



Very Early and Simple Determination of Chorionic and Amniotic Type in Twin Gestations by High-Frequency Transvaginal Ultrasonography

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Abstract. *Objective.* The aim was to determine the chorionic and amniotic types in multifetal pregnancies with transvaginal ultrasonography at very early stage of gestation.

Study design. Twenty-one spontaneous multifetal pregnancies were scanned transvaginally before 8 weeks' gestation (four of them from 4th week). The chorionic and amniotic type was determined ultrasonographically. All twin gestations had postpartum pathologic evaluation of the placenta and histologic determination of the chorionic and amniotic type.

Results. Ultrasonographic evaluation of the 21 pregnancies demonstrated 20 twin and 1 triplet gestation. Four of the twin pregnancies were monochorionic-diamniotic. Triplet was monochorionic-triamniotic (spontaneously aborted in 8th week of gestation). In all 20 twin pregnancies, transvaginal ultrasonography correctly predicted the chorionic and amniotic type before 8 weeks of gestation.

Conclusion. Transvaginal ultrasonography allows a reliable, simple and rapid determination; the dichorionic twin pregnancy in 4 weeks, monochorionic in 5 weeks, and differentiation of mono-or diamniotic in 7 weeks of gestation.

Key words: Transvaginal ultrasonography, Multiple pregnancy, "Eight" sign, "Two rings" sign, "One ring" sign

Dizygotic (always dichorionic) and monozygotic (but dichorionic) twin gestations develop similarly to singleton gestations and have similar complications, albeit slightly more frequently. On the other hand, monochorionic (always monozygotic) twins are at risk for many additional complications [1, 2] (Table 1). Moreover, congenital malformations are believed to be more frequent in mono- than in dichorionic twins.

In light of the above, it follows that the dichorionic twin pregnancy is a high-risk pregnancy, the monochorionic-diamniotic twin gestation is at very high risk, and mono-

Table 1 - Specific complications of monochorionic twin pregnancy

Vascular intertwin anastomoses
Twin-to-twin transfusion syndrome
Twin reversed arterial perfusion syndrome
Damage to the survivor after intrauterine demise of its co-twin
Exsanguination of the second twin through severed umbilical vessels of the first twin
Umbilical cord entanglement (in monoamniotic placenta)
Conjoined twins
Asymmetric duplication - endo- and ectoparasitic twins

chorionic-monoamniotic twins constitute an extremely high risk pregnancy. Thus, early recognition of chorionicity and amnionicity of a twin pregnancy is an essential element of perinatal management.

The ultrasonographic diagnosis of twinning has been the topic of several previous publications. However, most articles have dealt with it as a diagnostic process performed in the second and third trimesters with the use of transabdominal ultrasonography [3-5, 8, 10-12, 15]. At times this process is lengthy and inaccurate. There are only two articles which deal exclusively with first-trimester assessment of chorionic type [9, 13].

Nowadays, embryonic and extra embryonic structures are easily imaged and defined with the use of high-frequency transvaginal ultrasonography in the first trimester. Thus, chorionicity and amnionicity may be correctly diagnosed in this period.

My hypothesis was that, using high-frequency transvaginal ultrasonography between 4 and 8 weeks' gestation, we could simply and reliably determine not only the number of the fetuses but also the chorionic and amniotic type of multifetal pregnancies.

MATERIALS AND METHODS

Between January 1991 and May 1997, 21 spontaneous multifetal pregnancies before 8 weeks' (4 in 4th week) gestations were examined by ultrasonography. In this study, we used the Bruel & Kjaer Medical System 3535 with 6.5 MHz vaginal transducer.

The gestational age was assessed in two ways: by last menstrual period, if known, or by crown-rump length. The total number of gestational sacs, yolk sacs, fetuses and the surrounding amnion and chorion were targeted for evaluation in each pregnancy.

Amnion was defined as a uniformly thin membrane bordered on one side by the completely sonolucent amniotic fluid and on the other by the extra embryonic space demonstrating a uniform low-level echogenicity [13]. The yolk sac was present in this space, as a round structure with an echogenic thicker wall. The chorion was defined as an echogenic thicker structure surrounding the extra embryonic space and the amniotic sac [13]. Furthermore, pregnancies were classified as monochorionic diamniotic when the intra-amniotic membrane had two layers and as dichorionic diamniotic when it had four.

All placentas had postpartum pathologic evaluation and histologic determination of the chorionic and amniotic type. The pathologic reports for the placentas were compared with the ultrasonographic findings.

RESULTS

Ultrasonographically, the chorionic and amniotic types of all gestations could be assessed. Of the total 21 spontaneous multifetal pregnancies there were 20 twins (4 of these 20 were monochorionic-diamniotic) and 1 monochorionic triplet.

