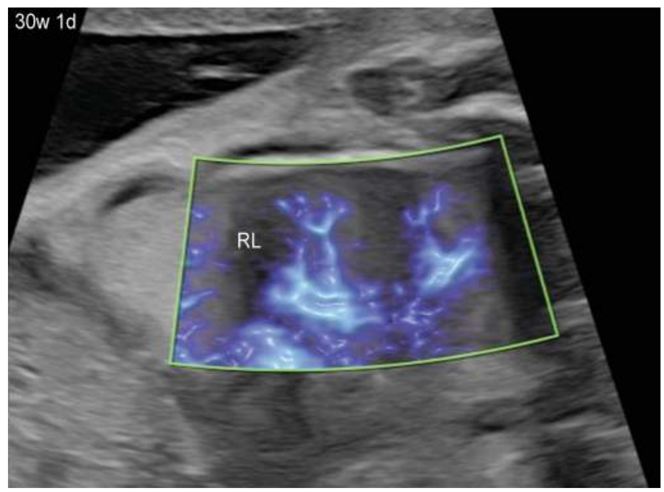


Fig. 5: Fetal pulmonary vessels depicted by Slow*flow*HD at 30 weeks and 1 day of gestation. RL, right lung

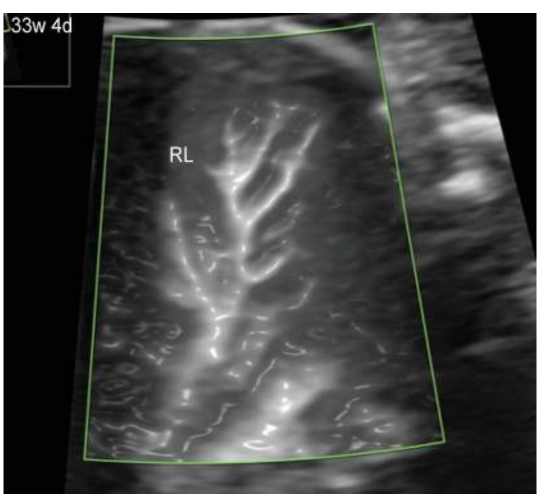


Fig. 6: Fetal pulmonary vessels depicted by Slow*flow*HD at 33 weeks and 4 days of gestation. RL, right lung

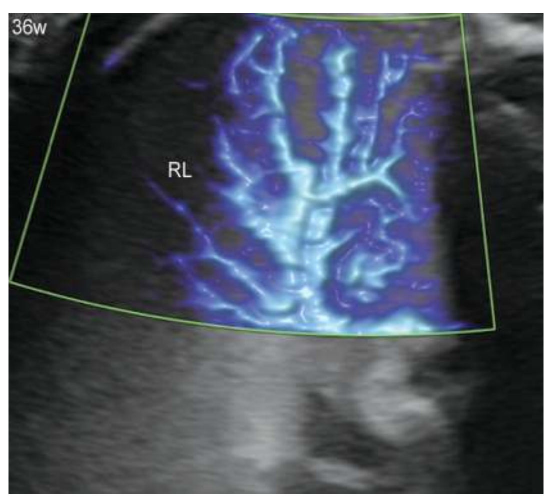


Fig. 7: Fetal pulmonary vessels depicted by Slow*flow*HD at 36 weeks of gestation. RL, right lung

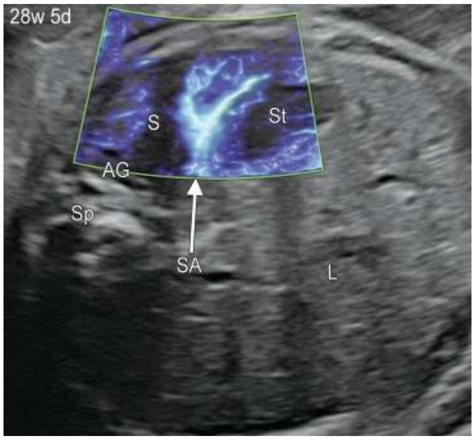


Fig. 8: Fetal splenic vessels depicted by Slow*flow*HD at 28 weeks and 5 days of gestation. AG, adrenal gland; L, liver; S, spleen; SA, splenic artery; Sp, spine; St, stomach

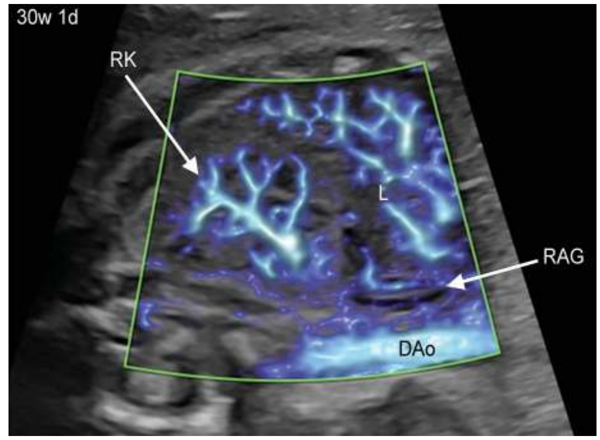


Fig. 9: Fetal intra-abdominal vessels depicted by Slow*flow*HD at 30 weeks and 1 day of gestation. DAo, descending aorta; L, liver; RAG, right adrenal gland; RK, right kidney

