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Yolk Sacs in Twin Pregnancy

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Abstract. OBJECTIVE. The purpose of this study was to evaluate the relationship between the yolk sacs separated or not separated by septum and chorionicity twin pregnancies scanned early in the first trimester, and the relation between size and morphologic features of the yolk sac and the outcome of twin pregnancies.

RESULTS. In all 38 sets of twins two yolk sacs were identified. During the first trimester of a dichorionic twin pregnancy, the yolk sacs were always separated by a septum and not separated ("Eight" sign) in monochorionic twin pregnancy. In five cases, one of yolk sac was abnormally large (> 8mm) and had thin wall. Four of the five mothers spontaneously aborted during the next 2-3 weeks. In one case of monochorionic twin ectopic pregnancy two yolk sacs were seen normally.

CONCLUSION. The sonographic identification of yolk sacs in multiple pregnancies allows an early and efficient recognition of presence and chorionicity of twin pregnancy, both in intra – and extrauterine. Identification of abnormal yolk sac or yolk sacs suggests death of one or all embryos.

Key words: Multiple pregnancy, Yolk sac, Transvaginal ultrasonography, "Eight" sign

INTRODUCTION

The Yolk sac is a first structure of gestational sac that can be detected in ultrasound examination. It was first reported by Mantoni and Pederson [9]. When we use transvaginal transducer it is possible to notice that structure in the fifth week of menstrual age of pregnancy, third week after fertilization. At this time, yolk sac is a dominant structure of gestational sac (Fig. 1).

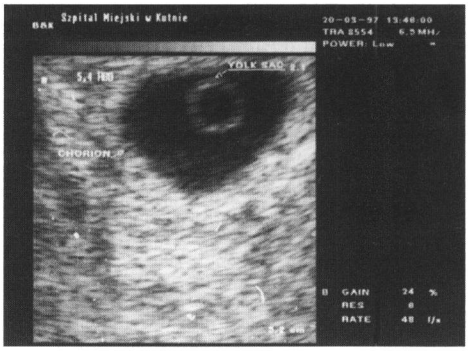

Fig. 1 - At 5 weeks. Yolk sac is dominant structure inside gestational sac.

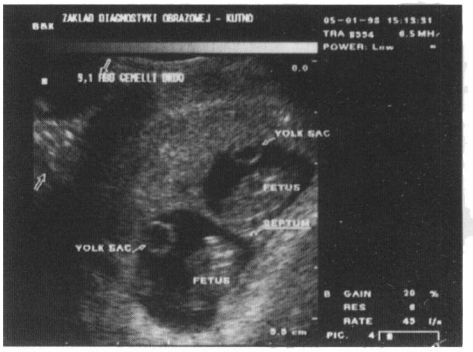

Fig. 2 - Dichorionic twin pregnancy. The yolk sacs are separated by thick septum. " Two rings " sign.

The purpose of this study was to evaluate the relationship between the yolk sacs separated or not separated by septum and chorionicity twin pregnancies scanned early in the first trimester, as well as to determine the relation between size and morphologic features of the yolk sac and the outcome of twin pregnancies.

MATERIALS AND METHODS

The study was performed by ultrasound B&K Medical System 3535 with 6,5MHz convex transvaginal probe. I prospectively reviewed 38 spontaneous twin pregnancies scanned between 5 and 10 weeks' gestation. The following parameters were evaluated: presence, size and morphologic features of yolk sacs, as well as the outcome of the pregnancy. Post partum, all cases underwent histologic examination.

RESULTS

Twenty four of 38 spontaneous twin pregnancies were dichorionic, eight – monochorionic diamniotic, five monochorionic twin gestations with discordant sizes and views of yolk sacs, and one a twin ectopic pregnancy (underwent salpingectomy).

In all 38 sets of twins two yolk sacs were identified. During the first trimester of dichorionic twin pregnancy, the yolk sacs were always separated by a septum and not separated (" Eight " sign) in monochorionic twin pregnancy (Fig. 2 and 4). In five cases, one of the yolk sacs was abnormally large (> 8mm) and had thinner wall (Fig. 5 and 6). Four of the five mothers spontaneously aborted during the next 2-3 weeks. In one case of monochorionic twin ectopic pregnancy two yolk sacs were seen normally (Fig. 7).

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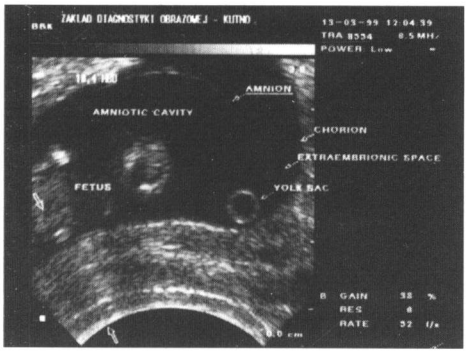

Fig. 3 - Yolk sac exists in the extraembryonic space.

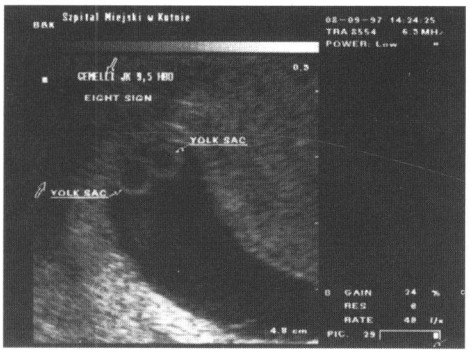

Fig. 4 - Monochorionic twin gestation. Two yolk sacs are seen in close proximity and not separated by septum. " Eight " sign.