Four patients had serial scans starting at 4 weeks (2-monochorionic, 2-dichorionic), and sixteen from 5th week of gestation. All patients had to repeat scans every one week until 8th week of gestation. Triplet gestation was spontaneously aborted in 8th week. This is why, ultrasound examination was carried out only twice (in 6th and 7th week).

Dichorionic twin was determined as early at 4 weeks' gestation, monochorionic in 5th week of gestation and di- or monoamniotic monochorionic could be differentiated no sooner than in 7th week.

Of the 20 twin pairs, 16 were dichorionic-diamniotic and 4 were monochorionic-diamniotic by histologic inspection; all were correctly identified by ultrasonography.

COMMENT

The applications of first-trimester transvaginal ultrasonography are well documented. With the introduction of high-resolution transvaginal ultrasonography, the diagnosis of chorionic and amniotic type becomes possible in the early course of the pregnancy.

The gestational sac can be imaged as early as 4 weeks 3 days. Thus, certain ultrasound diagnosis of dichorionic twin gestation is possible in this period (Fig. 1). By 5 weeks the yolk sac can be imaged. In this period yolk sacs are dominant structure inside gestational sac (Fig. 2). In 5th week of monochorionic twin gestation two yolk sacs are seen in close proximity (Fig. 3). The picture is similar to numeral "eight" and can be called "Eight" sign (Fig. 3 and 8). However, it is impossible to differentiate monochorionic diamniotic from monoamniotic twin gestation in this period. In dichorionic twin pregnancy, the yolk sacs are always separated by a thick septum (Fig. 5). By 6 weeks the embryo is seen (Fig. 4 and 5).

The amnion is the last structure to become ultrasonographically apparent. Detection of the amnion is difficult until about 7 weeks, when it separates from the fetal body and becomes quite easy to visualise [6, 7, 13, 14] (Fig. 6). Thus, certain differentiation of monoamniotic or diamniotic-monochorionic twin gestation is possible as early as in 7th week of gestation.

In conclusion, my studies proved that ultrasound examination performed in very early stage of multifetal gestation, allows to reliably, simply and rapidly determine chorionic and amniotic type of gestation. Unfortunately, during this period of gestation only a small number of spontaneous twin pregnancies are scanned (10% in my series).

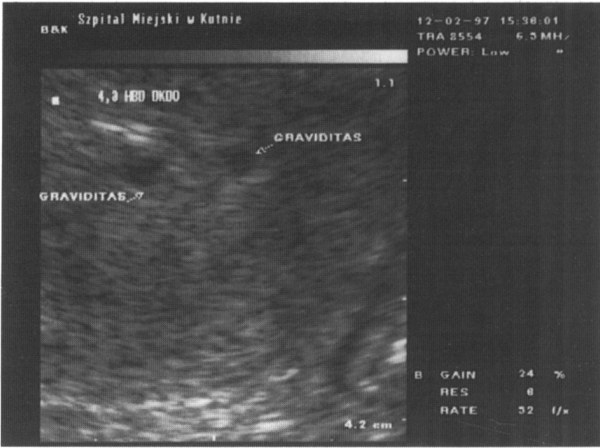


Fig. 1 - Dichorionic twin gestation at 4 weeks 3 days. This is very early view of "two rings" sign.



Fig. 2 - At 5 weeks 4 days. Yolk sac is dominant structure inside gestational sac.

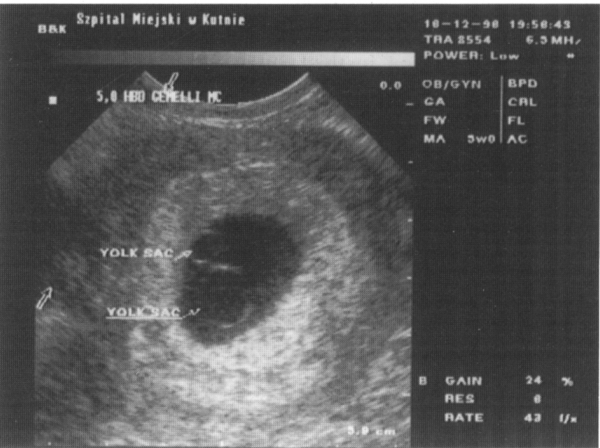


Fig. 3 - Monozygotic twin gestation at 5 weeks. Two yolk sacs are seen in close proximity. "Eight" sign.