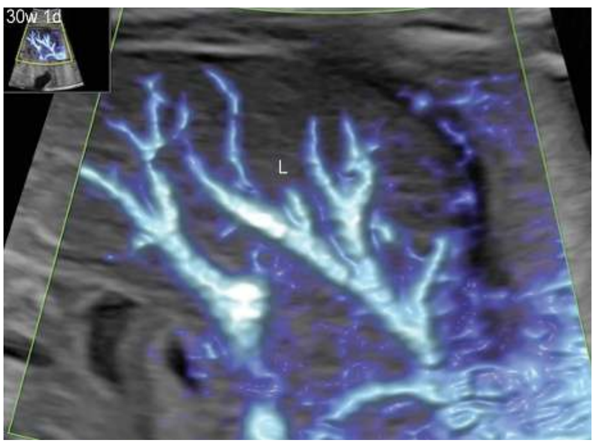


Fig. 10: Fetal hepatic vessels depicted by Slow*flow*HD at 30 weeks and 1 day of gestation. L, liver

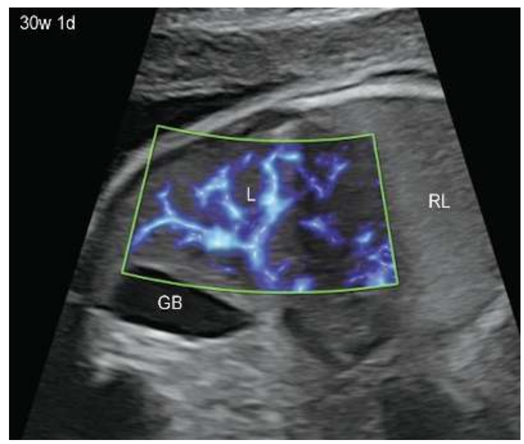
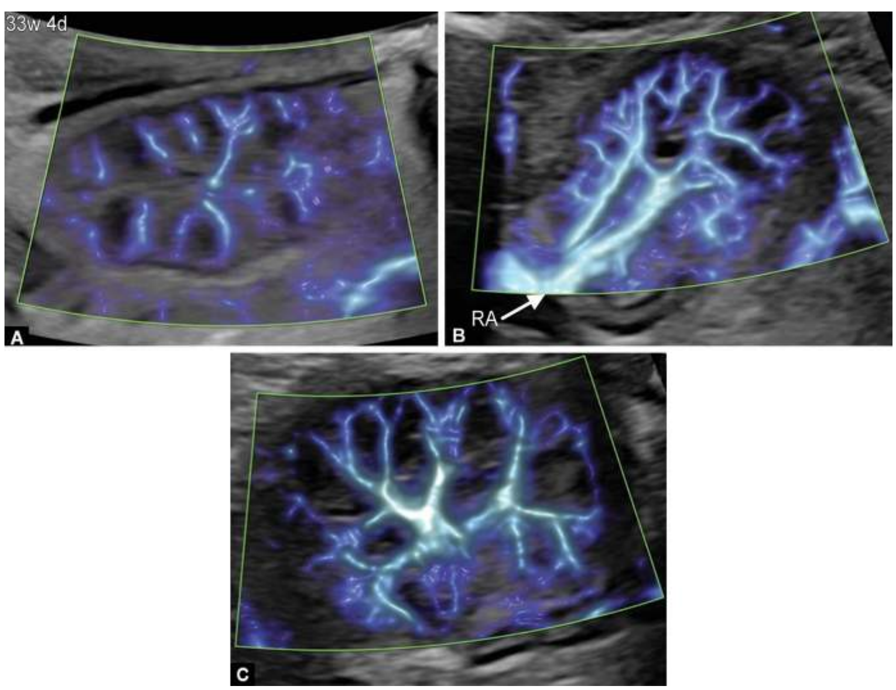


Fig. 11: Fetal hepatic vessels depicted by Slow*flow*HD at 30 weeks and 1 day of gestation. GB, gallbladder; L, liver; RL, right lung



Figs 12A to C: Fetal renal vessels depicted by Slow*flow*HD at 33 weeks and 4 days of gestation. RA, renal artery. (A) Longitudinal view; (B) Transverse view; (C) Transverse view

