



A STUDY ON YOLK SAC MORPHOLOGY & ITS SIGNIFICANCE
PREGNANCY OUTCOME- AN OBSERVATIONAL STUDY

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ABSTRACT:

Background –Pregnancy loss in first trimester is due to multiple known and some unknown factors. Yolk sac also plays a major role in early pregnancy by providing nutrition to the early pregnancy developing embryo. Sometimes abnormal yolk sac morphology leads to poor pregnancy outcome. So in this study we tried to find out the correlation of yolk sac morphology as the size ,shape, ecogenesity with respect to pregnancy outcome uptill 20 week pregnancy.

Methods- In our study we took 155 patient coming to obstetric department at T S Misra Medical College for a duration of six month from 21 january 2023 to 21 july 2023 . The size, shape and echogenicity were measured for pregnant patient between 6 to 10 week of gestation.

Result-In our study 155 patient enrolled for study in which 5 were lost their follow up so study was done in 150 patient . 3 (17.64 %) pregnant female had yolk sac size < 2 mm and 11(64.70%) had 5 mm. Distorted yolk sac were seen in 2 (11.76 %) cases . 1 (5.88%) case had no yolk sac and 1 (5.88%) had hypoechoic rim .

Conclusion- Yolk sac is very important structure in early pregnancy .In first 12 week of pregnancy ,yolk sac is the primary source of exchange between mother and fetus before placental circulation is established. It has secretory ,excretory and immunogenic function . In

our study there is positive correlation between abnormal morphology of yolk sac and poor pregnancy outcome.

Keyword: Embryo, Yolk sac , Placenta , Excretory, Immunogenic function.

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INTRODUCTION

The yolk sac, or umbilical vesicle, is a small membranous structure outside the embryo with various functions during embryonic development. The yolk sac reduces in size, communicates ventrally with the developing embryo via the yolk stalk, and later regresses. The yolk stalk is a term that may be used interchangeably with the vitelline duct, omphaloenteric duct, or omphalomesenteric duct. The yolk stalk serves to connect the yolk sac to the midgut, which is an early derivative of the gastrointestinal system. Both the midgut and yolk sac are endodermal in origin. The yolk sac contains an extensive capillary plexus for absorbing nutrients and oxygen that pass on to the embryo. The primitive aorta supplies blood to the yolk sac, where this absorption occurs at the capillaries, and then the vitelline veins drain and direct blood to the embryo.¹

Although it contains no yolk in humans, the yolk sac has several critical biological functions during early gestation, including primitive hematopoiesis and germ cell production. Clinically, the yolk sac can be visualized using sonography by five weeks post-fertilization, and its visual examination serves as a significant predictor of adverse pregnancy outcomes until its disappearance on sonography by the second trimester.

The yolk sac is responsible for critical biologic functions during early gestation. Before the placenta forms and can take over, the yolk sac provides nutrition and gas exchange between the mother and the developing embryo. It is also the main organ of embryonic blood cell production via blood islands near the yolk sac. Primitive hematopoiesis occurs in the yolk sac before the liver and bone marrow sequentially take over. Other functions of the yolk sac include the production of stem cells and primitive macrophages, the production of germ cells, metabolic regulation, and the synthesis of proteins such as albumin, alpha-fetoprotein, and apolipoproteins. The yolk sac also contributes to the formation of the umbilical cord.

During the first trimester, the sonographic findings of the yolk sac give clinicians, important information in terms of pregnancy outcomes. Absent, small, and large yolk sacs are associated with pregnancy loss compared to yolk sacs of pregnancies that continue past the

first trimester.² A yolk sac is defined as small or large when it falls below the fifth percentile or surpasses the 95th percentile, respectively, for the expected size. Measurements of the yolk sac merit consideration in addition to growth percentiles. Defined abnormal measurements are less than 2 mm or greater than 6 mm in size. Small and large yolk sacs have both correlated with spontaneous abortions. Other abnormal ultrasound findings associated with spontaneous abortions include irregularly shaped and calcified yolk sacs. It is important to note that an abnormal yolk sac finding does not always indicate spontaneous abortion. Although uncommon, viable pregnancies can occur with oval-shaped and enlarged yolk sacs.³ Some studies have found abnormal yolk sac shape to be more specific for spontaneous abortion than abnormal size, although both are considered strong predictors.⁴

