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Review Article

OVERVIEW OF EARLY PREGNANCY LOSS

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Abstract:

Introduction: It is typical to experience early pregnancy loss or the loss of an intrauterine pregnancy during the first trimester in clinical practice. A non-viable pregnancy up to 20 weeks of gestation is commonly called early pregnancy loss, sometimes known as miscarriage or spontaneous abortion. The most frequent type of pregnancy loss is early pregnancy loss, which happens in the first trimester (i.e., up to 12+6 weeks gestation). People who have experienced pregnancy loss are assessed to rule out any disease that needs immediate medical attention, and they are then given advice on the various therapy choices, including expectant, pharmaceutical, and surgical treatments. Obstetricians and gynecologists should be familiar with the use of various diagnostic techniques to distinguish between viable and unviable pregnancies and should be able to provide patients with the complete spectrum of therapeutic choices, including expectant, medicinal, and surgical management.

Aim of the study: The objective of the review is to identify miscarriage-related emergencies, outline typical history, physical, and laboratory evaluation, summarise available management options, and outline interprofessional team strategies for enhancing care coordination and patient communication.

Methodology: The present review is a comprehensive research of PUBMED since the year 1995 to 2022.

Conclusion: A pregnancy loss before 20 weeks gestation is referred to as Early loss of pregnancy. Early loss of pregnancy losses occur before 12 weeks of gestation as a result of chromosomal abnormalities. Smoking, being overweight, and having high blood pressure in the mother can all raise the risk of miscarriage. There is evidence that older mothers are more likely to miscarry, with rates for those over 40 reaching 74%. To ascertain whether a pregnancy is viable, transvaginal ultrasound evaluation is crucial. All three treatment methods (medical, surgical, or expectant management) have been shown to be equally safe and successful for women without co-morbid disorders.

Keywords: Early loss of pregnancy, ultrasound, emergency management

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INTRODUCTION:

The natural termination of a pregnancy before twenty weeks of gestation is known as a spontaneous abortion. To distinguish it from induced abortion, spontaneous abortion is often referred to as a "miscarriage" in everyday speech. Early pregnancy loss only refers to first-trimester spontaneous abortions. However, the majority of spontaneous abortions take place in the first trimester. There are several distinct types of early pregnancy loss; missing abortion occurs when there are insufficient uterine contractions to push out the conceived objects, resulting in the asymptomatic or "missed" demise of the embryo or fetus. Threatening abortion, on the other hand, is characterized by symptomatic, 'threatening' ejection of the genital products, but the cervical os remains closed, and the embryo or fetus is still viable.^[1]

An open cervical os, which denotes the 'inevitable' passage of the fetus' products, distinguishes inevitable abortion from threatening abortion. In an 'incomplete' abortion, the fetus' products pass 'incompletely' through the cervical os. A 'complete' abortion is defined as the passage of all sperm and egg. Three or more consecutive miscarriages are considered recurrent abortions. Retained fetal products of conception can become infected, which typically happens in the context of non-sterile-induced abortion. Septic abortion can result from this.^[2]

Etiology and Risk Factors^[3-6]

1. Embryonic causes of spontaneous abortion account for 80–90% of miscarriages in the first trimester and are the most common etiology.
2. Following a normal pregnancy, there is an inflammatory reaction that might become interrupted following a miscarriage.
3. Chromosome abnormalities, or genetic abnormalities within the embryo, are the most frequent cause of early loss of pregnancy and account for 50–65% of all miscarriages. With a 14.6% incidence rate,

the most prevalent single chromosomal aberration is the 45X karyotype.

4. About half of all chromosomal defects linked to miscarriage are trisomies, the biggest single type of chromosomal aberrations. The most frequent trisomy observed is trisomy 16. Triploidies make up to 20% of genetic disorders.

5. Although quantification is challenging, teratogenic and mutagenic variables may also contribute to spontaneous abortion.

