PHILIPS

Ultrasound

Clinical case study

The eL18-4 PureWave linear array transducer in the assessment of early first trimester dating

eL18-4 PureWave linear array transducer

Category

First trimester assessment

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Overview

Diagnostic ultrasound is commonly used to assess fetal viability and dating. Ultrasound has proven valuable in establishing estimated due date (EDD). Ultrasound measurement of the embryo or fetus in the first trimester (up to and including 13-6/7 weeks of gestation) is the most accurate method to establish or confirm gestational age.

Patient history

A 38-year-old G3P2002 female patient with asthma, Crohn's Disease and multiple medications exposures was evaluated for early pregnancy dating and consult for above issues. This was a desired pregnancy.

The patient's asthma had been well controlled with an inhaler and albuterol as needed. She was encouraged to discontinue tobacco use.

Crohn's Disease counselling was performed regarding the need for fetal ultrasound throughout gestation. Crohn's can lead to malnourishment and therefore risk to the pregnancy, including early miscarriage and, later on, intrauterine growth restriction (IUGR) or fetal distress. Because of this, we recommend initial evaluations including screening and growth ultrasounds in the first trimester. Some medications are considered overall safe in pregnancy, and control of Crohn's during pregnancy is important, therefore medications were recommended to be continued.

She was taking Clonazepam for significant anxiety. This medication has an association with clefting and neonatal abstinence syndrome, as well as IUGR.

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.

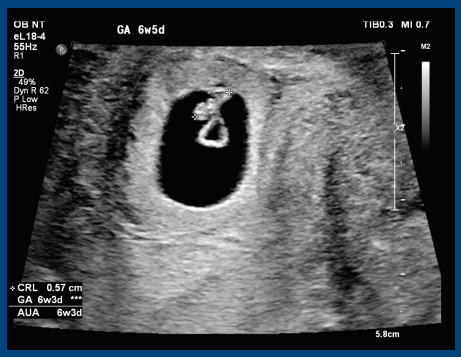

Figure 1 Normal fetal pole 6 weeks 3 days with yolk sac using eL18-4 linear transducer.

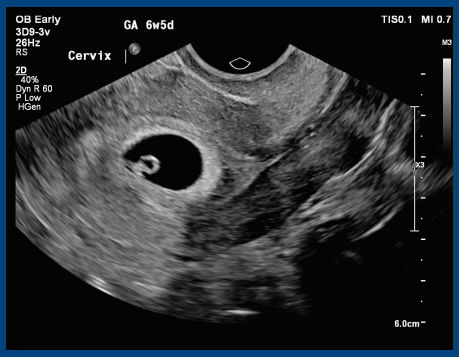

Figure 2 Normal fetal pole 6 weeks 3 days with yolk sac using 3D9-3v transvaginal transducer.

Protocol

With an early gestation for viability and dating, this patient was the ideal candidate for pregnancy assessment using both transvaginal and linear transducer technology – in this case, the 3D9-3v and the eL18-4 transducers **(Figures 1-4).** The uterus wasanteverted and close to the pelvic wall. Scanning with the eL18-4 linear array transducer was used to interrogate the uterus first. The uterus had a gestational sac located in the endometrial cavity. There was an early fetal pole and yolk sac. The fetal pole measured 6 weeks 3 days with cardiac activity and fetal heart rate 121 BPM. Both adnexa were obscured by intestinal gas.

The first image utilizing the eL18-4 linear array transducer demonstrates the gestational sac with decidual reaction surrounding the amniotic fluid; fetal pole and yolk sac are clearly visualized.

The adjacent image utilizing the 3D9-3v transvaginal transducer demonstrates the gestational sac with decidual reaction surrounding the amniotic fluid; fetal pole and yolk sac are visualized.

However, the resolution in the first image is crisp, clear and close to the near field, therefore demonstrating an image of higher resolution with the eL18-4 linear transducer.

At Platte River Perinatal Center, transvaginal ultrasound is routinely performed on all early pregnancies. This confirms the pregnancy location (in the endometrial cavity, uterus or adnexa), viability, dating and parity. We confirm viability, determine the correct EDD and consult the patient accordingly.

