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A Study of Placenta Localization in Pregnant Women with Previous Caesarean Section using Ultrasound

دراسة موقع المشيمة للنساء الحوامل اللائي لديهن عملية قيصرية سابقاً باستخدام الموجات فوق الصوتية

A thesis submitted for Partial Fulfilment of the Requirement of M.Sc. Degree in Medical Diagnostic Ultrasound.

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قال تعالي:

((ومأوتيتم من العلم إلاقليلا))

صدق الله ا لعظيم

(الاسراء58)

Dedication

This work dedicated to:

My Father...

My Mother...

My Husband...

My Duoght...

My supervisor

My god bless them for all their have

Given over the years.

Acknowledgment

Grateful thanks and grace to Allah for guiding and helping me finishing this research.

I would like also to express sincere thanks and gratitude to my supervisor dr. Mona Mohammed Ahmed for his knee supervision, guidance, and valuable comments and support the idea of this research until finishing.

Abstract

This was a descriptive cross-sectional study conducted at the department of obstetrics and gynecology in soba teaching hospitalit was conduct during the period from
April to august2019. The main aim was to assess the association of placenta location with previous caesarean section (CS) in pregnant woman. In antenatal Clinic as per protocol 60 pregnant women were scanned in their second and third Trimester for fetal wellbeing and placental localization after taking a detailed Obstetrical history and clinical examination. All women without previous caesarean Section were excluded. Methodology the data collection from pt by data collection Sheet and analysed by SPSS.
The study found that the most common placental location site in association with caesarean section for participants was posterior (46.7%), or anterior (25%), while (table 4.7) the placental location site in association with caesarean section was statistical significantly different and it correlated to the variety of No. of scars.
The incidence of placenta Previa was significantly increased in those with a previous caesarean section and (Ahmed et al., 2015), placenta Previa was highly significantly associated with previous caesarean section.

المستخلص

دراسة وصفية مستعرضة أجريت في قسم أمراض النساء و التوليد في مستشفى سوبا التعليمي تم خلال الفترة من أبريل إلى أغسطس. كان الهدف الرئيسي هو تقييم ارتباط موقع المشيمة مع العملية القيصرية السابقة لدى المرأة الحامل. في عيادة ما قبل الولادة وفقًا للبروتوكول تم فحص 60 امرأة حامل في الثلث الثاني والثالث من أجل عافية الجنين وتحديد موقع المشيمة بعد أخذ تاريخ الولادة المفصل والفحص السريري. تم استبعاد جميع النساء دون عملية قيصرية سابقة. منهجية جمع البيانات من النساء الحوامل بواسطة ورقة جمع البيانات وتحليلها بواسطة الحزمة الإحصائية للعلوم الاجتماعية.

وجدت الدراسة أن أكثر موقع للمشيمية شيوعًا بالاقتران مع العملية القيصرية للمشاركين هي الخلفية (46.7٪) ، أو الأمامي (25٪) ، بينما (الجدول 4.7) موقع الموقع المشيمي بالتزامن مع العملية القيصرية كان إحصائيًا مختلفًا إلى حد كبير انها مرتبطة بمجموعة متنوعة من الندوب.

زادت نسبة حدوث المشيمة المنزاحة بشكل كبير في تلك التي أجريت لها عملية قيصرية سابقة و ، وارتبطت المشيمة المنزاحة بشكل كبير بالعمليات القيصرية السابقة.

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List of abbreviations

CS	Cesarean section.
CPD	Cephalic Pelvic Disproportion.
EVT	extravillous trophoblast.
SCH	**Subchorionic Hematoma**
APH	antepartum hemorrhage.
P	placenta.
cp	chorionic plate.
TAS	trans-abdominal study.
EVS	Endovaginal.
TPS	transperineal.
SPSS	statistical social package for social sciences

Chapter One

1.1 Introduction

Placental development is a complex process and the mechanism of placental localization is not well understood. Between 2 and 10 weeks after fertilization, contact between maternal and fetal tissue is dependent on the cytotrophoblast shell of the developing placenta and the decasualizing endometrium. This is a dynamic phase of the pregnancy as the placenta increases in size and complexity. Therefore, a favourable endometrial environment is essential in order to ensure the development of an adequate fetal–maternal interface. To date, it is not known if a scar on the uterus has any effect on the global endometrial environment and on placental location in particular. (Betran et al., 2007).

The frequency of placenta Previa decreases with increasing gestational age because of ‘placental migration. This is because the placenta-free uterine wall grows faster than placenta-covered areas. The placenta does not actually move, but the tissue upon which it is embedded expands, leading to the placenta's appearing to move up and away from the cervix. This process applies in the normal intact uterus, but it is not known if the same mechanism occurs as effectively in a scarred uterus. (Belachew et al., 2017).

It is interesting to speculate what the mechanism might be for any differences in implantation site in the presence of a Cesarean section (CS) scar. One hypothesis is that the presence of a CS scar leads to a change in myometrial contractility; another is that the integrity of the myometrial–endometrial junctional zone is compromised. Hence any alteration in placental location might provide indirect evidence of a more global impact of the presence of a CS scar on uterine function, which may have implications for both future fertility and subsequent pregnancies.

Ultrasonography has become the imaging modality of choice for assessing the placenta. Although CS is an established risk factor for pathological placentation, it is not known if it influences placental location in other ways. A previous report based on ultrasound scans carried out at 28 weeks' gestation concluded that the presence of a CS scar has no impact on placental location. There have been several studies reporting on differences in placental migration according to placental position. However, the results have varied widely. Magann *et al*. reported that posterior placentae were three times more likely to migrate than anterior placentae, but Oppenheimer *et al*. reported no difference in migration rates between anteriorly and posteriorly situated placentae. Both these studies were performed in a small number of women with no history of Cesarean delivery.

As rates of caesarean section continue to increase worldwide, methods for prediction, surveillance, and management of complications during pregnancy and delivery associated with previous caesarean section become increasingly important. Uterine rupture, placenta previa, and placenta accreta are well-known and potentially life-threatening complications, but are fortunately still rare conditions.

It has been reported that, among women with placenta previa, all with abnormal invasive placentae had a previous caesarean section and anterior placenta previa. Pictorial ultrasound, including measurements of myometrial thickness and 3D power Doppler at the placental site, has been used to diagnose invasive placentation (Wong et al., 2008).

1.2 Problem of study:

Caesarean section increase rapidly worldwide and pregnant women with history of caesarean delivery considered as risk for placenta Previa as complication so ultrasound for placenta location is very important in follow up for these women.

1.3 objectives of study:

1.3.1 General objective:

To study the placenta location in pregnant women with previous caesarean section.

1.3.2 Specific objectives:

- To evaluate prevalence of placenta Previa in pregnant women with history of caesarean section.
- To assess the common placental location site in association with caesarean section.
- To correlate placenta location to the number of caesarean section.
- To compare between gravidity and No caesarean section.

Chapter Two

Literature Review

2.1.1 Anatomy:

2.1.1.1 Uterus :

The **uterus** is a hollow, thick-walled, muscular organ situated deeply in the pelvic cavity between the bladder and rectum. Into its upper part the uterine tubes open, one on either side, while below, its cavity communicates with that of the vagina.

When the ova are discharged from the ovaries they are carried to the uterine cavity through the uterine tubes. If an ovum be fertilized it imbeds itself in the uterine wall and is normally retained in the uterus until prenatal development is completed, the uterus undergoing changes in size and structure to accommodate itself to the needs of the growing embryo .The uterus measures about 7.5 cm. in length, 5 cm. in breadth, at its upper part, and nearly 2.5 cm. in thickness; it weighs from 30 to 40 gm. It is divisible into two portions. On the surface, about midway between the apex and base, is a slight constriction, known as the isthmus, and corresponding to this in the interior is a narrowing of the uterine cavity, the internal orifice of the uterus. The portion above the isthmus is termed the body, and that below, the cervix. The part of the body which lies above a plane passing through the points of entrance of the uterine tubes is known as the fundus.

Body (*corpus uteri*).—The body gradually narrows from the fundus to the isthmus.

The **vesical** or **anterior surface** (*facies vesicalis*) is flattened and covered by peritoneum, which is reflected on to the bladder to form the vesicouterine excavation. The surface lies in apposition with the bladder.

The intestinal or posterior surface (*facies intestinalis*) is convex transversely and is covered by peritoneum, which is continued down on to the cervix and vagina. It is in relation with the sigmoid colon, from which it is usually separated by some coils of small intestine.

The fundus (*fundus uteri*) is convex in all directions, and covered by peritoneum continuous with that on the vesical and intestinal surfaces. On it rest some coils of small intestine, and occasionally the distended sigmoid colon.

Cervix (*cervix uteri; neck*)—the cervix is the lower constricted segment of the uterus. It is somewhat conical in shape, with its truncated apex directed downward and backward, but is slightly wider in the middle than either above or below. Owing to its relationships, it is less freely movable than the body. The cervix projects through the anterior wall of the vagina, which divides it into an upper, supravaginal portion, and a lower, vaginal portion.

2.1.1.2.Ligaments

The ligaments of the uterus are eight in number:

one anterior; oneposterior; two lateral or broad; two uterosacral; and

two round ligaments.

The anterior ligament consists of the vesicouterine fold of peritoneum, which is reflected on to the bladder from the front of the uterus, at the junction of the cervix and body.

2.1.1.3.Vessels and Nerves:

the **arteries** of the uterus are the uterine, from the hypogastric; and the ovarian, from the abdominal aorta they are remarkable for their tortuous course in the substance of the organ, and for their frequent anastomoses. The termination of the ovarian artery meets that of the uterine artery, and forms an anastomotic trunk from which branches are given off to supply the uterus, their disposition being circular. The **veins** are of large size,

and correspond with the arteries. They end in the uterine plexuses. In the impregnated uterus the arteries carry the blood to, and the veins convey it away from, the intervillous space of the placenta (see page 63). The **lymphatics** are described on page 714. The **nerves** are derived from the hypogastric and ovarian plexuses, and from the third and fourth sacral nerves.

2.1.1.4 Placenta:

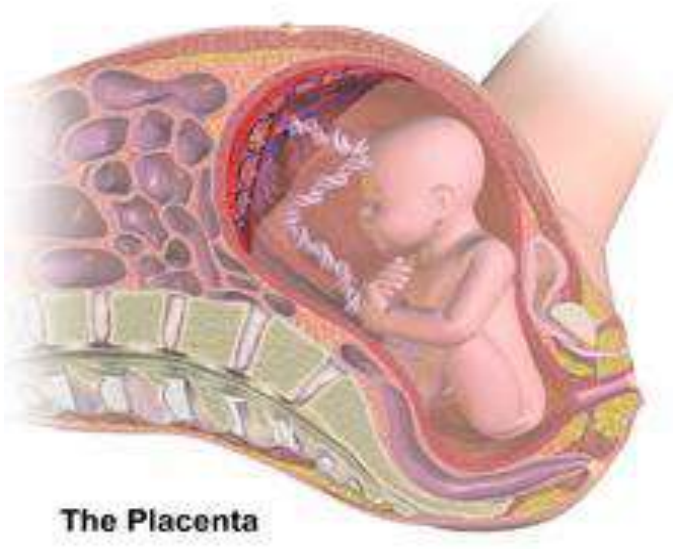


Figure 2.1Placenta (http//:en.wikipedia.org/placenta)

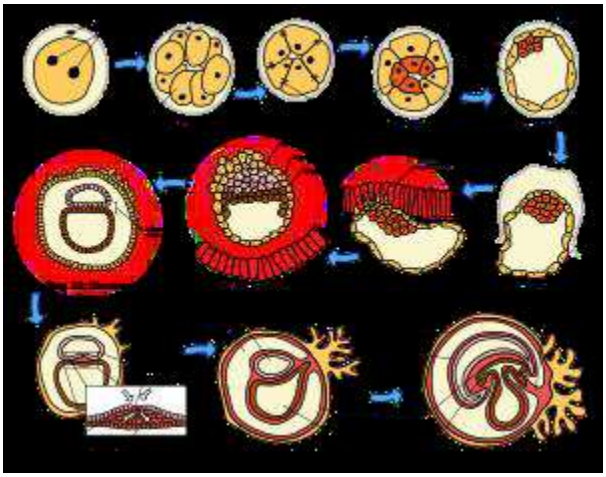


Figure2.2 The initial stages of human embryogenesis.
(http//:en.wikipedia.org/Human Embryogenesis)

2.1.1.4.1 Early development:

Implantation and invasion—Development of the placenta and fetus is a continuous process that begins at the time of fertilization. The first three days of development occur within the fallopian tube. Four days after fertilization, the morula (a solid mass of blastomere cells) enters the uterus. On the fifth day after fertilization, the morula becomes a blastocyst as fluid accumulates and polarization of the cells occurs. The blastocyst has an outer layer of cells (trophoblast) that will form the placenta and fetal membranes, an inner cell mass at one pole that will form the embryo, and a fluid filled cavity.

