



Radiodiagnosis

ULTRASOUND DOPPLER EVALUATION OF PLACENTAL ABNORMALITIES IN SECOND AND THIRD TRIMESTER.

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ABSTRACT Evaluation of the placental abnormalities is important for appropriate management of patients. Ultrasonography is easily available and routinely done investigation in all pregnant patients. This study was done to evaluate the role of ultrasound with Doppler for detecting various placental abnormalities in second and third trimester. Retrospective analysis of the ultrasound reports in 90 patients with their placental abnormality was done excluding intrauterine growth retardation related (IUGR) placental abnormalities. Out of total 90 patients, 79 (88%) placental abnormalities were diagnosed correctly on ultrasound examination in antenatal scan. The study showed importance of ultrasound and Doppler imaging in detecting placental abnormalities with placenta previa being most common followed by placental abruption and placental tumors as a least common abnormality.

Summary – Ultrasonography and Doppler is a non- invasive, non-radiational, low cost, sensitive imaging modality for diagnosis of placental abnormalities. Doppler ultrasound is particularly helpful in patients with placental invasion and placental tumors to see for abnormally increased vascularity. Placenta previa was most common and placental tumor as least common placental abnormality in second and third trimester in our study.

KEYWORDS : Ultrasonography, Doppler, placenta previa, placental invasion, placental abruption, tumors.

Introduction –

Ultrasound is a easily available, safe, non- invasive, non-radiational, low cost imaging modality which can be used to detect any placental abnormality. Accurate diagnosis of various placental abnormalities like placenta previa, placental abruption, placental invasion and placental mass lesions is important for appropriate management of patients. Therefore, assessment of placental morphology, location, normal variants and associated pathologies such as tumors is essential during routine follow up of patients in antenatal period.

Aims and objective –

To evaluate the role of ultrasound and Doppler in detection of placental abnormalities in second and third trimester.

Material and method –

All confirmed cases of placental abnormalities from obstetrics department of our hospital during January 2016 to December 2017 were included in study. Intrauterine growth retardation (IUGR) related placental abnormalities were excluded from the study. Retrospective ultrasound and clinical data of all patients were collected. Ultrasound data and reports were obtained from ALOKA ALPHA 7 ultrasound scanner. Reports were analysed and correlated with the final diagnosis.

Results –

A total of 90 patients met the study criteria. Maximum cases were of placenta previa. All 32 (100%) cases were diagnosed correctly. Out of 21 cases of placental invasion, 15 (71%) were diagnosed on ultrasonography. 11 cases of placental invasion were associated with placenta previa while in 4 cases there was no such association. In 30 (88%) out of 34 cases diagnosis of placental abruption was confirmed. Three cases of placental tumors were seen, in one of the case diagnosis was missed whereas in 2 (66%) showed positive results on ultrasonography. 79 (88%) cases of placental abnormalities out of 90 were diagnosed correctly on routine ultrasonography and Doppler assessment.

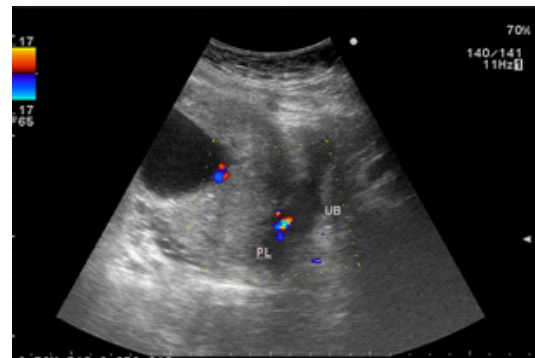


Fig 1. An ultrasound image in ANC with 30 weeks of gestation showing placenta completely covering internal os (complete placenta previa.)

