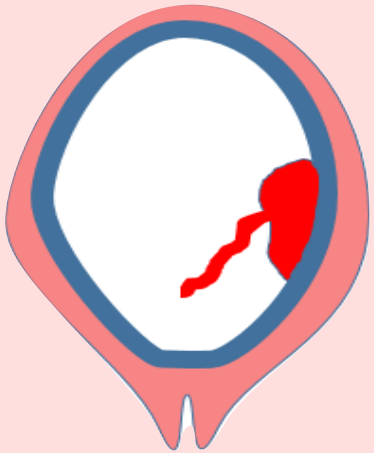
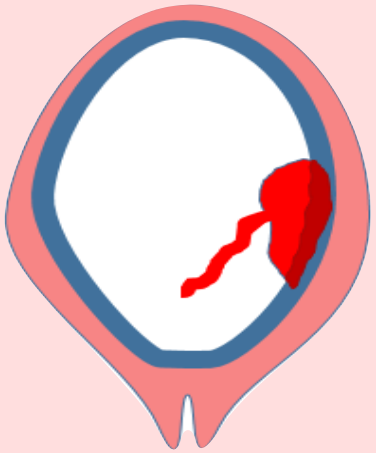
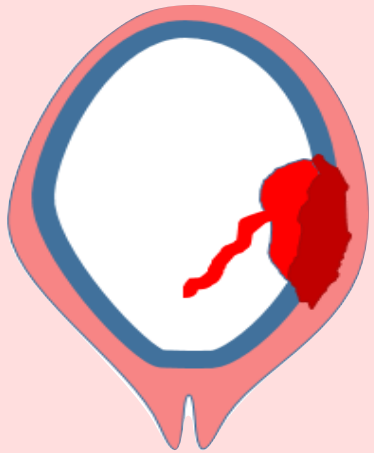


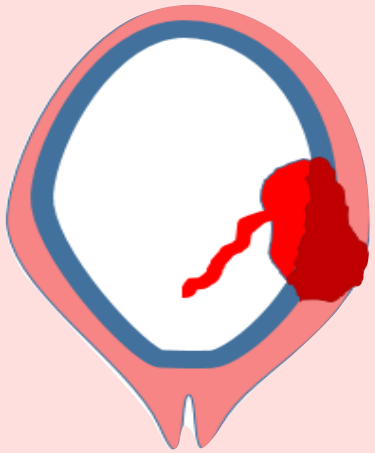
Normal placentation



Placenta Accreta



Placenta Increta



Placenta Percreta

Placenta Accreta Spectrum

Presenter: PGY2 顏廷聿

Supervision: 葉長青醫師

Date: 2022/07/01

OUTLINE

1. Introduction

2. Searching for placenta percreta: a prospective cohort and systematic review of case report.

3. **New insights into the etiopathology of placenta accreta spectrum**

4. Prospective evaluation of impact of post-cesarean section uterine scarring in perinatal diagnosis of placenta accreta spectrum disorder

Introduction

Placenta Accreta Spectrum (PAS)

Normal vs. Placenta Accreta Spectrum (PAS)

NORMAL PREGNANCY

The placenta attaches to a temporary layer in the uterus that's shed at delivery

PLACENTA ACCRETA

When the placenta attaches too deeply into the uterine wall

PLACENTA INCRETA

When the placenta attaches into the uterine muscle

PLACENTA PERCRETA

When the placenta goes completely through the uterine wall, sometimes invading nearby organs like the bladder

Classic diagnostic criteria

- **Forster 1927:** First documented case of placenta accreta
- Histological examination
  "**absence of the decidua** with **direct contact of the villi** with the uterine musculature "
- **Irvin, Hertig 1937**: Case series of 18 case
  difficulties in delivering the placenta requiring a hysterectomy in 16 cases and, in all cases, **absent decidua with direct attachment of the villous tissue to the superficial myometrium** on **microscopic** examination.

Traditional concept: Invasive placentation

- Luke et al, 1966: **Invasive placentation**
  "describe placenta increta where the villi are implanted deep in the myometrium without intervening decidua. "
- In their study of 18 cases, the authors commented on placenta percreta, but **provided no histologic evidence**
- Before 1966, only invasive hadatidiform mole were describe with "villous invasion"
- With no further evidence of villous tissue truly invading the uterine wall in accreta placentation , the term were kept.