The inner and outer cell masses multiply and the fluid cavity enlarges until the expanded blastocyst hatches out of the zona shell. Initially it is bathed in uterine secretions that provide oxygen and metabolic substrates; however, these secretions soon become inadequate for support of further development. Therefore, within 24 hours of hatching (approximately day 6 after fertilization), the blastocyst implants in the uterine lining, which provides access to substrates (glycogen filled stromal cells) necessary for continued growth. Implantation involves movement of the blastocyst to an optimal location (typically the mid to upper anterior or posterior wall of the uterus), adhesion, and invasion. As the trophoblast erodes deeper into the decidua, vacuoles form and become confluent to form lacunae by day 13 after fertilization. The lacunar space eventually becomes the intervillous space.

The progenitor cytotrophoblast cell is the stem cell of the placenta. These cells proliferate throughout gestation, differentiating along two pathways to form either villous cytotrophoblast, which ultimately can become syncytiotrophoblasts (outer cellular layer), or extravillous cytotrophoblasts (inner cellular layer, extravillous trophoblast [EVT]). Syncytiotrophoblast is a specialized epithelium that has several functions,

including transport of gases, nutrients, and waste products and synthesis of peptide and steroid hormones that regulate placental, fetal, and maternal systems. EVT has a proliferative component and an invasive component. There is also a migratory EVT, which is neither invasive nor proliferative. These cells populate the cell islands, septum, chorionic plate, and chorion leave.

At four to five weeks of gestation (menstrual dates), EVT erupts in columns with proliferative trophoblast at the base and invasive trophoblast at the distal portion of the column. Invasive EVT that invades decidua is called interstitial EVT, whereas EVT that invades and remodels the spiral arteries is called endovascular EVT. Endovascular invasion (intramural or intra-arterial) involves replacement or displacement of vascular smooth muscle and endothelial cells and transforms the narrow spiral arteries into wide uteroplacental arteries. Anastomoses between the dilated spiral arteries and endometrial veins form maternal sinusoids, which eventually distribute blood into the low resistance vascular network of the lacunar system, thus establishing the uteroplacental circulation.

2.1.1.4.2 Placental circulation:

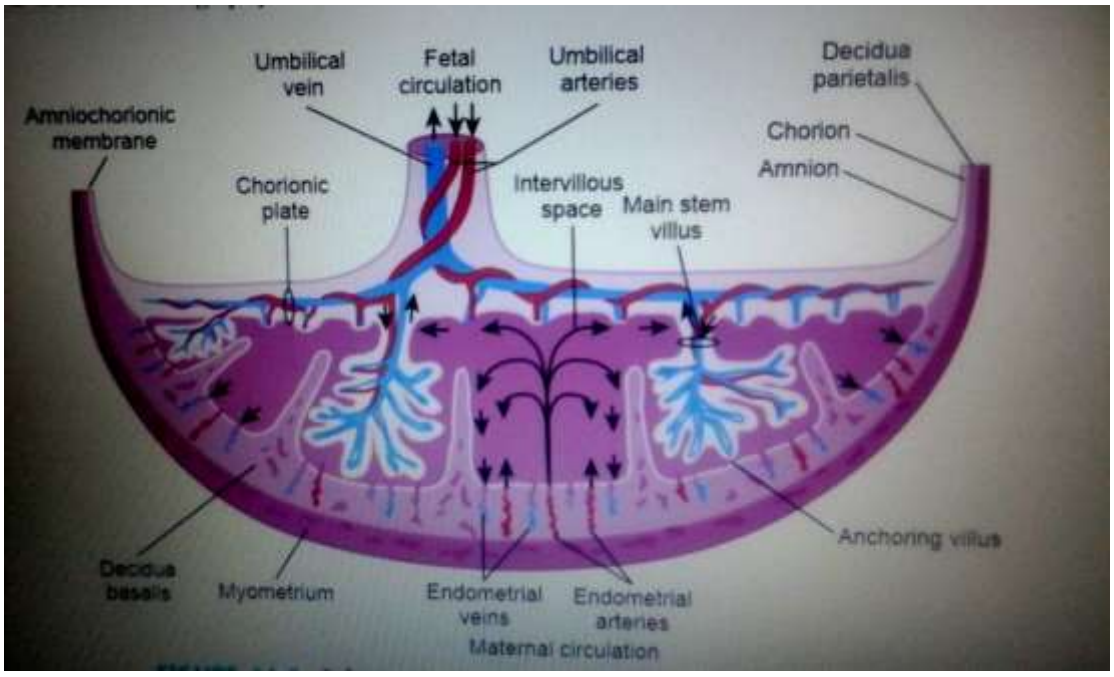


Figure2.3 Maternal blood fills the intervillous space, nutrients, water, and gases are actively and passively exchanged, then deoxygenated blood is displaced by the next maternal pulse.(http//:placentas.wordpress.com**)**

The intervillous space is limited on the maternal side by the *basal plate* and on the fetal side by the *chorionic plate*. It is incompletely limited laterally by the *decidual septa*. The complex division of the villi provides a great deal of placental surface and is a very important factor affecting the rate of fetal-maternal exchange. At term, the placental surface consists of more than 10 square meters. The anchoring or stem villi are attached to the basal plate and define a general circular area. The villus tree, in its entirety, forms a very complex system consisting of a major anatomic unit, the *cotyledon*.

I. The fetal circulation can be compared to the pulmonary circulation of the adult in that desaturated blood enters through the fetal arteries and oxygenated blood returns by way of the veins

A. BLOOD ARRIVES via the 2 umbilical arteries which are branches of the iliac arteries of the fetus. It is dispersed in a highly dense network which penetrates even the smallest villous division.

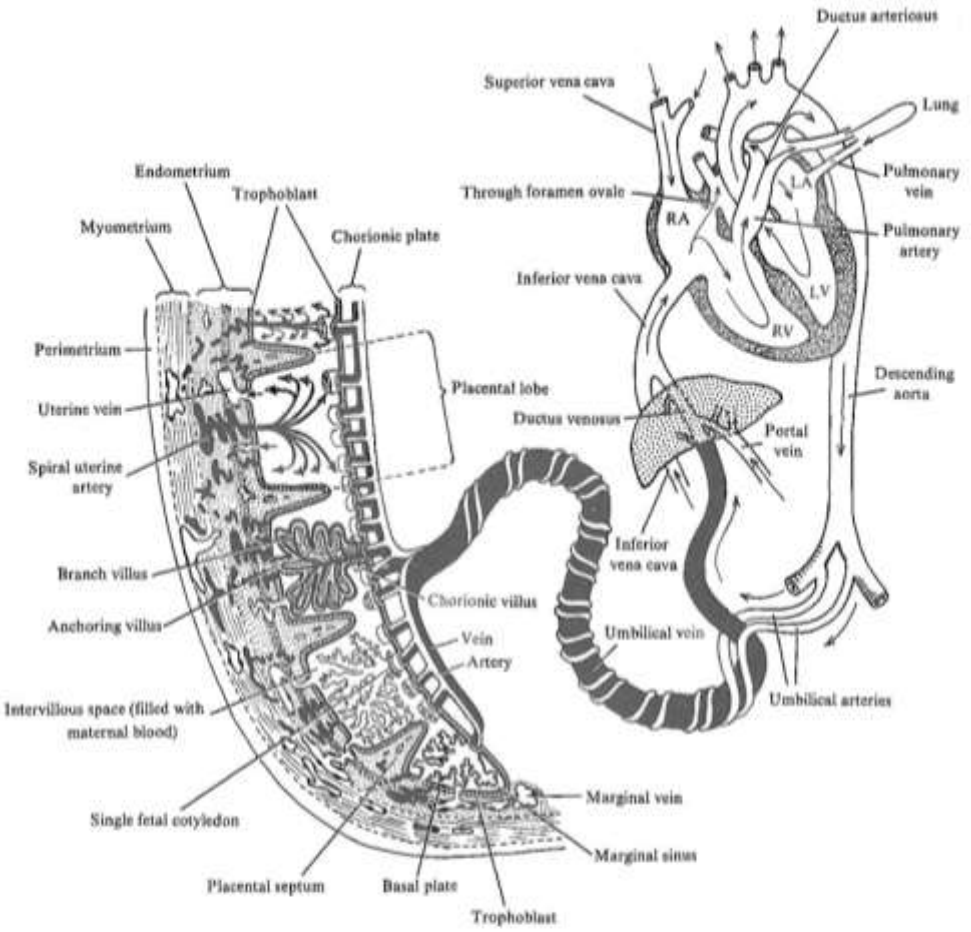
B. BLOOD IS RETURNED via the umbilical vein and finally reaches the inferior vena cava system of the fetus

C. FETAL CIRCULATION is carried out in a closed vascular system where the average pressure is about 30 mm Hg, which is much higher than that seen in the intervillous space where it is about 10 mm Hg. The difference in pressure prevents the collapse of the villous vessels.

II. The maternal circulation

A. BLOOD ARRIVES at the uterus by the branches of the uterine artery, spreads out in the intervillous spaces, and circulates between the branches of the villous trees. It is returned by branches of the uterine veins. The flow in these two circulations is very high, about 500 ml/min, which favors fetal-maternal exchange

B. MATERNAL CIRCULATION results from a difference in pressure which is very high in the artery (about 70 mm Hg) and relatively low in the intervillous space (about 10 mm Hg). Blood spurts up to the chorionic plate, then comes toward the basal plate and is taken up by the uterine veins where the pressure is even lower than that found in the intervillous space.



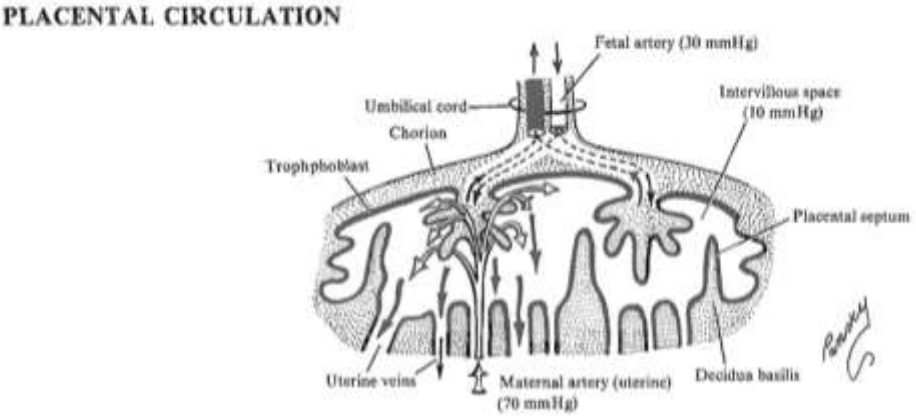


Figure2.4 placental anatomy snil

2.1.1.4.3 Placental Size and Growth

There is less emphasis nowadays in measurements of the placenta largely because the information is of limited diagnostic value. Thus, the placenta is not routinely measured. The most popular measurement is placental thickness (data on placental area, volume, and weight estimates have all

been studied and reported in the literature). As a guideline, placental thickness should be measured if the placenta appears to be either thick or thin. Placental thickness measurements should be made near the mid portion or center of the placenta with one calliper placed at the amniochorionic surface (chorionic plate) and the second calliper placed at the basal surface perpendicular to the amniochorionic surface (Proctor et al., 2009).

The measurement should exclude retroplacental veins, myometrium, fibroids, and contractions of the uterus that might incorrectly increase the measurement. In a normal pregnancy, placental thickness increases with gestational age. As a rule of thumb, the mean thickness of the placenta in millimetres is roughly equal to the gestational age in weeks (e.g. at 20 weeks, mean placental thickness is 20 mm; at28 weeks, mean placental thickness is 28 mm; and at 36 weeks, mean placental thickness is 36 mm) (Hunter et al. , 2015).

2.1.2 Physiology:

Waste products excreted from the fetus such as urea, uric acid, and creatinine are transferred to the maternal blood by diffusion across the placenta. Immunity Ig G antibodies can pass through the human placenta, thereby providing protection to the fetus in utero. This transfer of antibodies begins as early as the 20th week of gestational age, and certainly by the 24th week. This passive immunity lingers for several months after birth, thus providing the newborn with a carbon copy of the mother's long-term humoral immunity to see the infant through the crucial first months of extra uterine life. IgM, however, cannot cross the placenta, which is why some infections acquired during pregnancy can be hazardous for the fetus.