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

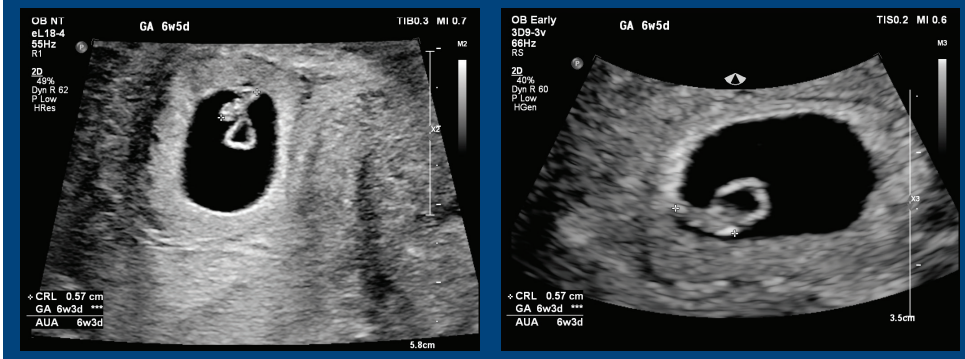

Figure 3 Measurements of the fetal pole demonstrating the different transducers and the resolution of the eL18-4 linear transducer compared to the 3D9-3v transducer.

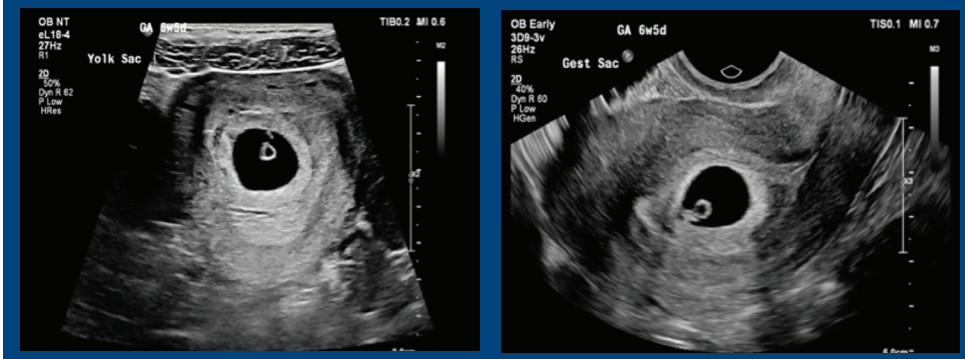

Figure 4 The difference between linear transducer (left) and transvaginal transducer (right) in an early pregnancy, 6 weeks and 3 days. Note the increased resolution of the gestational sac and yolk sac in the uterus.

Conclusion

Accurate dating of a pregnancy is important and will improve outcomes for both mother and fetus. As soon as data from the last menstrual period and the first accurate ultrasound are ascertained, the gestational age and the EDD can be determined, discussed with the patient, and documented in the medical record comprehensibly.

Transvaginal ultrasound has been the “gold standard” to evaluate early pregnancies for decades. Today a linear transducer may be an alternative to the long-accepted transvaginal approach in some patients.

This has two distinct advantages to clinical care. First, many patients prefer to avoid the discomfort of a vaginal ultrasound. Second, it requires significant additional time in the ultrasound unit to complete a vaginal ultrasound, as the patient is typically instructed to empty their bladder and will also need to undress and then dress again from the waist down.

This clinical case demonstrates an early pregnancy located in the uterus with cardiac activity, measurable crown rump length, and yolk sac. The linear images were closer to the transducer and easy to ascertain. The measurements were the same as the transvaginal transducer and the EDD was confirmed.

Reference

Pettker CM et al. Committee Opinion No 700: Methods for Estimating the Due Date. Committee on Obstetric Practice, the American Institute of Ultrasound in Medicine, and the Society for Maternal-Fetal Medicine. May 2017. DOI: 10.1097/AOG.0000000000002046.

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