

Enzo S. Werner ¹; Gerson Ribeiro ¹; Cecília Teixeira Werner ²; Alice Teixeira Werner ¹; Camilla Calil ³; Jorge Lopes ¹; Cristina Paula Scudieri Paes Werner ¹; Vinicius Arcoverde ¹; Heron Werner ¹

1. BiodesignLab Dasa/PUC-Rio, Rio de Janeiro, Brazil
2. Faculdade Ciências Médicas de Minas Gerais (FCM-MG), Belo Horizonte, Brazil
3. Universidade Federal de Juiz de Fora (UFJF), Brazil

Objective

To evaluate the relevance of the General Data Protection Law (GDPL) in fetal imaging workflows involving advanced 3D technologies, including virtual modeling, 3D printing, and extended reality (XR).

Methods

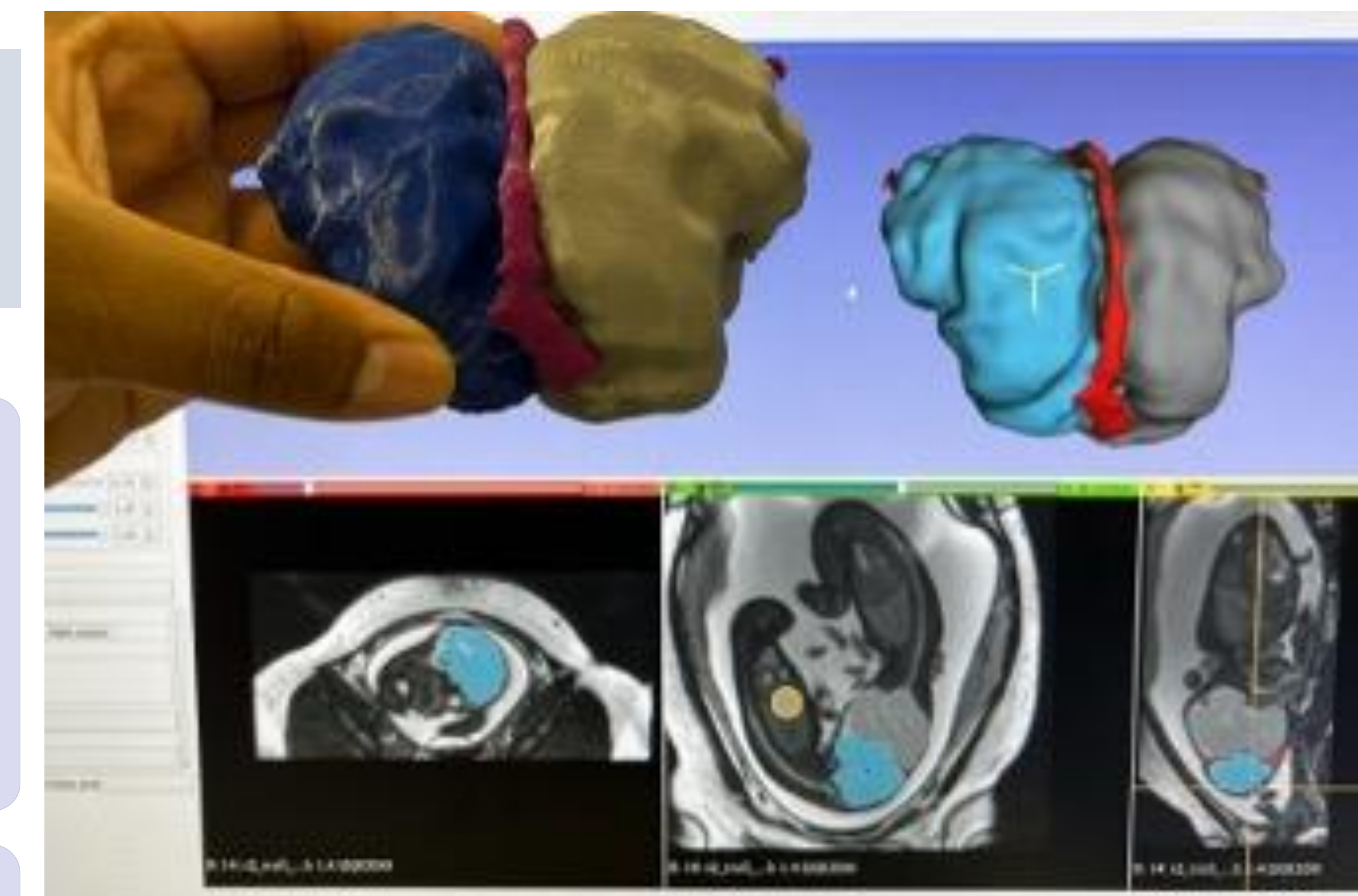
From 2022 onward, 28 cases of fetal malformations evaluated during the second and third trimesters were analyzed using high-resolution ultrasound and magnetic resonance imaging for applications involving 3D technologies, including 3D printing and XR.

