《熱血仁醫》搶救血崩產婦 許德耀擋住鬼門關

高雄長庚醫院婦產部副部長許德耀行醫廿多年，經常從鬼門關把產後大血崩的媽媽搶救回來。（記者方志賢攝）

2012/09/17 06:00

The Epidemiology of Postpartum Hemorrhage in a Nationwide Sample

Table 1. The Rate of Postpartum Hemorrhage and Postpartum Hemorrhage by Underlying Etiology in 2004

	ICD-9 codes	*n* (%)
Total deliveries	V27.x, 650, DRG 370–375	876,641
Postpartum hemorrhage		
All causes	666.x	25,654 (2.93)
Uterine atony	666.1	20,353 (2.32)
Retained placenta (including accreta)	666.0	2466 (0.28)
Delayed (more than 24 h after delivery)	666.2	2007 (0.23)
Coagulopathy	666.3	1349 (0.15)
Resulting in transfusion	666.x and transfusion procedure codes	2312 (0.26)
Resulting in hysterectomy	666.x and hysterectomy procedure codes	529 (0.06)
Atony resulting in transfusion	666.1 and transfusion procedure codes	1634 (0.19)
Atony resulting in hysterectomy	666.1 and hysterectomy procedure codes	265 (0.03)

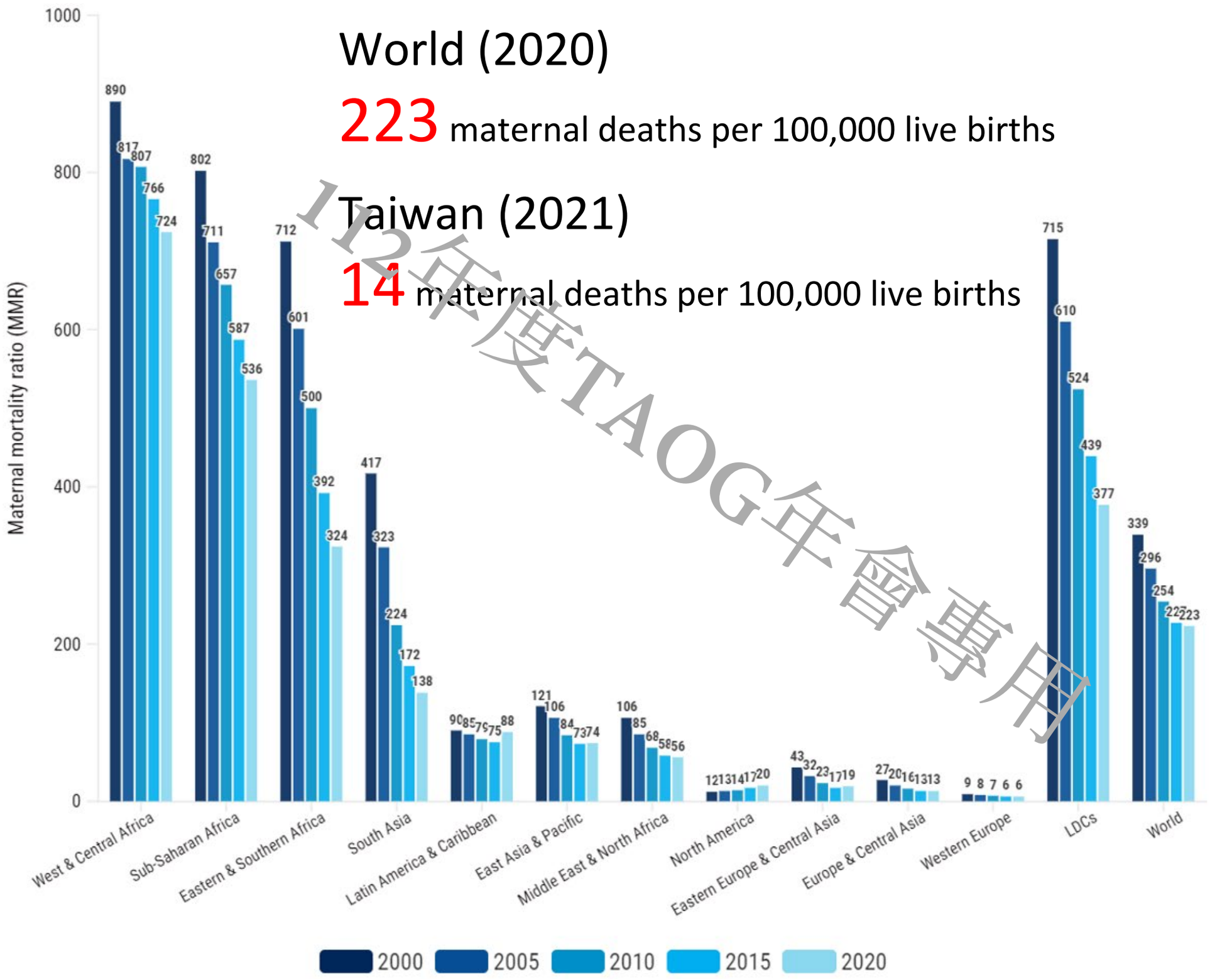
Maternal mortality ratio (MMR) trends by region

World (2020)

223 maternal deaths per 100,000 live births

Taiwan (2021)

14 maternal deaths per 100,000 live births



Source: World Health Organization, UNICEF, United Nations Population Fund and The World Bank, Trends in Maternal Mortality: 2000 to 2020 WHO, Geneva, 2023.
Notes: Maternal mortality ratio (MMR) is the ratio of the number of maternal deaths per 100,000 live births.

台灣孕產婦死亡率

2022年孕婦死亡人數除以活產率

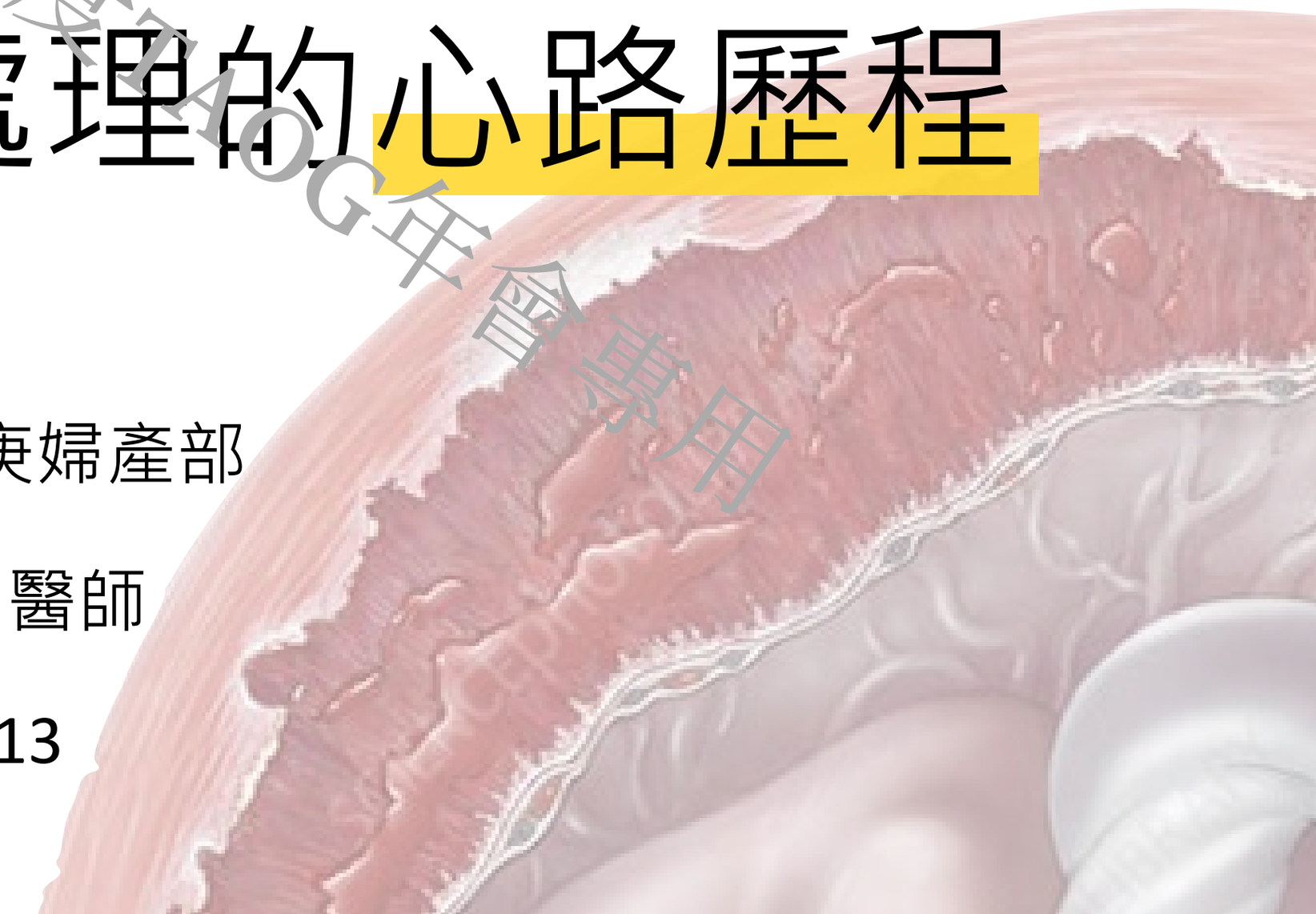
估算孕產婦死亡率已逼近10萬分之20

製圖：鄭博仁

Reduce Obstetric Pulmonary Embolism (ROPE)