Placenta percreta?

- Reporting of placenta percreta in the literature is mostly based on the **gross findings of hysterectomy specimens** presenting with villous tissue having penetrated through the entire uterine wall
- Most authors of PAS cohort **series do not provide complete information on gross and microscopic findings**, such as a cross-sectional gross image of the area of uterine penetration

Modern histopathologic

- Modern histopathologic cohort studies
  -> **different grades of villous invasion can coexist**
- Heterogenous histologic criteria reported for percreta
  - Injury, remodeling of the underlying uterine wall, extension of the trophoblastic cells into tissues other than the uterine smooth muscle

- FIGO has recently proposed a **new classification for the diagnosis and grading of PAS,** includes **clinical criteria** **at delivery** confirmed by **histopathologic findings** **of villous adherence or invasiveness**.

Aim

- Investigate hypothesis of PAS
- Share new insight of etiopathology of PAS
- Evaluate prospectively the effectiveness of ultrasound protocols in the prenatal diagnosis and postnatal examination of women presenting with PAS

Original Research ajog.org

OBSTETRICS

Searching for placenta percreta: a prospective cohort and systematic review of case reports

Eric Jauniaux, MD, PhD, FRCOG; Jonathan L. Hecht, MD; Rasha A. Elbarmelgy, MD; Rana M. Elbarmelgy, MD; Mohamed M. Thabet, MD; Ahmed M. Hussein, MD

