

accuracy of the first-trimester scan<sup>1–4</sup>. However, the majority of these studies have been conducted in large tertiary centers, whereas in current practice most women with a twin pregnancy are first scanned by obstetricians and midwife sonographers in first-level ultrasound units and later referred to specialist centers for follow-up, notably in cases of monochorionicity.

We report a ‘flash study’ on the re-evaluation of chorionicity using stored ultrasound images from scans at 11–14 weeks’ gestation, carried out by the Collège Français d’Echographie Foetale (CFEF) for a 1-month period. The concept of a ‘flash study’, recently introduced by one of the authors (L.J.S.) (CFEF 4<sup>th</sup> Scientific Meeting, Port-en-Bessin-Huppain, France, 1–3 October 2010), entails a study of short duration with wide coverage, without modifications in obstetric management, without additional cost and with an underlying educational message. Sonographers from private and/or public units and members of CFEF were recruited by e-mail. All consecutive women attending these units at 11–14 weeks’ gestation were included. Pregnancy data and digital ultrasound images were entered by the sonographer into a web-based database at the time of scan. Chorionicity was first assessed by the sonographer. One or two explicit sonographic images of the intertwin membrane junction for each twin pregnancy were required. Images were re-evaluated by two independent fetal medicine specialists blinded to both the sonographer’s initial diagnosis of chorionicity and the other specialist’s subsequent diagnosis. Chorionicity was confirmed by pregnancy outcome, neonate sex or placental histology.

Out of a total of 6970 ultrasound examinations, performed by 271 sonographers, there were 176 twin pregnancies, corresponding to a prevalence of 2.5% (95% CI 2.2–2.9). Of those, 134 (76%) and 41 (23%) were respectively labeled as dichorionic and monochorionic diamniotic by the sonographer. One monoamniotic pregnancy was excluded from the study. Requested images were submitted by the sonographers. There was concordance between the sonographer and the two fetal medicine specialists and between the fetal medicine

### ‘Flash study’ on chorionicity determination from ultrasound images at 11–14 weeks’ gestation in twin pregnancies

Numerous studies on the accuracy of chorionicity determination have been performed, showing high



**Figure 1** Ultrasound images of the intertwin membrane junction obtained at 11–14 weeks’ gestation for three discordant cases labelled as dichorionic by the sonographer and confirmed as such after delivery. Only one image of intertwin membrane junction was submitted in each case. In two cases (a,b) neither fetal medicine specialist could determine chorionicity because of poor image quality. In one case (c) the first fetal medicine specialist was uncertain, whereas the second made a diagnosis of monochorionic pregnancy. The quality of this image is low.

specialists in 172/175 (98.3%) and 174/175 (99.4%) cases, respectively, including all cases of monochorionic pregnancy, with a kappa value of 0.99 indicating excellent agreement<sup>5,6</sup>. In two of three discordant cases that were labelled as dichorionic by the sonographer and confirmed as such after delivery, neither of the fetal medicine specialists could determine chorionicity because of poor image quality (Figure 1). In the third case, also correctly identified by the sonographer as dichorionic, the first fetal medicine specialist was uncertain whilst the second classified it as a monochorionic pregnancy. In this case, image quality was also poor.

This is the first study addressing the reproducibility of determination of chorionicity based on ultrasound images. The findings suggest that images explicitly demonstrating chorionicity should be obtained and stored at first-trimester ultrasound examination. These images would be available for review if doubt arose regarding chorionicity in pregnancies with complications, particularly in cases of twin-to-twin transfusion syndrome or discordant malformations in monochorionic pregnancies. Finally, our data reflect 'real life' practice because of the 'flash study' design. Such studies should be encouraged and are currently being performed on other topics.

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## SUPPORTING INFORMATION ON THE INTERNET

The following supporting information may be found in the online version of this article:



**Table S1** Method of conception.

**Table S2** Score of certainty among sonographers and fetal medicine specialists for monochorionic and dichorionic pregnancies.

**Table S3** Intertwin discrepancy in crown–rump length and nuchal translucency in study population.

**Table S4** Previous studies on accuracy of determination of twin chorionicity.