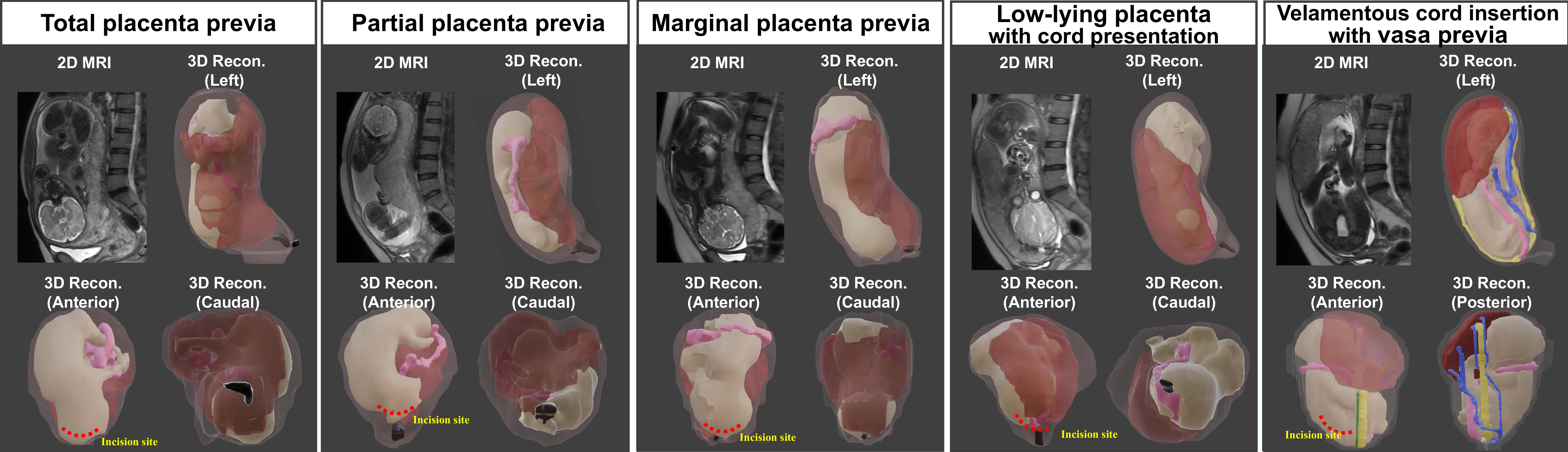


Objective: Accurate spatial understanding of placental location is essential for surgical planning in placental and cord abnormalities. However, conventional two-dimensional imaging may be insufficient to fully assess the relationship between the placenta, umbilical cord, and internal cervical os. Building upon our previous report on vasa previa, this study aimed to evaluate the feasibility of three-dimensional (3D) magnetic resonance imaging (MRI) reconstruction and its potential utility for surgical planning, as well as for the patient-counseling and medical education.

Method: We retrospectively analyzed five cases of placental abnormalities, including total, partial, and marginal placenta previa, vasa previa, and low-lying placenta. Preoperative MRI datasets were used to generate 3D reconstructions of the uterus, placenta, cervix, umbilical cord, and fetus using 3D Slicer and Blender, with manual segmentation. Spatial relationships were visually assessed, and the potential impact on surgical planning was qualitatively evaluated by comparison with conventional 2D MRI.

Red, placenta; Beige, fetus; Solid pink, umbilical cord; Black, internal cervical os



Results: 3D reconstruction was successfully achieved in all cases, providing enhanced visualization of placental distribution relative to the internal cervical os. Compared with 2D imaging, 3D models enabled clearer spatial recognition of placental coverage and its orientation. In the total placenta previa case, the reconstructed images suggested that preoperative knowledge of placental extent might have influenced the selection of the uterine incision site. The 3D models also facilitated intuitive understanding of spatial relationships.

Conclusion: 3D MRI reconstruction is feasible and may improve spatial understanding of placental anatomy. This approach has the potential to support preoperative decision-making and surgical planning for Cesarean section, while also aiding the patient-counseling and medical education.