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MATERIALS AND METHOD

In our study we took 155 patients visited to obstetric department at T S Misra Medical College for a duration of six month from January 2023 to July 2023. The size, shape and echogenicity were measured for pregnant patient between 6 to 10 weeks of gestation. Five cases lost follow up so 150 pregnant female included in this study after taking proper informed consent. TVS was done to know the normal and abnormal criteria of yolk sac as per our study.

Criteria of normal yolk sac:

Size – 2-5 mm, Shape –Round

Margin-echogenic- echogenic with hypoechoic cavity

Criteria for abnormal sac:

Size - < 2 mm or > 5 mm

Shape – irregular (oval ,elliptical)

Margin : not echogenic

Cavity : some foci of echogenesity present

First ultrasonography was done at 6 -10 weeks of gestation and all the finding related to early pregnancy eg. Gestational sac , yolk sac, crown-rump length , location of sac were noted down .On analysing all the parameters , chi-squaire test test was applied to determined the result in form of p- value.

TABLE 1

AGE	NUMBER	PERCENTAGE
20 – 25	20	21.33 %
26-30	71	47.33 %
31-35	45	30 %
36-40	14	9.3 %

TABLE 2

GRAVIDA	NUMBER	PERCENTAGE
PRIMIGRAVIDA	51	34 %
2 nd gravida	53	35 .33 %
>gravid	46	30 .66 %

TABLE 3

CHARACTERISTIC	NUMBER (%)	ABORTION RATE
SIZE < 2 mm	3 (17.64 %)	2 (11 .76 %)
Size > 5 mm	11 (64 .70 %)	9(52. 94 %)
Distorted shape	2 (11 .76 %)	1 (5 .88 %)
Two yolk sac	0 (0)	0 (0)
No yolk sac	1(5 .88 %)	1 (5.88 %)
Hypochoic rim	1 (5 .88 %)	1 (5.88 %)

DISCUSSION:

The mean age of study group was 29.3113±4.514 ..During study 155 pateint enrolled but 5 case not returned for next visit and lost follow up so 150 pregnant women included in our study . Out of 150 patients , 17 (12 %) cases had abnormal yolk sac of which 14 (9.33 %) were result in spontaneous abortion .

With regards to abnormal yolk sac characteristics , 11 (64.70 %) had yolk sacs that were greater than 5 mm ; the largest was 8.4 mm who had history of 4 recurrent abortion.

Spontaneous abortion occur in 9 (52.94 %) who were between 6 – 10 weeks of pregnancy . The largest yolk sac with a normal, uneventful pregnancy was 6.4 mm in diameter.

3 (17.64) patient had yolk sac that were < 2 mm ; spontaneous abortion occur in 2 (11.76 %) . One patient with yolk sac diameter 1.8 mm continues to term pregnancy but intra-uterine growth restriction occurs in the last trimester.

2 (11.76 %) pregnant female had distorted yolk sac out of which 1 (5.88 %) result in abortion . One patient (5.88 %) had hypoechoic yolk sac resulted in spontaneous abortion at 7 week of gestation.

As in our study, the expected frequency of variable is more than five so Fisher's exact test was applicable and which was found to be highly significant. In our study it seems to be positive correlation between abnormal yolk sac morphology and poor pregnancy outcome .

CONCLUSION

Yolk sac is very important structure in early pregnancy. In first 12 week of pregnancy, yolk sac is the primary source of exchange between mother and fetus before placental circulation is established. It has secretory, excretory and immunogenic function. In our study there is positive correlation between abnormal morphology of yolk sac and poor pregnancy outcome.

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