FIGO GUIDELINES

FIGO consensus guidelines on placenta accreta spectrum disorders: Introduction★,§

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§The views expressed in this document reflect the opinion of the individuals and not necessarily those of the institutions that they represent.

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Placenta accreta is a histopathologic term for a condition first described in 1937 by obstetrician Frederick C. Irving and pathologist Arthur T. Hertig at the Boston Lying-In Hospital [1]. Their study described 18 new cases of placenta accreta presenting with “the abnormal adherence of the afterbirth in whole or in parts to the underlying uterine wall.” Attempts to remove the placenta led to major postpartum hemorrhage that required emergency or secondary hysterectomy to control the bleeding in 14 cases. The histologic criterion used for their diagnosis of accreta placentation was the complete or partial absence of the decidua basalis—a sign that is still used today in many clinical and histopathological studies [2]. There were case reports published in the decade before Irving and Hertig published their series but the depth of description of the cases included their study makes it the first pivotal publication on placenta accreta.

Irving and Hertig described all their cases as “vera” or “adherent,” where the villi were attached to the surface of the myometrium without invading it. They discussed the possibility of deeper penetration of the villi into the myometrium, but none of their cases and those described in their literature review presented with histologic features of myometrial invasion by placental tissue. Only one of their cases and another from their literature review had undergone a prior cesarean delivery. More than 95% of the cases reported in their paper had a history of manual removal, curettage, and/or endometritis. Thirty years later, similar reviews of the literature reported a history of one or more cesarean deliveries in more than a quarter of women presenting with placenta accreta, as well as the occurrence of the more invasive forms [3,4].

Over the last 40 years, cesarean delivery rates around the world have risen from less than 10% to over 30%, and almost simultaneously a 10-fold increase in the incidence of placenta accreta spectrum (PAS) disorders has been reported in most medium- and high-income countries [5]. It should be noted that changes in the incidence of PAS disorders secondary to increased cesarean delivery rates may be delayed by up to 10 years, depending on birth rates and interpregnancy intervals, which vary in different parts of world. For the USA alone, it was estimated in 2011 that, if the cesarean delivery rate continues to increase as it has done before, by 2020 the cesarean delivery rate will be over 50% and there will be an additional 4504 annual cases of PAS disorders and 130 maternal deaths due to its complications [6]. Thus, it is not surprising that 80 years later, more than 90% of women presenting with a placenta accreta have had at least one prior cesarean delivery [5–9].

PAS disorders were first defined by Luke et al. [3] to include both abnormally adherent and invasive placentas. Three categories are now considered: (a) adherent placenta accreta, also described by pathologists as “placenta creta, vera or adherenta” when the villi simply adhere to the myometrium; (b) placenta increta, when the villi invade the myometrium; and (c) placenta percreta, when villi invade the full thickness of the myometrium including the uterine serosa and sometimes adjacent pelvic organs [3–5]. Variations in the lateral extension of myometrial invasion also divide PAS disorders into the focal, partial, or total categories, depending on the number of placental cotyledons involved. Finally, the degree of villous adhesion or invasion is rarely uniform throughout the placenta, limiting the accuracy of microscopic

diagnosis when the whole uteroplacental interface is not available for analysis [3]. This terminology describes accurately the spectrum of accreta placentation; however, recently some clinicians have started to use an archaic “Victorian” etymology, i.e. “morbidly adherent placenta” (MAP), to describe the different grades of accreta placentation. This is confusing and misleading, as technically it excludes the invasive forms of PAS disorders. Other terms used include “placental adhesive disorders,” “abnormally adherent placenta,” “abnormal placental adherence,” and “advanced invasive placentation”, all of which are exclusive rather then inclusive and ignore both clinical and pathological diagnostic standards.

It is essential to evaluate epidemiological data and outcome based on clear diagnostic criteria and this is only possible if the same starting points are used. It would be considered inadequate if an invasive tumor of the uterine cervix or any other organs, such as the liver, was encumbered with a similar plethora of inaccurate terminology. Therefore, when evaluating accreta placentation to obtain accurate epidemiologic data there is a need for a standardized approach. The term PAS disorders proposed by Luke et al. [3] provides standardized terminology, which covers the depth of villous invasiveness, lateral extension of accreta placentation, and the possible combination of different depths of invasiveness in the same placenta accreta. Thus, for the purposes of simplicity and clarity, the present guidelines use PAS disorders to describe the different pathological forms of accreta placentation.