6. Asherman syndrome is one of the iatrogenic causes.

7. The following are some examples of maternal reasons for spontaneous miscarriage:^[4,5]

- A. Genetic: The probability of aneuploidy is directly correlated with maternal age (>30% in those over 40 years old). A parental chromosomal abnormality (i.e., balanced translocation) occurs in 2-3% of couples who experience recurrent miscarriages.
- B. The following list of reproductive tract structural anomalies is provided. Cervical incompetence, fibroids, and uterine birth abnormalities, particularly the uterine septum

The most frequent risk factors are advanced mother age and past early pregnancy loss. For instance, the rate of early pregnancy loss among women between the ages of 20 and 30 is just 9 to 17%, whereas the rate in women over the age of 45 is 80%. A few other risk factors are consuming cocaine, smoking, and drinking alcohol.^[6]

There are some acute maternal risk factors:^[6]

- A. Absence of the corpus luteum
- B. Active infections, such as bacterial vaginosis in the vagina, the rubella virus, CMV, listeria infection, toxoplasmosis, malaria, brucellosis, human immunodeficiency virus (HIV), dengue fever, and influenza.

Factors affecting chronic maternal health include the following:^[6]

- A. Untreated thyroid disease: According to a meta-analysis, in women with adequate

thyroid function, the relationship between spontaneous abortion, premature delivery, and thyroid autoantibodies discovered a significant correlation between maternal thyroid autoantibodies and miscarriage and preterm birth. Levothyroxine therapy appears to have the potential to reduce the hazards.

- B. Uncontrolled Diabetes Mellitus
- C. Polycystic Ovary Syndrome
- D. Chronic Renal Diseases
- E. Systemic Lupus Erythematosus
- F. Severe Hypertension

Clinical Presentation of Early Pregnancy Loss

History:

Patients who have experienced a spontaneous complete abortion typically report previous vaginal bleeding, abdominal pain, and tissue passing. The abdominal pain and vaginal bleeding stop once the tissue has passed. Until proven differently, assume that every reproductive-aged woman presenting with vaginal hemorrhage is pregnant. Other signs, including a fever or chills, are more indicative of an infection, as in a septic abortion. Abortions that are septic must be treated right away, or else they could be fatal.^[7]

Vaginal Bleeding - Because life-threatening hemorrhage could occur, measuring the amount of bleeding is crucial. The patient might be able to specify how many pads or tampons were used over a certain period of time and how much each pad was soaked. Even though this is merely an estimate, soaking a pad for an hour or more indicates large and alarming quantities of bleeding that need immediate attention. The emergency room should receive these patients. Blood clots indicate severe bleeding since they are present. Blood clot presence might sometimes be mistaken for tissue migration. The passed material can be examined to determine if it is a clot or tissue. If the substance is tissue, the kind of abortion can be determined.^[7]

The type of spontaneous abortion determines the symptoms. Missed abortions are either symptom-free or come with a reversal of the typical symptoms and signs of a healthy pregnancy. Abdominal-pelvic cramps and vaginal bleeding are linked to threatened, inevitable, incomplete, and complete abortions. Septic abortion is frequently accompanied by fever, purulent vaginal or cervical discharge, tachycardia, and hypotension, in addition to these symptoms. In an effort to rule out early pregnancy loss, hemorrhage higher than that associated with menstruation should be quantified. Even in the absence of sepsis, patients with considerable bleeding may display symptoms and signs of hypovolemia.^[7]

Physical Examination:

Pregnant patients who are bleeding vaginally require immediate attention. The first step is to estimate the patient's hemodynamic stability as follows:^[8]

- Orthostatic vital signs should be taken.
- In cases of orthostatic hypotension, start fluid resuscitation as soon as possible.
- The following step is a pelvic and abdominal examination.