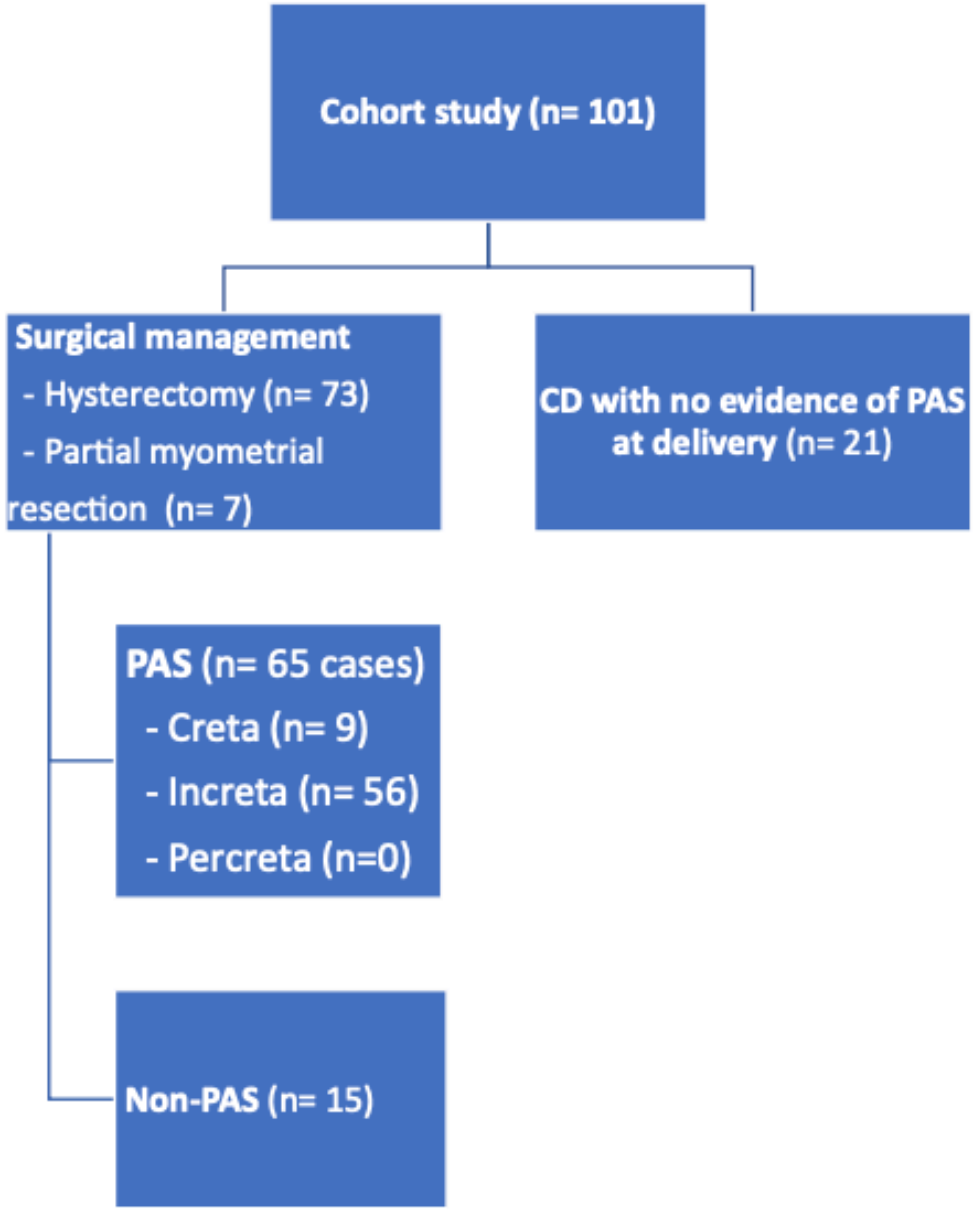
Study aim

- Hypothesis that placenta percreta,
  → a heterogeneous category with most cases **owing to primary or secondary uterine abnormality** rather than an abnormally invasive form of placentation.

Study design

- Prospective cohort study: evaluated **between the intraoperative findings using the FIGO classification** with the **postoperative histopathology diagnosis.**
- Systematic literature review of case reports of placenta percreta, which included histopathologic findings and gross images.

Result


Cohort study (n= 101)
Surgical management
- Hysterectomy (n= 73)
- Partial myometrial resection (n= 7)
CD with no evidence of PAS at delivery (n= 21)
PAS (n= 65 cases)
- Creta (n= 9)
- Increta (n= 56)
- Percreta (n=0)
Non-PAS (n= 15)

Result

- **Systematic literature review identified 41 case reports** of placenta percreta with microscopic images and presenting symptomatology, suggesting that **most cases were the consequence of a uterine rupture.**
- Placenta percreta in the literature found no histopathologic evidence of transmural villous tissue invasion into the uterine serosa and/or pelvis.

Conclusion

- **Placenta accreta is not an invasive disorder of placentation** but the consequence of post- operative **surgical remodeling or a preexisting uterine pathology**
- Found **no histologic evidence supporting the existence of a condition where the villous tissue penetrates the entire uterine wall**.

