PHILIPS

Ultrasound

Clinical case study

Evaluation of a fetal adrenal mass with the eL18-4 PureWave linear array transducer

eL18-4 PureWave linear array transducer

Category

Fetal adrenal mass assessment

Authors

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Overview

Diagnostic ultrasound is widely used for prenatal evaluation of growth and anatomy as well as for the management of multiple gestations and fetal anomalies. Detailed fetal anatomy ultrasound scans provide higher resolution, resulting in more comprehensive evaluations of fetal anatomy.

Patient history

A 24-year-old primigravida pregnant female was referred to Center for Fetal Diagnosis and Treatment at the Children's Hospital of Philadelphia (CFDT) with a history of fetal ventricular septal defect identified at 26 weeks by echocardiography and previously unseen chest mass thought to be a congenital pulmonary airway malformation (CPAM). The patient related an estimated date of delivery of 12/29/2017 which projected to a gestational age of 36 weeks 5 days at the time of evaluation. Ultrasound performed at the referring center at 35 weeks 2 days revealed a hyperechoic area measuring 1.4 x 1.4 x 1.1 cm seen in the region of the left adrenal gland, a new finding not identified on prior detailed scans and therefore very concerning for adrenal hemorrhage rather than a neoplasm.

She was referred to our center for further evaluation and counseling regarding diagnosis, prognosis and management options.

Protocol

A complete detailed examination of the fetal anatomy was performed utilizing the Philips EPIQ 7 system and a variety of transducers including the C5-1, V6-2, C9-2 and eL18-4.

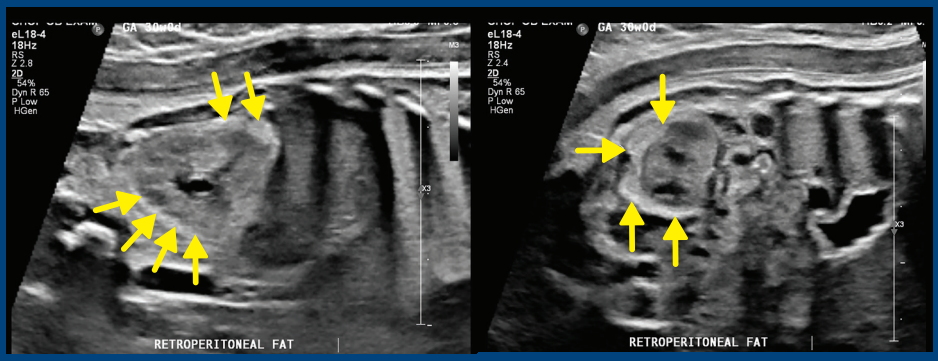
The Philips eL18-4 PureWave linear array transducer is our first high-performance transducer featuring ultra-broadband PureWave crystal technology with multi-row array configuration, allowing for fine-elevation focusing capability.

Findings

The detailed fetal anatomic survey noted a male fetus in a cephalic presentation with a posterior placenta, free of the region of the internal cervical os. The amniotic fluid index was normal, measuring 17.1 cm with a deepest pocket of 4.8 cm.

Fetal biometry estimated the average gestational age to be approximately 1 week and 2 days ahead of expected with an estimated fetal weight of 1695 grams, which was normal at the 75th percentile. The high resolution images with the eL18-4 transducer demonstrated normal retroperitoneal fat adjacent to both kidneys. The kidneys appeared unremarkable with normal echotexture, size and cortical medullary differentiation.

The adrenals were normal in size and echotexture with no evidence of hemorrhage. A normal cycling bladder was identified. Postnatal examination confirmed a lumbosacral, midline, fluid-filled mass at the level of L5 S1, covered by a thin layer of dysplasic skin, which is not a myelomeningocele.



Figures 1 and 2 Coronal image of the left kidney with arrows on the retroperitoneal fat using the eL18-4 transducer.

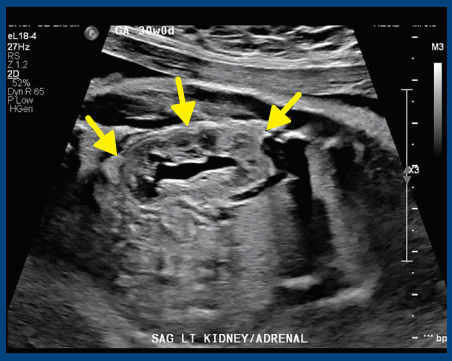


Figure 3 Sagittal image of left kidney and adrenal gland demonstrating normal tissue and normal retroperitoneal fat (arrows) circumferentially around the kidneys, using the eL18-4 transducer.