The abdominal examination aids in identifying the presence or absence of an acute abdomen. The following needs to be assessed:^[9]

- Complete abortions result in benign abdominal conditions such as normal bowel sounds, no hepatosplenomegaly, no rebound, and minor suprapubic discomfort.
- In a first-trimester pregnancy loss, the uterus is typically either not palpable abdominally or positioned just above the pubic symphysis. Other pathologies may also cause the uterus to expand.
- A complete abortion is unlikely to occur if rebound discomfort or an enlarged abdomen are present. Instead, assume that an ectopic pregnancy is present and, if rebound discomfort is there, administer intensive fluid resuscitation to the patient with the help of two IV lines, quantitative hCG, a stat ultrasound (if the patient is stable enough), and an emergency laparoscopy or emergency exploratory laparotomy.
- A Speculum examination is carried out to evaluate for bleeding, including the source and amount of bleeding, as well as infection indicators (such as frank pus from the cervical os). An open cervical os and bleeding from the cervix are indicators of an active pregnancy loss. The traditional diagnosis for symptoms of vaginal bleeding with an open cervix was "inevitable abortion." This terminology is no longer used, however, as only 12% of women with first-trimester bleeding experience pregnancy loss, and cervical dilatation can be challenging to visually measure in practice. While some women who experience pregnancy loss have a visibly dilated cervix or pregnancy tissue at the os, other women (especially those who are parous) have an external cervical os that looks dilated even during a healthy pregnancy.^[9]
- Bimanual examination - A bimanual exam can reveal if the external cervix is open and whether the cervical canal contains tissue. When the uterus is palpated, tenderness could mean an infection. Additionally, bimanual examination can estimate gestational age if ultrasound is not

easily available. This estimate can then be compared with the patient's known gestational age to check for discrepancies and potential pregnancy losses. In patients with obesity, uterine fibroids, or other uterine irregularities, uterine size may be challenging to measure. The patient's estimated gestational age can also be off. In order to diagnose pregnancy loss, clinicians must understand of the drawbacks related to physical examination.^[9]

Diagnosis

Laboratory Investigations:

Complete blood count (CBC) –

A CBC will assist in determining how much blood has been lost and whether anemia is present. Transfusions would be necessary if the patient has symptoms and both the hemoglobin and hematocrit are extremely low. The CBC will also show whether you have an infection because an illness would show up as a left shift on the differential and an elevated white blood cell count.^[8]

Level of Beta-hCG –

The diagnosis could be challenging to make if the hCG level is low (i.e., 200 mIU/mL). If the patient is stable and not in discomfort, observation and periodic monitoring of the hCG levels may be a possibility in the event that these low hCG levels plateau and drop, the patient is likely to spontaneously miscarry or undergo a tubal abortion. But if the numbers increase, a follow-up ultrasound is required to assess whether an intrauterine pregnancy or an ectopic pregnancy is present, and then the proper care is required. Throughout the early first trimester, the hCG level should increase by at least 53% every two days.^[11]

Transvaginal ultrasonography should be able to identify a viable intrauterine pregnancy if the hCG level is over 1500–2000 mIU/mL. Transabdominal ultrasound should be able to show a viable intrauterine pregnancy at a level over 3000 mIU/mL. An empty uterus on ultrasonography is compatible with a successful abortion if the values are this high, the cervical canal is closed, and the patient's history is consistent with passing tissue (which a doctor has confirmed).^[11]

Blood type and screen –

If RhoGAM treatment is necessary, it is crucial to consider blood type and screen (potential crossmatch). In order to prevent the likelihood that the patient was exposed to a positive antigen during the pregnancy, a Rh-negative woman should receive medical treatment of RhoGAM within 72 hours of miscarriage or ectopic pregnancy. The patient can forego immunoglobulin therapy if the baby's father is similarly Rh-negative. Additionally, it is crucial when transfusions are required. Be aware that for patients who experience a miscarriage, the Society of Family Planning discourages routine Rh testing and the delivery of Rh immunoglobulin before 12 weeks gestation.^[12]

Imaging Investigations:

Tone Doppler assessment –

Even though it is not a diagnostic criterion, the absence of fetal heart tones on a handheld Doppler in pregnancy of at least 12 weeks warrants additional investigation for pregnancy loss. Gestational age, patient habits, uterine position, and fetal position all affect a patient's capacity to detect heart tones.^[8]

