


Picture of the Month

Visualization of fetal tongue circulation using Doppler ultrasound

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We present imaging in a fetus at 34 weeks of gestation for which Doppler ultrasound evaluation of the tongue was performed to visualize the blood vessels, using HD-Flow™ and SlowflowHD™ (GE Healthcare, Zipf, Austria) modalities, a 2–9-MHz curvilinear probe and an RM6C volumetric probe. A cross-sectional image of the fetal head with the face upturned was obtained; the evaluation plane was located in the middle of the oral cavity with a clear image of the tongue. Figure 1 shows the deep lingual arteries on each side of the tongue with their lateral branches and their final trajectories orientated toward the medial region of the tongue. Figure 2 shows the deep lingual arteries running in parallel with the veins, and the spectral Doppler waveforms in each vessel.

The tongue is a highly vascularized, innervated muscular organ needed for the normal processes of swallowing and phonetics, and it is the main component of the gustatory system. The tongue's blood supply is provided by the lingual artery, a branch of the external carotid artery, originating between the superior thyroid artery and the facial artery. The lingual artery has an ascending trajectory from the neck toward the tongue, running in close proximity to the hyoid bone. Further, it passes through the oropharyngeal triangle (the space formed by the superior pharyngeal constrictor, middle pharyngeal constrictor and mylohyoid muscles) and runs between the genioglossus and hyoglossus muscles, finally reaching the tip of the tongue. The lingual artery gives branches to the hyoid muscles, the sublingual artery, the deep lingual or ranine artery and the dorsal lingual branches. The sublingual arteries supply the sublingual glands, the floor of the oral cavity and the gingiva. The venous return is performed by the deep lingual veins that follow the ranine arteries and drain into the dorsal lingual vein that finally joins the internal jugular vein¹.

In the fetus, an enlarged tongue (macroglossia) is considered a major sign for the diagnosis of Beckwith–Wiedemann syndrome. In this condition, the tongue is

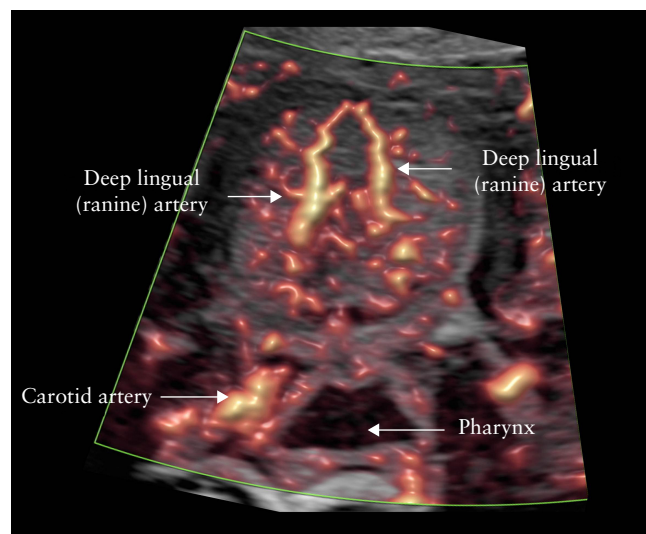


Figure 1 Cross-sectional Doppler ultrasound image of fetal tongue at 34 weeks of gestation, obtained using 2–9-MHz curvilinear probe and SlowflowHD™, showing deep lingual (ranine) arteries and their branches.

constantly visualized outside the oral cavity and might present with other anomalies such as ankyloglossia (decreased mobility of the tongue caused by a short, thick lingual frenulum)². Such newborns require partial glossectomy and frenulotomy after birth. A bifid tongue has been associated with Larsen syndrome and a lobulated tongue with short-rib polydactyly and oral-facial-digital syndromes. Cystic avascular structures in the posterior region of the tongue usually correspond to thyroglossal duct cysts. Hall *et al.* reported the presence of a duplication cyst in the tongue³. Congenital ranula, caused by atresia or failure of canalization of the salivary ducts of the sublingual or submandibular glands, can affect the shape of the tongue and may be misdiagnosed as a tongue cyst. Movements of the tongue have been observed mainly