There is increasing evidence that the management of women with PAS disorders by multidisciplinary teams in centers of excellence decreases maternal morbidity and mortality when compared with standard obstetric care [10–13]. Adequate multidisciplinary team management of PAS disorders can only be arranged when the diagnosis is made prenatally and the involvement of pelvic organs and tissues around the uterus has been accurately defined. New imaging techniques have played an increasing role in the prenatal diagnosis of this condition, facilitating prenatal management and allowing programmed delivery tailored for the individual need of the patient in the adequate environment [14]. Ultrasound imaging is the most commonly used technique to diagnose PAS disorders prenatally. However, the terminology employed to describe the different categories of ultrasound signs is also heterogeneous and complex. Together with the lack of detailed histopathologic correlations in most studies, this may explain why no single ultrasound sign or set combination of ultrasound signs has been found to be specific for the depth of abnormal placentation, and accurate for the differential diagnosis between adherent and invasive placentation [15–17]. The European Working Group on Abnormally Invasive Placenta (EW-AIP) and the AIP international expert group have recently proposed a standardized description of ultrasound signs used in the diagnosis of PAS disorders [18,19].

Ultrasound signs of adherent and invasive placentation vary with gestational age and depend on the thickness and composition of the placental bed, number of prior uterine scars, presence of scar defects between pregnancies, depth of invasion, and the lateral extension of the villous tissue [17].

Prospective studies providing correlation between prenatal imaging findings, clinical data at delivery, and histopathology are essential to improve the screening, diagnosis, and management of PAS disorders. Research protocols should be standardized and used by both clinicians and pathologists to better define the ultrasound signs that may be useful in the screening of women at high risk for PAS disorders.

There is also wide variation globally on the management of PAS disorders, with some centers opting for a radical approach, whereas others have proposed a range of conservative approaches [20,21]. Over the last decade, there has been an increasing number of case reports, cohort studies, modeling work, and systematic reviews on the diagnosis and management of PAS disorders. The American College of Obstetricians and Gynecologists (ACOG) and the Royal College of Obstetricians and Gynaecologists (RCOG) have published guidelines with evidence-based approaches for optimized clinical management of PAS disorders [22,23]. However, these guidelines are designed for the specific needs of local healthcare environments. Again the success rate and outcome of each procedure is directly linked to the degree of placental invasiveness in depth and laterally. Thus the evaluation of the efficacy and safety of a management method depends on the accuracy of the clinical diagnosis and confirmation of the depth of placental invasiveness should be confirmed by adequate pathological examination. Limited data exist from low-income countries, but with cesarean deliveries increasing globally, the prevalence and incidence of PAS disorders are rapidly becoming a global issue and an international approach to this complex obstetric condition is

needed.

The present guidelines were developed by FIGO's Safe Motherhood and Newborn Health Committee. In September 2016, all national member societies of FIGO were contacted by email and asked to appoint one expert with wide knowledge of the scientific literature on PAS disorders, good written and spoken English, and availability to provide prompt written feedback by email. A total of 34 experts were nominated for the consensus panel. Geographical representation of the members of the consensus panel is given in Figure 1.

The process of guideline development and consensus recommendations started in January 2017 and included three rounds for each chapter. Each round started with a draft version of each chapter, which was sent by email to the panel members. Feedback from the panel was received within a timeframe of three weeks. The authors considered all comments and a revised manuscript was produced for the next round. After the three-round process was complete, the members of the panel were asked to read the final version and provide written consent for their name to be included in the panel list for that chapter. The consensus process for the four chapters was concluded in July 2017.

The aim of these consensus guidelines is to improve the diagnosis and management of PAS disorders throughout the world, thus reducing the burden of maternal mortality and long-term sequelae that arise from this

disease.

Conflict of interest

The authors have no conflicts of interest to declare.

References

[1] Irving FC, Hertig AT. A study of placenta accreta. *Surg Gynec Obstet.* 1937;64:178–200.

[2] Benirschke K, Burton GJ, Baergen RN. Pathology of the human placenta. 6th edition. Berlin: Springer-Verlag; 2012.

[3] Luke RK, Sharpe JW, Greene RR. Placenta accreta: The adherent or invasive placenta. *Am J Obstet Gynecol* 1966;95:660–8.

[4] Fox H. Placenta accreta: 1945-1969. Obstet Gynecol Survey 1972;27:475–90.

[5] Solheim KN, Esakoff TF, Little SE, Cheng YW, Sparks TN, Caughey AB. The effect of cesarean delivery rates on the future incidence of placenta previa, placenta accreta, and maternal mortality. J Matern Fetal Neonatal Med. 2011;24:1341–6.

[6] Jauniaux E, Chantraine F, Silver RM, Langhoff-Roos J; for the FIGO Placenta Accreta Diagnosis and Management Expert Consensus Panel. FIGO consensus guidelines on placenta accreta spectrum disorders: Epidemiology. *Int J Gynecol Obstet.* 2018

[7] Jauniaux E, Jurkovic D. Placenta accreta: pathogenesis of a 20th century iatrogenic uterine disease. Placenta. 2012;33:244–51.

