# The relation between Abnormal Yolk Sac Characteristics and Abortion Rates at First Trimester

## Thesis

*Submitted for Partial Fulfillment of M.Sc. Degree*
*in **Obstetrics and Gynecology***

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✍ Gehan Mahmoud Gaber Abd Elatif

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# List of Abbreviations

| Abbrev. | Full-term |
|---|---|
| **+FHTs** | **:** Positive fetal heart tones |
| **ACOG** | **:** American College of Obstetricians and Gynecologists |
| **aFP** | **:** Alpha Fetoprotein |
| **AGM** | : Aorta/gonad/mesonephros |
| **aI-AT** | **:** aI-antitrypsin |
| **APLA** | **:** Anti phospholipid antibody syndrome. |
| **BMI** | **:** Body mass index |
| **BPM** | **:** Beat per minute |
| **CRF** | **:** Case Recorded Form |
| **CRL** | **:** Crown-rump length |
| **FHR** | **:** Fetal heart rate |
| **FPR** | **:** False Positive Rate |
| **GA** | **:** Gestational age |
| **GS** | **:** Gestational sac |
| **LMP** | **:** Last menstrual period |
| **LMP** | **:** Last menstrual period |
| **MP** | **:** Multipara |
| **MSD** | **:** Mean sac diameter |
| **NSAIDS** | **:** Non steroidal anti inflammatory drugs |
| **PG** | **:** Primigravity |
| **RM** | **:** Recurrent Miscarriage |
| **ROC** | **:** Receiver operator characteristic |
| **SD** | **:** Standered deviation |
| **SLE** | **:** Systemic lupus erythematosus |
| **SYS** | : Secondary yok sac |
| **TOP** | **:** Termination of pregnancy |
| **TPR** | **:** True Positive Rate |

**TVS** **:** Transvaginal ultrasound

**YS** **:** Yolk sac aorta/gonad/mesonephros (AGM)

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# The relation between abnormal yolk sac characteristics and abortion rates at first trimester.

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# Introduction

Miscarriage is defined as the loss of an intrauterine pregnancy before fetal viability (24 completed weeks of gestation) .The WHO defines this as the expulsion of the fetus or embryo with a fetal weight of 500 gm or less **[Robinson et al .2014].**

The terms miscarriage, early pregnancy failure, or early pregnancy loss are all synonyms to the term abortion, and are used interchangeably to describe the same condition **[Tan et al 2011].**

Miscarriage can be classified into threatened, inevitable incomplete, complete, missed, septic, and recurrent abortion **[Roman et al 2004].**

Causes of miscarriage may include genetic, uterine, or hormonal abnormalities, reproductive tract infections, and tissue rejection **[ Kleinhaus et al 2006].**

There are two types of miscarriage, sporadic and recurrent. Unlike sporadic miscarriage, recurrent miscarriage tends to occur even if the fetus has normal chromosome complement **[Sullivan et al 2004]**.

Missed miscarriage means absence of embryo with heart beat at least 2 weeks after an ultrasound scan that showed a gestational sac without a yolk sac, or absence of embryo with heart beat at least 11 days after an ultrasound scan that showed a gestational sac with a yolk sac **[Harris et al 2006].**

The criteria for the first trimester missed miscarriage are a gestational sac with a mean diameter of more than 12 mm without a yolk sac, or a mean gestational sac diameter exceeding 16 mm without an embryo, or yolk sac of more than 6 mm mean diameter (with or without abnormal morphology) that ultimately fails to develop an embryonic structure, or an embryo with a crown-rump length (CRL) of more than 7 mm without cardiac activity

**[Salamanca et al 2013].**

Identification of the gestational sac is a critical landmark in monitoring an early pregnancy, and can be reliably seen at 5 weeks by using transvaginal ultrasound [**Tan et al 2011].**

The first recognizable structure inside the gestational sac is the yolk sac, which should be detectable as a regularly rounded extra-amniotic structure when the gestational sac reaches dimensions of 8 to 10 mm. The normal biometric value of the yolk sac diameter during the first trimester should be an inner diameter of 3-6 mm **[Cho et al 2006].**

During embryonic development, the yolk sac is the primary route of exchange between the embryo and the mother, it also provides nutritional, immunologic, metabolic, endocrine, and hematopoietic functions to the embryo until the placental circulation is established**[Sinan et al 2011].**.

> The yolk-sac is situated on the ventral aspect of the embryo; it is lined by endoderm, outside of which is a layer of mesoderm. It is filled with the vitelline fluid, which possibly may be utilized for the nourishment of the embryo during the earlier stages of its existence**.[Adija et al 2015].**

Normally the yolk sac is a round structure with an anechoic center that is surrounded by a uniformly thick and well-defined echogenic wall **[chao et al 2006].**

As for the size of the yolk sac, it is reported that the diameter of a yolk sac increases steadily (0.1 mm) per day. In fact, the yolk sac size progressively increases from the beginning of the 5th gestational week to the end of the $10^{th}$ gestational week. Afterward, the yolk sac size decrease gradually **[Varelas et al 2008]**.

The upper normal limit has been defined as 5-6 mm for the normal yolk sac in pregnancies with gestational age of 5 to 10 weeks. Therefore it has been concluded that an abnormally large

yolk sac can indicate a poor obstetric outcome, which usually results in embryonic death **[Lucie Morin et al 2005].**

The lack of a yolk sac or a smaller than gestational age yolk sac diameter is indicative of pregnancies that may result in spontaneous abortion **[Berdah et al 2010].**

Calcified yolk sac may appear as an echogenic ridge on sonography only observed with a dead embryo because the yolk sac would undergo calcification within a few days after embryonic death **[Shetty et al 2016].**

Echogenic Yolk sac associated with fetal death but it is not associated with anomalies or poor pregnancy outcome **[Adija et al 2015].**

Irregular Yolk sac means not rounded shape or indented ridge is an unrelated to an increased rate of spontaneous abortion [**Sinan Tan et al ]** but in other study detected that distorted shape has the most important factor for early pregnancy loss **[Moradan et al 2012]**.

**Moradan Sanam** concluded that abnormal yolk sac characteristics are associated with spontaneous abortion

Finally we are considering the following yolk sac characteristics are abnormal for classification: diameter less than 2mm or more than 5 mm, not rounded shape, present of degenerative changes and echogenic yolk sac **[Moradan et al 2012]**.

## AIM OF THE W0rk

This study aims to assess accuracy of yolk sac characteristics in predicting pregnancy outcome in pregnant women between 5-6 weeks of gestation.

## Research hypothesis:

In pregnant women during 5-6 weeks, yolk sac characteristics