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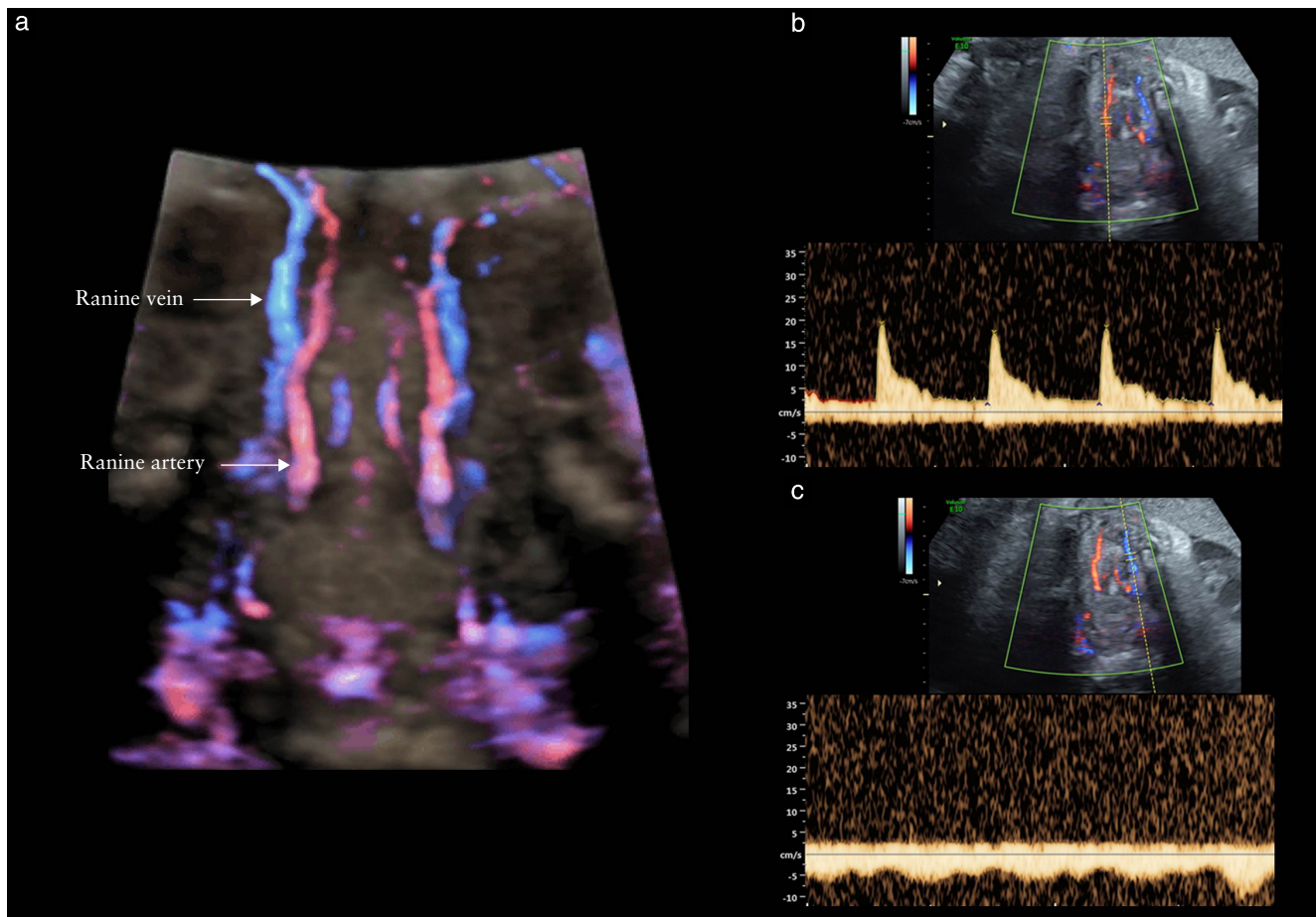


Figure 2 Cross-sectional Doppler ultrasound images of fetal tongue at 34 weeks of gestation, showing deep lingual (ranine) arteries and veins. (a) Image obtained using RM6C volumetric probe and 3D HD-Flow™. (b,c) Spectral Doppler displaying deep lingual artery (b) and deep lingual vein (c) waveforms.

after 24 weeks of gestation, related to fetal behavioral changes⁴. Biometric charts for fetal tongue width and circumference have been reported previously⁵; nevertheless, there is a paucity of studies evaluating anatomical and functional characteristics of the fetal tongue. Ultrasound visualization of the fetal tongue, its movements and its circulation might contribute to the diagnosis of fetal congenital anomalies and genetic syndromes.

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