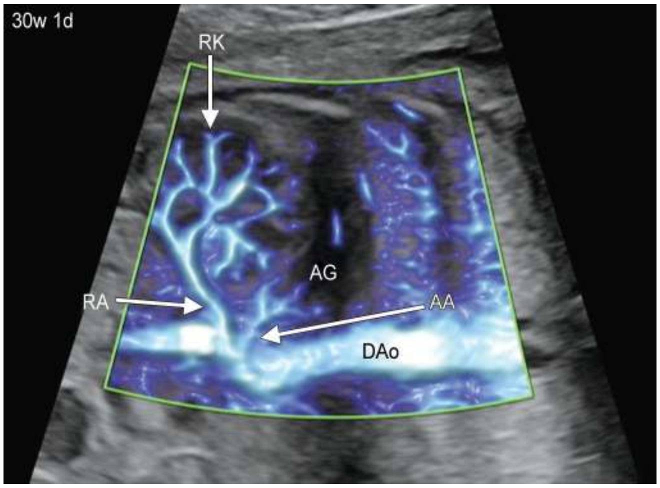


Fig. 13: Fetal intra-abdominal vessels depicted by Slow*flow*HD at 30 weeks and 1 day of gestation. AA, adrenal artery; AG, adrenal gland; DAo, descending aorta; RA, renal artery; RK, right kidney

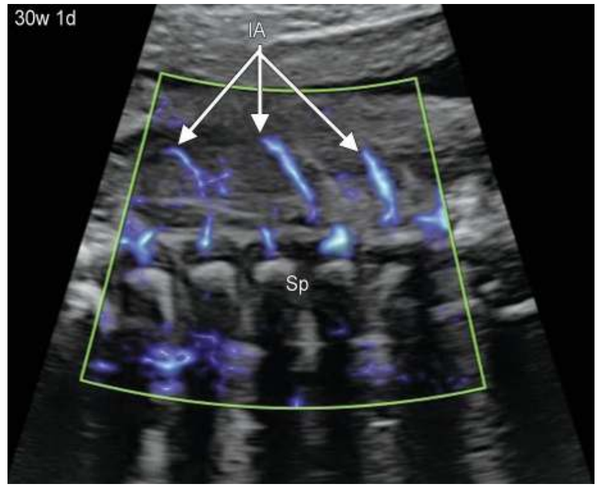


Fig. 14: Fetal intercostal arteries (LA) depicted by Slow*flow*HD at 30 weeks and 1 day of gestation. Sp, spine

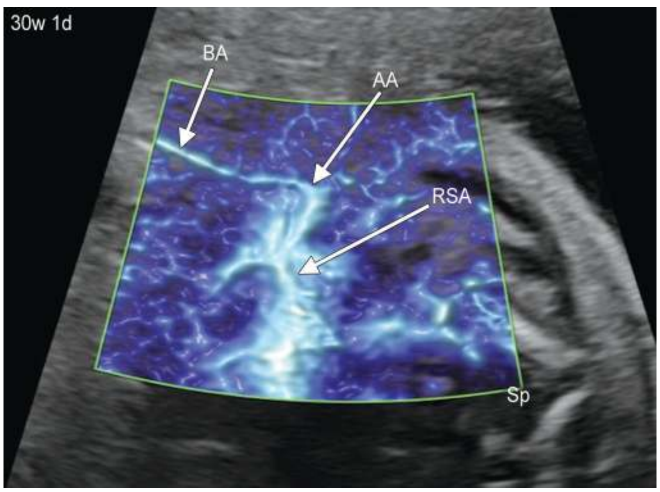


Fig. 15: Fetal arm arteries depicted by Slow*flow*HD at 30 weeks and 1 day of gestation. AA, axillary artery; BA, brachial artery; RSA, right subclavian artery

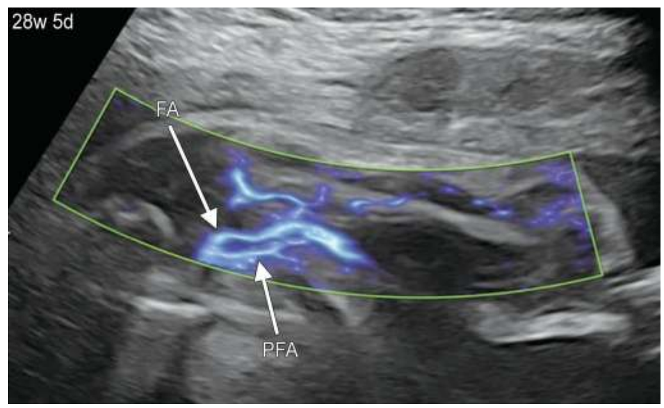


Fig. 16: Fetal leg arteries depicted by Slow*flow*HD at 28 weeks and 5 days of gestation. FA, femoral artery; PFA, profundal femoris artery

In the present study, we had the first experience of using Slow*flow*HD for the detection of fetal peripheral small vessels. As a result, very small intracranial, intrathoracic, and intraabdominal vessels could be clearly depicted in fetuses using this technology. Moreover, small vessels of the extremities could also be noted. Further studies involving a larger sample size are needed to ascertain the actual usefulness of Slow*flow*HD for the detection of small peripheral vessels of fetuses. Moreover, quantitative assessments of Slow*flow*HD signals are indispensable to assess the relevance of this technology for future clinical use and research.

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