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Screening and Early Diagnosis of Placenta Previa and Placenta Accreta Spectrum Updates

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Abstract

Background*: Placenta accreta spectrum (PAS) is one of the major causes of massive obstetric hemorrhage and life-threatening complication of pregnancy. Patients with placenta previa may develop severe postpartum hemorrhage especially when coinciding with placenta accreta, it may be associated with potentially life-threatening maternal hemorrhage after removal of the placenta due to its incomplete separation and massive bleeding from the placental attachment site.*

Objectives*: aimed to review the update on screening and early diagnosis of placenta previa and placenta accreta spectrum,*

Methods*: These databases were searched for articles published in English in 3 data bases [PubMed – Google scholar – science direct] and Boolean operators (AND, OR, NOT) had been used such as [Diagnosis of Placenta Accreta and Placenta Accreta Spectrum OR PAS] and in peer-reviewed articles between June 2005 and February 2023. Documents in a language apart from English have been excluded as sources for interpretation was not found. Papers apart from main scientific studies had been excluded: documents unavailable as total written text, conversation, conference abstract papers and dissertations.*

Conclusion*: Placenta previa is a major risk factor for postpartum hemorrhage. The presence of placenta previa can also increase a woman's risk for placenta accreta spectrum. Antenatal diagnosis decreases maternal morbidity and mortality. TVS is safe, superior to TAS and improves the accuracy of placental localisation. Color and pulsed Doppler are useful to confirm the position of the placental edge. MRI is not essential for diagnosis of PAS but may adjunct U/S in cases of parametrial extension or posterior placenta localization.*

Keywords*: MRI, Placenta Accreta, Placenta Previa, Ultrasonography, Screening.*

Introduction

Placenta accreta is a histopathological term first defined by Irving and Hertig in 1937, as the "abnormal adherence of the afterbirth in whole or in parts to the underlying uterine wall in the partial or complete absence of decidua". (1)

The presence of placenta previa can also increase a woman's risk for placenta accreta spectrum (PAS).(2) This spectrum includes placenta accreta, increta, and percreta. Uncontrolled postpartum hemorrhage from placenta

previa or PAS may necessitate a blood transfusion, hysterectomy thus leaving the patient infertile, admission to the ICU, or even death.

Normally, the placenta adheres only to the decidua basalis, thus it separates smoothly from the wall of the uterus after delivery (3). Placenta accreta (PA) exists when the chorionic villi penetrate through the decidua basalis into the myometrium (4,5).

Placenta previa and placenta accrete carry significant maternal and fetal morbidity and mortality (4). The maternal mortality in women with PA may reach as high as 7–10 % (4,7, 8). There is increasing evidence that the management of women with PAS disorders by multidisciplinary teams and antenatal diagnosis decrease maternal morbidity and mortality.(9)

Causes and risk factors identification:

Theoretically, any primary uterine anomaly or secondary damage to the uterine wall structure can lead to PAS disorders, including the invasive forms. (10)

***Caesarean scar**: The association of placenta previa with history of caesarean delivery found a dose-response pattern for the relative risk. Systematic review and meta-analysis of 22 studies including over 2 million deliveries indicated that the incidence of placenta praevia increases from 10 in 1000 deliveries with one previous caesarean delivery to 28 in 1000 with three or more caesarean deliveries. (11,12)*

***Other etiological factors:** Twin pregnancies, Smoking, Advanced maternal age, and assisted reproductive techniques. (13,14,15)*

***PAS disorders risk:** The single most important risk factor, reported in around half of all cases of PAS disorders, is placenta previa. (16)*

Screening and diagnosis

The combination of grey-scale and colour Doppler imaging ultrasound increases the sensitivity of ultrasound imaging to around 90% with negative predictive values ranging between 95% - 98%. (17) However, the diagnostic accuracy of PAS screening in non-specialist referring hospitals is only 50%, as clinical suspicion for PAS and/or knowledge of risk factors is low. (18)

TVS is safe, superior to TAS and improves the accuracy of placental localisation particularly when the placenta is posterior.(19) TVS is the gold standard for diagnosing placenta previa and also evaluate cervical length if indicated. (20)

The mid trimester screening

Mid pregnancy routine fetal anomaly scan should include placental localisation thereby identifying women at risk of persisting placenta praevia or a low-lying placenta. (9) If the placenta is thought to be low lying (less

than 20 mm from the internal os) or praevia (covering the os), a follow-up ultrasound including a TVS is recommended at 32 weeks of gestation to diagnose persistent low-lying and/or placenta praevia. In women with a persistent low-lying or placenta praevia at 32 weeks of gestation who remain asymptomatic, an additional TVS is recommended at around 36 weeks of gestation to discuss about mode of delivery. (21)

Apparent placental 'migration' following the development of the lower uterine segment during the third trimester of results in the resolution of the low-lying placenta in 90% of the cases before term. (22) This is less likely to occur in women with a previous caesarean delivery. (23)