Furthermore, the placenta functions as a selective maternal-fetal barrier against transmission of microbes. However, insufficiency in this function may still cause mother-to-child transmission of infectious diseases (Korkmaz et al., 2013).

The first hormone released by the placenta is called the human chorionic gonadotropin hormone. This is responsible for stopping the process at the end of menses when the Corpus luteum ceases activity and atrophies. If hCG did not interrupt this process, it would lead to spontaneous (Sekiguchi et al., 2013).

2.1.3. Pathology:

2.1.3.1 Placenta Previa:

The term “placenta Previa” refers to a placenta that is “previous” to the fetus in the birth canal. The incidence at delivery is approximately 0.5% of all pregnancies.

Bleeding in the second and third trimesters is the hallmark of placenta Previa. This bleeding can be life threatening to the mother and fetus. With expectant management and cesarean delivery, both maternal and perinatal mortality have decreased over the past 40 years (Sekiguchi et al., 2013).

The term ‘placenta Previa’ should only be used after 28 weeks. The differentiation of placental positions has historically been performed by digital assessment of the lower uterine segment and placenta through the cervix. Using this potentially hazardous method of evaluation placental position was classified as complete placenta Previa, partial placenta Previa, incomplete placenta Previa, marginal placenta Previa, low-lying placenta, and placenta distant from the internal cervical os (Young et al., 2014).

The use of ultrasound to evaluate the position of the placenta in the uterus has both improved knowledge of the placenta within the uterus and simplified terminology with respect to placental position. Complete placenta Previa describes the situation in which the internal cervical os is totally covered by the placenta. Marginal placenta Previa denotes placental tissue at the edge of or encroaching on the internal cervical os. A low placenta is one in which the placental edge is within 2 cm, but not covering any portion, of the internal cervical os. The terms “incomplete placenta Previa” and “partial placenta Previa” have no place in the current sonographic assessment of placental position and should be used only by a clinician performing a digital examination when a “double setup” is necessary to determine where the leading edge of the placenta lies (Fuchs et al., 2008).

2.1.3.2 Placenta accreta:

A placenta that is abnormally adherent to the uterine wall after delivery is termed placenta accrete. Placenta accreta occurs if the placenta invades the myometrium more deeply, and placenta percreta refers to a placenta that at least in part protrudes through the uterine serosa. Placenta accreta, increta, and percreta are serious complications of pregnancy associated with maternal blood loss, need for hysterectomy, and retained products of conception Although placenta accreta (increta or percreta) can occur in any pregnancy, important risk factors include prior uterine surgery (with risk increasing with increasing number of prior cesarean deliveries), placenta Previa, unexplained elevated maternal serum alpha-fetoprotein (MS-AFP), increased maternal cell-free placental lactogen, and advancing maternal age (Fuchs et al., 2008).

Several sonographic signs are associated with placenta accreta. The presence of a coexisting placenta Previa in the majority of cases makes it

particularly likely that the adherent portion of the placenta will be low in the uterus, in the region of a prior cesarean section scar. This simple fact makes the evaluation of these placentas much more straight forward with the transvaginal ultrasound probe (Choet al., 2008).

Sonographic findings of placenta accreta include loss of the normal hypoechoic retroplacental-myometrial interface, thin-ing or disruption of the hyperechoic subvesicular uterine serosa, presence of focal exophytic masses, and numerous placental lakes (Fuchs et al., 2008).

The color Doppler ultrasound findings suggestive of placenta Previa accrete include diffuse lacunar blood flow throughout the placenta, dilated vascular channels between the placenta and bladder or cervix, absence of the normal subplacental venous flow, and the demonstration of vessels crossing the placental myometrial disruption site . Three-dimensional sonography may also be helpful for evaluation of vascular anatomy in the setting of a placenta accrete (Fuchs et al., 2008).

2.1.3.3 Placenta abruption:

Placental abruption is defined as separation of the placenta prior to the delivery of the fetus. Placental abruption is one of the worrisome causes of vaginal bleeding in the latter part of pregnancy because it contributes to perinatal mortality.

Patients typically present with third-trimester vaginal bleeding associated with abdominal or uterine pain and labor (Fuchs et al., 2008).

Risk factors: History of prior abruption, hypertension, prolonged rupture of membranes, IUGR, chorioamnionitis, polyhydramnios, maternal thrombophilia's, substance use (tobacco, alcohol, cocaine), maternal trauma, and advanced maternal age are all risk factors for placental abruption.

A subplacental hematoma between the placenta and uterine wall is a placenta abruption. This should be differentiated from a subchorionic hematoma, in which the hematoma is underneath the chorion, not the placenta. Although a subchorionic hematoma can occur anytime during pregnancy, it is more common in the first half of pregnancy. Preplacental hematoma is a rare condition likely caused by bleeding from fetal vessels and located on the fetal surface of the placenta under the chorion. History of placental abruption or previous Caesarian section increases the risk by a factor of 2.3 (Fuchs et al., 2008).

2.1.3.4 False thickening of the placenta

False placental thickening may be seen with placental abruption if the retro placental hematoma has the same echogenicity (isoechoic) as the normal placental tissue. Color Doppler may be helpful in distinguishing true placental thickening from pseudo thickening. With true placental thickening, the normal intraplacental vascular network should be seen from the chorionic to basal surface; with abruption and a retro placental hematoma, color will be seen in the placental tissue and be lacking in the hematoma (Ishikawa et al., 2006).

The graph shows there is significant variance in normal placental thickness at different gestational ages. This graph indicates the placenta appears to grow until term but at a slower rate in the third trimester. A placental thickness greater than 4 cm is considered abnormal at any gestational age. Less than 2.5 cm at or greater than 35 weeks is considered too thin. The four conditions most commonly associated with placental thickening are:

a) Diabetes mellitus, especially gestational diabetes and class A, B, and C.

b) Immune and nonimmune fetal hydrops.

c) Fetal infections (e.g. cytomegalovirus).

d) Chromosomal abnormalities, especially triploidy Small or thin placentas are most commonly associated with maternal hypertensive disease, severe IUGR, and severe diabetes mellitus (class D, E, R). Rarely, a thin placenta may be due to amembranous placenta (placenta membranacea or diffuse) which is a thin, poorly functional placenta that covers the entire surface of the chorionic sac.

The placenta may also appear unusually thin with severe polyhydramnios as it is stretched over a large surface area of the uterine wall (Allen et al., 2002).

2.1.3.5 Placental Tumors

All primary and secondary tumors of the placenta are rare. The most common tumor of the placenta by far is chorioangioma. Other primary tumors of the placenta include teratoma and choriocarcinoma. Choriocarcinoma is most likely to develop secondary to hydatidiform mole. Melanoma is reported to be the most common tumor to metastasize to the placenta. Various angiomatous tumors of the placenta ranging widely in size have been described and because of their semblance of their components to the blood vessels and stroma of the chorionicvillus, the term chorioangioma is the most appropriate designation (Alvarez-Goriset al., 2016).

Macroscopic placental chorioangiomas are reported to occur with an incidence of1in 16,000 to 1 in 1,500 deliveries. The incidence of clinically insignificant ,microscopic chorioangiomas (not detectable with ultrasound) is reported to be as high as 1 in 100 placent as. Small lesions (3 cm in diameter) are usually not associated with fetal or maternal complications. The most common fetal and maternal complications are IUGR, fetal hydrops (due to fetal congestive heart failure), polyhydramnios, and premature labour. Chorioangiomas may also

associate with elevated maternal serum alpha-fetoprotein in the absence of other placental or fetal anomalies (Alvarez-Goris et al., 2016).

Sonographically, chorioangiomas typically appear as solid placental mass towards the fetal surface of the placenta. In contrast, fibroids arising from the retroplacental uterine wall cause a bulging effect on the maternal surface of the placenta and the serosal surface of the uterus. Chorioangiomas have a variable echo appearance from solid, homogeneous masses resembling placental tissue to complex masses with septae. The vascularity of chorioangiomas is variable and may affect outcome. Retroplacental hematoma (clot) appears as a mass of variable echogenicity between the uterine wall and the uterine surface of the placenta. Afresh hematoma may be more echogenic than the placenta and with aging gradually becomes less echogenic. An isoechoic hematoma may mimic a thick placenta although modern systems with good contrast resolution will generally (Niknejadi et al., 2016).

2.1.3.6 Subchorionic Hematoma (SCH)

SCH is also known as extramembranous or extrachorionic hematoma. With SCH, the chorioamniotic membrane appears to bulge towards the amniotic cavity due to the hematoma between the uterine wall and membrane. This finding is seen more frequently than a retroplacental hematoma. SCH seen in the first trimester and in the early second trimester is associated with threatened abortion. An early pregnancy SCH appears as a fluid collection in the uterine cavity. Before 10-11weeks gestation, the amnion is still separate from the chorion and one will see the amniotic and chorionic cavities (Miyake et al., 2015).

2.1.3.7 Placenta Membranacea

Classically, this term describes a thin membranous placenta covering the entire or greater part of the chorioamniotic membrane. The expression membranacea is somewhat misleading, for this form of placenta is not necessarily either thin or membranous. The essential feature of the anomaly is that all or most of the chorioamniotic membranes are covered on their outer (endometrial) aspect by functioning chorionic villi. Exceptionally, there may be a focal thickening to forma placental disc, but more commonly the gestational sac is diffusely covered by villous tissue, albeit of varying thickness (Ravangard et al., 2013).

In nearly all instances there is recurrent vaginal bleeding in the late first and second trimesters the consequence of which is either spontaneous abortion or premature labor. The bleeding is due to the fact that the placenta membranacea must also, of necessity, be placenta previa. Fetal survival is usually hampered by prematurity and IUGR (Ahmed and Gilbert-Barness, 2003).

2.1.3.8 Placenta Annularis

Define as a ring-shaped placenta which surrounds the gestational sac. This type of placenta is considered by some investigators to be a variant of placenta membranacea. It is associated with an increased risk of ante- and postpartum bleeding and IUGR (Allen et al., 2002).

2.1.3.9 Placenta Extrachorialis

Placenta extrachorialis or extrachorial placenta is a placenta in which themembranes and decidua have an abnormal relationship to the amniochorionic surface of the placenta (resulting in a chorionic surface that is smaller than the basal surface). Placenta circummarginate represents a minor degree of this abnormality and is not of clinical significance (asymptomatic and very unlikely to be recognized with

prenatal ultrasound). Placenta circumvallate results insignificant raising and folding of the membranes at the edge of the placenta forming a raised ring of tissue. Placenta circumvallate is usually asymptomatic however it may be associated with antepartum hemorrhage (APH) and premature labour (Proctor et al., 2009).

2.1.4 Ultrasound of placenta:

2.1.4.1 Normal placenta appearance:

The normal placenta appears as a sonographically uniform structure with mid amplitude echoes. In the third trimester, the placenta generally appears less homogeneous and may have small anechoic or hypoechoic areas of different pathological etiologies. Calcium deposits are seen in the majority of placentas in the third trimester and appear as high amplitude (white) linear echoes. The fetal or amniochorionic surface of the placenta (generally referred to by authors as the chorionic plate) forms a strong interface with the amniotic fluid. This surface is very angle dependent (specular reflector) and appears as a bright (white) echo when the sound beam strikes at normal incidence (perpendicular to the interface)
(Fuchs et al., 2008).

Note the homogeneous echo pattern of the anterior wall placenta (P) and the bright echoes produced from the chorionic plate (cp) that demarcates the interface between the placenta and the amniotic fluid
(AF) (Horton et al., 2010).

Posterior uterine wall was Routine evaluation of the p abortion of the fetus. The corpus luteum also produces and. Routine evaluation of the placenta with colour.

Doppler is now favoured to rapidly find the placental cord insertion site and to detect vascular abnormalities in the placenta and the retroplacental uterine wall (Horton et al., 2010).