學會也發起 ROPE，避免產後靜脈栓塞及肺栓塞計劃

植入性胎盤產前與產後出血處理的心路歷程



高雄長庚婦產部

許德耀 醫師

2023/08/13

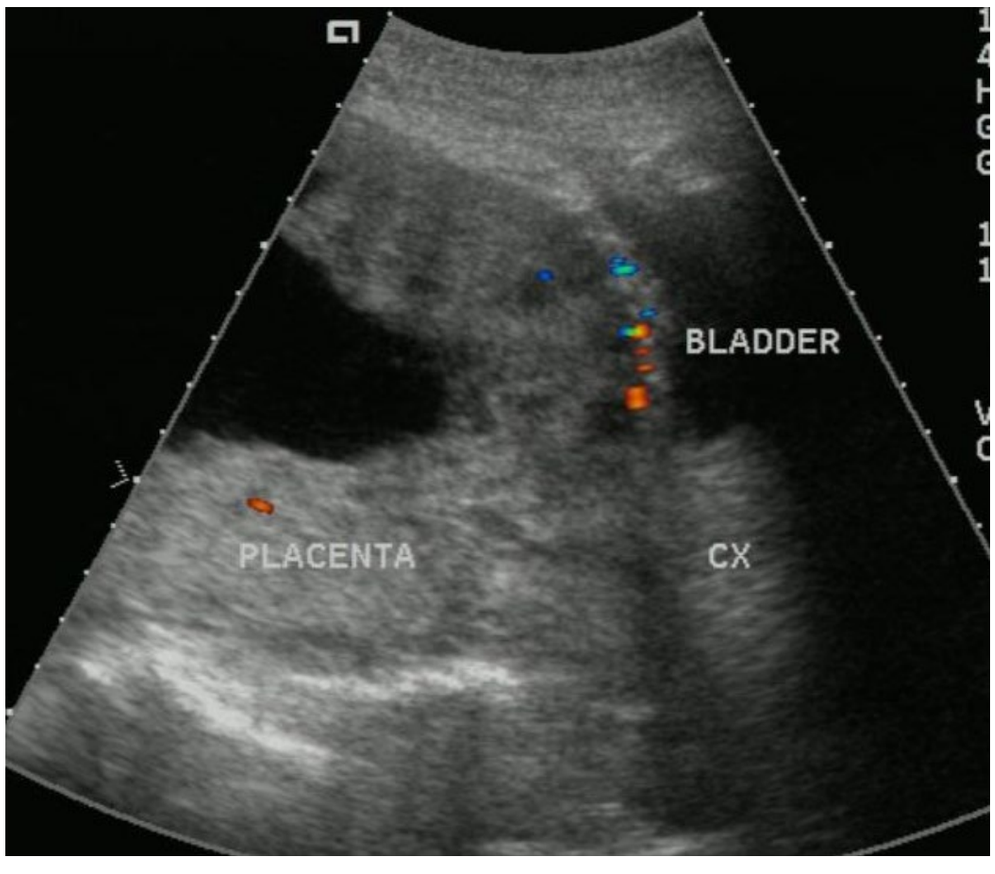
故事要從11年前講起

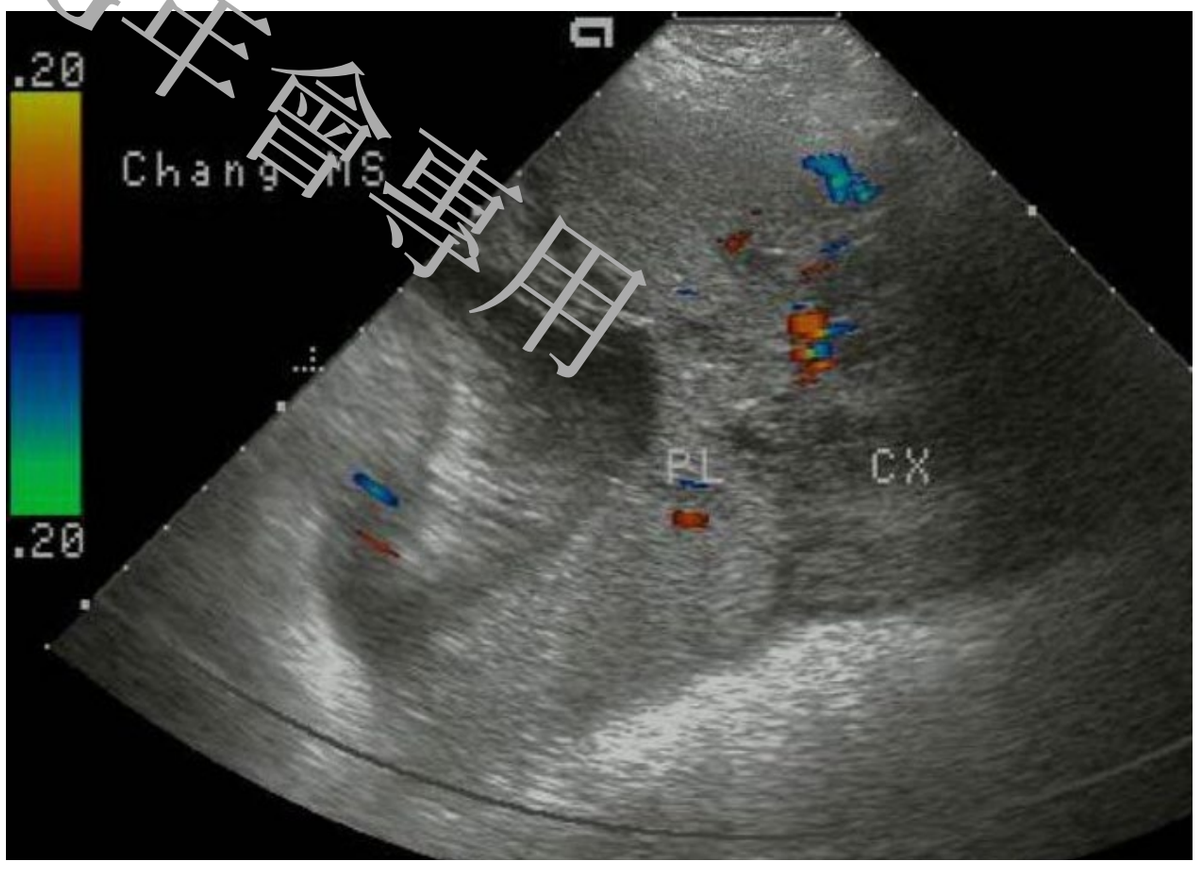
33 y/o, G3P1(C/S)A1

Placental previa totalis noted at GA 27 weeks

Massive vaginal bleeding at GA 38 weeks

Arrange emergent CS





Outcome for accreta

Journal of *Clinical Medicine*

MDPI

Article

Prophylactic Transcatheter Arterial Embolization Helps Intraoperative Hemorrhagic Control for REMOVING Invasive Placenta

Kun-Long Huang [1,†], Ching-Chang Tsai [1,†], Hung-Chun Fu [1], Hsin-Hsin Cheng [1], Yun-Ju Lai [1], Hsuan-Ning Hung [1], Leo Leung-Chit Tsang [2] and Te-Yao Hsu [1,*]

- This **retrospective** study was conducted on 17 pregnant women diagnosed with abnormal placentation in 2001–2018 in our hospital

	Prophylactic TAE group	Control group
n	11	6
Intervention	Bilateral uterine artery and/or bilateral internal iliac artery	NIL
Placenta	Both Removed	

Outcome for accreta

Prophylatic TAE 出血量少！

Table 2. Primary outcomes.

Characteristic [a]	Prophylactic TAE group (N = 11)	Non-Prophylactic TAE group (N = 6)	p Value
Estimated blood loss (mL)	990.9 ± 701.7	3448.3 ± 1767.4	0.018 *
Accreta (mL)	1055.0 ± 704.9	2133.3 ± 862.2	0.048 *
Units of pRBC transfusion	2.9 ± 2.1	6.3 ± 6.9	0.536
Operative time (min)	114.6 ± 21.3 [b]	148.8 ± 81.9	0.725
Hysterectomy	1(9.1%)	2(33.3%)	0.515
Transfer to ICU	3(27.3%)	2(33.3%)	1.000
Hospitalization days [c]	7.9 ± 3.3	7.8 ± 3.3	0.913

[a] Values are presented as mean ± SD, or number (%).[b] Prophylactic TAE and cesarean section in prophylactic TAE group. [c] Postoperative hospitalization. pRBC: packed red blood cell, ICU: intensive care unit. * $p < 0.05$

Table 3. Secondary outcome.

Maternal Complications [a]	Prophylactic TAE Group (N = 11)	Non-Prophylactic TAE Group (N = 6)	p Value
Total	2(20%)	2(33.3%)	0.604
Maternal pulmonary edema	1	0	
Postpartum hemorrhage	1	2	

[a] Values are presented as number (%)

關於placenta accreta spectrum

產前診斷的重要！

Echo? MRI? 準確性

產前出血vs產前沒出血

Echo, MRI 哪些sign?

病人安全與生育

處理的方向？

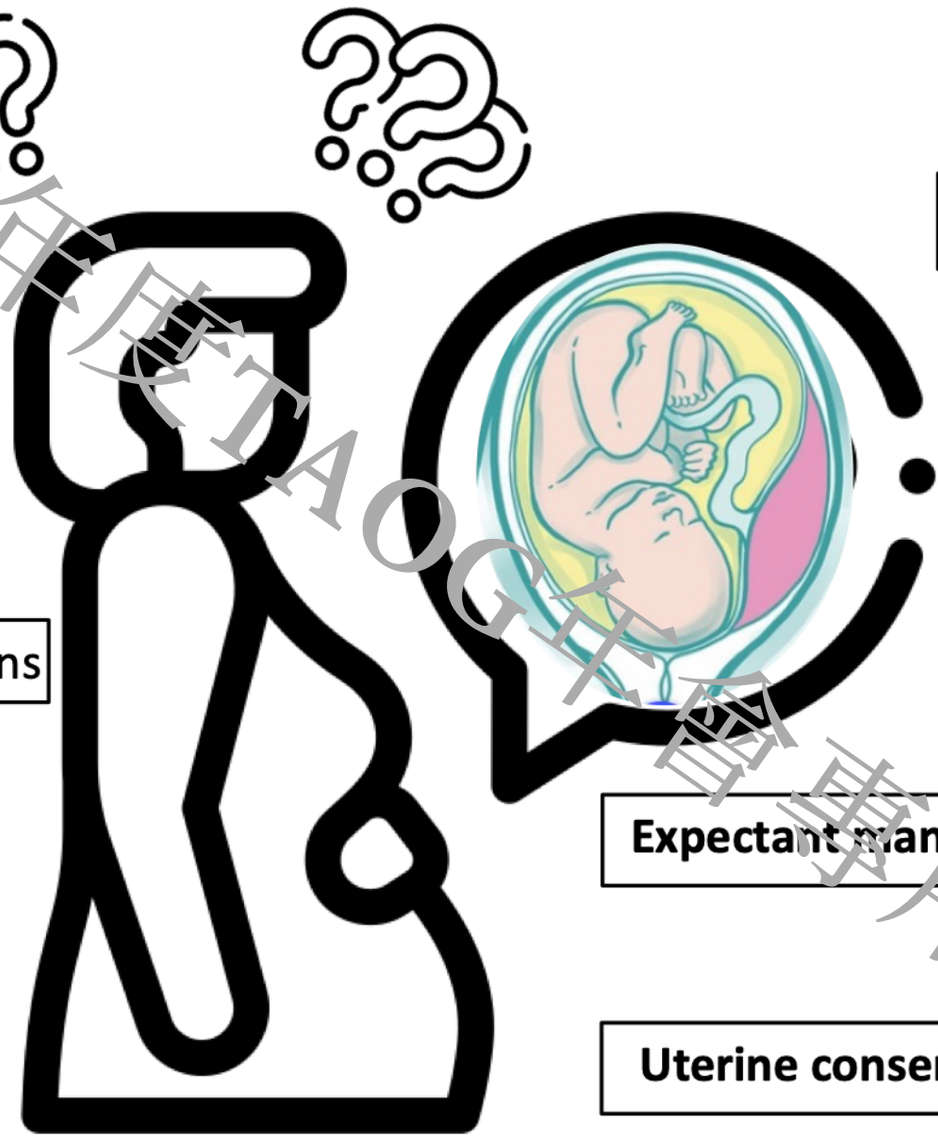
Multidisciplinary team approach

Scheduled delivery

Prophylactic endovascular interventions

Thromboembolism prophylaxis

Use of ureteral stents
for reducing urologic complications



Cesarean hysterectomy

Delayed-interval hysterectomy

Expectant management (placenta is left in situ)

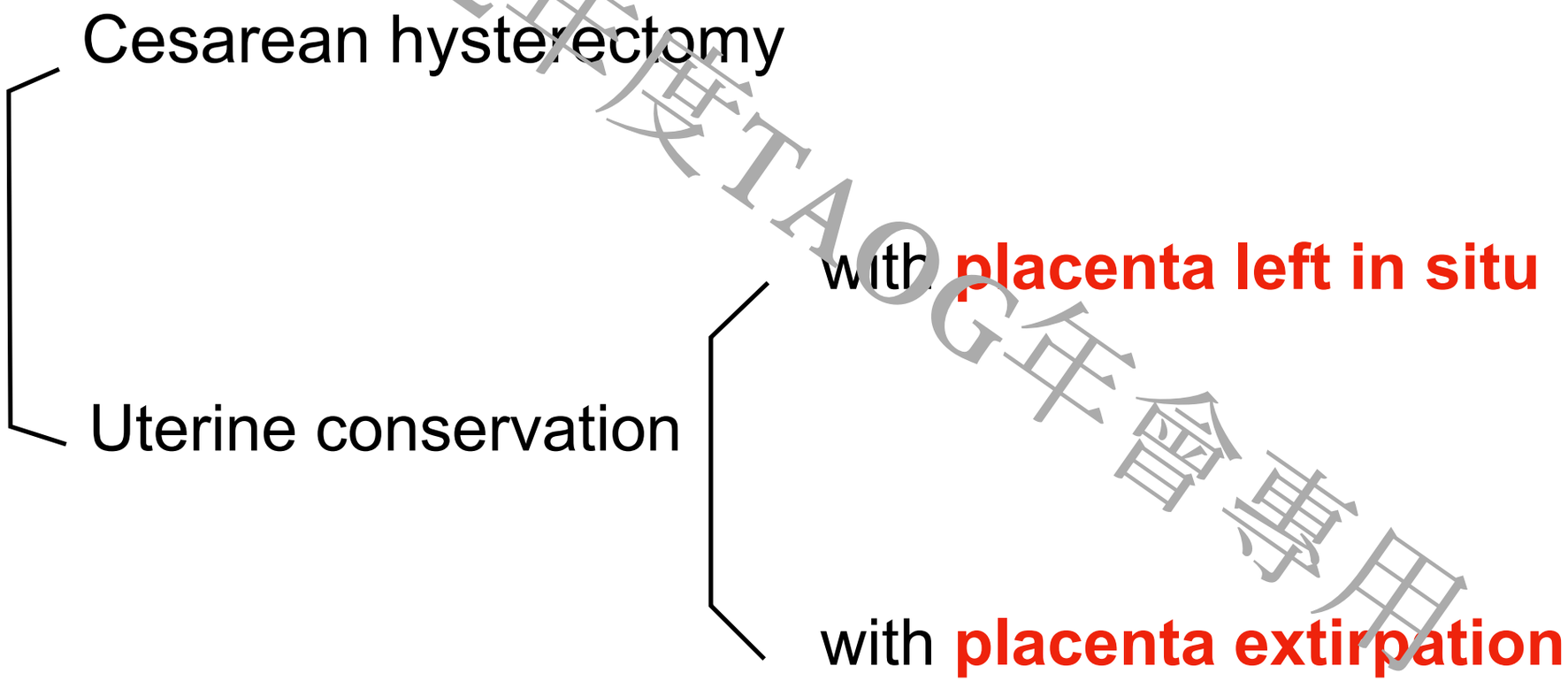
Uterine conservation with placental resection

