Diagnóstico Prenatal

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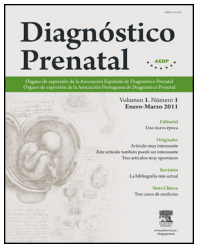

Original

Diagnosis of chorionicity: The role of ultrasound

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ABSTRACT

Chorionicity is the main determinant of the perinatal outcome in twin pregnancies: perinatal mortality and morbidity are significantly higher in monochorionic versus dichorionic twins. This is mainly due to complications associated specifically with monochorionicity, such as twin to twin transfusion syndrome (TTTS), selective fetal growth restriction (FGR) and twin reverse arterial perfusion syndrome (TRAP), consequences of the presence of inter-twin vascular anastomoses in the common placenta. For this reason the diagnosis of chorionicity in twins is of clinical importance in order to plan an increased surveillance in monochorionic gestations and to recognize the appearance of complications in their early stages.

Different sonographic signs may be used to evaluate chorionicity: number of placental masses, sex of the fetuses, characteristics of the intertwine membrane. The last one is surely the most useful and valuable tool: the take-off of the membrane from the placental surface shows the typical "lambda" appearance in dichorionic pregnancy and the typical "T" appearance in the monochorionic ones. In this article the sonographic features that help in the accurate depiction of chorionicity are reviewed.

Diagnóstico de corionicidad: papel de la ecografía

Palabras clave:
Gemelos
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RESUMEN

La corionicidad es el principal determinante del desenlace perinatal en los embarazos gemelares: la morbimortalidad perinatal es significativamente superior en los gemelos monocoriónicos que en los bicoriónicos. Esto se debe principalmente a las complicaciones asociadas con la corionicidad, a saber, el síndrome de transfusión fetal-fetal (STFF), la restricción del crecimiento fetal selectivo (CIR) y la perfusión arterial reversa (secuencia TRAP), que son debidas a anastomosis vasculares intergemelares en la placenta común. Por esta razón, el diagnóstico de corionicidad en gemelos es de importancia clínica, ya que así se podrá planificar una mayor vigilancia en gestaciones monocoriónicas y detectar la aparición de complicaciones en las primeras etapas.

Distintos signos ecográficos sirven para evaluar la corionicidad: número de masas placentarias, sexo de los fetos, características de la membrana intergemelar. Esto último es,

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sin duda, la herramienta más útil y valiosa: la separación de la membrana de la superficie placentaria muestra una típica forma «lambda» en el embarazo bicoriónico y un típico signo en «T» en el monocoriónico. En este artículo se revisan las características ecográficas que ayudan a la descripción exacta de la corionicidad.Keywords: Twins; Chorionicity; UltrasoundPalabras clave: Gemelos; Corionicidad; Ecografía

Introduction

Twin pregnancies account for 1–2.5% of all pregnancies[1]; the prevalence of twins showed an increase of approximately 80% since the beginning of the 1970s, mainly due to the increase of the maternal age at conception over this period and to the widespread diffusion of the assisted reproduction technology.

Twin pregnancies are at significant risk for adverse outcome with perinatal mortality and morbidity rate three to six times that of singletons. The main determinant of fetal outcome in twin pregnancy is placental chorionicity: monochorionic twins have a three to five higher risk of perinatal loss and handicap in comparison to dichorionic.[2,3] This is mainly due to complications specifically associated with monochorionicity such as twin to twin transfusion syndrome (TTTS), twin reversed arterial perfusion syndrome (TRAP), selective intrauterine growth restriction (IUGR), which are consequences of the vascular anastomoses between the two twins sharing the single placenta.[4]

The determination of chorionicity in a twin pregnancy is important to plan an intensive monitoring of the monochorionic pregnancies with the aim of improving their outcome, to perform accurately prenatal invasive procedures and to early diagnose and manage complications such as TTTS and selective IUGR.

Zygosity and chorionicity

Zygosity refers to the type of conception: monozygotic twins result from the mitotic division of a zygote originating from a single ovum fertilized by one sperm; dizygotic twins are the result of a double conception originating from two ova fertilized by two sperms. Monozygotic twins account for 30% of all twin pregnancies. The origin of monozygotic twinning is still unclear and different hypotheses have been proposed, the most exiting one suggesting that monozygotic and dizygotic twinning events arise from the same embryogenic mechanism.[5–7]

Chorionicity refers to the type of placentation and does not reflect zygosity. Whereas dizygotic twins are always dichorionic, monozygotic twins may be monochorionic or dichorionic depending on when the zygote divides. This is the hypothesis of the Corner's theory[8] which has never been demonstrated in humans,[6] but is useful for understanding the development of different types of chorionicity in monozygotic twins. According to this theory, if the split of the zygote occurs during the first three days following fertilization, dichorionic diamniotic twins develop: this occurs in 29% of the cases. When the split occurs 4–7 days after fertilization a monochorionic diamniotic twin pregnancy develops: this occurs in 70% of the cases. In 1% of the cases the split occurs later (between 8 and 12 days) resulting in monochorionic monoamniotic twins. When a partial splitting of the zygote occurs between 13 and 16 days following fertilization conjoined twins develop; this is an extremely rare condition occurring in up to 200,000 births.

Ultrasound diagnosis of chorionicity

Although dizygotic twins always have a dichorionic placenta, the appearance of the placentas would depend on the sites of the blastocysts implantation. In case of distant implantations in the uterine cavity two separate placentas can be demonstrated; in case of close implantation they will appear fused in a single placental mass, similar to that of the monozygotic monochorionic twins. However, due to the higher risk of complications, monochorionic twins need an increased surveillance with strict follow-up and for this reason they must be differentiated from the dizygotic dichorionic twins with fused placentae as early as possible.

First trimester The ideal time to determine chorionicity is the first trimester. As early as 4–5 weeks postmenstrual weeks, by using transvaginal sonography, it is possible to recognize the chorionic sacs inside the uterine cavity within the tick deciduas. They appear as sonolucent round structures with a brightly echogenic rim. By simply counting the chorionic sacs it is possible to establish whether the pregnancy will be monochorionic, dichorionic, trichorionic and so on (Fig. 1).

The visualization of a single chorionic sac at 4–5 weeks, however, does not exclude the possibility of a monochorionic twin pregnancy. By the sixth postmenstrual week the yolk sac and the embryo can be visualized inside the chorionic sac and the definitive diagnosis of a single pregnancy or monochorionic twin pregnancy can be done. If a single chorionic sac is visualized containing two yolk sacs and two embryonic

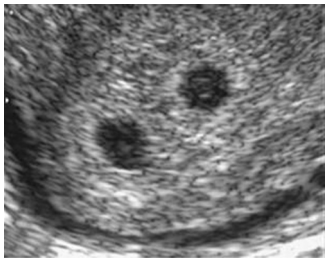

Fig. 1 – Dichorionic twin pregnancy at 5 weeks 3 days. Two round sonolucent sacs with a brightly echogenic rim are clearly visible in the thick decidua.