

New Perspectives in Prenatal Ultrasound

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Introduction

No doubt – despite all new and exciting options, real-time B-mode imaging of the fetus is still the method of choice in prenatal diagnostics, even more so since recent advancements in B-mode imaging have significantly improved resolution and precision. How do we derive maximum benefit from these improvements,

particularly in combination with the new 3D capabilities?

The physician expects high resolution and sufficient penetration to provide an – above all artefact-free – image with a maximum of information. At the same time, details should not be lost and the frame rate should remain high.

Techniques

Both ApliPure and ApliPure+ meet these expectations to a very large extent. Moreover, a new tool, Precision Imaging, further enhances the image without compromising the wealth of information. Precision Imaging in effect sharpens the image which makes the examination easier on the eyes and thus helps avoid fatigue (figs. 1–4).



Figs. 1–2: Profile, 21st week of pregnancy, with clearly defined borders, nasal bone display, and in the median sagittal view from corpus callosum up to the vermis cerebelli and cisterna magna.



Fig. 3: Hygroma colli in the presence of Turner's syndrome, 18th week of pregnancy, with excellent differentiation of the small septae in the hygroma and excellent penetration.



Fig. 4: Transvaginal sonography of a fetus, 12th week of pregnancy, with enlarged nuchal translucency and an additional dorsal view in 3D mode (trisomy 21).



Fig. 5: Chorangioma, 29th week of pregnancy, with view of intra-tumoral vessels using ADF.



Fig. 6: Normal ductus venosus, 21st week of pregnancy, in color Doppler mode. Despite the added color, the B-mode image remains clear and the anatomic structures are optimally displayed to analyse.

Additional imaging modes significantly support diagnostics and are thus indispensable. Color Doppler remains the method of choice but Advanced Dynamic Flow (ADF) offers a more precise image with even less artefacts. ADF allows for visualisation of smallest vessels which is particularly important in the first trimester of pregnancy (figs. 5–8).

3D techniques have also become a vital tool in modern prenatal diagnostics. It is, however, not surface rendering – so popular with expecting parents – but different planar renderings that offer the most meaningful benefits (figs. 9–15).

Conclusion

The capabilities of a modern high-end ultrasound system allow for precise diagnoses, particularly in difficult examinations. B-mode imaging remains the most important feature of any US system. The focus has to be on best possible visualisation with high image resolution and fast image acquisition. Additional methods, however, such as color Doppler and 3D/4D, have become indispensable.

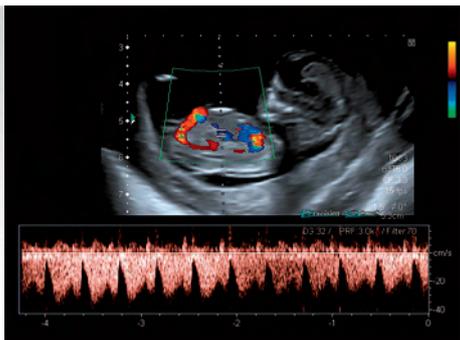


Fig. 7: First trimester, ductus venosus, 12th week of pregnancy (transabdominal), color and spectral Doppler in duplex mode.

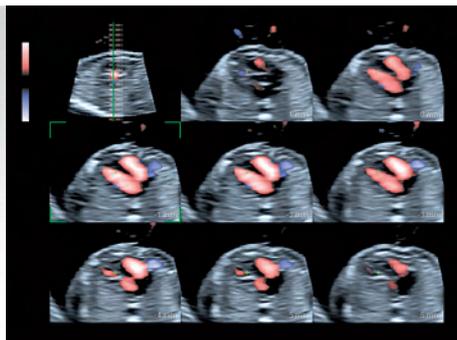


Fig. 8: 22nd week of pregnancy, heart (STIC), MultiView method, four-chamber view, diastolic inflow via the valves in both chambers (ADF).



Fig. 9: First trimester, 3D surface view with good visualization of the face, arms, and hands, with characteristic arm position.



Figs. 10–11: 22nd week of pregnancy, 3D view of the face and hand in a fetus with trisomy 21; right image: sagittal view in B-mode with missing nasal bone.

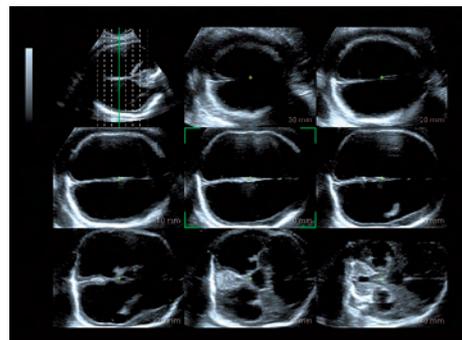


Fig. 12: 33rd week of pregnancy, pronounced hydrocephalus associated with spina bifida; MultiView mode.

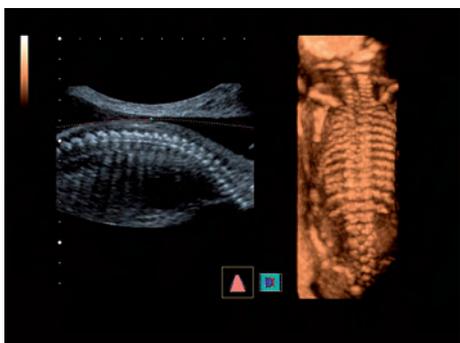


Fig. 13: 22nd week of pregnancy, normal spine in 3D skeleton mode.

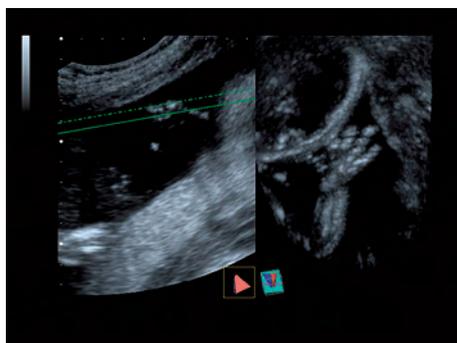


Fig. 14: 19th week of pregnancy, view of underarm and hand with fingers via the computed C plane and VolPure-C method.

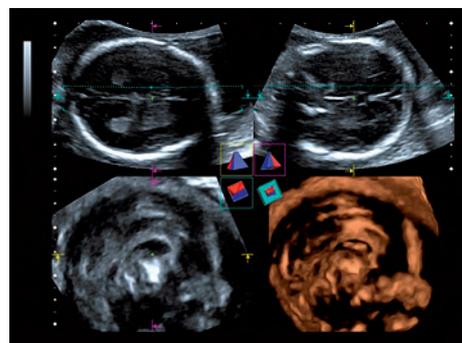


Fig. 15: 20th week of pregnancy, visualization of the brain in MPR with the corpus callosum in the C-plane.

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