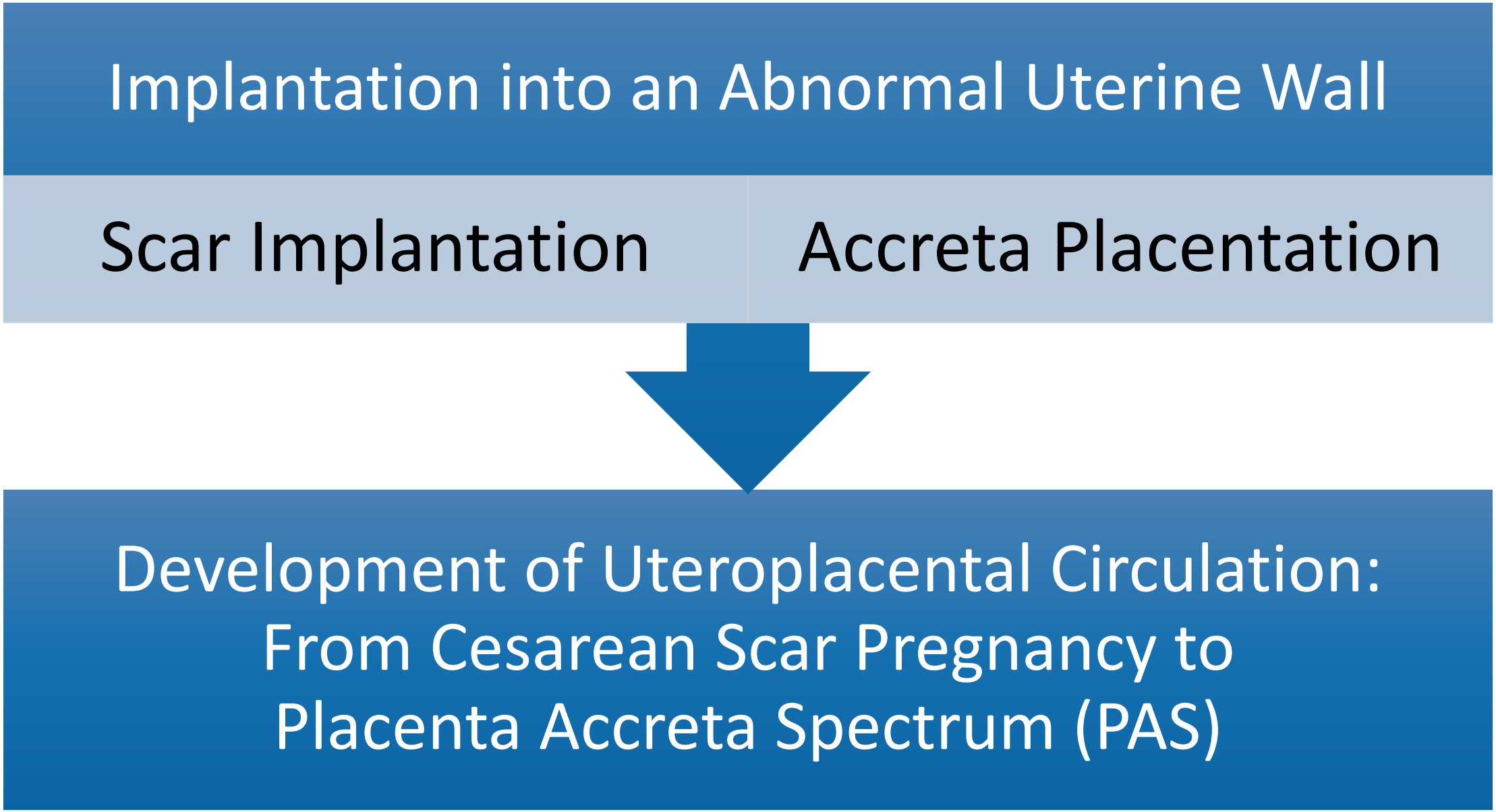
Expert Review ajog.org

New insights into the etiopathology of placenta accreta spectrum

Eric Jauniaux, MD, PhD, FRCOG; Davor Jurkovic, PhD, FRCOG; Ahmed M. Hussein, MD; Graham J. Burton, MD, DSc

Objectives

- New evidence-based data challenge the concept of “invasive placentation”
- Review of evidence on description and impact on the epidemiology, diagnosis, and management of PAS


Implantation into an Abnormal Uterine Wall
Scar Implantation
Accreta Placentation
Development of Uteroplacental Circulation:
From Cesarean Scar Pregnancy to
Placenta Accreta Spectrum (PAS)

Implantation into abnormal uterine wall

- The **rise in cesarean delivery (CD) rates** has been the **main drive** in the **increase in PAS prevalence** for the last 3 decades
- CD rates: 1 in 30,000 (1920s) -> 1 in 272 (2016)
- Recent systematic review and meta-analysis(29 articles between 1988 and 2015) → pooled prevalence of PAS of 0.17%
- Studies that include histopathology data, the pooled prevalence of PAS is 0.5% (1 in 2197)
- CD → the main predisposing factor of placenta previa and PAS

Scar implantation

- Uterine myometrium scarification: **deposit of collagen and fibrin** around the surgical incision, myofiber disarray, tissue edema, inflammation, and elastosis
- Lower uterine segment : **fewer myofibers** and more elastic connective tissue than the upper segment
  → more vulnerable to the development of cesarean scar defect
- The larger and deeper the defect, the more likely that the blastocysts would implant there.

- Cervical D&C → advanced into the myometrium during curettage
  → causing **permanent myometrial defects** and scarring
  → facilitate implantation of blastocysts into the myometrium
  → PAS and antepartum uterine rupture

- Myomectomy → large and deep uterine scar, but only 9 cases of myomectomy scar pregnancies were reported .
  → data indicate that the repair of an upper segment surgical scar where the myometrium is thicker and **made of a denser layer of myocytes than in the lower segment** is rarely associated with a major wall defect, reducing the risk of scar implantation.