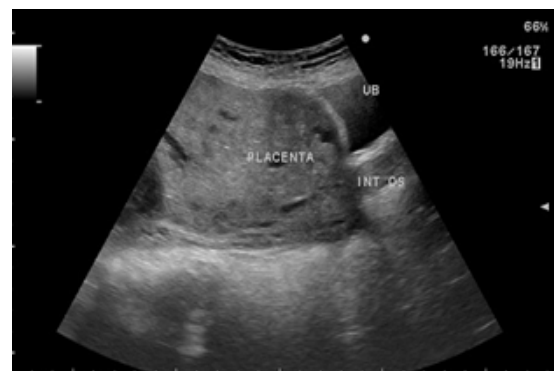


Fig 2. An ultrasound image in ANC 36 weeks of gestation showing placental lacunae and loss of retroplacental clear space in case of placenta accreta.



Fig 3. An ultrasound image in ANC 37 weeks of gestation showing complete placenta previa placental invasion (placenta increta) into myometrium with severe thinning of myometrium, loss of retroplacental clear space anteriorly extending upto serosal surface of posterior wall of urinary bladder with its irregularity.

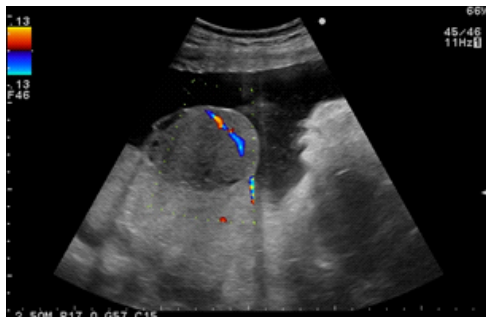


Fig 4. An ultrasound Doppler image in ANC 33 weeks of gestation showing well defined rounded hypo echoic lesion arising in placenta protruding into amniotic fluid with vascularity on Doppler.

Discussion –

There are various placental abnormalities which are encountered in second and third trimester of pregnancy. These are placenta previa, placental invasion, placental abruption, placental tumors etc. (1, 2)

Incidence of placenta previa is 2.8 per 1000 in singleton and 3.9 per 1000 in twin pregnancies. Placenta previa is termed as implantation of placenta in the lower uterine segment within 2 cm from internal os. The usual presentation is bleeding per vaginum. Three degrees of placenta previa are described according to position of lower end of placenta from internal os, these are marginal, partial or complete.(3-5)

Transvaginal ultrasonography is a preferred modality for assessment of placenta previa because of its high sensitivity, specificity, positive predictive value and negative predictive value .It is a safe modality even when vaginal bleeding is present. Patient is instructed to empty urinary bladder. On trans-abdominal ultrasound posterior placenta is poorly visualized, visualization of lower segment can be hindered by foetal head and obesity (3, 5). In our study, 32 patients (100%) were diagnosed correctly as placenta previa in which lower edge of placenta was within 2 cm of internal os.

Assessment of placenta previa after 35 weeks helps in planning of delivery. Trial of labour can be given if distance between internal cervical os and the lower edge of placenta is more than 20 mm, otherwise caesarean section is a preferred choice. (5)

Placental invasion is an invasion of chorionic villi into myometrium occurring due to defect in decidua basalis. Placental invasion is a broad term includes placenta accreta vera (Villi attached to myometrium without invasion), placenta increta (Villi attached to myometrium with invasion) and placenta percreta (invasion beyond serosa, urinary bladder can be involved). The overall incidence is 3 in 1000 deliveries. 5 to 10 % of patients with placenta previa have placenta accreta. Previous history of caesarean section increases risk of placental invasion. Massive postpartum haemorrhage can occur after placental separation leading to complications. These patients often require

hysterectomy. (3, 5-7)