Management varies widely

- Appropriate timing of delivery：34 0/7 ~ 35 6/7 weeks of gestation

Obstet Gynecol. 2018 Dec;132(6):e259-e275

- No standard surgical method



Outline

- **4 cases with placenta accreta spectrum after conservative management**
  - Case 1: placenta accreta, post placenta extirpation
  - Case 2: without postpartum surgical intervention
  - Case 3: following postpartum surgical evacuation
  - Case 4: following postpartum delayed hysterectomy
- **Placenta accreta spectrum**
- **Demonstrate the management of PAS in KCGMH**

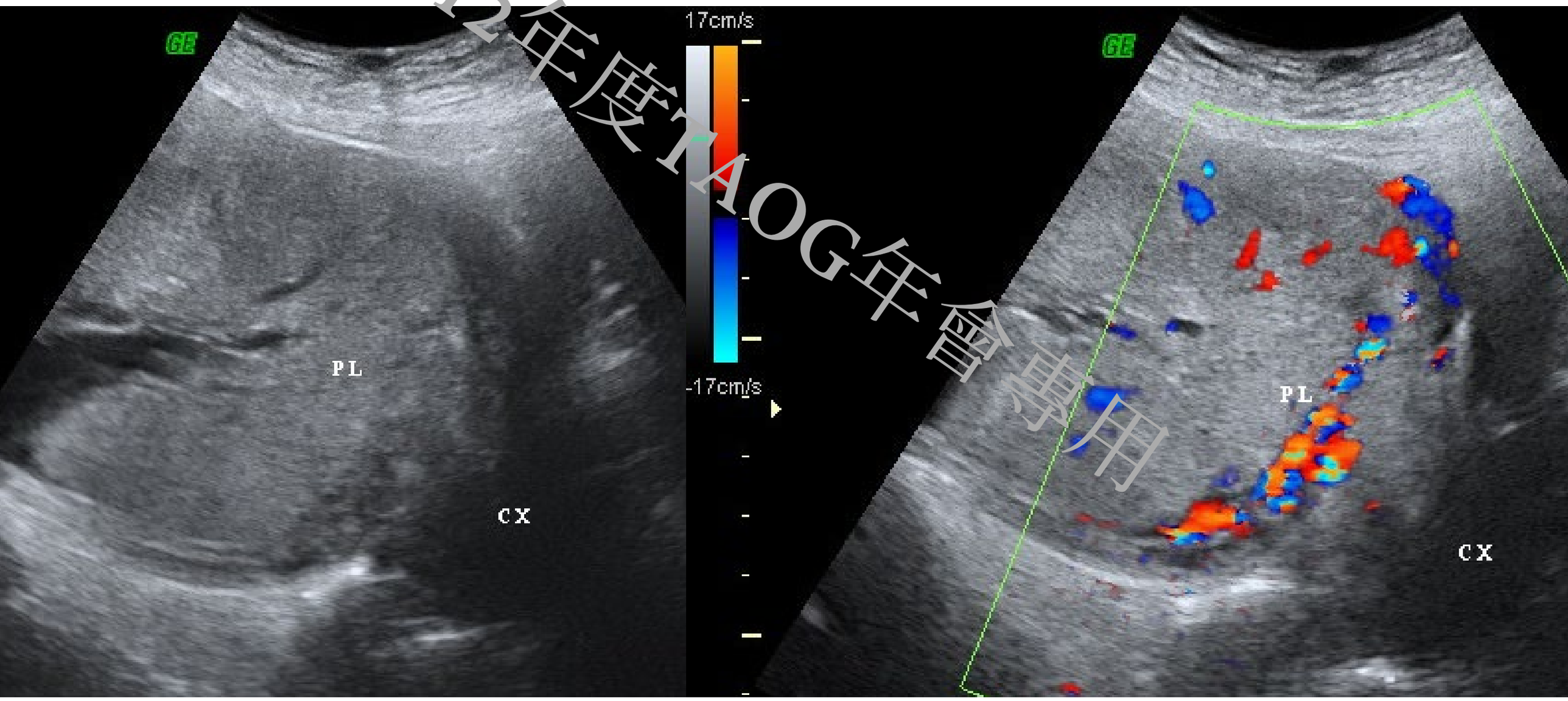
Case 1

- 32 y/o, G3**P1(C/S)**SA1, natural pregnancy, no systemic disease
- Prenatal exams: WNL (GDM(-), PIH(-))

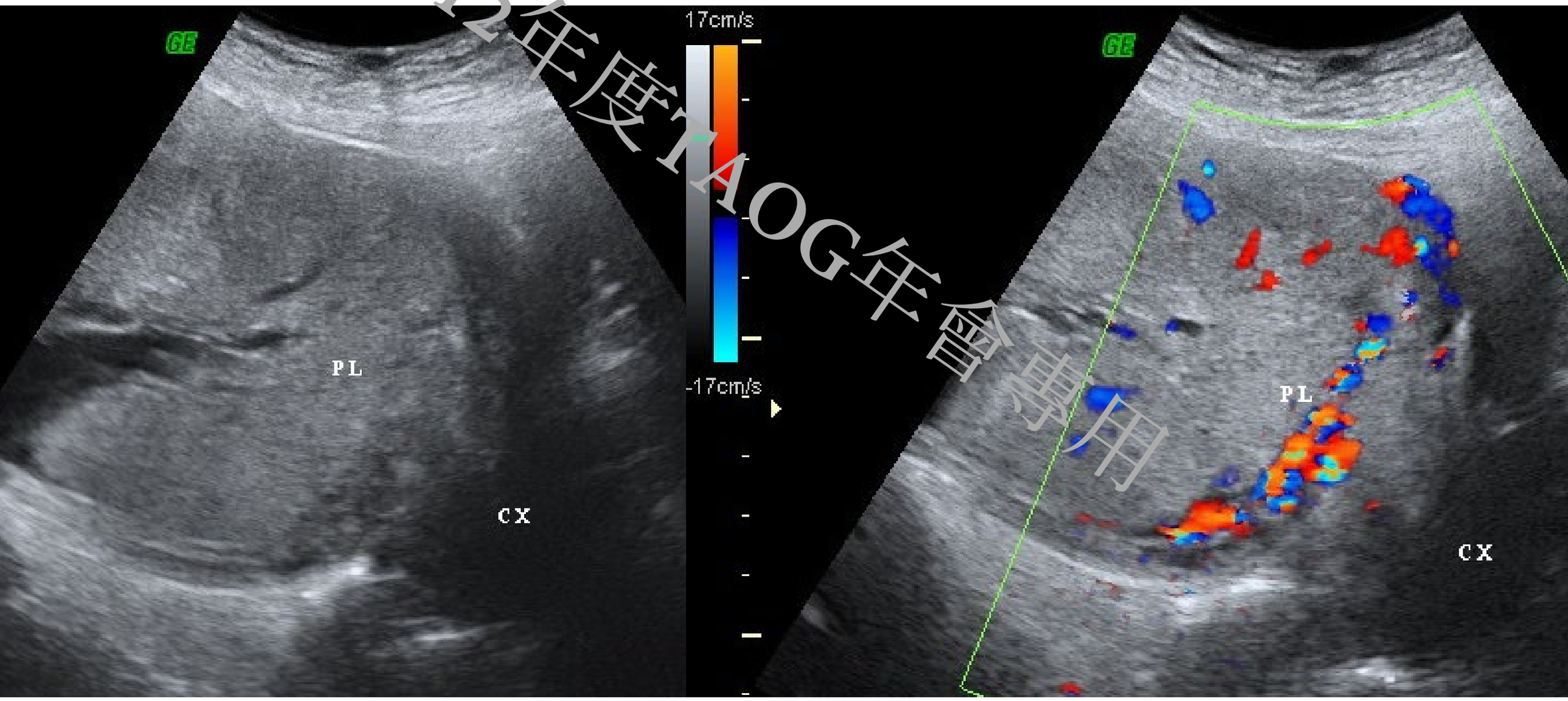
2015 8/24 — GA 29 weeks referred for suspect placenta accreta