Accreta Placentation

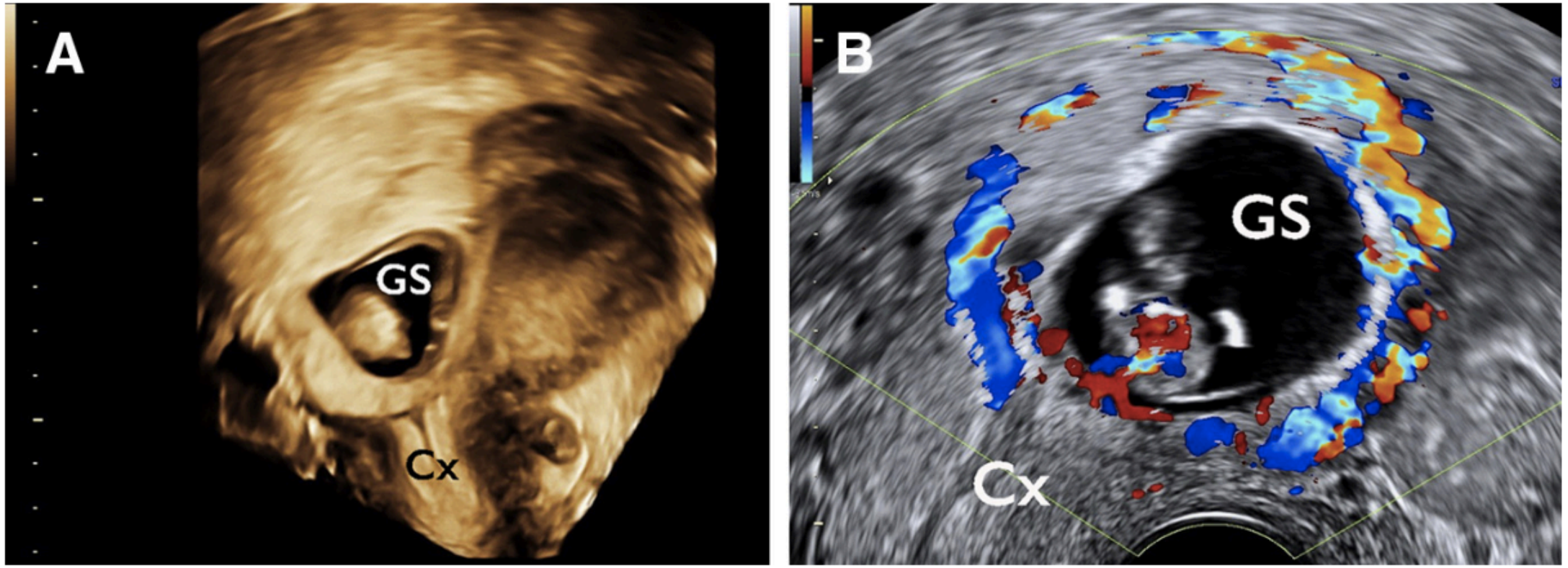
- Normal placentation: **extravillous trophoblast (EVT)**
- EVTs migrate down the spiral arteries, and through the endometrial stroma to the inner third of the myometrium or junctional zone (JZ)
- Accreta placentation has been characterized by EVT cells migrating deeper and in larger numbers into the uterine wall
- This “deep” EVT migration, reaching the peripheral uterine circulation and covering serosa, has been misinterpreted for decades as histologic evidence for invasive placentation

- Several studies suggested that the presence of EVT cells close to the uterine surface is due to **the loss of the subdecidual myometrium** in the scar area and the mechanisms that control the physiological EVT migration;
- however, it **does not indicate that the EVT cells or the villous tissue are abnormally invasive** in any of the stages of accreta placentation.

Development of Uteroplacental Circulation: From CSP to PAS

- In CSPs that develop into PAS, there is a major increase in the **uteroplacental and intervillous circulations** with advancing gestation within and around the accreta area
- Flow velocities increase with advancing gestation
- Continuous high-pressure arterial inflows
  → progressive **development of placental lacunae**
  → progressive **accumulation of fibrinoid** onto the basal plate at the level of the Rohr layer, where the villous population is dense