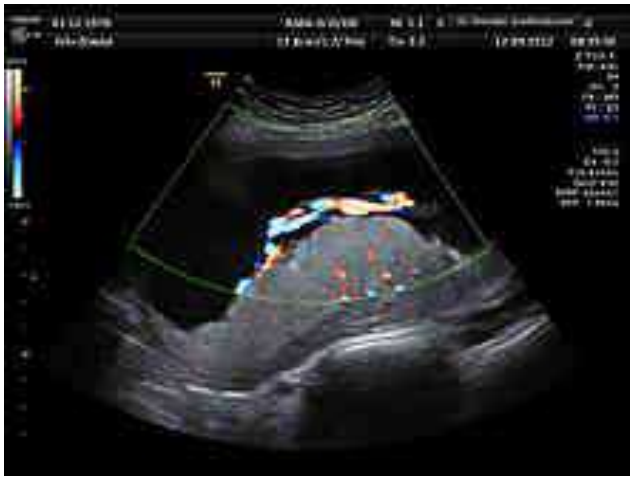


Figure (2.5) Color Doppler image show posterior placenta and umbilical cord. (Horton et al., 2010).

The retroplacental uterine wall consists of the richly vascular myometrium and decidua basalis. These tissues are distinctly hypoechoic in comparison to the placenta. After 18 weeks gestation, the normal anterior retroplacental uterine wall (sometimes referred to as the subplacental complex or the retroplacental space) has an average thickness of 9.5 mm. The sonographic diagnosis of placental accrete depends on this normal hypoechoic zone being invaded by more echogenic villi and appearing thinner or not seen (Oppenheimer et al., 2001).

2.1.4.2 Sonographic technique:

The equipment and transducer deemed most appropriate for the obstetrical ultrasound study may be used). If the system has electronic beam focusing, the focal zone should be adjusted to optimally visualize the placenta. The placenta is best identified by scanning the uterus longitudinally and is easily recognized by its more echogenic pattern compared with that of the underlying myometrium (Oppenheimer et al., 2001).

A posterior placenta is more difficult to visualize in its entirety due to attenuation and shadowing from the overlying fetus. If indicated,

positioning the patient in a left or right posterior oblique position may be helpful in better visualizing a posterior placenta. For the standard trans-abdominal study (TAS), the bladder should be adequately distended to optimize visualization of the cervix and lower uterine segment and to show the relationship of the placenta to the internal os.

Over distention of the bladder distorts the appearance of the cervix and lower uterine segment and may lead to the false positive diagnosis of placenta Previa.

Endovaginal (EVS) or transperineal (TPS) techniques should be performed whenever TAS does not adequately show the relationship of the placenta to the internal os (e.g. due to attenuation by fetal parts or the patient presents with an empty bladder) and there is a high index of suspicion of placenta Previa (e.g. patient presents with third trimester bleeding) (Oppenheimer et al., 2001).

2.2 Previous studies:

The relationship between previous cesarean section and subsequent development of placenta Previa and placenta Previa with accrete has been assessed by (To and Leung, 1995), The records of all patients delivered with the diagnosis of placenta previa during the 10-year period from 1984 to 1993 were reviewed, the result that From a total of 50,485 deliveries, 421 (0.83%) had placenta previa, 43 (10.2%) of whom had a history of previous cesarean section. The incidence of placenta previa was significantly increased in those with a previous cesarean section (1.31%) compared with those with an unscarred uterus (0.75%) (R.R. 1.64). This risk increased as the number of previous cesarean sections increased (R.R. 1.53 for one previous section, 2.63 for two or more). The incidence of an anterior placenta previa and placenta accreta was significantly increased in those with previous cesarean scars. The incidence of placenta accreta was 1.18% among patients with placenta previa, 80% being in patients with previous cesarean section. The relative risk for placenta accreta in patients with placenta previa was 35 times higher in those with a previous cesarean section than in those with an unscarred uterus.

Study of (Ahmed et al., 2015) aimed to identify the association of placenta previa with multiparity and previous caesarean section in pregnant women. In antenatal clinic as per protocol 200 pregnant women were scanned in their second and third trimester for fetal wellbeing and placental localization after taking a detailed obstetrical history and clinical examination. All women with or without symptoms of placenta previa showing placental implantation in lower uterine segment on ultra sound scan were documented. After completion of the two years data regarding the detailed obstetrical and surgical history were recorded in a questionnaire and analyzed using SPSS Software. Sixty five women were diagnosed as cases of placenta previa. The overall incidence of placenta

previa was found to be 32.5% (65 women). Out of these 7 were primigrvidas, 12 were multiparous, 34 were grand multiparous .It was clearly evident from the study that placenta previa is associated with multiparity and previous caesarean section. Placenta previa was highly significantly associated with previous caesarean section (P =0000 <0.05). As well as, with multiparity and the association was found to be as high as previous caesarean section (P =0000<0.05).

Chapter three

Material and method

3.1 Materials:

3.1.1 Population of study:

Total sample of 60 pregnant women with history of caesarean section were include in the study. Pregnant women with no history of caesarean section were excluded.

3.1.2 Machine used:

Ultra sound machine with transducer frequency 3.5MHz, machine Volson 730.

3.2 Methods

3.2.1 Technique used:

Verbal informed consent for the examination was obtained from each patient. The women were scanned in supine position; coupling agent was applied to ensure good contrast, curve linear transducer putted longitudinally below women umbilicus.

The placenta was located trans abdominal with a normally filled bladder; for the purposes of this study and to obtain consistent findings between all operators, it was decided to have only five placental-location subgroups. If the placenta was thought to be ‘right anterior’, it was classified as ‘anterior’, and similarly ‘left posterior’ was considered to be ‘posterior’. Therefore, placental locations were recorded using the following five subgroups: anterior, posterior, fundal, low-lying and praevia.

3.2.2 Data collection:

This is descriptive cross section study conduct at the department of obstetrics and genecology in soba hospital it was conduct during the

period from December 2018 to May 2019.Using a questionnaire that fulfils the objective of the study. The data obtained from the patients include (7) variables (age, gravidity, parity, number of caesarean section, placenta site, placenta pathology and gestational age).

3.2.3 Data analysis:

The data were analysed using (SPSS Software) statistical social package for social sciences (Version 20 SPSS, Chicago, Illinois USA). Descriptive statistics were calculated for every measured variable, in order to evaluate the studied sample. All analyses were performed using descriptive frequency and crosstabs probabilities and a P-value of $p<0.05$ was considered statistically significant.

3.2.4 Ethical approval:

The ethical approval was granted from the hospital and the radiology department; which include commitment of no disclose of any information concerning the patient identification.

Chapter Four

Results

Table 4.1: distribution of participants according to age:

Age	Frequency	Percent
Less than 25 years	3	5.0
25-30 years	20	33.3
31-35 years	26	43.3
36-40 years	11	18.3
Total	**60**	**100.0**

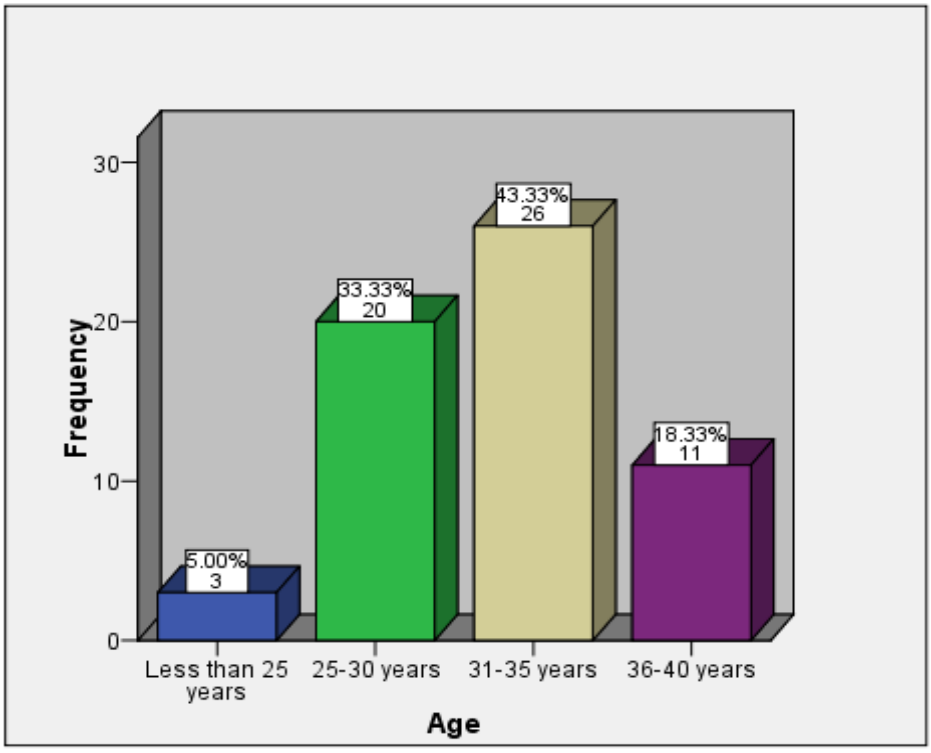


Figure 4.1: distribution of participants according to age

Table 4.2: distribution of participants according to No. of gravidity:

Gravidity	Frequency	Percent
Less than three	10	16.7
3-5	38	63.3
More than 5	12	20.0
Total	**60**	**100.0**

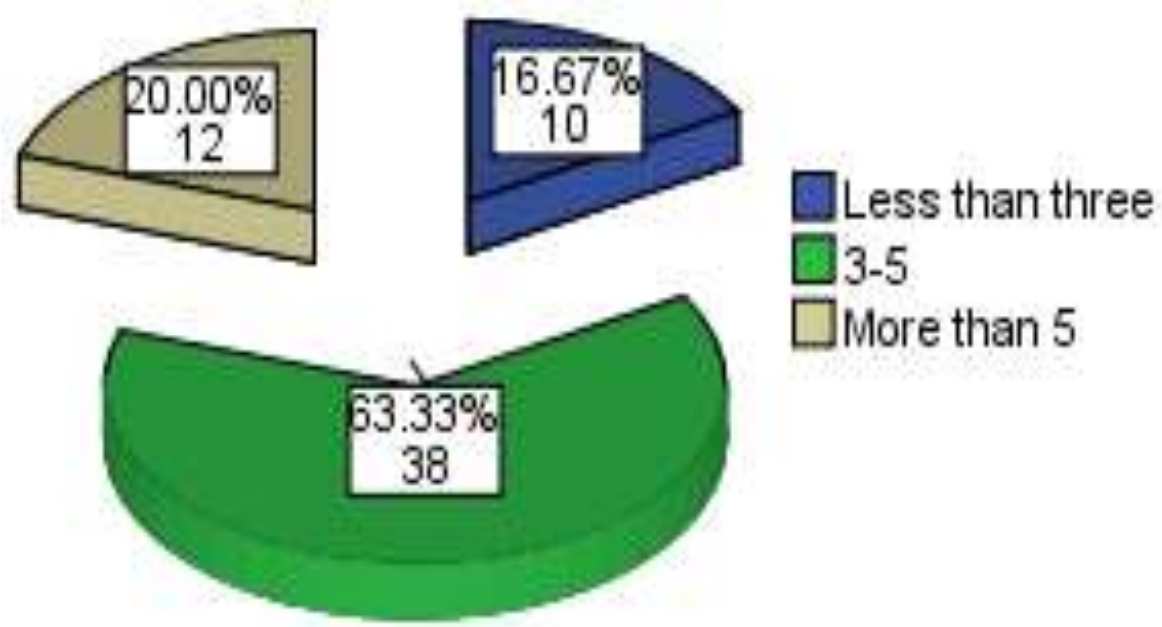


Figure 4.2: distribution of participants according to No. of gravidity

Table 4.3: distribution of participants according to No. of parity:

Parity	Frequency	Percent
Less than three	28	46.7
3-5	29	48.3
More than 5	3	5.0
Total	**60**	**100.0**

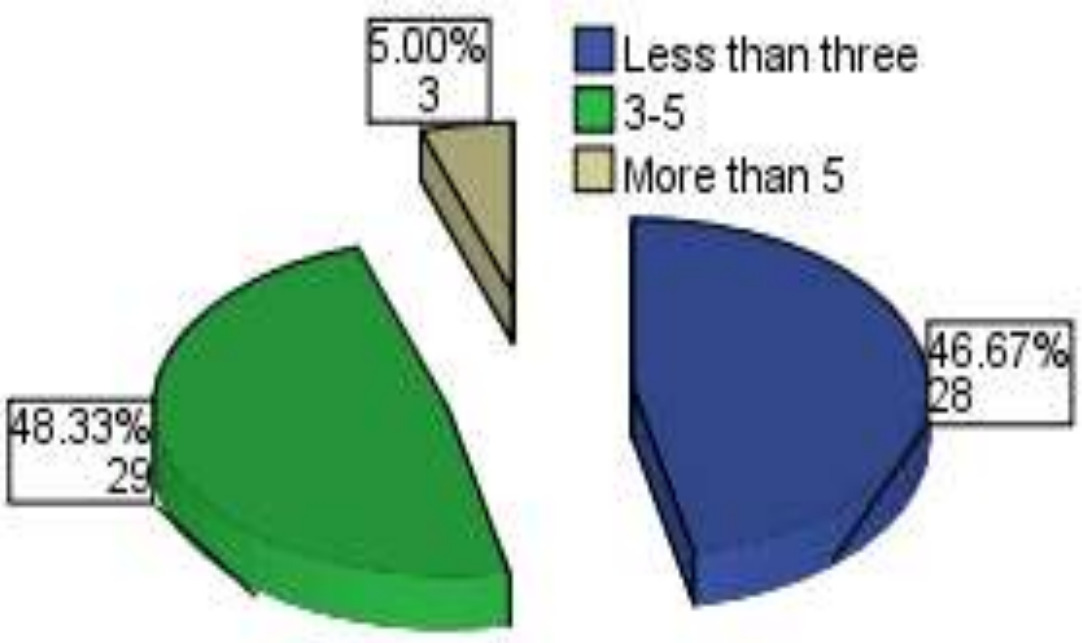


Figure 4.3: distribution of participants according to No. of parity

Table 4.4: distribution of participants according to No. of scars:

No. of scars	Frequency	Percent
One	15	25.0
Two	24	40.0
More than two	21	35.0
Total	**60**	**100.0**

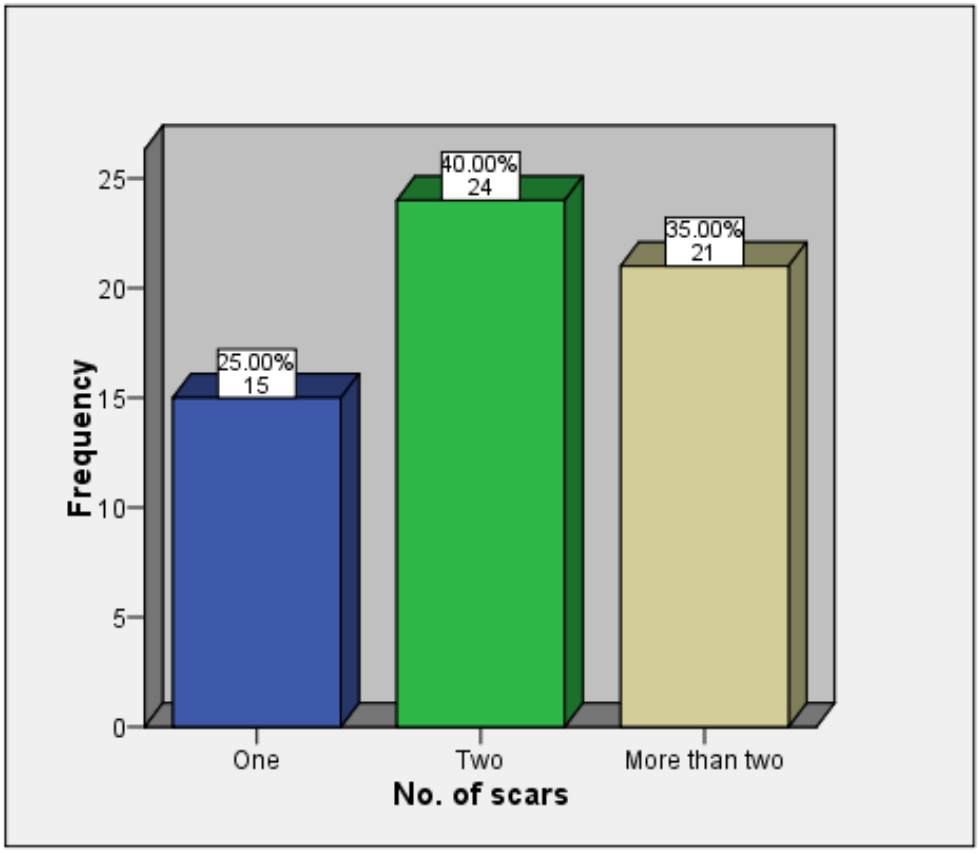


Figure 4.4: distribution of participants according to No. of scars

Table 4.5: distribution of participants according to gestational age:

Gestational age	Frequency	Percent
Less than 25 weeks	2	3.3
25-28 weeks	3	5.0
29-32 weeks	3	5.0
33-36 weeks	31	51.7
More than 36 weeks	21	35.0
Total	**60**	**100.0**

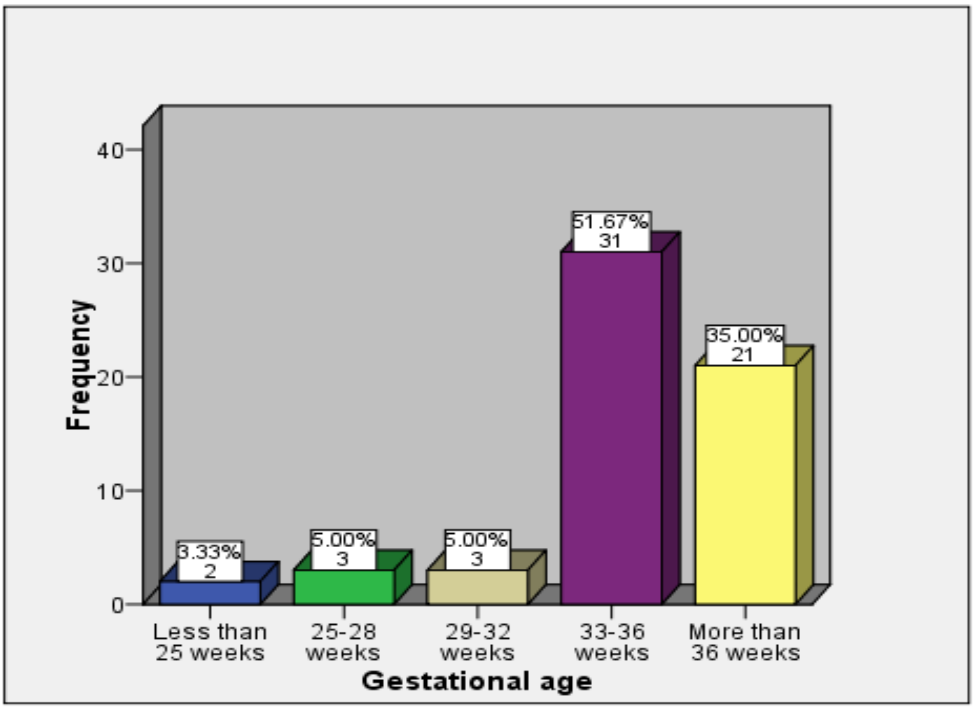


Figure 4.5: distribution of participants according to gestational age

Table 4.6: distribution of participants according to placenta site:

Placenta site	Frequency	Percent
Anterior	15	25.0
Posterior	28	46.7
Fundal	9	15.0
Low lying	4	6.7
Previa	4	6.7
Total	**60**	**100.0**

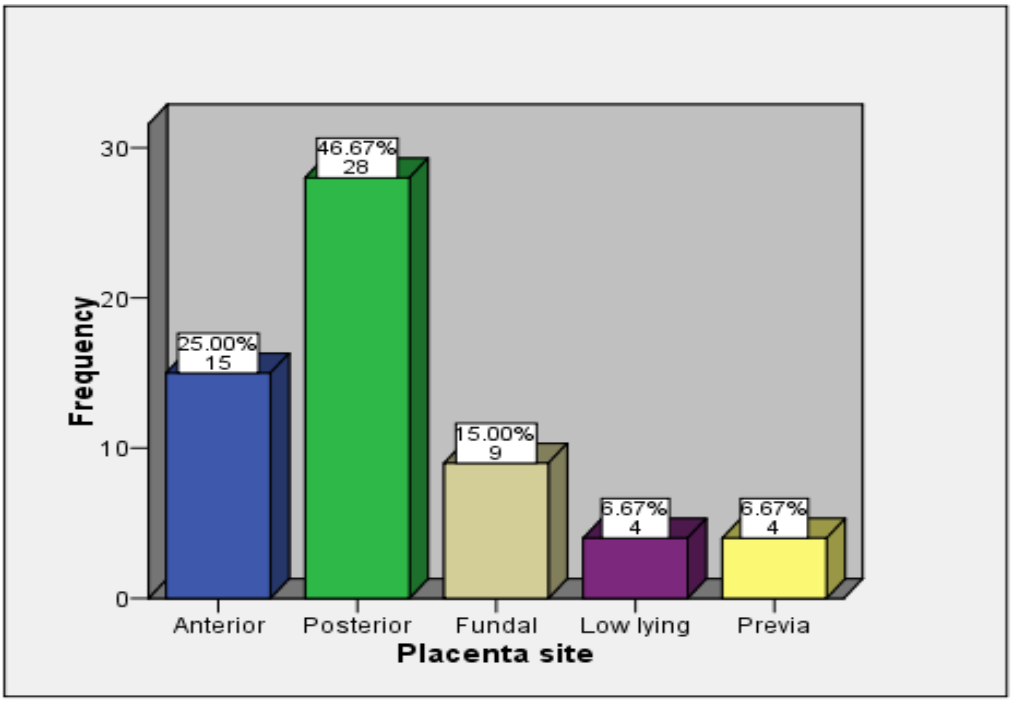


Figure 4.6: distribution of participants according to placenta site

Table 4.7: Chi-square test for association between the placenta site and No. of scars:

		No. of scars			
Placenta site		One	Two	More than two	**Total**
Anterior	Count	8	1	6	**15**
	%	53.3%	4.2%	28.6%	**25.0%**
Posterior	Count	4	15	9	**28**
	%	26.7%	62.5%	42.9%	**46.7%**
Fundal	Count	3	4	2	**9**
	%	20.0%	16.7%	9.5%	**15.0%**
Low lying	Count	0	2	2	**4**
	%	.0%	8.3%	9.5%	**6.7%**
Previa	Count	0	2	2	**4**
	%	.0%	8.3%	9.5%	**6.7%**
Total	**Count**	**15**	**24**	**21**	**60**
	%	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Chi-Square Tests			
	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	15.159	8	0.056
Likelihood Ratio	18.287	8	0.019

Table 4.8: Chi-square test for association between the placenta site and pregnant age:

		Age				
Placenta site		Less than 25 years	25-30 years	31-35 years	36-40 years	**Total**
Anterior	Count	0	8	4	3	**15**
	%	.0%	40.0%	15.4%	27.3%	**25.0%**
Posterior	Count	2	7	14	5	**28**
	%	66.7%	35.0%	53.8%	45.5%	**46.7%**
Fundal	Count	1	3	4	1	**9**
	%	33.3%	15.0%	15.4%	9.1%	**15.0%**
Low lying	Count	0	1	1	2	**4**
	%	.0%	5.0%	3.8%	18.2%	**6.7%**
Previa	Count	0	1	3	0	**4**
	%	.0%	5.0%	11.5%	.0%	**6.7%**
Total	**Count**	**3**	**20**	**26**	**11**	**60**
	%	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Chi-Square Tests			
	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	10.320	12	0.588
Likelihood Ratio	11.153	12	0.516

Table 4.9: Chi-square test for association between the placenta site and gestational age:

		Gestational age				
Placenta site		Less than 25 weeks	25-28 weeks	29-32 weeks	33-36 weeks	**Total**
Anterior	Count	0	0	0	6	**9**
	%	.0%	.0%	.0%	19.4%	**42.9%**
Posterior	Count	1	1	3	15	**8**
	%	50.0%	33.3%	100.0%	48.4%	**38.1%**
Fundal	Count	0	1	0	5	**3**
	%	.0%	33.3%	.0%	16.1%	**14.3%**
Low lying	Count	1	1	0	2	**0**
	%	50.0%	33.3%	.0%	6.5%	**.0%**
Previa	Count	0	0	0	3	**1**
	%	.0%	.0%	.0%	9.7%	**4.8%**
Total	**Count**	**2**	**3**	**3**	**31**	**21**
	%	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Chi-Square Tests

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	20.332	16	0.206
Likelihood Ratio	19.218	16	0.258

Chapter five

Discussion, conclusion and recommendations

5.1 Discussion:

A sample of (60) second and third trimester pregnant mostly in their 33-36 weeks (51.7%) (Table 4.5) and 25-35 years old (77.6%) (Table 4.1) was selected, most (63.3%) of them have 3-5gravidities (table 4.2), while the majority (95%) of them have 3-5 or less than 3 parities (table 4.3), since most (75%) of them had two or more scars (table 4.4).