Ultrasound

怎麼判讀這2張超音波？

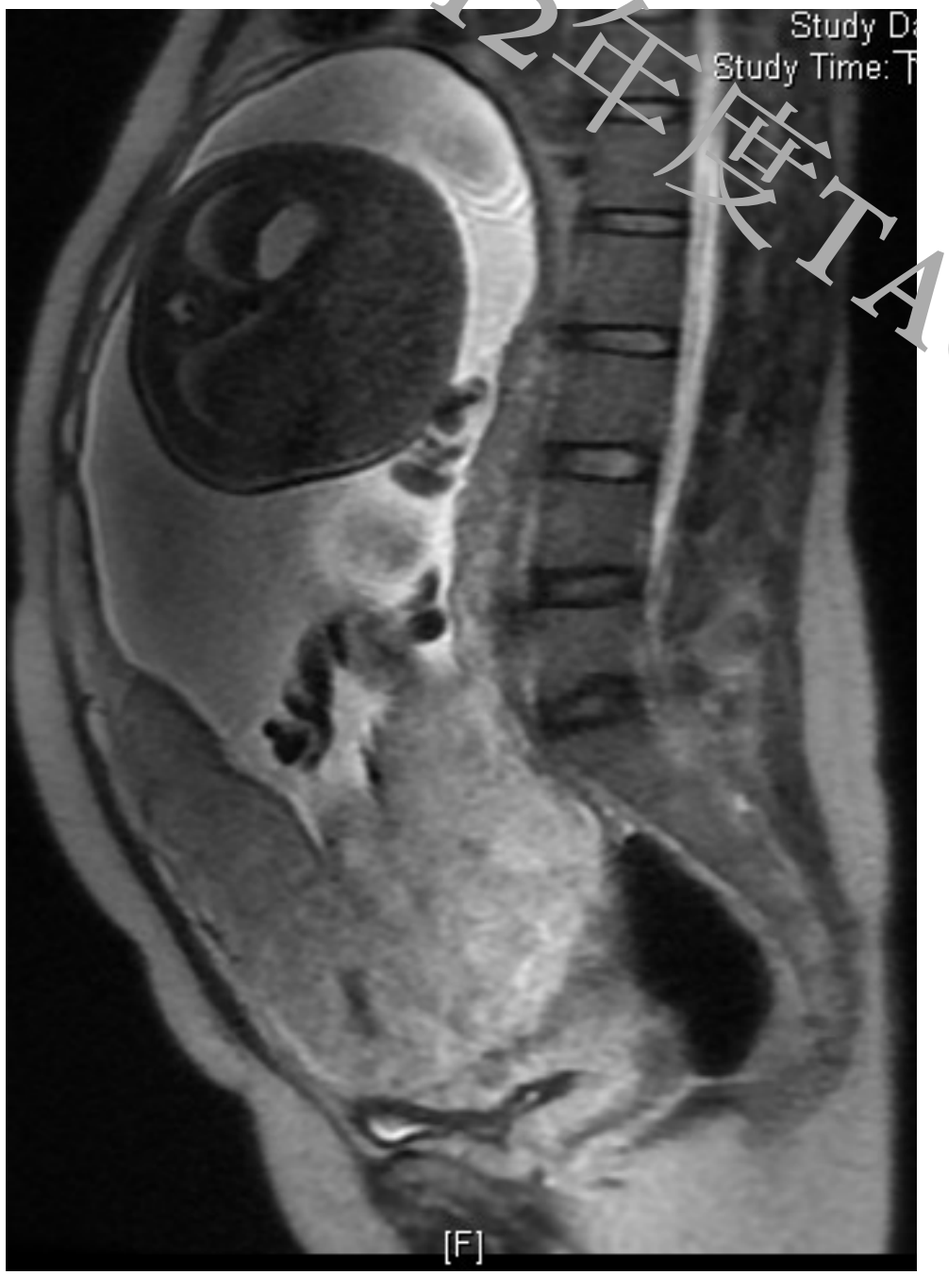


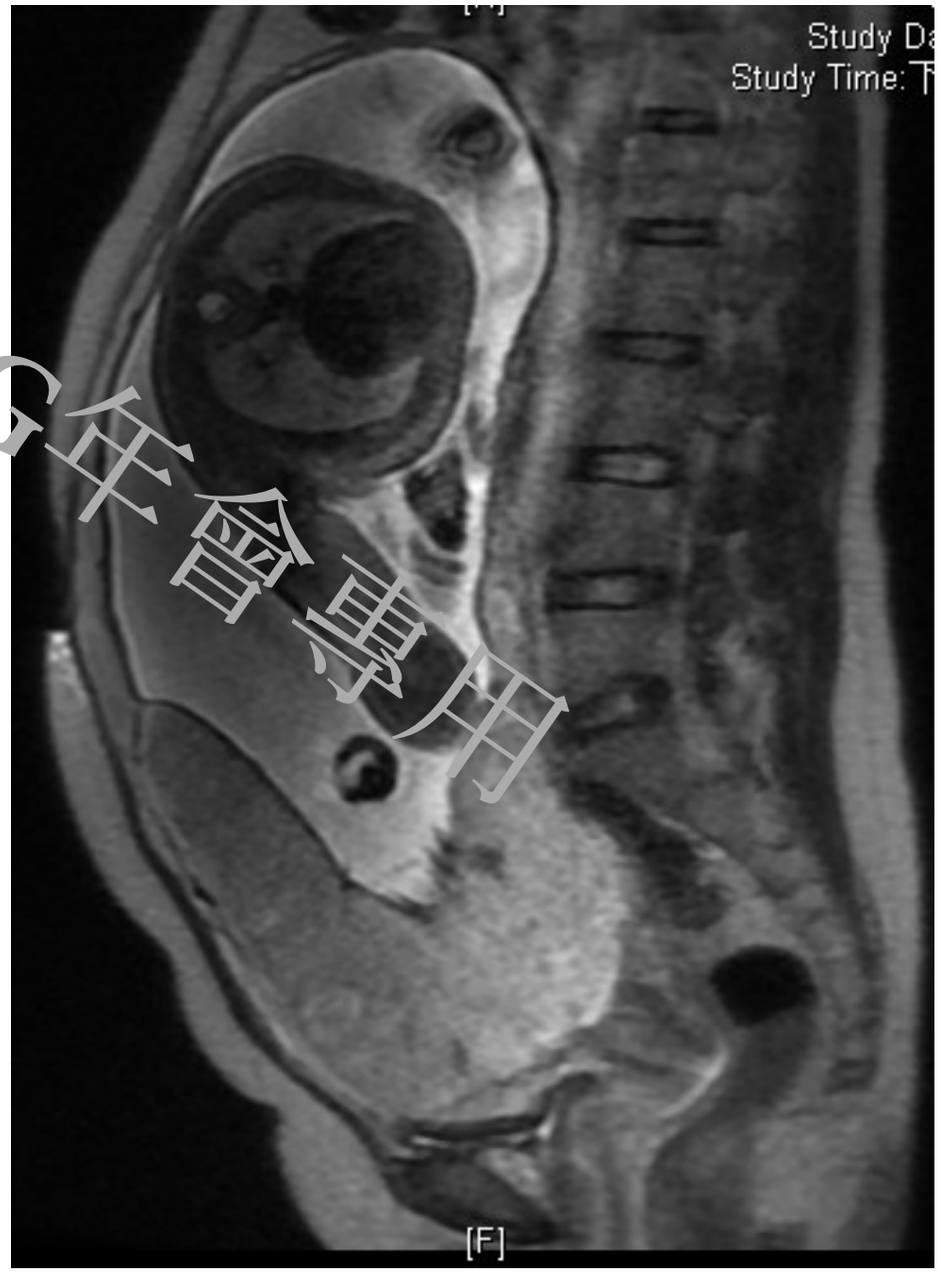
Suspect placenta accreta



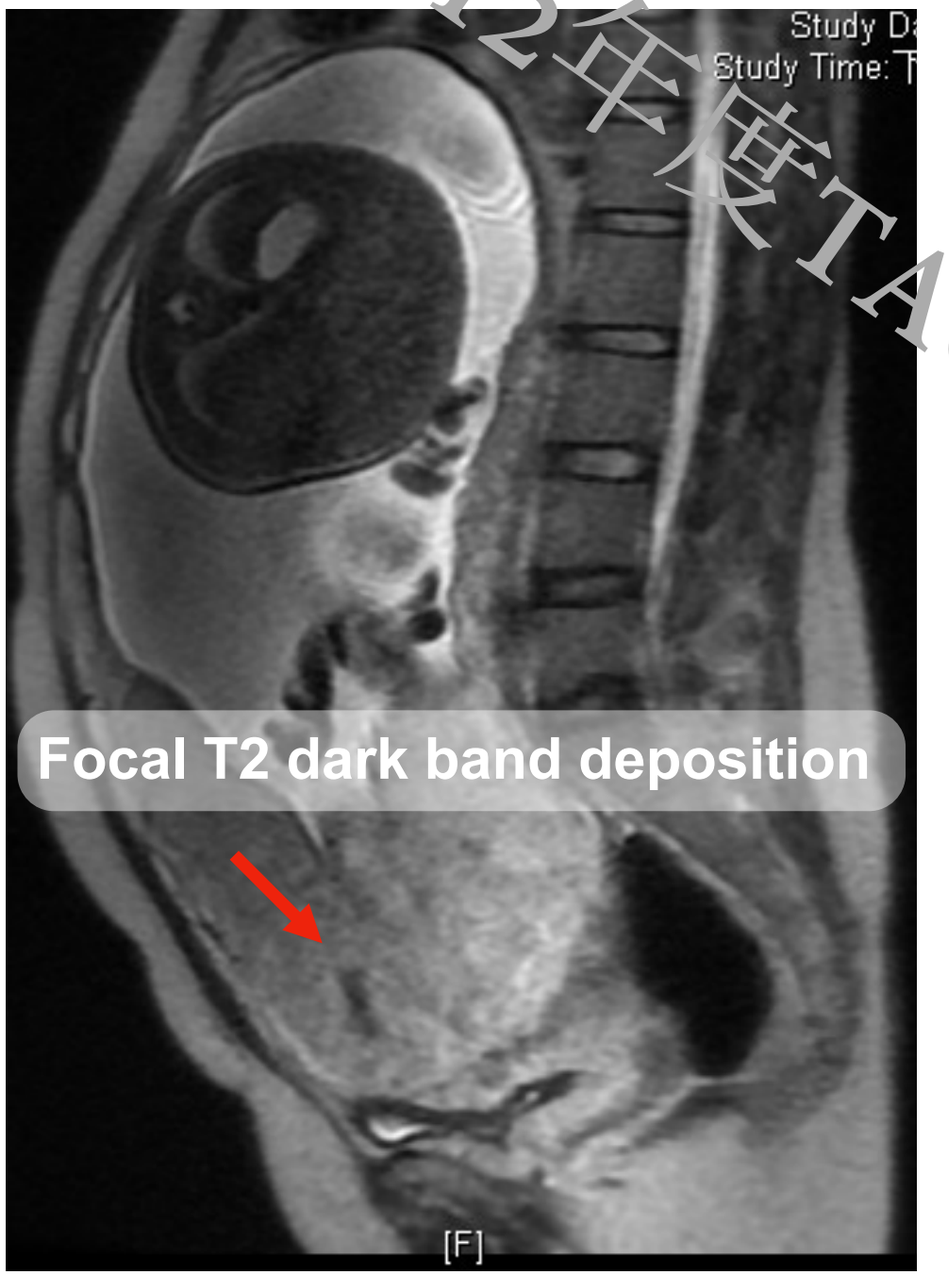
MRI at GA 34 weeks

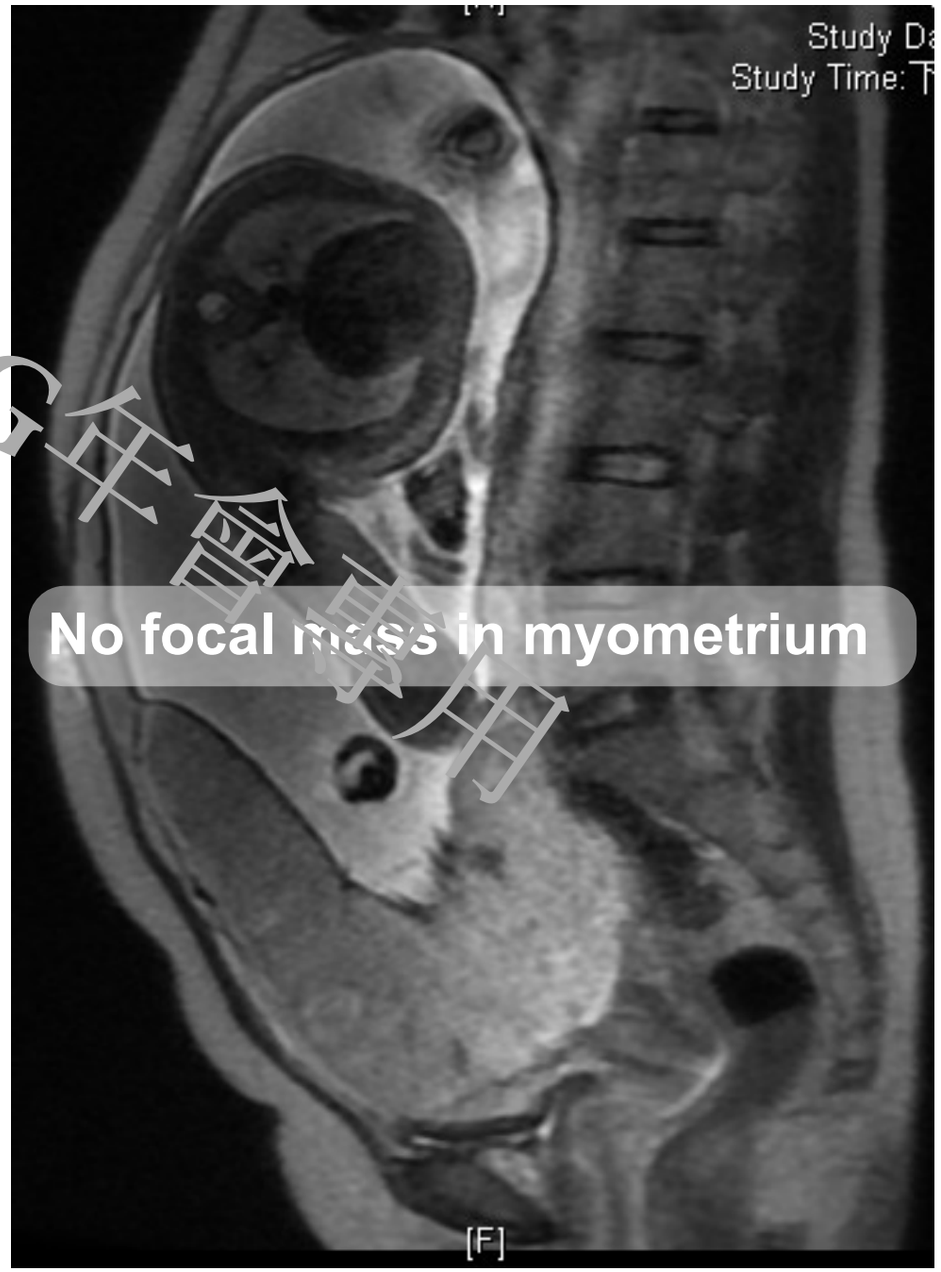
怎麼判讀這張MRI？





placenta accreta at least





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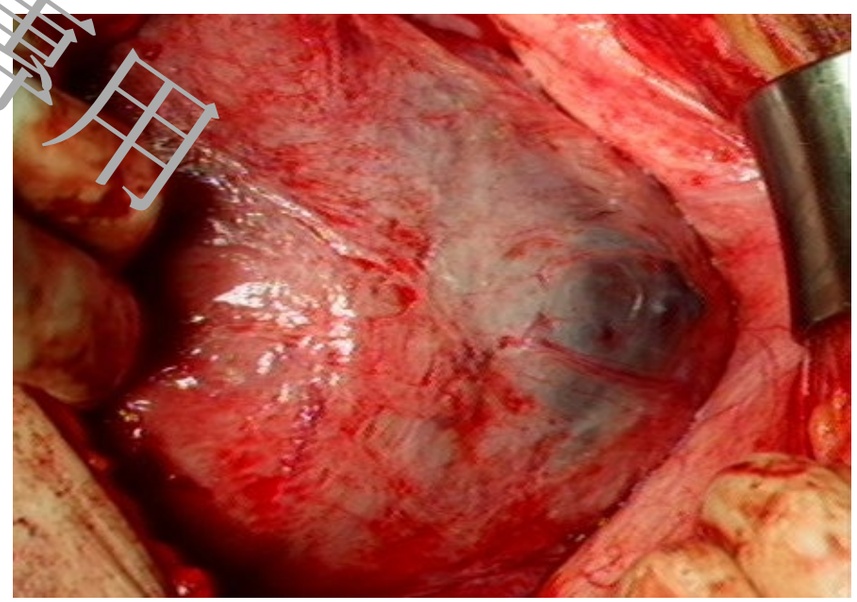
2015 8/24 — GA 29 weeks — referred for suspect placenta accreta

10/23 — GA 36+ weeks — Scheduled C/S + prophylactic TAE

- Pre-op ultrasound to confirm location of placenta margin
- Right femoral sheath was placed