FIGURE 2
Transvaginal ultrasound views of a cesarean scar pregnancy at 11 weeks

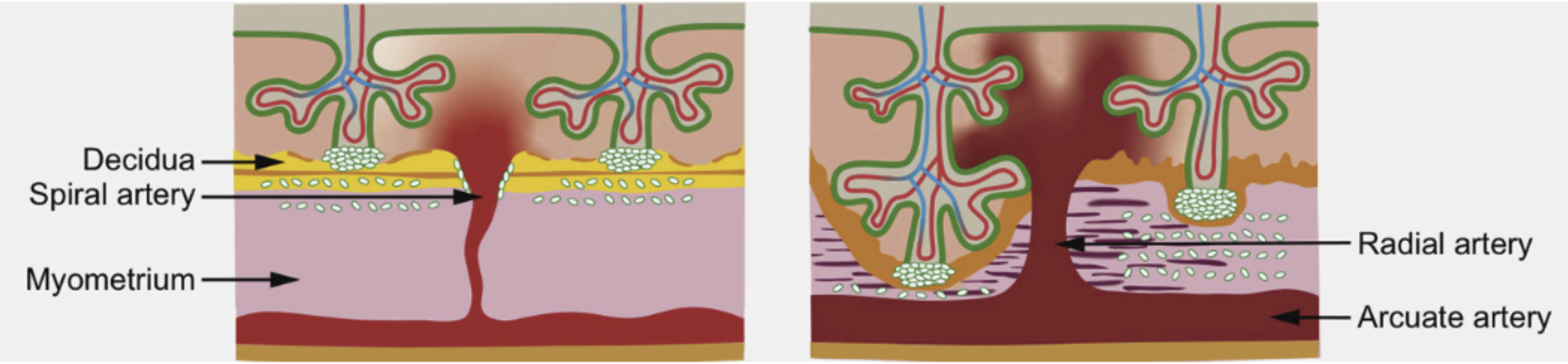


A, 3-dimensional view of the gestational sac (GS) above the cervix (Cx). **B,** CDI view showing increased hypervascularity around the gestational sac.

Jauniaux. Etiopathology of accreta placentation. Am J Obstet Gynecol 2022.

FIGURE 4

Diagram of uteroplacental interface in the third trimester of pregnancy



Conclusion

- **No evidence of a primary trophoblastic anomaly** in any of the different development stages of PAS, unlike those observed in hydatidiform moles.
- PAS is a congenital placental disorder **secondary to the permanent remodeling of the uterine wall**, which essentially occurs after surgery of the lower segment
- The **failure of normal decidualization** and **loss of the normal subdecidual myometrium layers** and/or **their replacement by scar tissue** brings the anchoring villi close to the surface of the uterus in the scar area

- **The loss of the factors that regulate the EVT cells** migration allows them to reach the uterine serosa and the large maternal arteries in the periphery of the uterus and contribute to their transformation as they would form the spiral arteries in an intact myometrium
- **Accreta placentation is not invasive**, the villous tissue does not cross the uterine serosa, and the abnormal attachment of the placenta is **secondary to distortion of the uteroplacental interface by excessive fibrinoid deposition.**

- These histologic changes, the development of intervillous lacunae, immunohistochemical findings, associated with PAS are probably **secondary to high-volume high-velocity blood flowing from the abnormally dilated deep arterial uterine circulation** during the second half of pregnancy.

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Prospective evaluation of impact of post-Cesarean section uterine scarring in perinatal diagnosis of placenta accreta spectrum disorder