Color and pulsed Doppler are useful to confirm the position of the placental edge and rule out vasa previa, as resolution of a low-lying placenta can be associated with vasa previa. (21)

First trimester screening

Recently, it has been suggested that caesarean scar pregnancy as a precursor of one of the different grades of PAS disorders. (24) Even if not accreta, is associated with a very high risk of complications due to the consequences of a placenta previa, i.e., massive obstetric hemorrhage. Thus, women diagnosed in the first trimester with a caesarean scar pregnancy should be counselled regarding the high risk of complications and termination in the first trimester should be considered. (25)

Screening for PAS disorders

Women with a history of previous caesarean section seen to have an anterior low-lying placenta or placenta praevia at the routine fetal anomaly scan should be specifically screened for placenta accreta spectrum. (26) Absence of US findings doesn't exclude PAS; so, clinical risk factors are equally important for prediction.

***Unified descriptors for ultrasound findings in (PAS)**. (26,27)*

2D grey scale

Loss of the retro placental "clear zone".

Abnormal placental lacunae, often containing turbulent flow.

Bladder wall interruption or loss.

Myometrial thinning overlying the placenta to <1 mm.

Placental bulge, into a neighbouring organ, typically the bladder.

Focal exophytic mass.

Colour Doppler imaging

Uterovesical hypervascularity

Subplacental hypervascularity

Bridging vessels, from the placenta across the myometrium

Placental lacunae feeder vessels

3D

Intraplacental hypervascularity: complex, irregular arrangement of numerous vessels, exhibiting tortuous courses and varying calibers.

There is a recent contingent strategy that has the potential to improve the antenatal PAS detection rate and decrease maternal morbidity and mortality using the following markets:

(1) The presence of multiple irregular lacunar spaces within the placenta.

(2) Loss of the retroplacental 'clear zone'.

(3) Myometrial thinning of the retroplacental area.

(4) Increased placental thickness; and

(5) Bladder wall interruption.

The presence of two or more of these ultrasound signs was considered diagnostic of PAS. Cases with one isolated sign were classified as equivocal, and the absence of any ultrasound signs was considered negative for a PAS diagnosis. (18)

MRI

The main MRI features of placenta accreta include abnormal uterine bulging, dark intraplacental bands on T2-weighted imaging, heterogeneous signal intensity within the placenta disorganised vasculature of placenta and disruption of the uteroplacental zone. (28) MRI is not essential for making a prenatal diagnosis of suspected PAS disorders but may be useful in evaluating the pelvic extension of a placenta percreta or areas difficult to evaluate on ultrasound. (26)

Serum biomarker

PAPP-A MoM of placenta previa-accreta group was significantly higher than those of the non-adherent placenta previa. Serum PAPP-A was found to be significantly positively associated with placenta accreta after adjusted gestational week at time of blood sampling, BMI, age, smoking, and previous cesarean section history.(29) Using enzyme-linked immunosorbent assay, confirmed 4 proteins are dysregulated in placenta accreta spectrum compared with nonadherent cases: (median antithrombin III concentrations, median plasminogen activator inhibitor 1 concentrations, soluble Tie2 and soluble vascular endothelial growth factor receptor 2). (30)

At 14–22 weeks, women presenting with a placenta previa are at higher risk of PAS disorders if serum β-hCG and alpha-fetoprotein (AFP) are above 2.5 multiples of the median (MoM). Overall, biomarkers could be used with ultrasound imaging to screen for PAS disorders. (26)

Conclusion

Mid pregnancy routine fetal anomaly scan should include placental localisation. TVS is the gold standard for diagnosing placenta previa and diagnosing PAS and the degree of invasion if performed by a skilled operator.

Women with a history of previous caesarean section seen to have an anterior low-lying placenta or placenta praevia should be specifically screened for placenta accreta spectrum. Absence of US findings doesn't exclude PAS; so, clinical risk factors are equally important. MRI diagnostic accuracy is similar to U/S imaging in detecting PAS when performed by expert sonographers.

REFERENCES

1- **Ahn KH, Lee EH**, **et al**., Anterior placenta previa in the mid-trimester of pregnancy as a risk factor for neonatal respiratory distress syndrome. PLoS One. **2018**;13(11): e0207061.

2- **Silver RM, Branch DW**. Placenta Accreta Spectrum. N Engl J Med. **2018** Apr 19;378(16):1529-1536.

3- **Russo M, Krenz EI, Hart SR, Kirsch D.** Multidisciplinary approach to the management of placenta accreta. Ochsner J. **2011**; 11:84–8.

4- **Royal College of Obstetricians and Gynaecologists (RCOG).** Green-top Guideline No. 27: Placenta previa, placenta previa accreta and vasa previa: diagnosis and management. London: RCOG; **2011**.

5- **Vahdat M, Mehdizadeh A, Sariri E, Chaichian S, Najmi Z, Kadivar M.** Placenta percreta invading broad ligament and parametrium in a woman with two previous cesarean sections: a case report. Case Rep Obstet Gynecol. **2012**;251381.