- Longitudinal incision of abdomen and classical incision of uterus
- Deliver a live male baby, Apgar score 9 → 10
- Prophylactic TAE was performed
- Placenta extirpation
- Blood loss: 550 ml (含羊水)



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10/23 — GA 36+ weeks — Scheduled C/S + prophylactic TAE

10/25 — Remove femoral sheath

10/27 — Discharge

11/04 — OPD F/U: well recovery

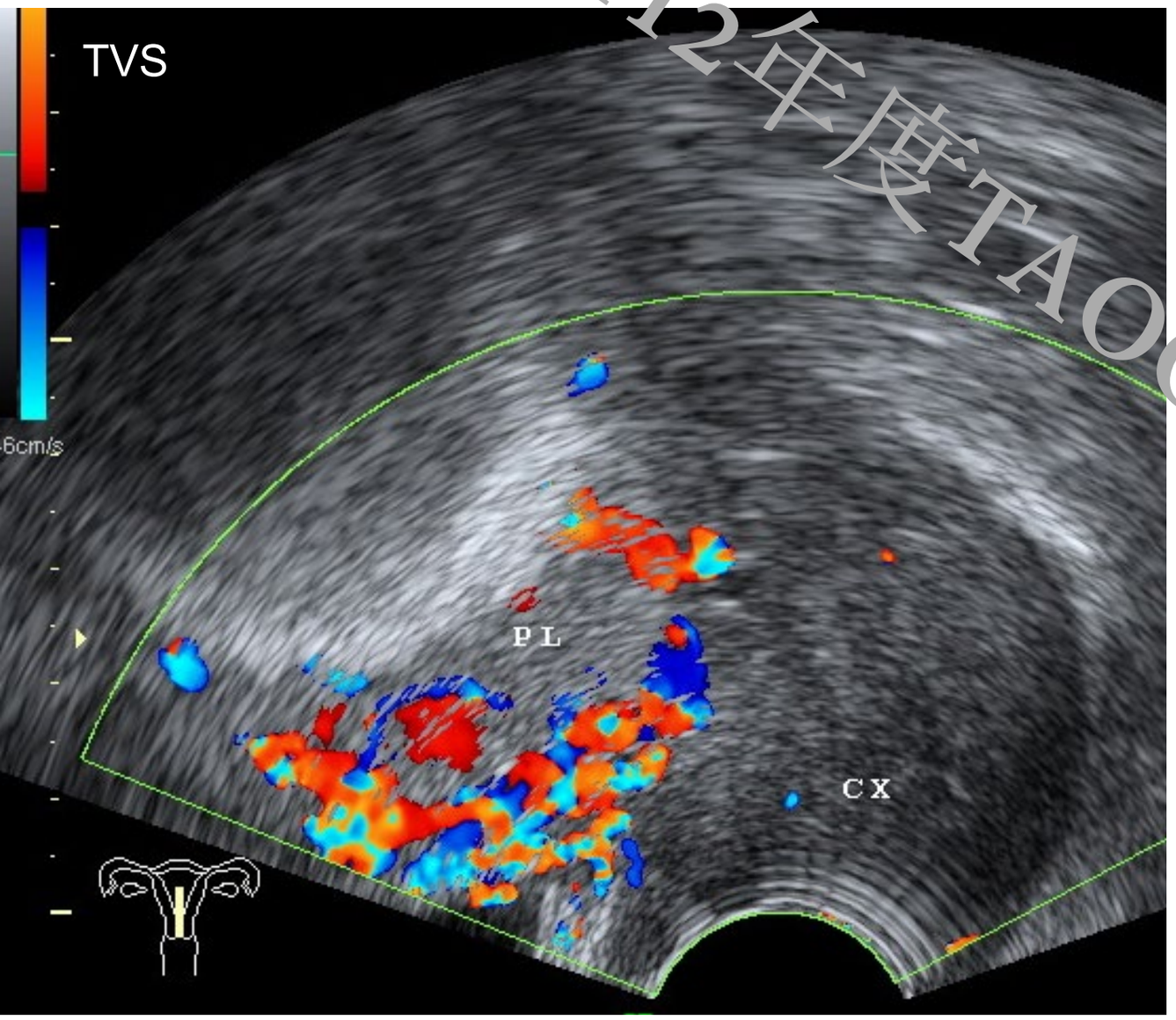
Case 2

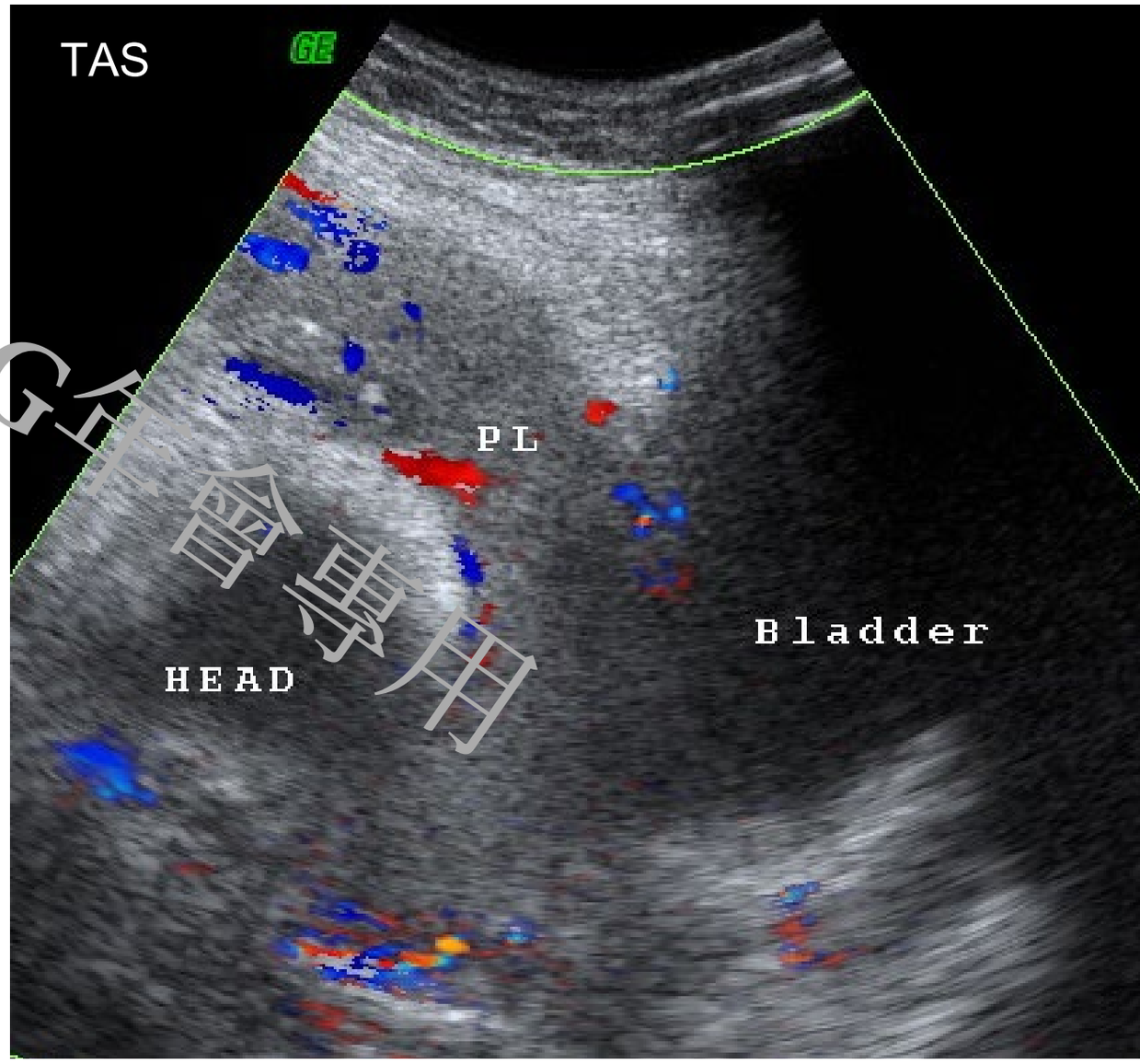
- 41 y/o, G3**P1(C/S)**SA1, natural pregnancy, no systemic disease
- Prenatal exams: WNL (Amniocentesis: normal karyotype, GDM(-), PIH(-))