[8] Jauniaux E, Grobmann W. Caesarean section: Introduction to the "World's No. 1" Surgical Procedure. In: Jauniaux E, Grobman W, eds. Textbook of Caesarean Section. Oxford: Oxford University Press;2016:1–8.

[9] Jauniaux E, Bhide A, Wright JD. Placenta accreta. In: Gabbe SG, Niebyl JR, Simpson JL, Landon M, Galan H, Jauniaux E, Driscoll DA,

Berghella V, Grobman WA, eds. Obstetrics: Normal and Problem Pregnancies. 7th Ed. Philadelphia: Elsevier; 2016:456–66.

[10] Eller AG, Bennett MA, Sharshiner M, Masheter C, Soisson AP, Dodson M, et al. Maternal morbidity in cases of placenta accreta managed by a multidisciplinary care team compared with standard obstetric care. Obstet Gynecol. 2011;117:331–7.

[11] Chantraine F, Braun T, Gonser M, Henrich W, Tutschek B. Prenatal diagnosis of abnormally invasive placenta reduces maternal peripartum hemorrhage and morbidity. Acta Obstet Gynecol Scand. 2013;92:439–44.

[12] Silver RM, Fox KA, Barton JR, Abuhamad AZ, Simhan H, Huls CK, et al. Center of excellence for placenta accreta. Am J Obstet Gynecol. 2015;212:561–8.

[13] Shamshirsaz AA, Fox KA, Salmanian B, Diaz-Arrastia CR, Lee W, Baker BW, et al. Maternal morbidity in patients with morbidly adherent placenta treated with and without a standardized multidisciplinary approach. Am J Obstet Gynecol. 2015;212:218.e1–9.

[14] Jauniaux E, Bhide A, Kennedy A, Woodward P, Hubinont C, Collins S; for the FIGO Placenta Accreta Diagnosis and Management Expert Consensus Panel. FIGO consensus guidelines on placenta accreta spectrum disorders: Prenatal diagnosis and screening. *Int J Gynecol Obstet*. 2018

[15] Jauniaux E, Collins SL, Jurkovic D, Burton GJ. Accreta placentation: a systematic review of prenatal ultrasound imaging and grading of villous invasiveness. Am J Obstet Gynecol. 2016;215:712–21.

[16] Jauniaux E, Bhide A. Prenatal ultrasound diagnosis and outcome of placenta previa accreta after caesarean delivery: a systematic review and meta-analysis. Am J Obstet Gynecol. 2017;217:27–36.

[17] Jauniaux E, Collins SL, Burton GJ. Placenta accreta spectrum: Pathophysiology and evidence-based anatomy for prenatal ultrasound imaging. *Am J Obstet Gynecol*. 2017. doi: 10.1016/j.ajog.2017.05.067. [Epub ahead of print]. Dec 2017.

[18] Collins SL, Ashcroft A, Braun T, Calda P, Langhoff-Roos J, Morel O, et al. Proposal for standardized ultrasound descriptions of abnormally invasive placenta (AIP). Ultrasound Obstet Gynecol 2016;47:271–5.

[19] Alfirevic Z, Tang A-W, Collins SL, Robson SC, Palacios-Jaraquemada J, Ad-hoc International AIP Expert Group. Pro forma for ultrasound reporting in suspected abnormally invasive placenta (AIP): an international consensus. Ultrasound Obstet Gynecol 2016;47:276–8.

[20] Allen L, Jauniaux E, Hobson S, Paillon-Smith J, Belfort MA; for the FIGO Placenta Accreta Diagnosis and Management Expert Consensus Panel. FIGO consensus guidelines on placenta accreta spectrum disorders: Nonconservative surgical management. *Int J Gynecol Obstet.* 2018

[21] Sentilhes L, Kayem G, Chandraharan E, Palacios-Jaraquemada J, Jauniaux E; for the FIGO Placenta Accreta Diagnosis and Management Expert Consensus Panel. FIGO consensus guidelines on placenta accreta spectrum disorders: Conservative management. Int J Gynecol Obstet. 2018

[22] Committee on Obstetric Practice. Committee opinion no. 529: placenta accreta. Obstet Gynecol. 2012;120:207–11.

[23] Royal College of Obstetricians and Gynaecologists. Placenta praevia, placenta praevia accreta and vasa praevia: diagnosis and management. Green–top guideline No.27. London: RCOG; 2017.

Figure 1. Geographical representation of the members of the Consensus Panel.