6- **Garmi G, Salim R.** Epidemiology, etiology, diagnosis, and management of placenta accreta. ObstetGynecolInt; **2012**:873929.

7- Chandraharan E, Rao S, Belli AM, Arulkumaran S. The Triple-P procedure as a conservative surgical alternative to peripartum hysterectomy for placenta percreta. Int J Gynaecol Obstet. **2012**; 117:191–4.

8- **O'Brien JM, Barton JR, Donaldson ES.** The management of placenta percreta: conservative and operative strategies. Am J ObstetGynecol. **1996**; 175:1632–8.

9- **Jauniaux E, Alfirevic Z, Bhide AG, et al.** Royal College of Obstetricians and Gynaecologists: Placenta Praevia and Placenta Accreta: Diagnosis and management: green-top guideline no. 27a. BJOG. **2019**;126(1): e1–e48.

10- **Fox H**. Placenta accreta 1945–1969. *Obstet Gynecol Surv*. **1972**; 27: 475– 490.

11- **Marshall NE, Fu R, Guise JM.** Impact of multiple cesarean deliveries on maternal morbidity: a systematic review. Am J ObstetGynecol**2011**; 205:262. e1–8.

12- **Klar M, Michels KB**. Cesarean section and placental disorders in subsequent pregnancies–a meta-analysis. J Perinat Med **2014**; 42:571–83.

13- **Weis MA, Harper LM, Roehl KA, Odibo AO, Cahill AG**. Natural history of placenta previa in twins. Obstet Gynecol **2012**; 120:753–8.30.

14- **Shobeiri F, Jenabi E**. Smoking and placenta previa: a meta-analysis. J Matern Fetal Neonatal Med **2017**; 30:2985–90.

15- **Rosenberg T, Pariente G, Sergienko R, et al**. Critical analysis of risk factors and outcome of placenta previa.Arch Gynecol Obstet **2011**;284:47–51.

16- **Thurn L, Lindqvist PG, Jakobsson M, et al.** Abnormally invasive placenta-prevalence,risk factors and antenatal suspicion: Results from a large population-based cohort study in the Nordic countries. *BJOG*. **2016**; 123:1348–1355.

17- **D'Antonio F, Iacovella C, Bhide A**. Prenatal identification of invasive placentation using ultrasound: Systematic review and meta-analysis. *Ultrasound Obstet Gynecol*. **2013**; 42:509–517.

18- **C.M. Coutinhu, V. Georgion , et al** . Effectiveness of contingent screening for placenta accreta spectrum disorders based on persistent low- lying placenta and previous uterine surgery. *Ultrasound Obstet Gynecol* **2021**; **57**: 91–96.

19- **Oppenheimer L**; MATERNAL FETAL MEDICINE COMMITTEE. Diagnosis and management of placenta previa. J Obstet Gynaecol. **2007** Mar;29(3):261-266.

20- **Greg M, MD,** placenta previa imaging. Sep. **2020**.practice essentials, Medscape.

21- **Charles J lockwood, MD. MHCM, Karen R, MD**.; Placenta previa: management. UpToDate **2020**. Topic 6809 Version 45.0

22- **Dashe JS, McIntire DD, Ramus RM, et al.** Persistence of placenta previa according to gestational age at ultrasound detection. Obstet Gynecol **2002**; 99:692–7.

23- **Cho JY, Lee YH, et al.** Difference in migration of placenta according to the location and type of placenta previa. J Clin Ultrasound **2008**; 36:79–84.

24- **Cali G, Forlani F, et al.** Natural history of cesarean scar pregnancy on prenatal ultrasound: The crossover sign. *Ultrasound Obstet Gynecol*. **2017**; 50:100–104.

25- **Birch Petersen K, Hoffmann E, et al**. Cesarean scar pregnancy: A systematic review of treatment studies. *Fertil Steril*. **2016**; 105:958–967.

26- **E. Jauniaux,**| **Amar Bhide, Anne Kennedy et al**. |for the FIGO Placenta Accreta Diagnosis and Management Expert Consensus Panel. FIGO consensus guidelines on placenta accreta spectrum disorders: prenatal screening and diagnosis. *Int J Gynecol Obstet*. **2018;** 140: 274– 280.

27- **Collins SL, Ashcroft A, Braun T, et al**. Proposal for standardized ultrasound descriptors of abnormally invasive placenta (AIP). *Ultrasound Obstet Gynecol*. **2016**; 47:271–275.

28- **D'Antonio F, Iacovella C, et al.** Prenatal identification of invasive placentation using magnetic resonance imaging: systematic review and meta-analysis. Ultrasound Obstet Gynecol **2014**; 44:8–16.

29- **Wang, F., Chen, S., Wang, J. et al**. First trimester serum PAPP-A is associated with placenta accreta: a retrospective study. *Arch Gynecol Obstet* (**2021).**

30- **Scott A. shainker, DO, MS Robert M. Silver MD** et al. Placenta accrete spectrum: biomarker discovery using plasma proteomics. AJOG vol 223 p433.E1-433E.14 **2020**