2010 11/24 — GA 32 weeks referred for suspect placenta accreta

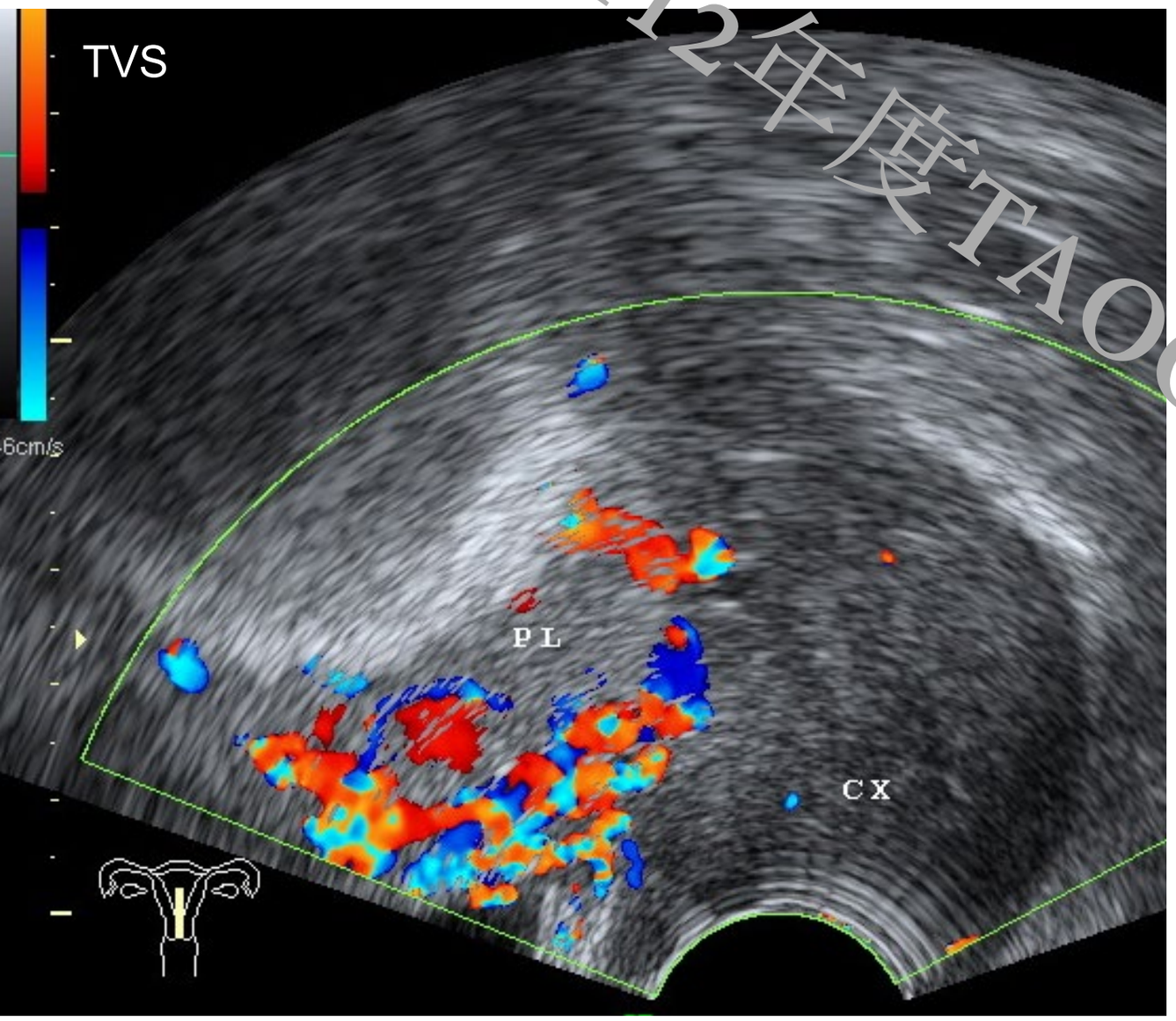
Ultrasound

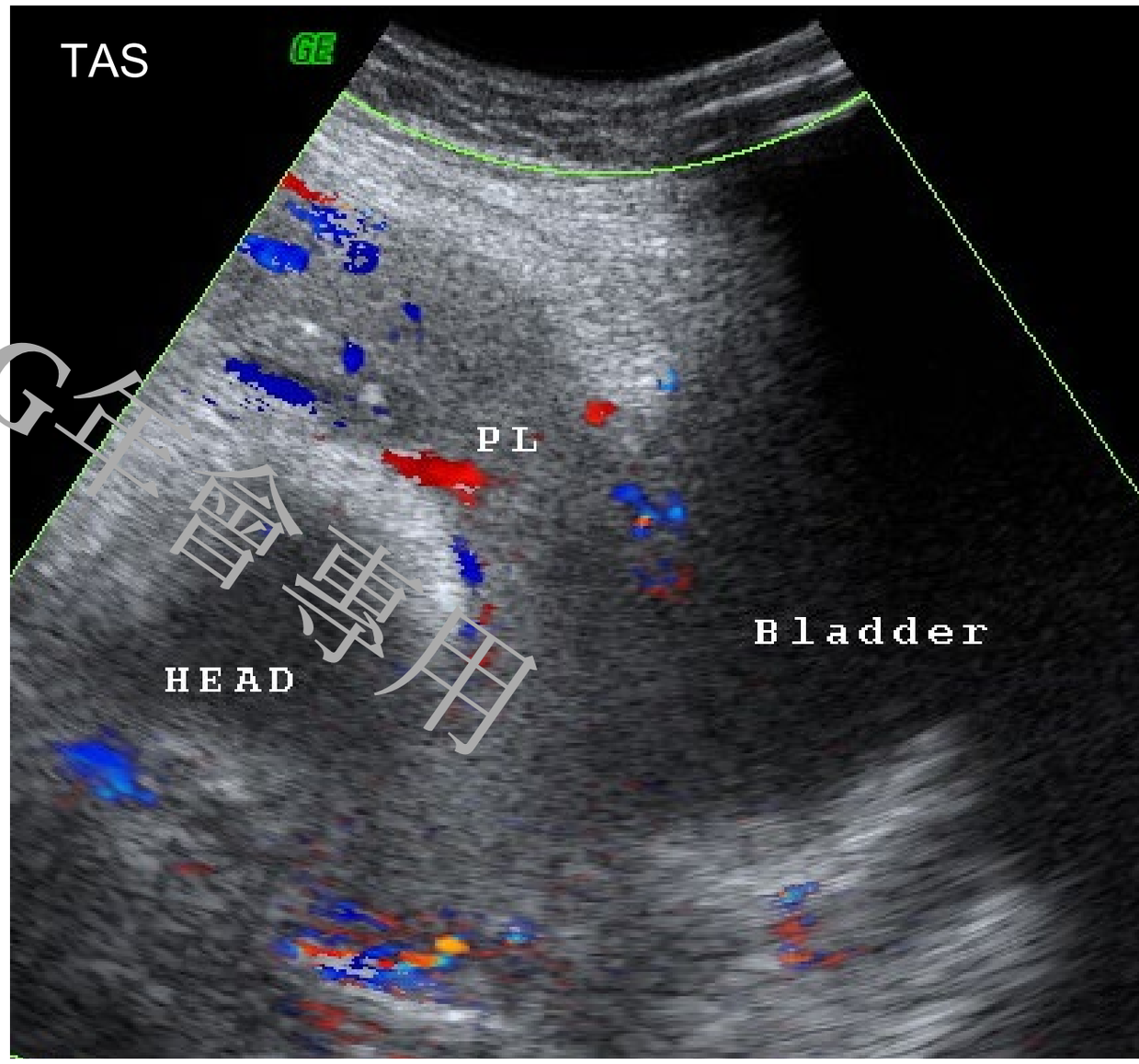
怎麼判讀這2張超音波？





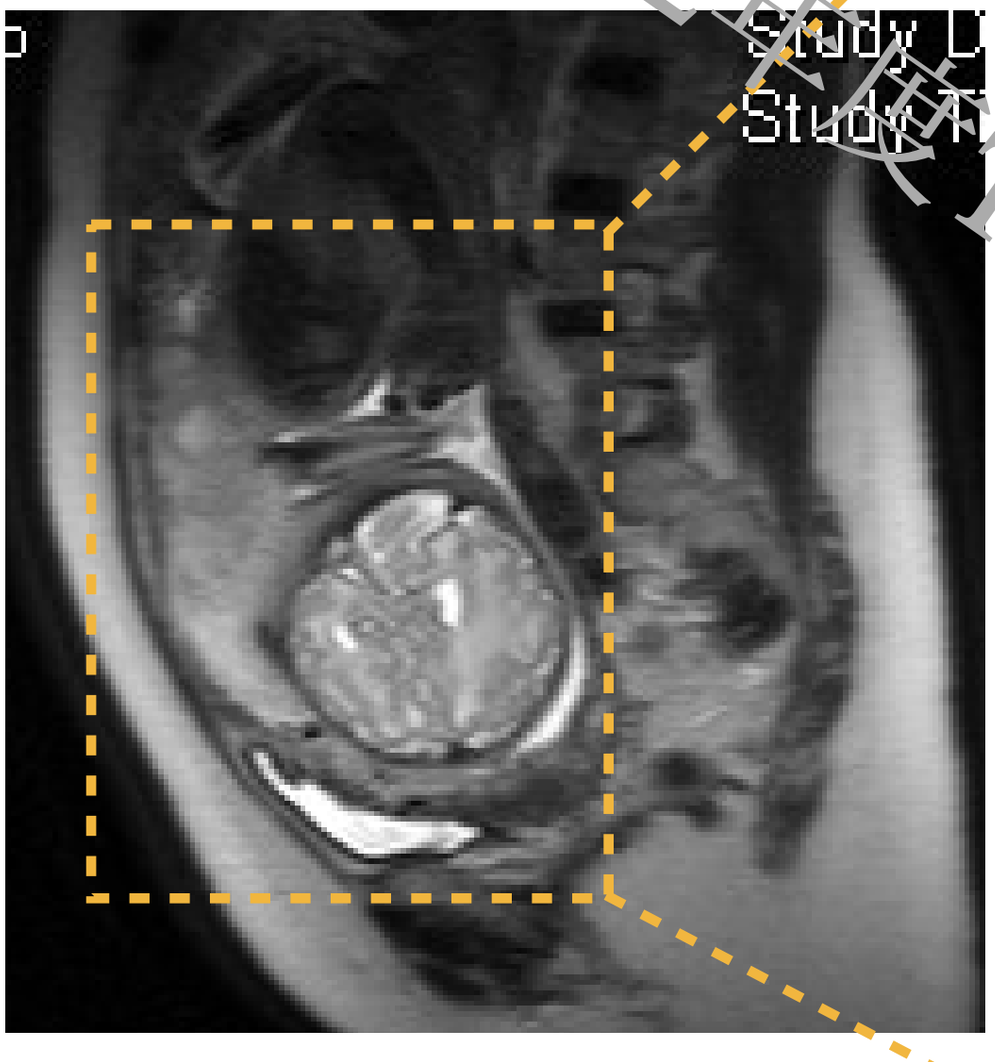
Suspect placenta percreta

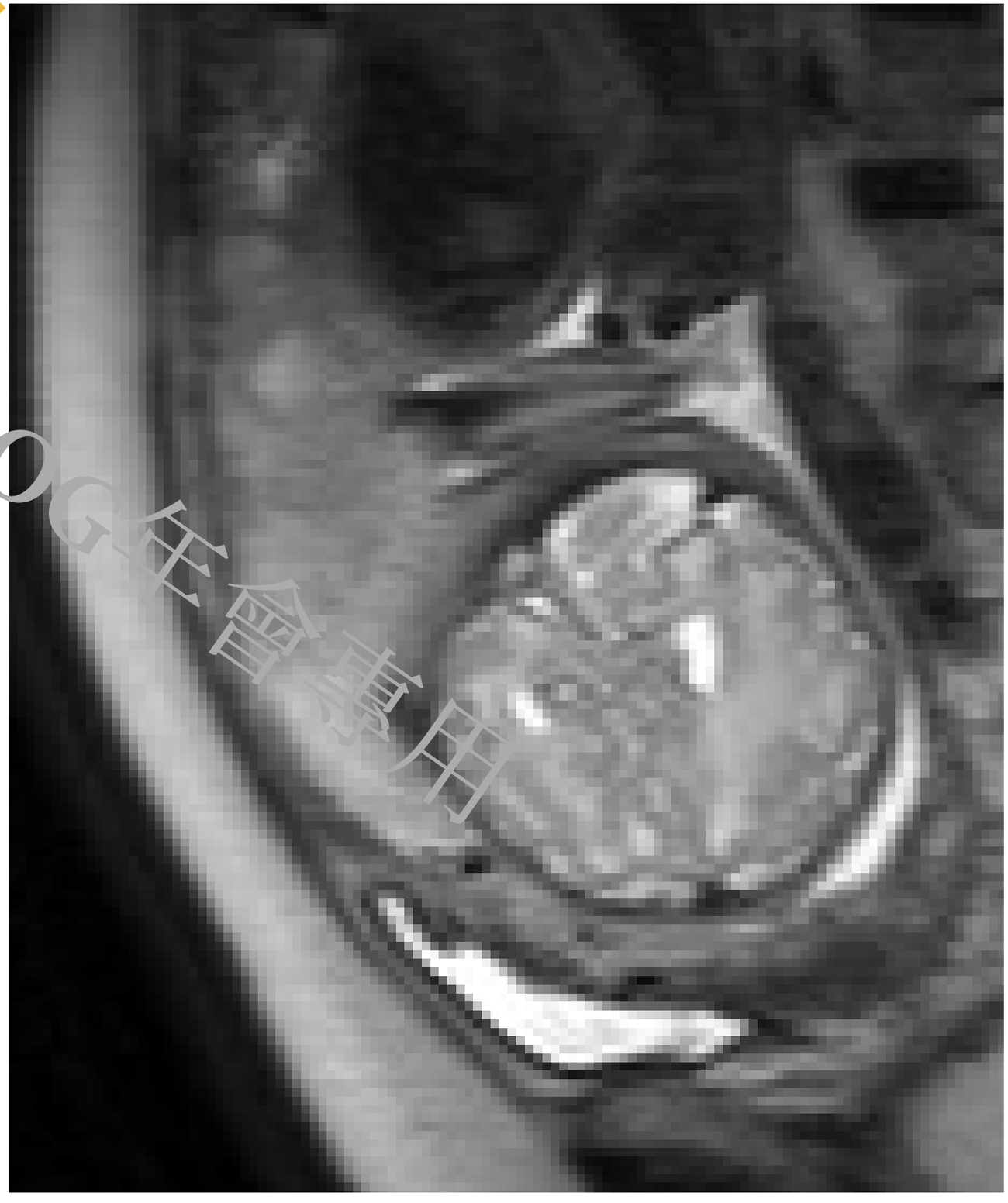




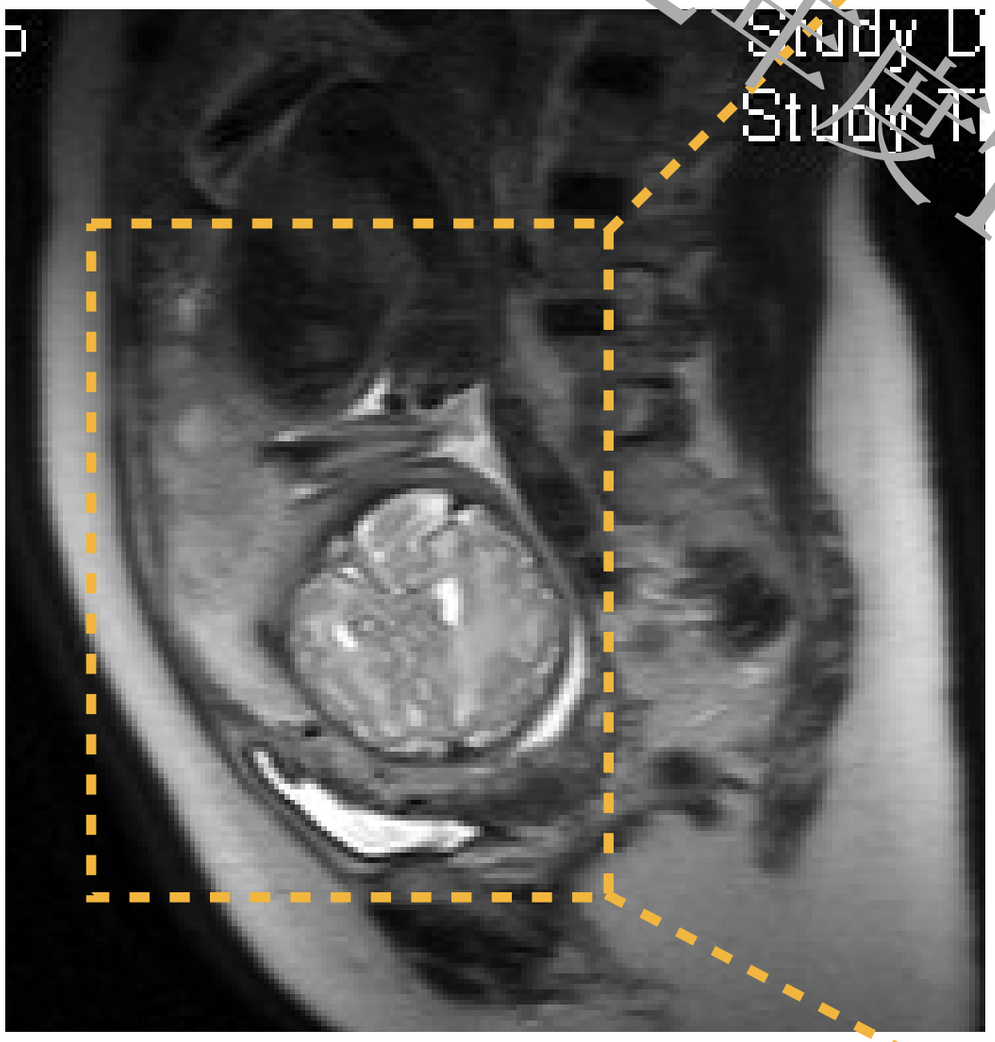
MRI at GA 33 weeks

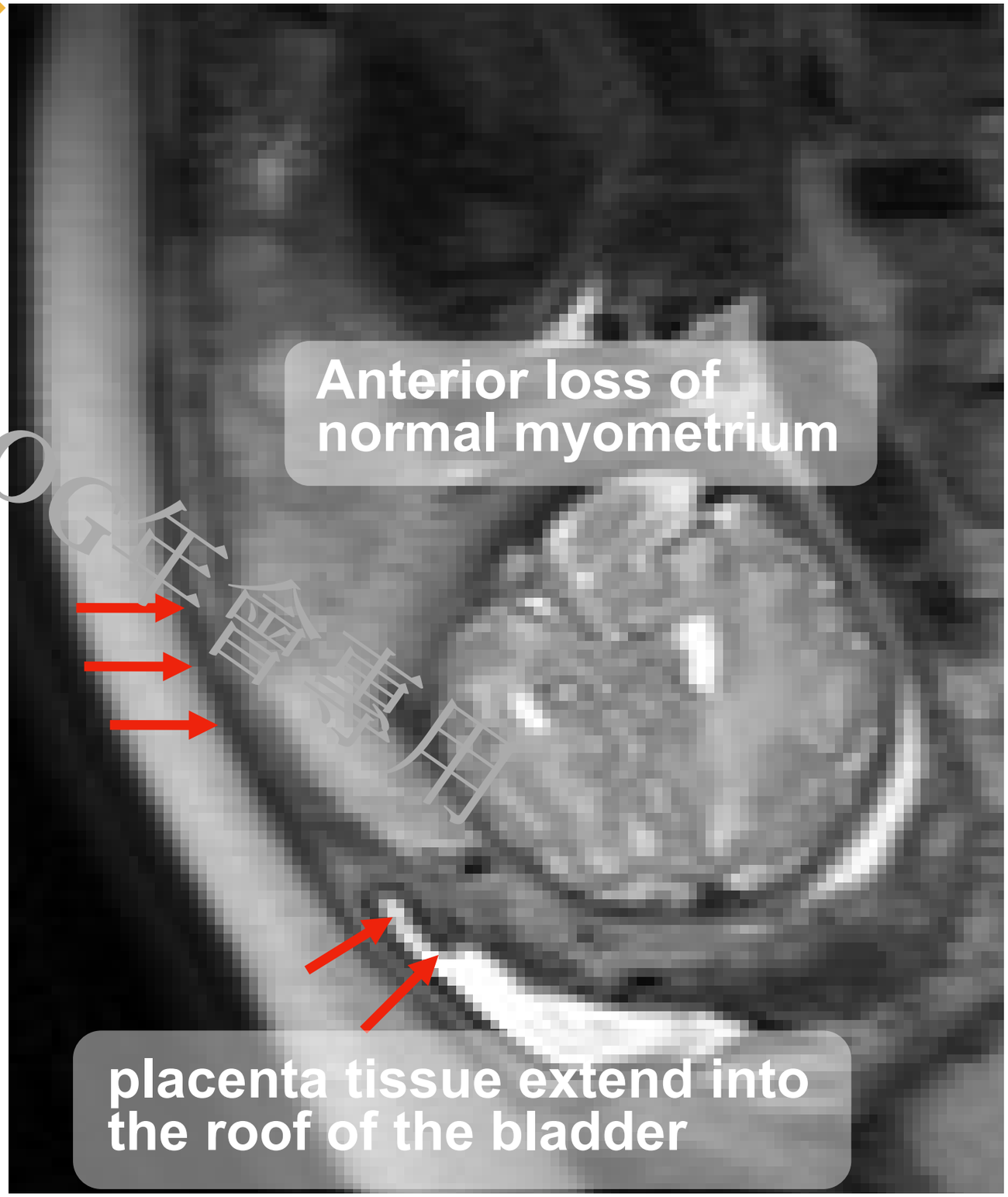
怎麼判讀這張MRI？





Compatible with placenta percreta





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- Prenatal exams: WNL (Amniocentesis: normal karyotype, GDM(-), PIH(-))