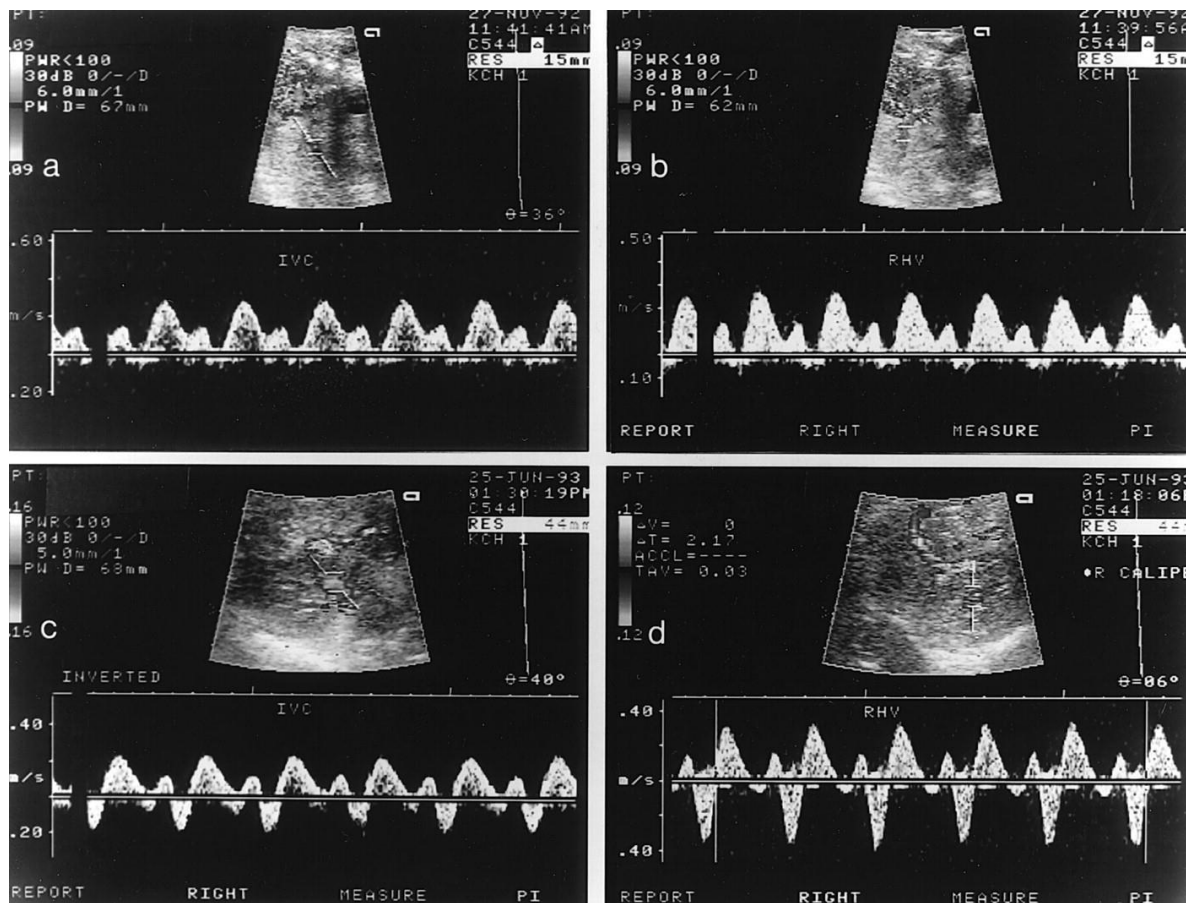


Fig. 1 Right hepatic vein and inferior vena cava with normal waveforms (a and b), Compromised fetus in Corresponding waveforms (c and d).^[10]

Transvaginal sonographic findings –

In accordance with newer, more conservative guidelines that are now widely accepted, A single transvaginal ultrasound that reveals an embryo with a crown-rump length of 7 mm or greater without cardiac activity or a gestational sac with a mean sac diameter of 25 mm or greater without an embryo is regarded as conclusive evidence that a pregnancy is non-viable.^[13]