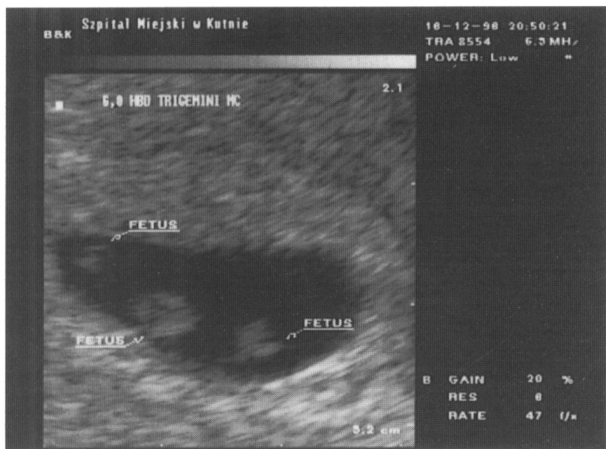


Fig. 4 - Monochorionic triplets at 6 weeks.

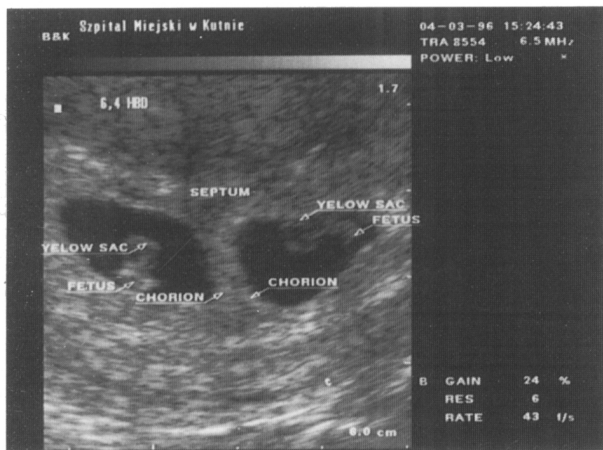


Fig. 5 - Dichorionic twin gestation at 6 weeks 4 days. The yolk sacs are separated by septum. "Two rings" sign.

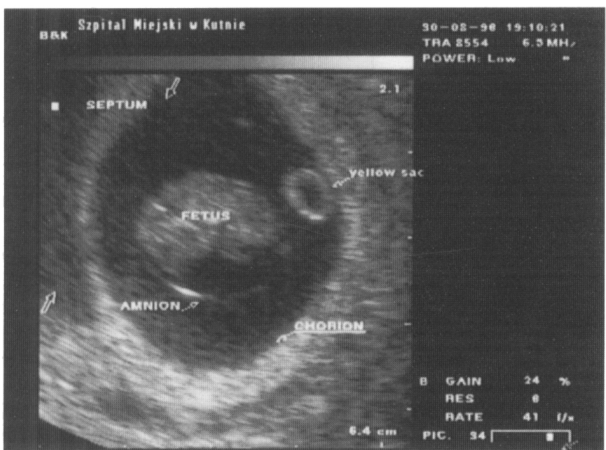


Fig. 6 - Dichorionic twin gestation at 7 weeks one day. The amnion separates from the fetal body. It is possible to determine amniotic type of twin gestation.

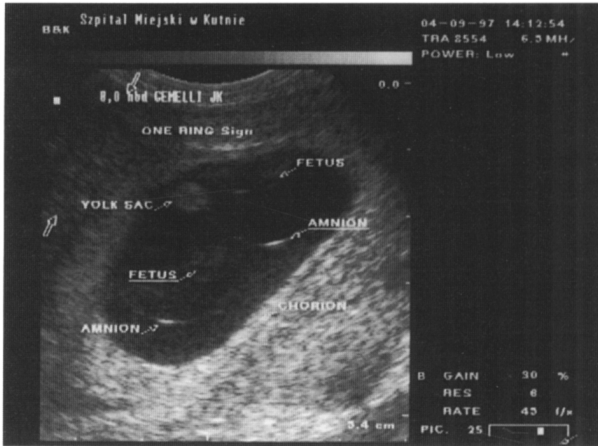


Fig. 7 - Monochorionic diamniotic twin gestation at 8th week. "One ring" sign.

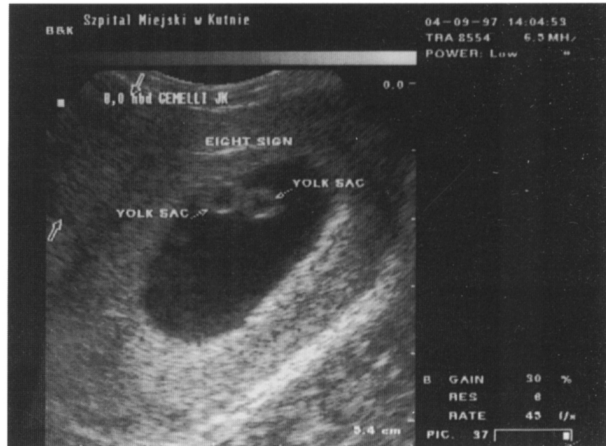


Fig. 8 - Monochorionic twin gestation at 8th week. "Eight" sign.

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