2010 11/24 — GA 32 weeks referred for suspect placenta accreta

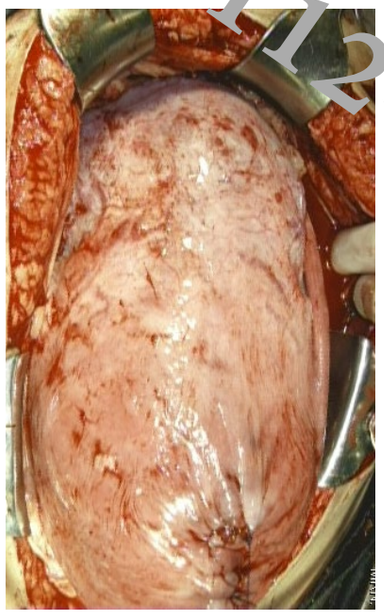
12/19 — GA 36+ weeks admission due to vaginal bleeding and preterm uterine contraction

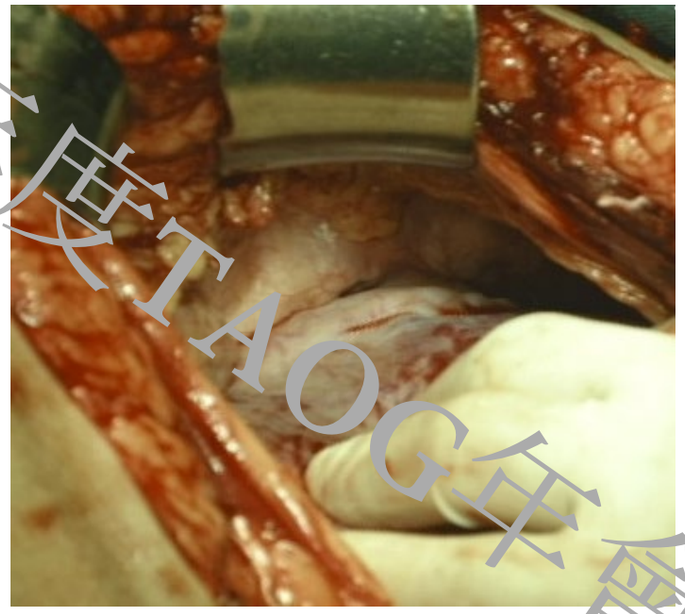
➔ tocolysis for 5 days and plan C/S with radiologist

2010
12/24

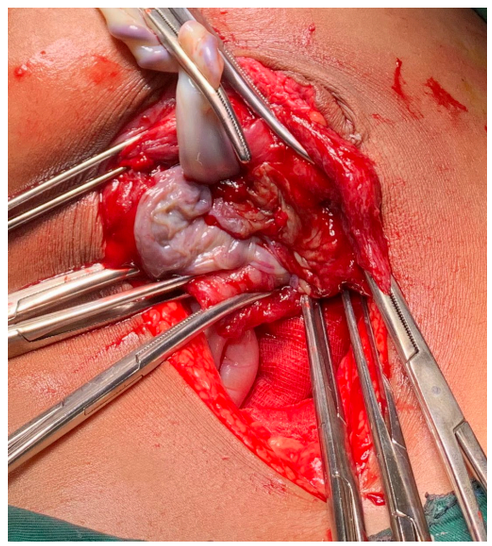
GA 36+ weeks arrange C/S + prophylactic TAE

- Pre-op ultrasound to confirm location of placenta margin
- Right femoral sheath was placed firstly
- Longitudinal incision of abdomen and classical incision of uterus