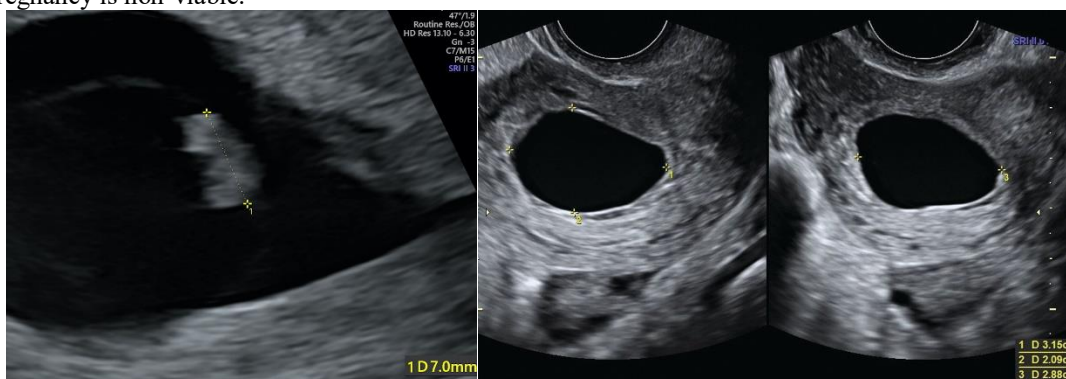


Fig. 2 Crown-rump length of 7 mm and gestational sac with a mean sac diameter of 25 mm or greater. ^[13]

The definite diagnosis of an early pregnancy loss can also be made based on successive transvaginal ultrasound images performed over a predetermined period of time, given the expected linear development of typical early pregnancies. After that period of monitoring, there was no heart activity, which is unmistakable proof of an early miscarriage. Although it is not certain, a shorter period of observation without a fetal heartbeat would suggest an early pregnancy loss. ^[13]

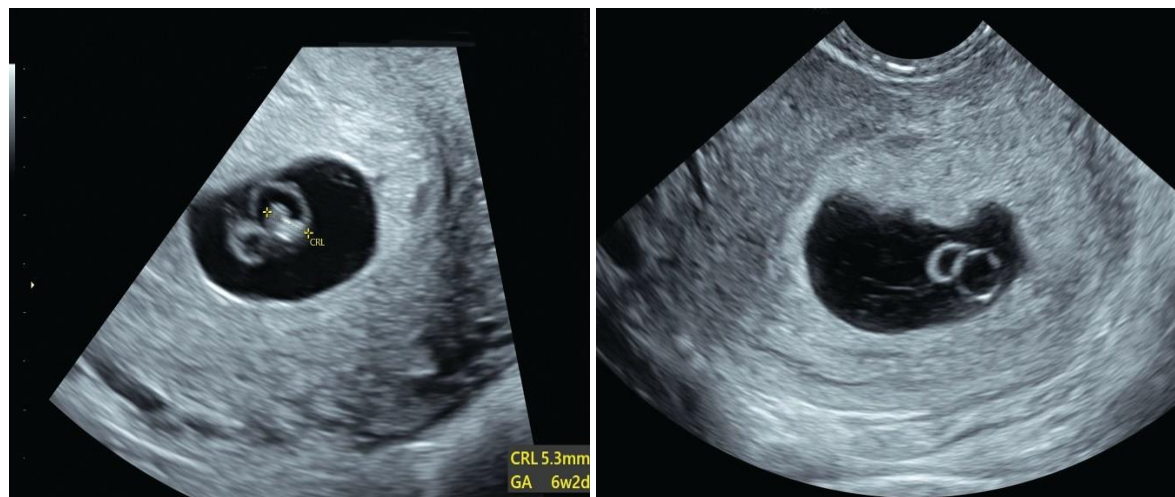


Fig.3 crown-rump length of <7 mm and amnion with an adjacent yolk sac and without a visualized embryo is indicative of early pregnancy loss.^[13]

