

The eL18-4 PureWave linear array transducer in early assessment of the fetal urinary system

eL18-4 PureWave linear array transducer

Category

Fetal assessment

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Overview

Diagnostic ultrasound is commonly used to assess fetal anatomy during early pregnancy and has proven especially valuable in the assessment of fetal kidneys and bladder, for which malformations are common.

Once chromosomal abnormalities were ruled out, thanks to chorionic villus sampling and genetic analysis, the objectives for the fetal medicine practitioners were to accurately assess the risk of altered kidney function.

Patient history

A 35-year-old female patient was referred for a diagnosis of fetal megacystis at 12 weeks gestation in a supposedly male fetus. This condition can lead to the diagnosis of chromosomal abnormalities or severe and early bladder obstruction (posterior urethral valves), both conditions having a very poor prognosis.

Sonographic clues to indirectly assess fetal renal function are the amount of amniotic fluid, the filling and voiding cycles of the bladder, and the differentiation of kidney parenchymas. The aspect of renal parenchyma on fetal ultrasound is well described from 16-17 weeks gestation onwards. Before 16-17 weeks, it is described as being homogeneously hyperechoic.



The Philips eL18-4 PureWave linear array transducer is our first high-performance transducer featuring ultra-broadband PureWave crystal technology with multi-row array configuration, allowing for fine-elevation focusing capability.

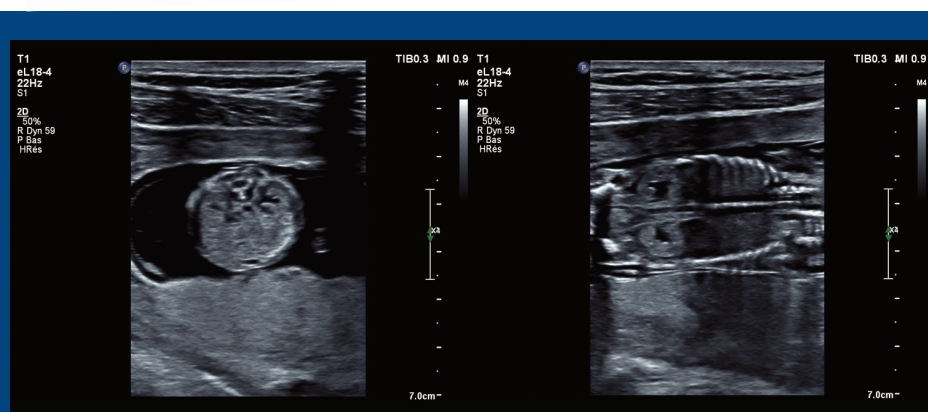


Figure 1 Normal cortico-medullary differentiation with mild hydronephrosis at 14 weeks gestation.

We were able to identify cortico-medullary differentiation from 14 weeks gestation onwards (Figure 1), as well as normal bladder cycles and the absence of dilated posterior urethra (Figure 2). Therefore, we could be more confident in telling the future parents that we were very optimistic regarding their future baby's renal function.

Baby is now one year old. Kidney ultrasound and renal function are normal and baby is doing perfectly well.

Protocol

With a BMI of 22, this patient was the ideal candidate for fetal assessment with linear transducer technology, in this case eL18-4. Structurally the fetal bladder appeared normal, with the eL18-4 B-mode images demonstrating thin walls, a non-dilated posterior urethra, and normal cycles of filling and voiding. Additionally, eL18-4 B-mode images could identify normal cortico-medullary differentiation with mild hydronephrosis in both axial and coronal planes.

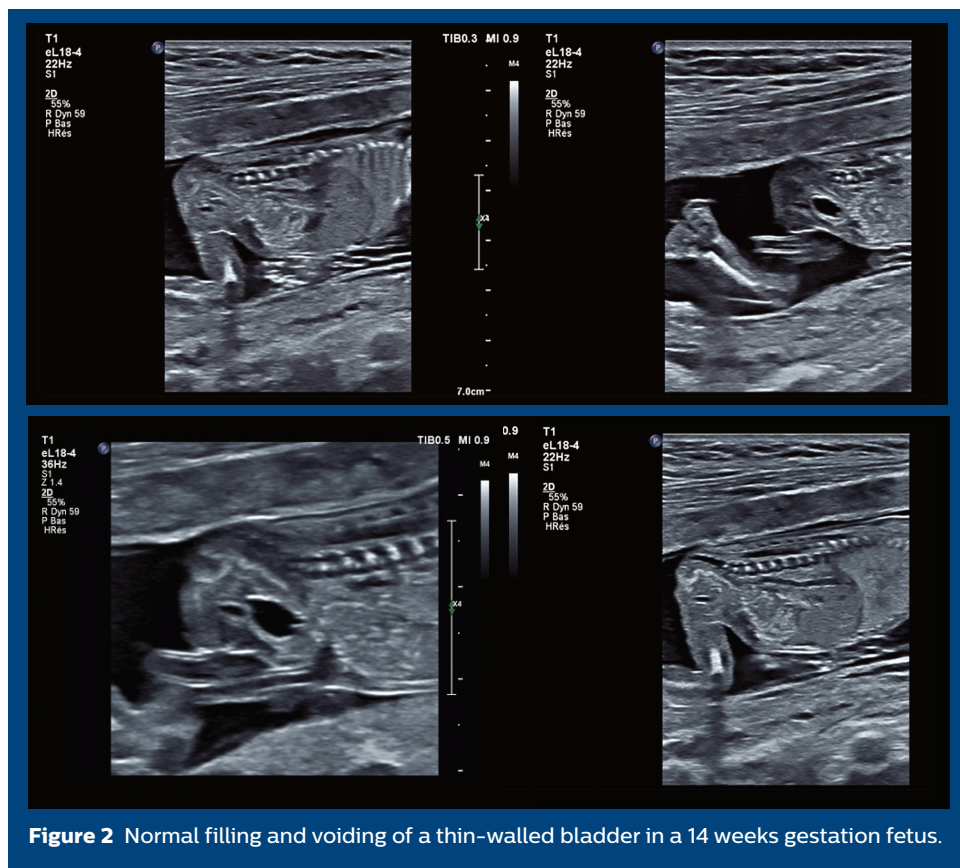


Figure 2 Normal filling and voiding of a thin-walled bladder in a 14 weeks gestation fetus.

Conclusion

Prior to the introduction of high-frequency linear transducers in fetal ultrasound, assessment of urinary system remained accurate mostly after 16-17 weeks gestation. This new technology enables very early morphological assessment of first-trimester fetuses for more accurate diagnosis and parental counseling.

This clinical case, with the eL18-4, demonstrates that cortico-medullary differentiation is possible in 14 weeks gestation for fetal kidneys, thus dramatically enhancing our diagnostic and prognostic abilities.

Results from case studies are not predictive of results in other cases. Results in other cases may vary.

Reference

Hamdaoui N, Dabadie A, Lesieur E, Quarello E, Kheiri M, Hery G, Guidicelli B, Bretelle F, Gorincour G. Ultrasound of the fetal urinary system during the first trimester of pregnancy. *Gynecol Obstet Fertil Senol*. 2017 Jun;45(6):373-380. doi:10.1016/j. PMID:28552751.