



EP05.43 Modified reverse face technique with silhouette manipulation in the evaluation of bilateral persistent fetal vasculature



Lisa M. Allen, RDMS, RDCS (FE), RVT, Lindsey A. Guzewicz, MS, CGC
SUNY Upstate Medical University, Department of Obstetrics and Gynecology, Division of Maternal-Fetal Medicine

Introduction:

Persistent fetal vasculature (PFV) is a rare congenital ocular abnormality resulting from the failure of the hyaloid artery to regress. Partial or incomplete failure of regression can produce different clinical manifestations of persistent fetal vasculature which can be diagnosed by prenatal ultrasound in the late third trimester¹. The combination of the modified reverse face view with Hdlive silhouette manipulations can be invaluable tools in the prenatal evaluation of complex fetal ocular anomalies.

Case:

Persistent fetal vasculature was diagnosed prenatally at 37 weeks of gestation using various three-dimensional imaging techniques. Standard two-dimensional imaging demonstrated a complex, disorganized accumulation of structures noted within the normally anechoic globes. Three-dimensional sonography was used to further evaluate the ocular anomalies. A modified thick slice “reverse face” technique allowed for visualization from the posterior aspect of the fetal face to visualize the ocular contents from behind in a ‘see-through fashion’ (Figure 1). Further manipulation was performed utilizing HDlive silhouette adjustments which produced increased detail of the conical “martini glass” fibrous stalks that extended from the posterior surface of the lens to the posterior aspect of the globe. This technique allowed for a more detailed representation of the fibrovascular stalks (Figures 2 and 3). Based on the sonographic findings, the prenatal diagnosis of bilateral persistent fetal vasculature with detached retinas and intraocular hemorrhage was suspected and confirmed postnatally.