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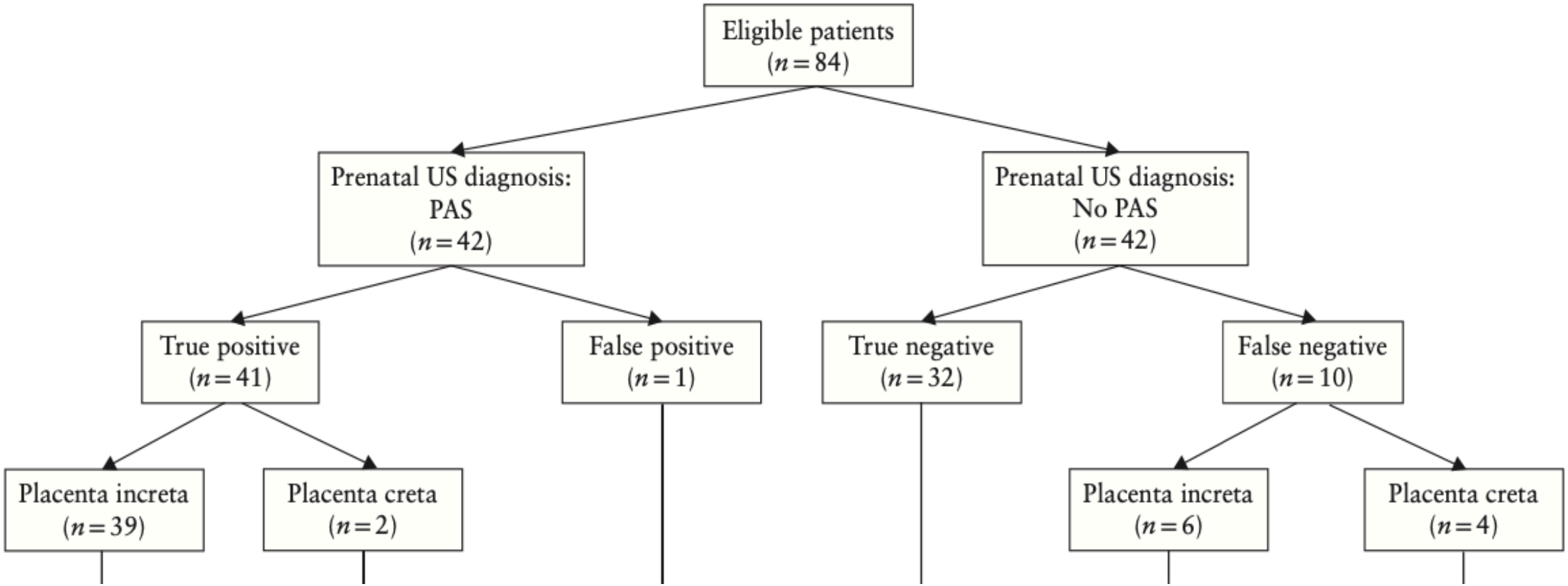
Aim

- Evaluate prospectively the **effectiveness of ultrasound standardized protocols** in the prenatal diagnosis and postnatal examination of women presenting with a low-lying placenta or placenta previa and a history of multiple Cesarean deliveries (CDs)

- Cohort study of 84 case with a history of ≥ 2 prior CDs presenting with a singleton pregnancy and low-lying placenta/placenta previa at 32 – 37 weeks' gestation
- All women were investigated using the standardized description of ultrasound signs of PAS proposed by the European Working Group
- The ultrasound features were compared with intraoperative and histopathological findings.
- Compare subgroup of 32 non-PAS with those of 39 PAS of ultrasound findings.

Result


Eligible patients
(n = 84)
Prenatal US diagnosis:
PAS
(n = 42)
Prenatal US diagnosis:
No PAS
(n = 42)
True positive
(n = 41)
False positive
(n = 1)
True negative
(n = 32)
False negative
(n = 10)
Placenta increta
(n = 39)
Placenta creta
(n = 2)
Placenta increta
(n = 6)
Placenta creta
(n = 4)

PAS ultrasound findings

- Compared with the non-PAS subgroup, the PAS subgroup showed
- Higher placental lacunae
- Hypervascularity of the uterovesical/subplacental area
- Presence of bridging vessels
- Presence of lacunae feeder vessels
- Increased vascularization of the anterior uterine wall intraoperatively

Conclusion

- Remodeling of the lower uterine segment following CD scarring leads to structural abnormalities of the uterine contour on both ultrasound examination and intraoperatively**, independently of the presence of accreta villous tissue on microscopic examination**.
- These anatomical changes are often reported as diagnostic of placenta percreta, including cases with no histological evidence of PAS.
- Guided histological examination could improve the overall diagnosis of PAS and is essential to obtain evidence-based epidemiologic data.

Summary

- Placenta accreta is not an invasive disorder of placentation but the consequence of post- operative surgical remodeling or a preexisting uterine pathology
- Failure of normal decidualization, loss of the factors that regulate the EVT cells migration, distortion of the uteroplacental interface by excessive fibrinoid deposition, high-volume high-velocity blood flowing may serve as the etiopathology of PAS.
- Prenatal ultrasound signs validated by standardized clinical and histopathological protocols, including detailed guided sampling for microscopic examination, allow for accurate perinatal diagnosis of placenta accreta spectrum.

Reference

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Thank you for listening!

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