The study found that the most common placental location site in association with caesarean section for participants was posterior (46.7%), or anterior (25%) (table 4.6), while (table 4.7) the placental location site in association with caesarean section was statistical significantly different and it correlated to the variety of No. of scars, P-value (Asymp. Sig.) for Chi-Square Tests (Likelihood Ratio) was 0.019 which is less than the test significant level (0.05) indicating that the placenta was anterior for most (53.3%) of who had only one scar while it was posterior for most (62.5%) of who had two scars or more than two scars (42.9%), whereas there was no low lying or Previa placenta for who had only one scar compared to (8.3%) and (9.5%) respectively for who had two scars or more than two scars. Thus the study tends to agree with (To and Leung, 1995), the incidence of placenta Previa was significantly increased in those with a previous caesarean section and (Ahmed et al., 2015), placenta Previa was highly significantly associated with previous caesarean section (P =0000 <0.05). As well as, with multiparty and the association was found to be as high as previous caesarean section (P =0000<0.05).

The study found the placental location site was statistically not significantly correlated to the pregnant age or gestational age, P-values

(Asymp. Sig.) for Chi-Square Tests were more than the test significant level (0.05) indicating that the placenta is independent on pregnant age or gestational age.

5.2 Conclusion:

A sample of (60) second and third trimester pregnant mostly in their 33-36 weeks 25-35 years old and have 3-5gravidities was selected, who majorly have 3-5 or less than 3 parities mostly had two or more scars.

The common placental location site in association with caesarean section is posterior or anterior.

The placental location site is statistical significantly correlated to the variety of No. of scars but not to pregnant age nor gestational age.

Low lying and Previa placenta prevalence in pregnant women with respect to caesarean section and increases with number of scar.

5.3 Recommendations:

- The sonologist should be more accurate in determine of entire length of placenta and document both upper and lower margin.
- Further studies should be done large sample volume and control group to Compare the prevalence of placenta Previa on both groups.
- Further studies should be done to assess other pregnancy associated Complication with previous CS.

- More training for sonographer and radiologist to use advance tool (Doppler and 4D)
- Other imaging modalities such as MRI are recommended as a complementary methods with U/S to assess the placenta invasion.

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Appendix

Questionnaire

Correlation study of placenta localization after caesarean section

Date and Time induction commenced _ _ /_ _/_ _ _ _

Personal information:

1. Age ( )
2. Gravidity ( )
3. Parity ( )
4. Gestational age ( )
5. No of scar: One ( ) Tow ( ) More than two ( )

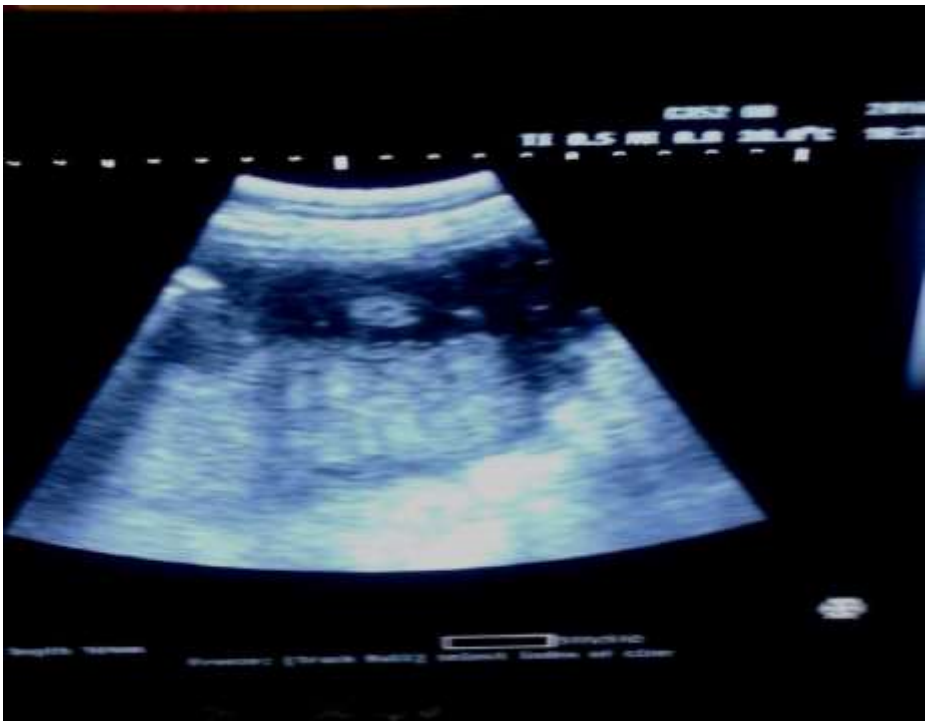
Sonographic finding:

6. Gestational age ( )
7. Placenta site:

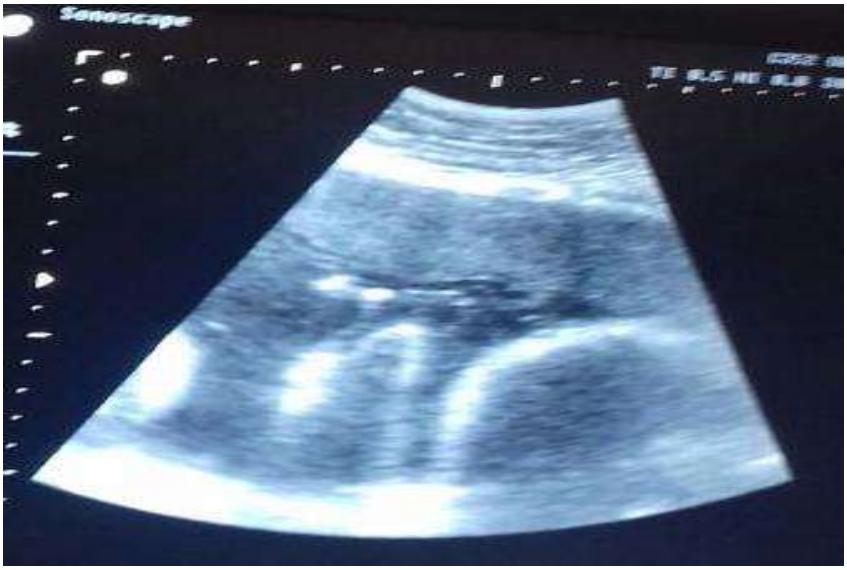
Anterior ( ) posterior ( ) fundal ( )low lying ( )Previa ( )

8. Presence of placenta pathology: Yes ( ) No ( )

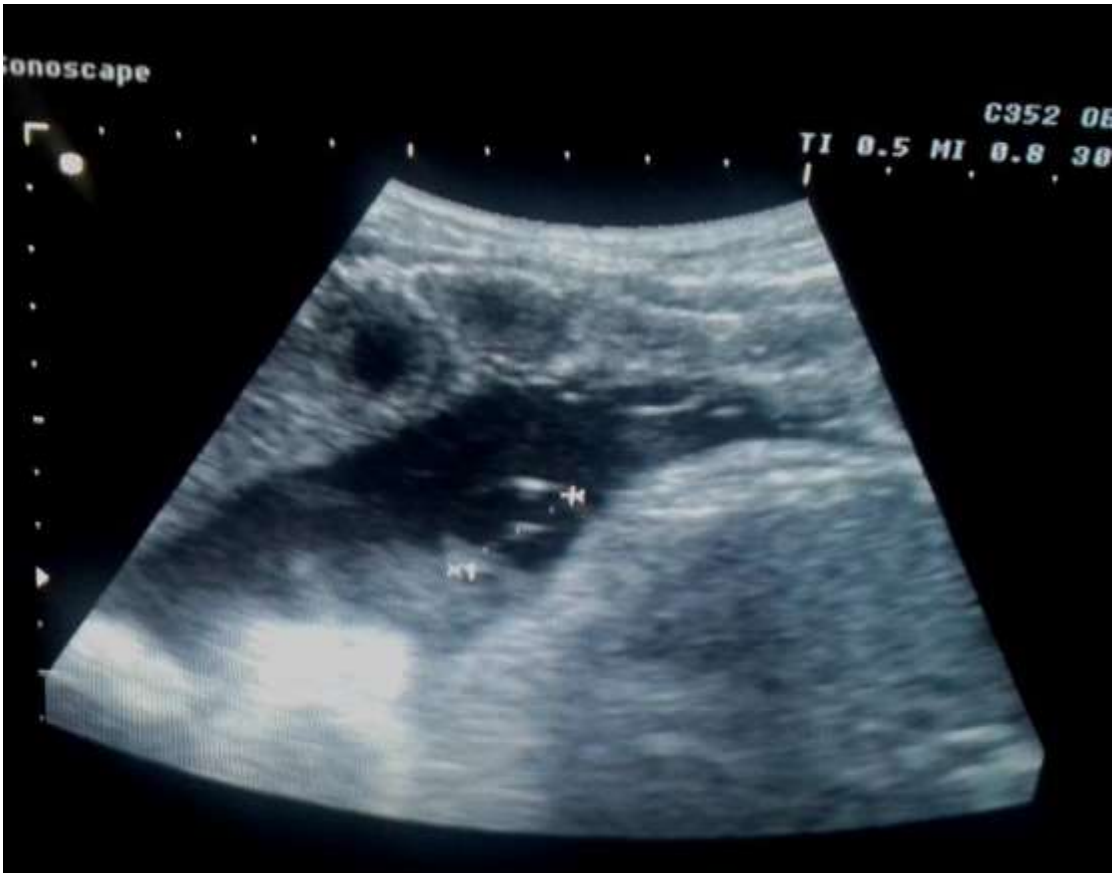
Appendix (1)



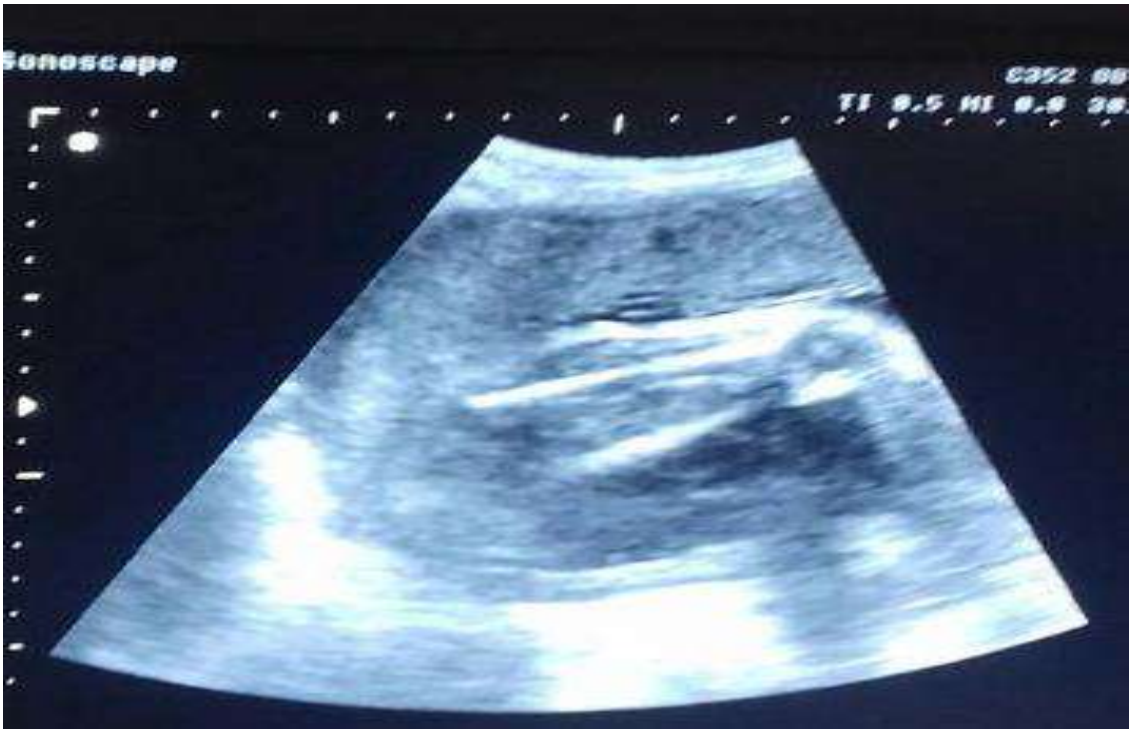
Ultrasound image (1) shows posterior placenta at 38 weeeks in women with one Cs