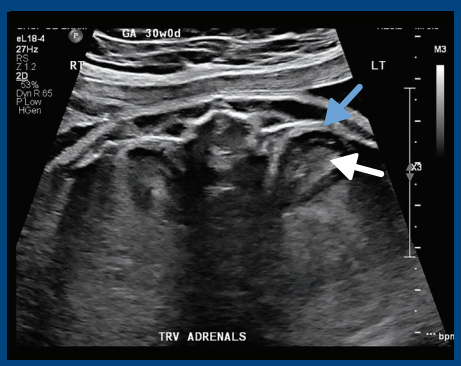


Figure 4 Transverse image of adrenal area using eL18-4 transducer, clearly discerning the difference between retroperitoneal fat (blue arrow), echogenic medulla (white arrow) and hypoechoic cortex of adrenal.

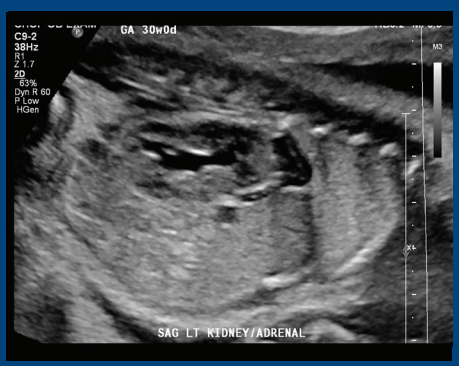


Figure 5 Sagittal image of the left kidney and the adrenal gland using the C9-2 transducer – retroperitoneal fat was not identified.

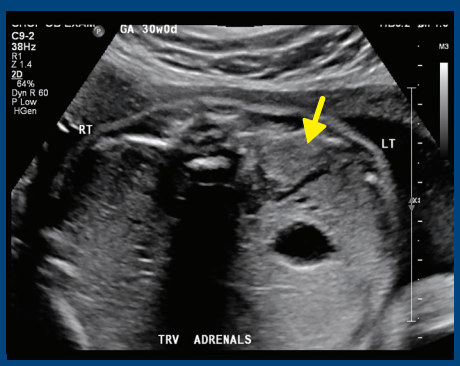


Figure 6 Transverse image of adrenal area using the C9-2 transducer, attempting to reproduce the echogenic area (arrow) identified on the outside scan which was suspicious for adrenal hemorrhage or mass.

Conclusion

The fetal adrenal glands are much larger than adult adrenal glands relative to body size. They are thought to be more susceptible to hemodynamic stress. Prenatal analysis of suprarenal masses in the fetus has proven to be very difficult. The differential diagnosis for a suprarenal mass detected in a fetus includes masses that are adrenal in origin (neuroblastoma, adrenal hyperplasia and hemorrhage), renal in origin (such as congenital mesoblastic nephroma and congenital nephroblastoma), or nongenitourinary in origin (such as subdiaphragmatic extra-lobar pulmonary sequestration). Linear array transducers offer high-resolution anatomic assessment, but traditionally have been limited to superficial structures only, such as small parts and vascular examinations. By using the eL18-4 PureWave linear array transducer, we were able to differentiate clearly between the normal retroperitoneal fat and the adrenal gland without hemorrhage. Increased echogenicity was actually shown circumferentially along the renal capsule and not primarily in a suprarenal location as would be expected of adrenal hemorrhage (**Figures 1-3**). In addition, with the eL18-4 transducer we clearly discerned the difference between the retroperitoneal fat, echogenic medulla, and hypoechoic cortex of the adrenal (**Figure 4**). This was not defined with the C9-2 curved array transducer used earlier in the examination (**Figures 5 and 6**). Clearly, there was no mass effect on the kidney and adjacent retroperitoneal tissues. In this case, the ability to penetrate the tissues in a very late third trimester patient with a high BMI as well as to differentiate the retroperitoneal structures with such fine detail in a large for gestational age fetus is simply remarkable.

References

Maki E, Oh K, Rogers S, Sohaey R. Imaging and Differential of Suprarenal Masses in the Fetus. J Ultrasound Med. 2014;33:895-904.
McNamara A, Levine D. Intraabdominal Fetal Echogenic Masses: A Practical Guide to Diagnosis and Management. Radiographics. 2005;25: 633-645.

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

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