Results

Central nervous system anomalies were the most prevalent findings, followed by thoracic, abdominal and urinary tract abnormalities, and placental anomalies. All participants provided informed consent covering both imaging modalities and ensuring complete data anonymization in compliance with GDPL requirements. Patients reported increased reassurance after the consent process, reinforcing the role of the GDPL in patient data protection.

Conclusion

Advanced fetal imaging technologies have improved diagnostic accuracy and visualization. Since its implementation in Brazil in 2020, the GDPL has established regulatory standards for personal data processing, promoting legal compliance, data security, and patient confidentiality in fetal imaging practices, including those involving 3D technologies.



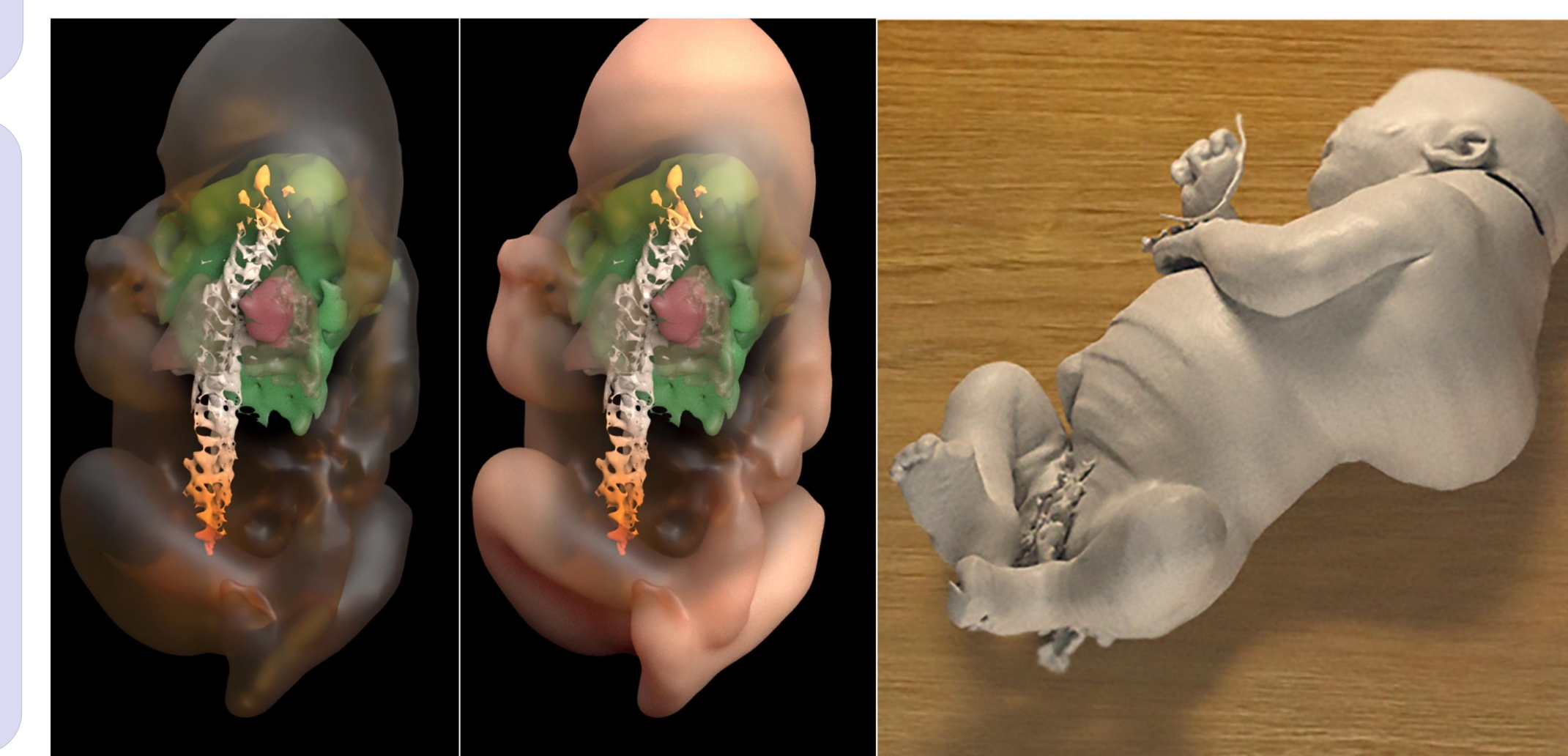
T2-weighted True Fast Imaging with Steady-State Precession (TRUFI) magnetic resonance imaging (MRI) of the fetal brains of craniopagus twins at 30 weeks' gestation. A 3D-printed model was created for surgical planning.



3D-printed model of Tetralogy of Fallot and Transposition of the Great Arteries.



Augmented Reality (AR)



Virtual and physical models generated from imaging data of a 37-week fetus diagnosed with a rhabdoid tumor.