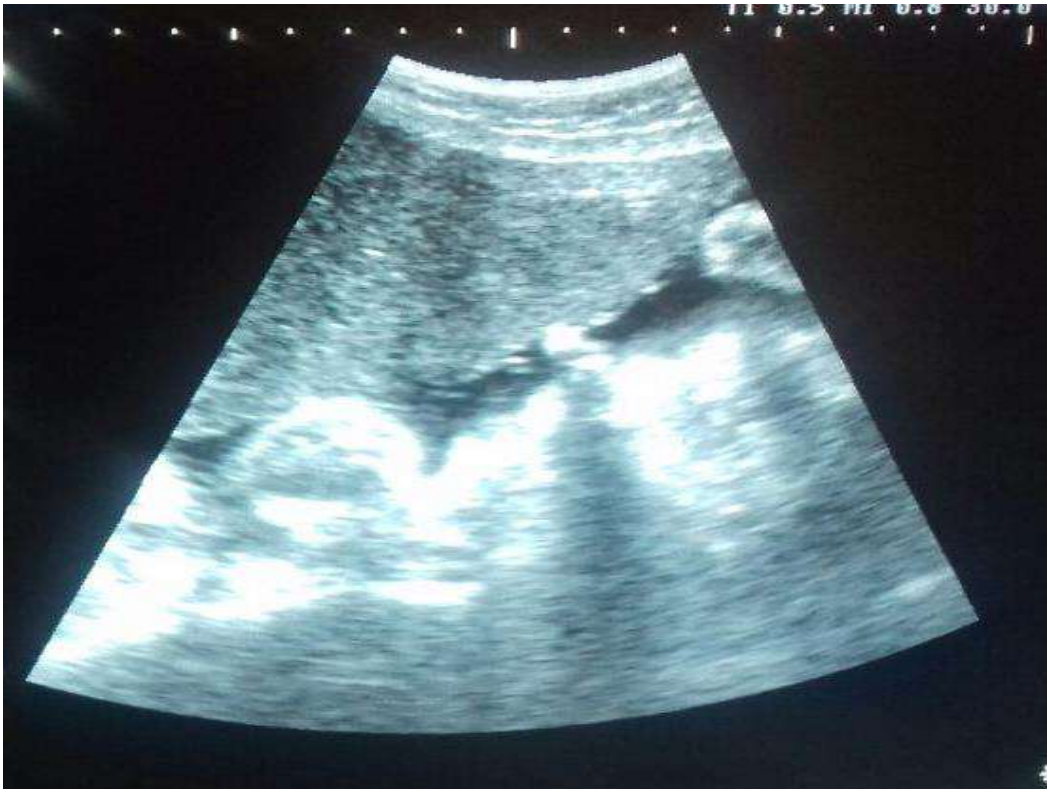
Ultrasound image (2) shows anterior placenta at 37 weeks +6 day in women with one caesarean section



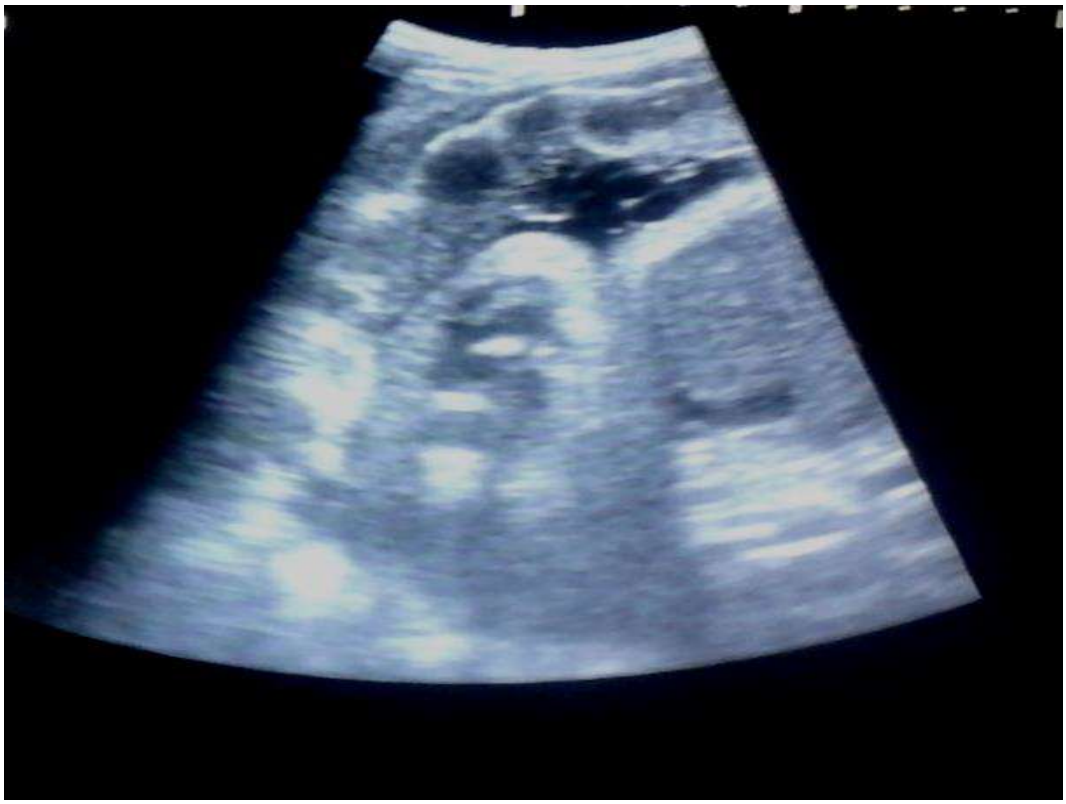
Ultrasound Image (3) show anterior placenta at 37 week 2 Previous C/S



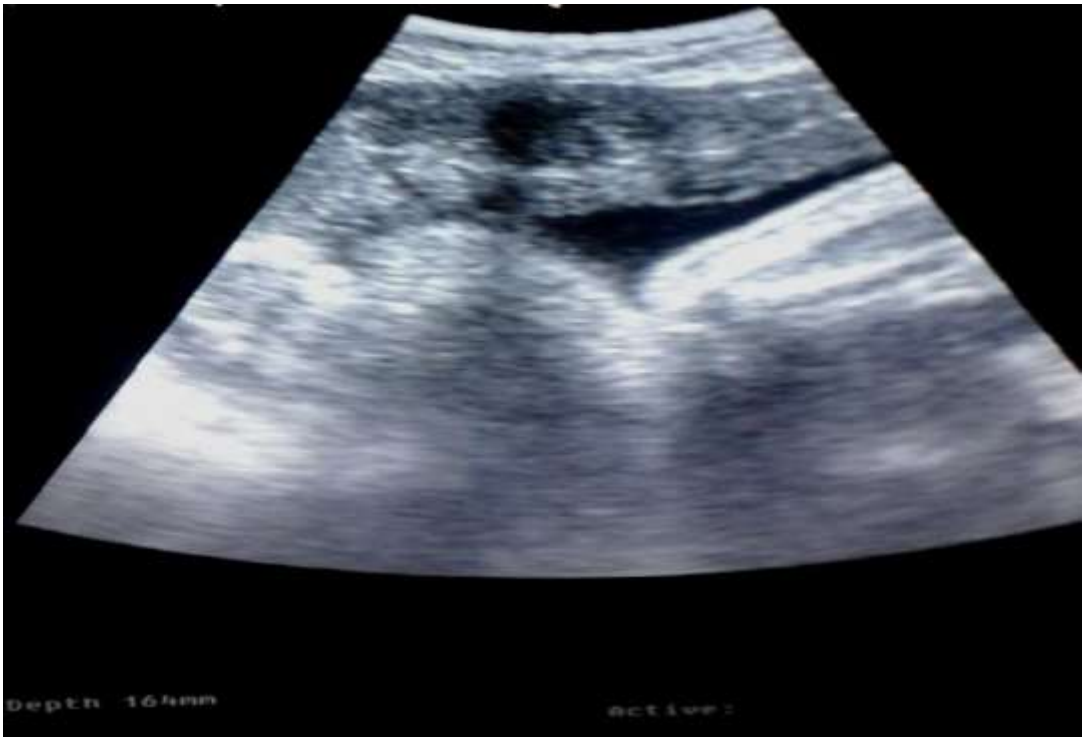
Ultrasound image (4): shows anterior placenta at30 weeks 3 Previous C/S



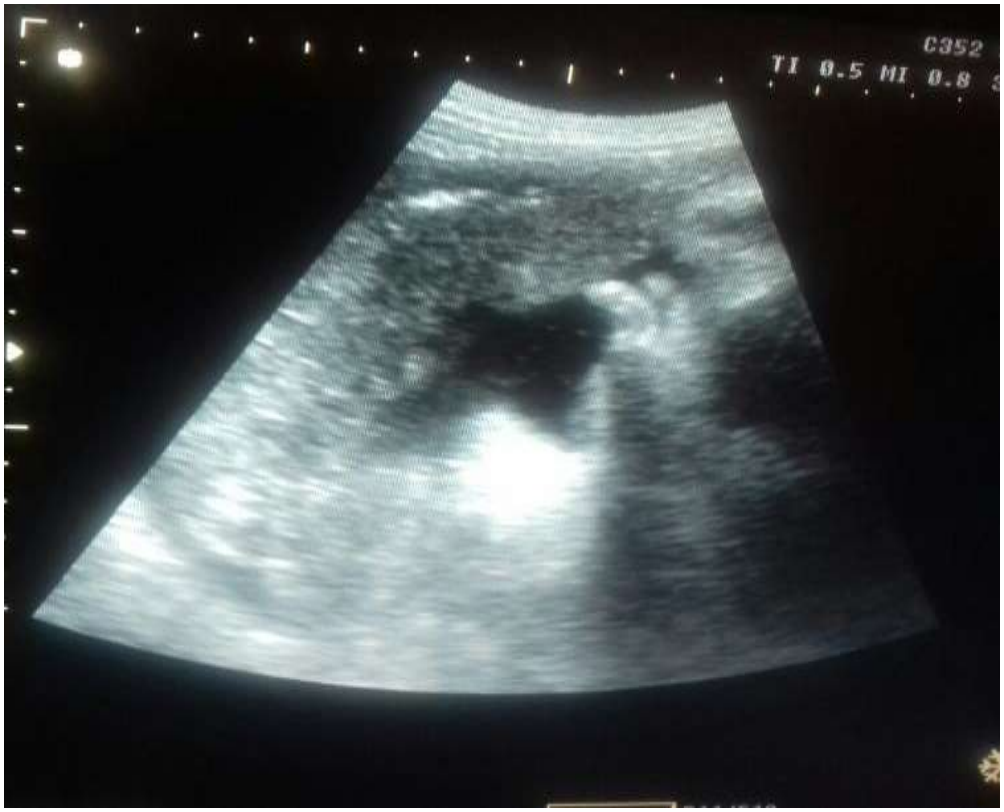
Ultrasound image (5)shows anterior placenta at 33 weeks with one caesarean Section



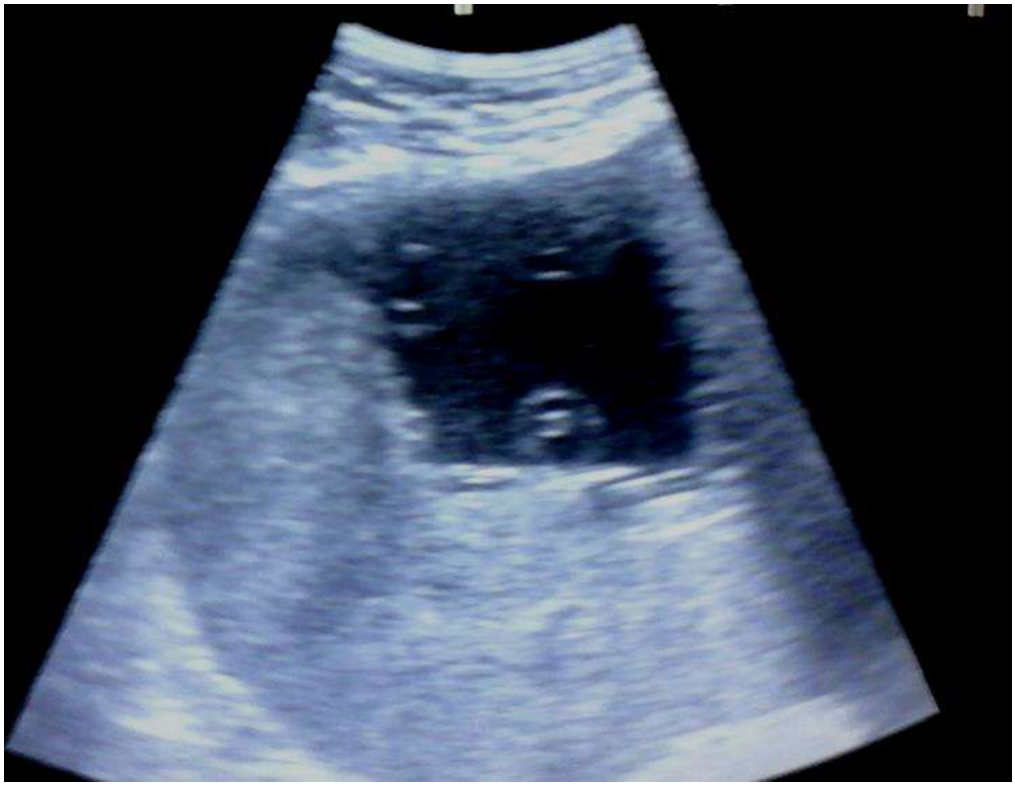
Ultrasound image (6) shows anterior placenta at 37 weeks+ 5 days 3 Previous C/S