When there is evidence of a previous intrauterine pregnancy, a spontaneous abortion can be identified if the mean gestational sac diameter on pelvic ultrasound is greater than or equal to 25 mm but contains no embryo or if the embryo's crown-rump length is greater than or equal to 7 mm, but there is no cardiac activity. If an embryo with heart activity is absent at least 14 days after a previous ultrasound showed a gestational sac or at least 11 days after a previous ultrasound showed a gestational sac with a yolk sac, early pregnancy loss may also have occurred. A heart rate of less than 85 beats per minute in the embryo is one ultrasound finding that is worrisome but not conclusive of an early pregnancy loss.^[1,7]

Management of Early Pregnancy Loss

There are three types of management present for early pregnancy loss:

1. Expectant Management
2. Medical Management
3. Surgical Management

1. Expectant Management:

Expectant management should often be restricted to gestations within the first trimester due to a lack of safety studies for expectant care in the second trimester and concerns about hemorrhage. In about 80% of women, expectant management is successful in attaining full expulsion with enough time (up to 8 weeks) 19. Limited evidence suggests that symptomatic women (those who report tissue passing or have ultrasound findings consistent with incomplete expulsion) may respond better to expectant care than asymptomatic women. Additionally, studies that took into account women who experienced incomplete early pregnancy loss typically reported better success rates than studies that simply took into account women

who experienced missing or anembryonic pregnancy loss.^[14]

2. Medical Management:

Women without infection, hemorrhage, severe anemia, or bleeding problems who desire to expedite the process of expulsion but would rather avoid surgical evacuation can explore medical therapy for early pregnancy loss. Medical care for early pregnancy loss reduces the time to expulsion and enhances the rate of full expulsion without the need for surgical intervention compared to expectant management. Misoprostol-based regimens have been the subject of in-depth research for the medical management of preterm labor. The majority of studies indicate that misoprostol is more successful when administered vaginally or sublingually than when administered orally, even though the sublingual route is linked to more occurrences of diarrhea.^[15]

As an outcome, it is advised to use 800 micrograms of vaginal misoprostol as the first line of treatment in patients for whom medical care for early pregnancy loss is warranted. When mifepristone is available, the addition of a dose (200 mg orally) 24 hours prior to the delivery of misoprostol may greatly improve therapeutic efficacy. Despite the fact that early research on the use of mifepristone for the treatment of early pregnancy loss was contradictory.^[15]

3. Surgical Management:

The standard approach for women who reach an early pregnancy loss with retained tissue is surgical uterine evacuation. Women who exhibit hemorrhage, hemodynamic instability, or symptoms of infection need to have their uteruses surgically removed right away. In other circumstances, such as the existence of

medical comorbidities such as severe anemia, blood problems, or cardiovascular illness, surgical evacuation may also be desirable. Because surgical evacuation offers faster process completion with less follow-up, many women choose it over expectant or medical treatment.^[16]

In the past, sharp curettage was frequently used to perform uterine evacuation. Suction curettage is preferable to using only sharp curettage. Using an electric vacuum source or a manual vacuum aspirator, suction curettage can also be done in an office environment while being given local anesthesia with or without the addition of sedation. As long as the obstetrician-gynecologist or other gynecologic clinician is certain that the uterus is empty, the routine use of sharp curettage in addition to suction curettage in the first trimester does not offer any further advantage. When compared to the identical treatment done in the operating room, surgical management in the office environment offers significant cost savings.^[16]

CONCLUSION:

Team-based care is crucial since Early loss of pregnancy can happen anywhere, including at home, in a clinic, or in a hospital. The smooth transfer of medical records, including pertinent tests and imaging, to outpatient clinics for proper follow-up is the responsibility of emergency department providers. Clear advice for patients on when to see the clinic instead of the emergency room for persistent symptoms is essential in the outpatient setting, as is convenient scheduling of frequent sessions. The psychological health of the patient and her family must be taken into consideration despite the fact that the medical aspects of miscarriage management might be challenging.

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