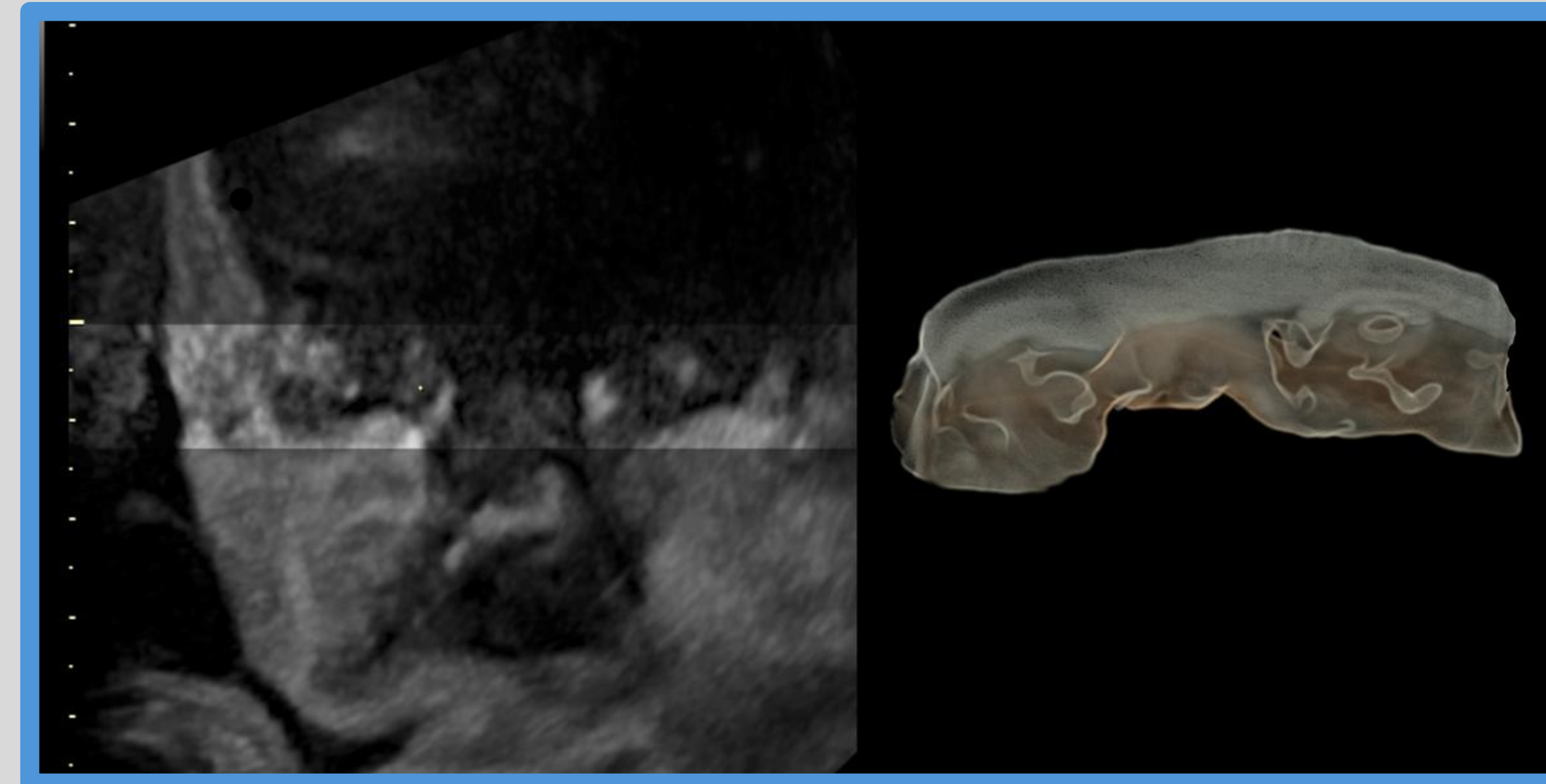


Figure 1: Three-dimensional image utilizing the modified reverse face technique with a thick slice render box. Hdlive silhouette was applied and further rotations were made to demonstrate the bilateral fibrovascular stalks within the globes.