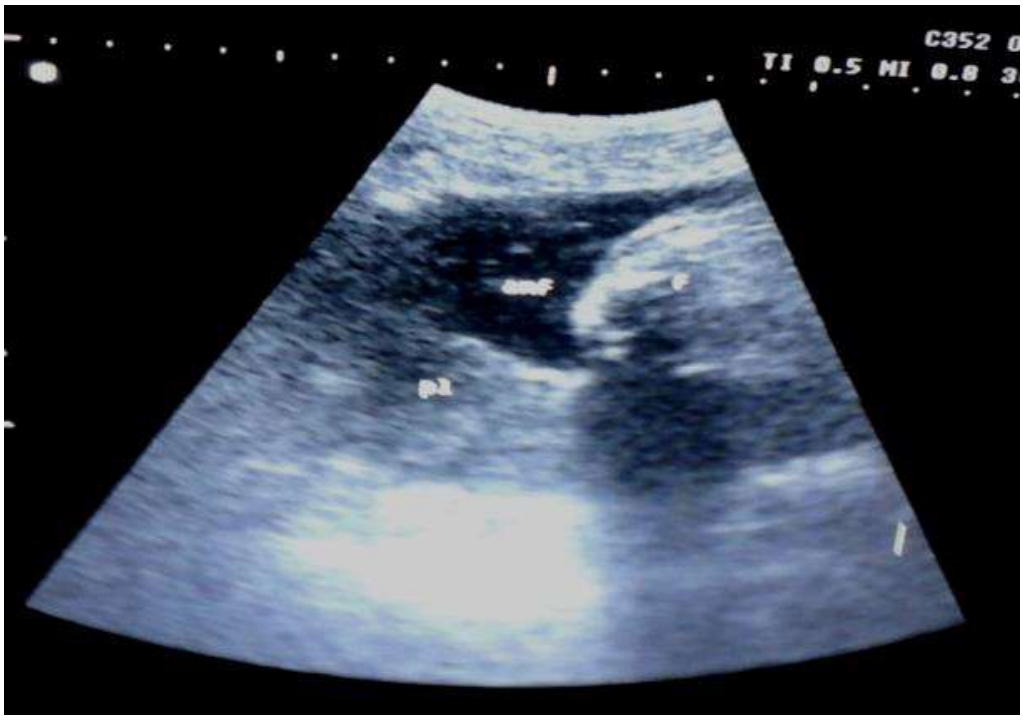
Ultrasound image(7) shows anterior placenta at 36 weeks 1 Previous C/S



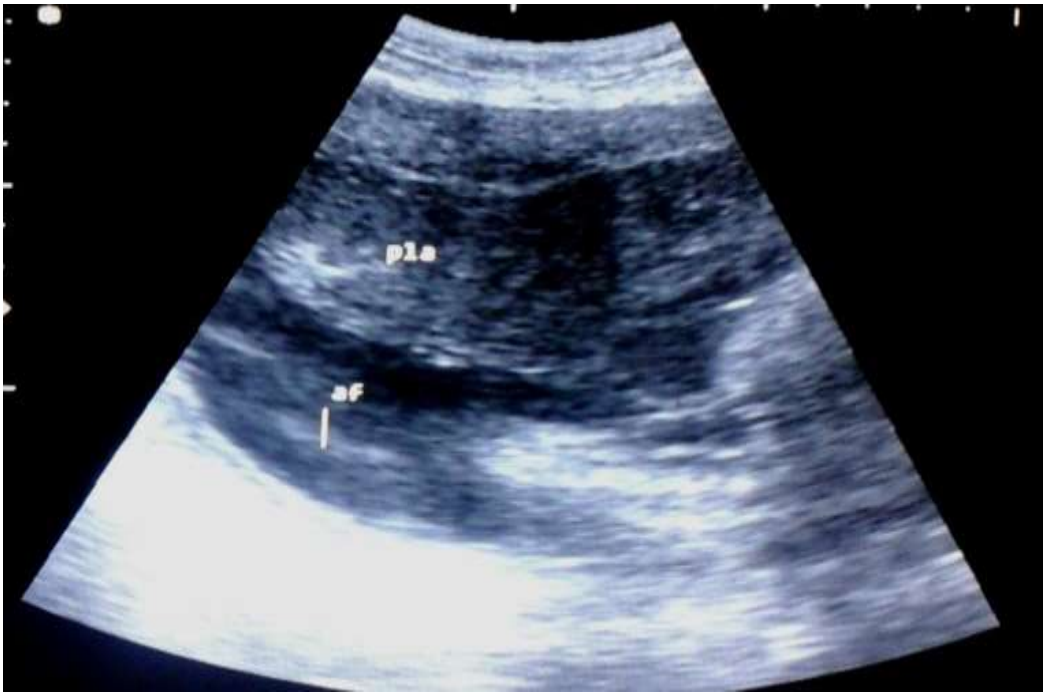
Ultrasound image (8) shows fundal placenta at 39 weeks with one cesarean section



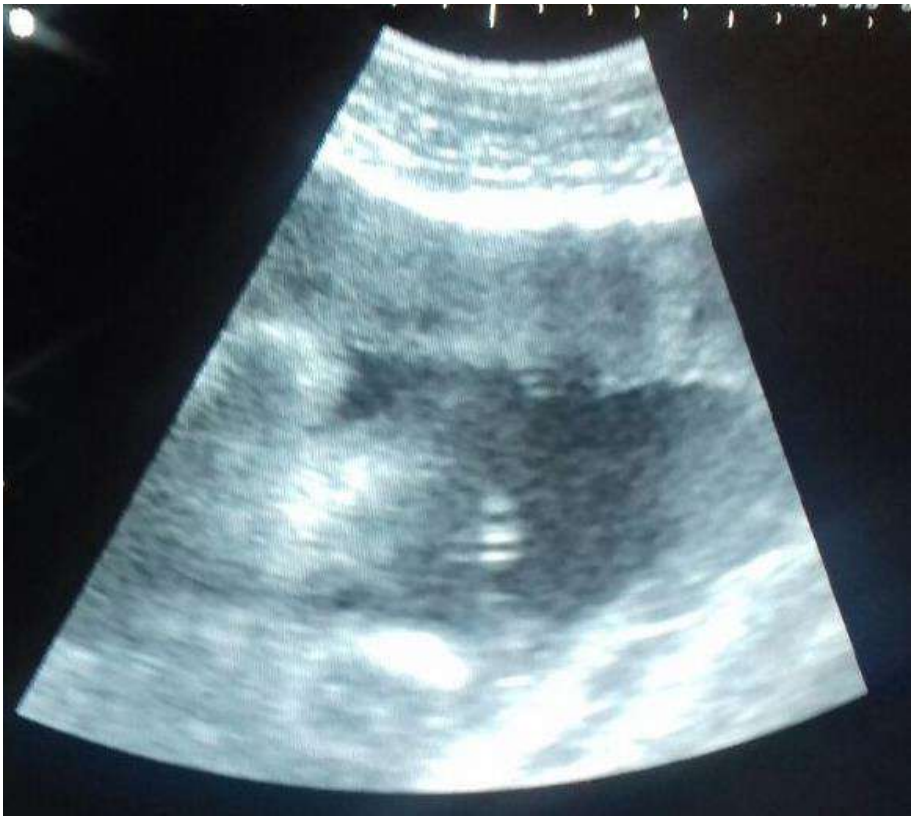
Ultrasound image (9) shows posterior placenta at 34 weeks 3 Previous C/S



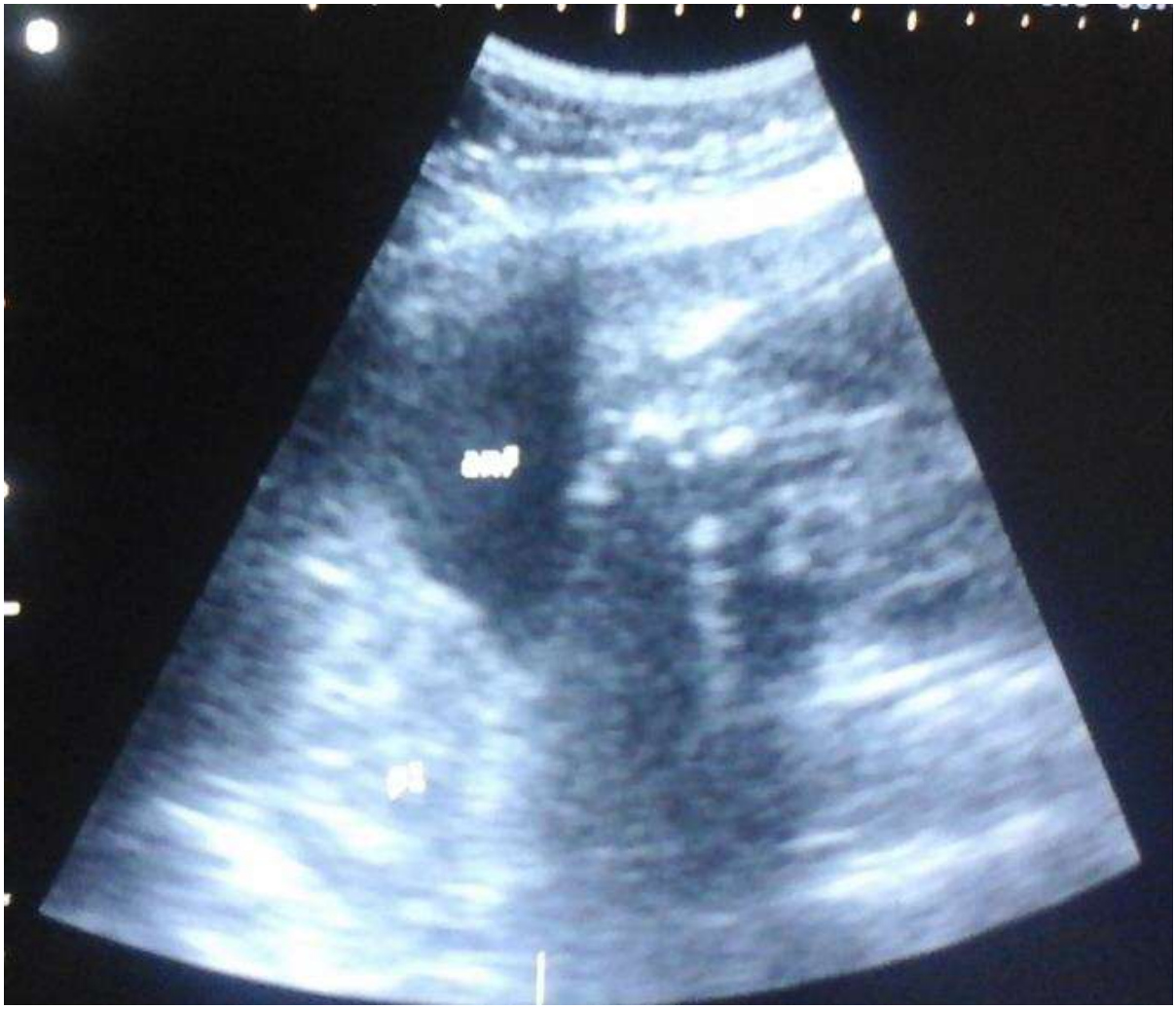
Ultrasound image(10) shows posterior placenta at 28 weeks 2 Previous C/S



Ultrasound image (11) shows anterior placenta at 32 weeks +5 day in women with 4 cesarean section



Ultrasound image (12) shows anterior placenta at 37 weeks 1 Previous C/S



Ultrasound image (13) shows posterior placenta at 34 weeks 1 C/S