Sensitivity of ultrasonography in detecting placenta accreta is 85%. Doppler study adds in the diagnosis. (3, 8) Ultrasound is performed at 18-20 weeks of gestation in most of the patients. Examination by transvaginal ultrasound is essential whenever there is evidence of low lying placenta or placenta previa. Placenta previa is associated with greater risk of placental invasion. Placental lacunae give “moth eaten” or “swiss cheese” appearance to the placenta and shows varying size and shapes. Lacunae show turbulent flow as that of the placental lakes, which can be confused with it. Risk of placental invasion increases with increase in the number of lacunae. Increase in the number of blood vessels surrounding myometrium can be seen on Doppler examination. Retroplacental hypoechoic clear space is lost (21 % false positive rate is noted, so should not be used as solitary criteria). There is thinning of myometrium usually less than 1 mm. Urinary bladder wall shows irregularity with increased vascularity (in favour of placenta percreta) and retroplacental blood flow is often seen interrupted.(7,8) Colour Doppler shows increased sensitivity of 82% and specificity of 97% in the diagnosis when there is diffuse and focal lacunar flow in placental parenchyma, urinary bladder and uterine serosal hypervascularity, presence of subplacental venous plexus with their prominence and absence of subplacental vascular signal.(3) There were total 21 cases of placental invasion, of which 15 (71%) were diagnosed correctly. Among these 11 cases were associated with placenta previa. However, there was no evidence of placenta previa in rest 4 cases. In these cases, presence of multiple placental lacunae, thinning of myometrium with loss of retroplacental hypoechoic clear space was seen. Small sized and focal invasion noted in rest of six cases which were missed on ultrasonography. Subjective error can be the other contributing factor for missed diagnosis.

Placental abruption is a condition in which placenta separates from myometrium prematurely and generally seen in the second or third trimester. Predominantly it is a clinical diagnosis. Edge of the placenta is the most common site for separation. Incidence of placental abruption is 1 %. Whenever placental separation is more than 50 %, blood loss causing adverse effect on outcome of pregnancy is more. In acute setting of abruption use of ultrasonography is limited, it is more helpful in chronic type of abruption. (3, 9)

Whenever retroplacental bleed is seen it should be quantified using ultrasound. Retroplacental collections need to be distinguished from subchorionic collection (less risk of fatal complications), normal retroplacental complex (decidua , myometrium and vessels are seen with thickness less than 2 cm), marginal sinuses (normal placental variations). Appearance of retroplacental haemorrhage changes with duration, it is hyper echoic in acute stage with its echogenicity decreasing in further course and become iso echoic in 3 to 7 days, hypo echoic in 1 to 2 weeks and anechoic after 2 weeks.(3,9) Correctly diagnosed cases were 30 (88%) out of 34 in our study which showed variable appearance of retroplacental collection. Among undiagnosed four cases, in three cases there was absence of retroplacental clot (may have passed before ultrasonography examination) and minimal retroplacental collection was noted in rest one case.

Chorioangioma is a benign, non-trophoblastic tumor arising from placenta with its incidence 0.6 to 1 %. These are placental hamartomas and usually asymptomatic. However maternal complications such as polyhydramnios, premature uterine contractions, pre eclampsia, premature labour, placental abruption and fetal complications like heart failure, fetal hydrops, haemolytic anaemia, intrauterine growth retardation, thrombocytopenia etc. can be seen with larger (more than 5 cm) tumors.(2,10)

Antenatal Doppler ultrasound is a gold standard modality for primary diagnosis of chorioangioma. (10) It appears well defined echo complex mass lesion and appears different from rest of placenta protruding into amniotic cavity. Mostly these tumors are located near umbilical cord insertion. Doppler shows intense vascularity within the lesion with low resistance flow in umbilical artery. This should be differentiated from teratoma and subchorionic fibrin deposition which shows presence of calcific foci, cystic components with minimal vascularity on Doppler.

Serial ultrasound examination is required in patients with tumor size of more than 5 cm. Ultrasound helps in early detection of fetal anemia and impending fetal hydrops.(3) In our study, 2 (66%) out of 3 cases were correctly diagnosed and another case remained undiagnosed most probably due to its small size.

Conclusion –

Ultrasonography and Doppler is a non- invasive, non- radiational, low cost, sensitive imaging modality for diagnosis of placental abnormalities. Doppler ultrasound is particularly helpful in patients with placental invasion and placental tumors to see for abnormally increased vascularity. Most common diagnostic abnormality detected was placenta previa with placental tumours as an uncommon aetiology.

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