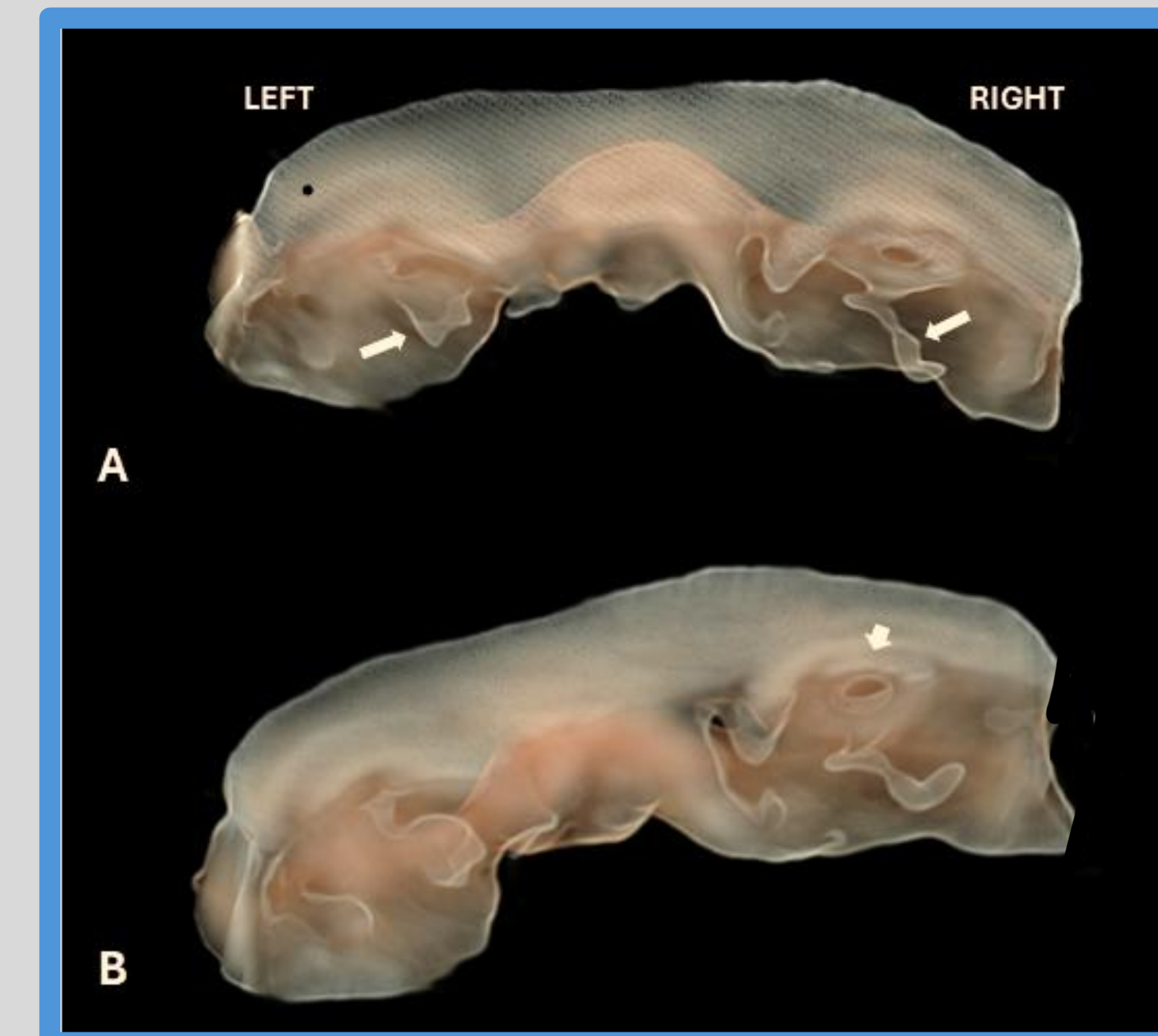


Figure 2: (A) Modified reverse face technique with Hdlive silhouette manipulation demonstrates the bilateral fibrovascular stalks (white arrows). (B) Upon slight rotation, the fibrovascular stalk is clearly demonstrated coursing from the lens (white arrowhead) to the posterior aspect of the globe.