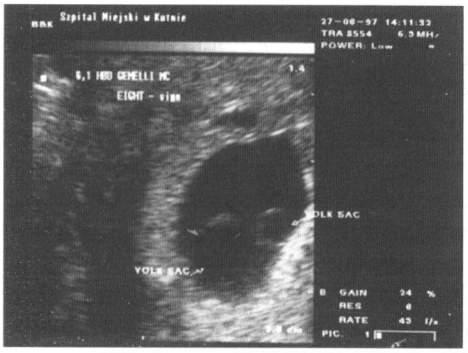

Fig. 5 - Monochorionic twin gestation. Death of one embryo – yolk sac has abnormal size (> 8mm).

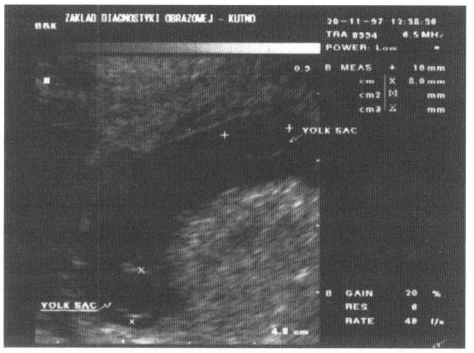

Fig. 6 - Monochorionic twin gestation. Two yolk sacs have abnormal size.

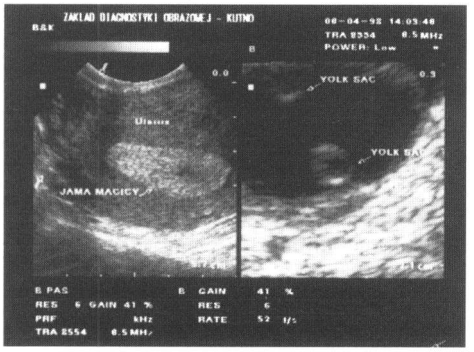

Fig. 7 - Monochorionic ectopic twin pregnancy at 5 weeks. On the left – only see thick endometrium in uterine cavity, without pregnancy. On the right – gestational sac outside of uterine cavity with two yolk sacs not separated by any septum.

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DISCUSSION

The secondary fetal yolk sac plays an integral role in embryonic development in the early first trimester. Various investigations have implicated the yolk sac as being a source of immunologic precursors, blood-forming elements, and even nutrition during a critical stage in organogenesis [3, 4]. Because of the dependence of the embryo on the yolk sac, it is possible that lack of yolk sac can make impossible normal embryonic development. Then, yolk sac should always coexist with the embryo throughout the first trimester. The recent Bromley at al. [1] and Levi at al. [6] have reported cases of monoamniotic twin pregancies in which they observed only one yolk sac.

In all my cases of dichorionic and monochorionic diamniotic twin pregnancies, the number of yolk sacs was the same as the number of embryos. The same situation took place in a monochorionic ectopic twin pregnancy (Fig 7). On the contrary, I can not so far answer a question what is the number of yolk sacs in monochorionic monoamniotic twin gestation because in this period I did not observe any of such pregnancy. Thus, I can not exclude that the existence of one yolk sac in twin pregnancy is possible, especially when the splitting of one zygote takes place after the ninth day since fertilization, that is the period when primary yolk sac was created. The situation is the most probable in the case of conjoined twins. In dichorionic twin pregnancies each embryo exists in two separate chorionic sacs ("two rings" sign) [10]. In all my cases of dichorionic twin pregnancies yolk sacs were always separated by a thick septum, which consists of two chorions (Fig. 2).

Yolk sac always exists in the extraembryonic space (demonstrating a uniform low-level echogenicity), that is outside the amnion (Fig. 3) [8, 10]. In my cases of monochorionic diamniotic twin pregnancies yolk sacs were always present in the same space and not separated by any septum. In the early stage of first trimester two yolk sacs were seen in close proximity (Fig. 4). This picture is similar to figure eight and it can be called "Eight" sign (Fig. 4).

New diagnostic tools allow observation of the yolk sac in nearly 100% of cases depending on gestational age, even in the absence of a living embryo [11]. Transvaginal sonography has made it possible to discriminate between viable and nonviable pregnancies earlier than transabdominal sonography [13]. Reliable ultrasound criteria have been identified for diagnosing nonviable pregnancies [7, 12]. Lindsay et al. [7] reported that a large yolk sac was associated with a poor singleton pregnancy outcome. Also, an undersized yolk sac was reported to be associated with spontaneous abortion [5].

A large yolk sac has been considered as an alteration of metabolic functions of the yolk sac membrane with accumulation of secretive substances following embryonic death [2]. In the case of intrauterine demise of one embryo in multiple pregnancies I observed discordant sizes and morphologic features of yolk sacs. In case of embryo demise the diameter of the yolk sac tended to be larger, more than 8 mm, and with a thinner wall than in viable embryos (Fig. 5). Moreover, in my five cases of monochorionic twin pregnancies complicated by one embryo's demise, the second also demised in a short time. Four of these five monochorionic twin pregnancies were associated with spontaneous abortion. I did not observe this in my cases of dichorionic twin pregnancies. In the case of all embryo's demise, both yolk sacs had abnormal size and morphological view (Fig. 6).

CONCLUSIONS

The sonographic identification of yolk sacs in multiple pregnancy allows an early and efficient recognition of presence and chorionicity of twin pregnancy, both in intra – and extrauterine. Identification of abnormal yolk sac or yolk sacs suggests death of one or all embryos.

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