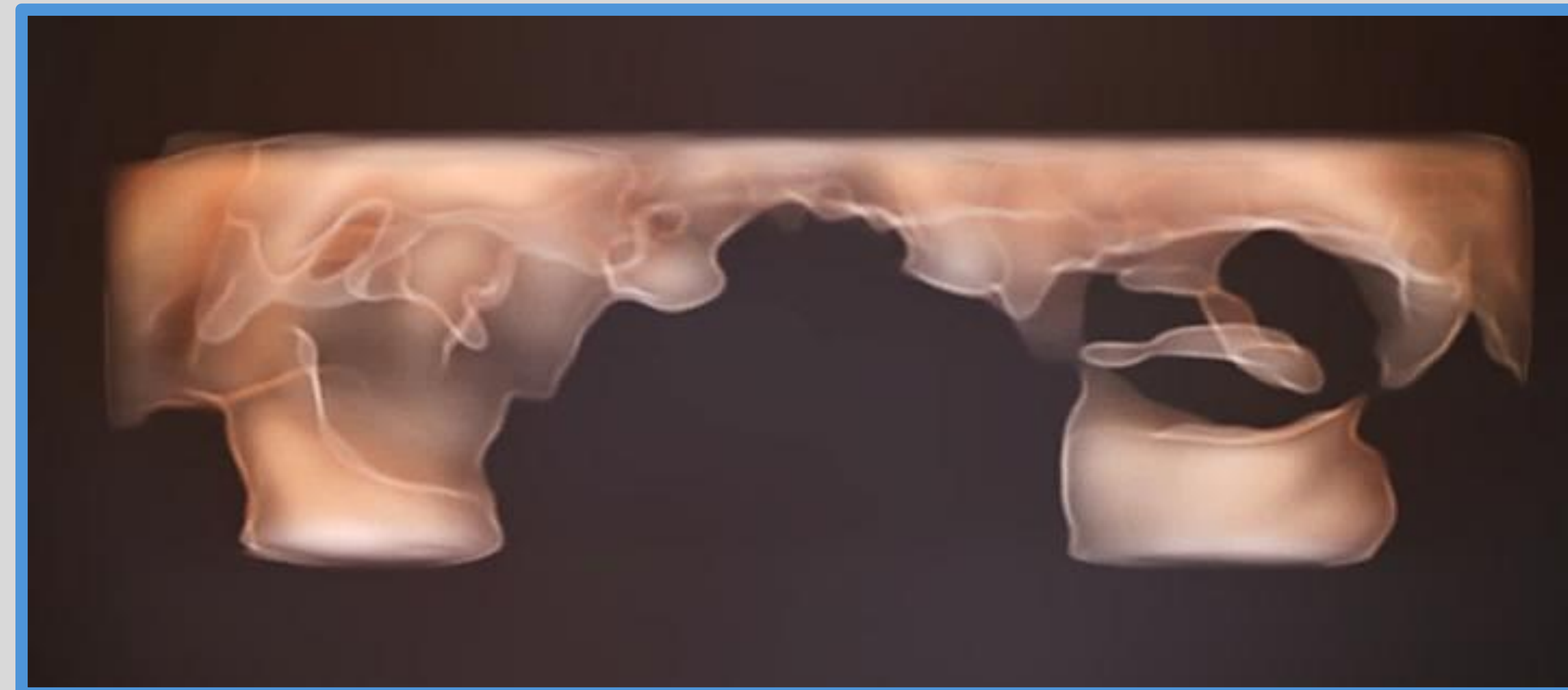


Figure 3: The final reconstructed image was created with further adjustments of the rotational axis, the HDlive light source, and the Hdlive silhouette percentage. The martini glass configuration of the fibrovascular stalk on the right is remarkably demonstrated.

Discussion:

In 2003, the reverse face technique was introduced primarily to assist in the prenatal diagnosis of cleft palate. This involves the 180° rotation of the frontal view of the face to overcome shadowing². This application has also been used in the diagnosis of ocular anomalies³. Hdlive utilizes a combination of an adjustable virtual light source and shadows that increases the depth perception. The addition of Hdlive silhouette, also known as ‘see-through fashion’, creates a gradient at organ boundaries where an abrupt change of the acoustic impedance exists within tissues. Adjustments in the Hdlive silhouette percentage, threshold, and gain can be optimized to generate remarkable images of structural development⁴.

Conclusion:

The modified reverse face view in combination with Hdlive silhouette manipulation can be invaluable in the prenatal evaluation of persistent fetal vasculature and other ocular anomalies. This technique allows for a unique perspective from behind the eye to demonstrate both the inner and outer the structure using a virtual light source, shadows, and definition of tissue boundaries.

References:

1. Chen C, Xiao H, Ding X. Persistent fetal vasculature. Asia Pac J Ophthalmol. 2019;8:86-95.
2. Campbell S, Lees CC. The three-dimensional reverse face (3D RF) view for the diagnosis of cleft palate. Ultrasound Obstet Gynecol. 2003;22:552-554.
3. Wong HS, Parker S, Tait J, Pringle KC. Antenatal diagnosis of anophthalmia by three-dimensional reverse face view. Ultrasound Obstet Gynecol. 2008;32:103-105.
4. Pooh R. A new field of “fetal sono-ophthalmology” by 3D Hdlive silhouette and flow. Donald School J Ultrasound Obstet Gynecol.