- Deliver a live male baby, 3045gm, Apgar score 9 → 10



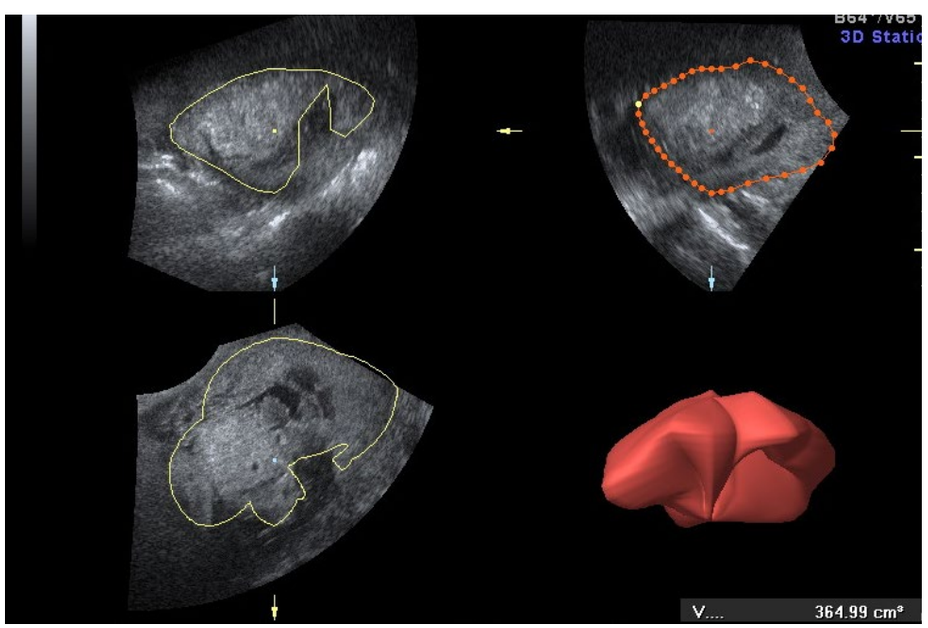
- Placenta was left in situ without extirpation
- Prophylactic TAE was performed after hemostasis
- Blood loss: 1350 ml (including amniotic fluid)
- Post-op antibiotic with clindamycin + gentamicin

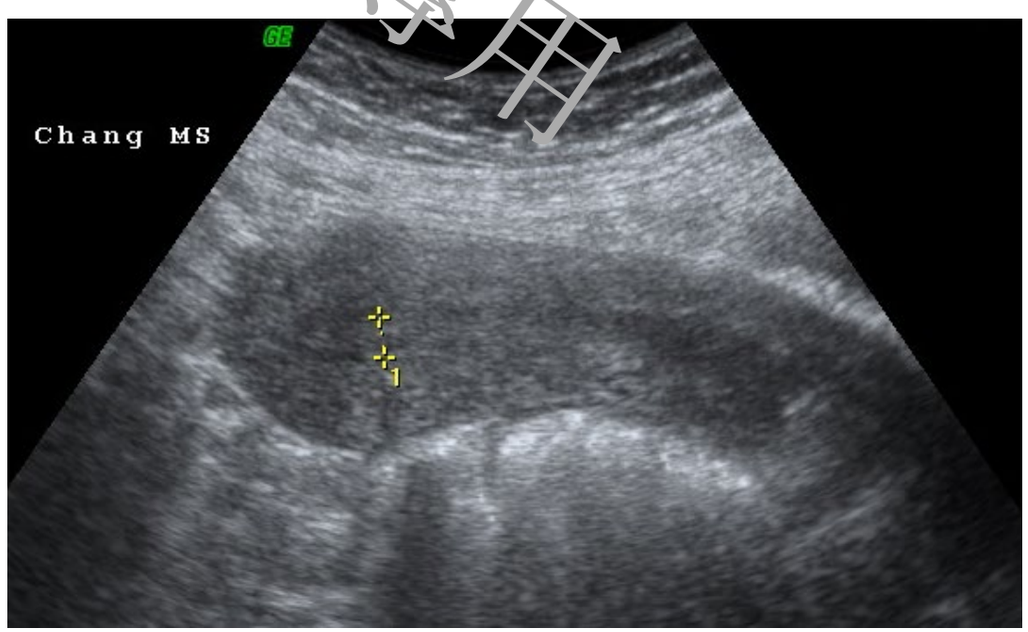
2010
12/25 **Post-op day 1** remove right femoral sheath

12/31 **Post-op day 7** Discharge

Measure residual placental volume during OPD F/U

- The placenta volume was measure by 3-D VOCAL program
- Measure interval: 3 weeks
- Closely monitor until complete resorption (平均 **4.5** 個月)





Case 3

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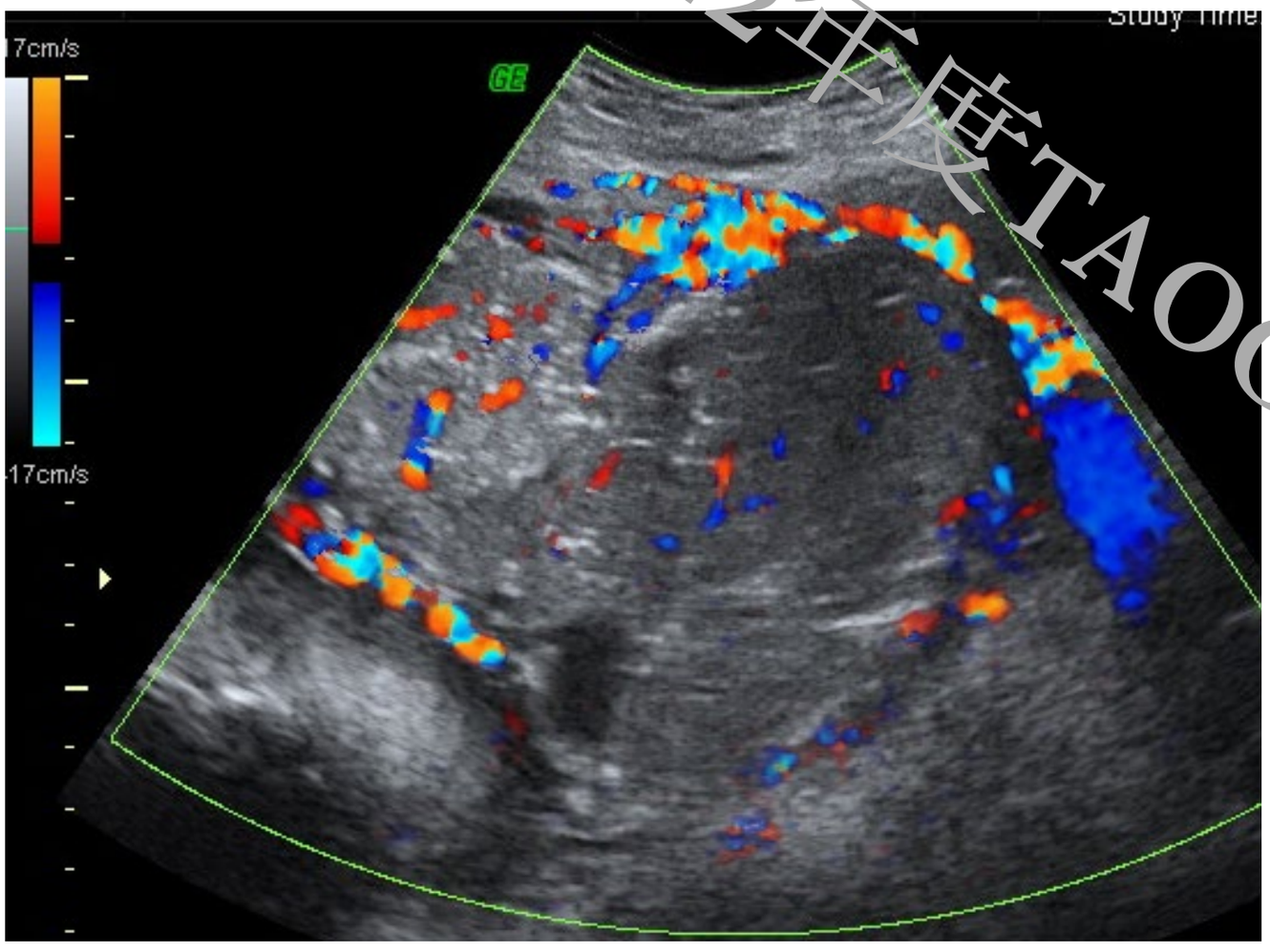
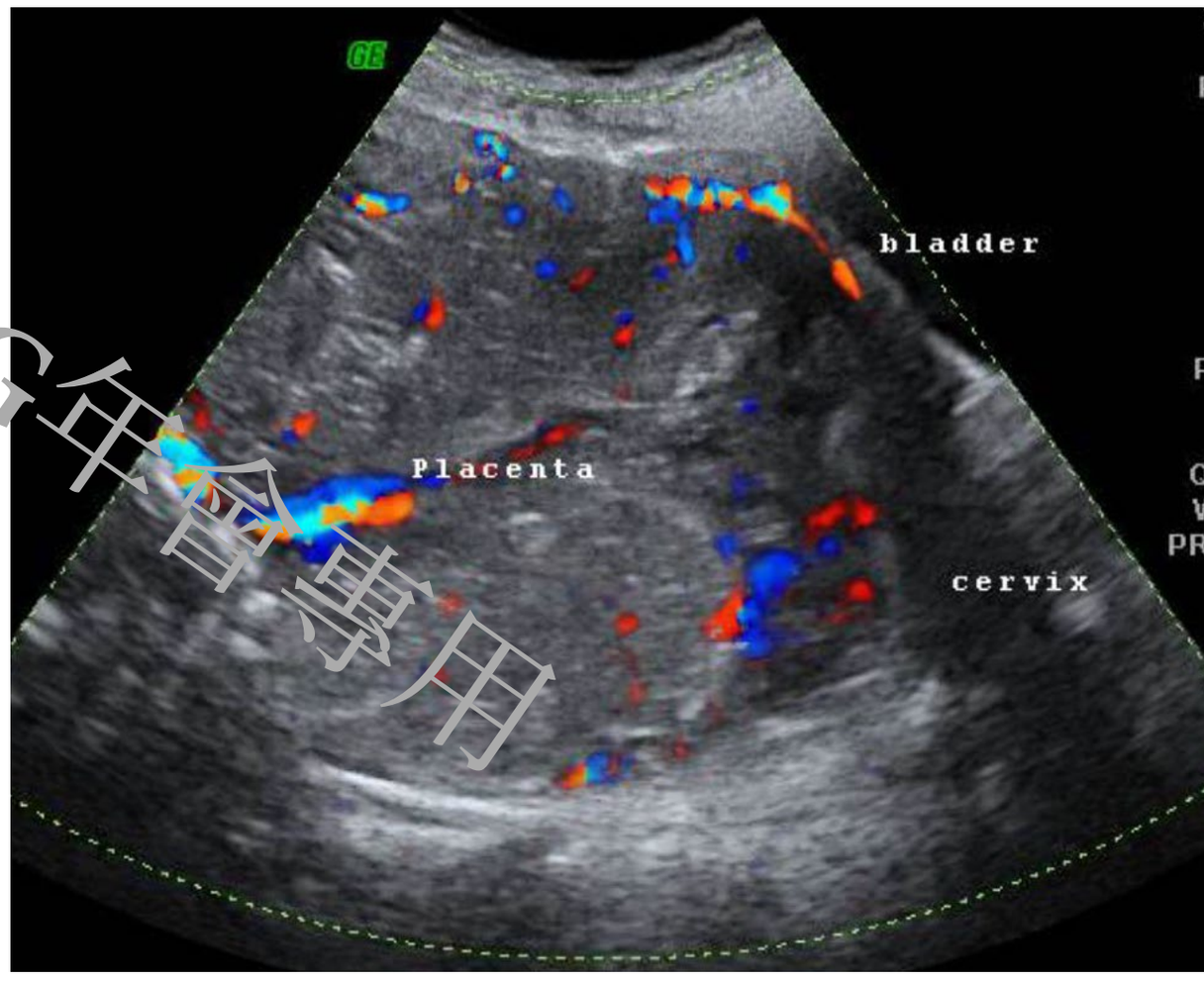
- Prenatal exams: WNL (1st trimester Down screen: low risk, GDM(-), PIH(-))

2019 12/04 — GA 32 weeks referred for suspect placenta accreta

Ultrasound

怎麼判讀這2張超音波？





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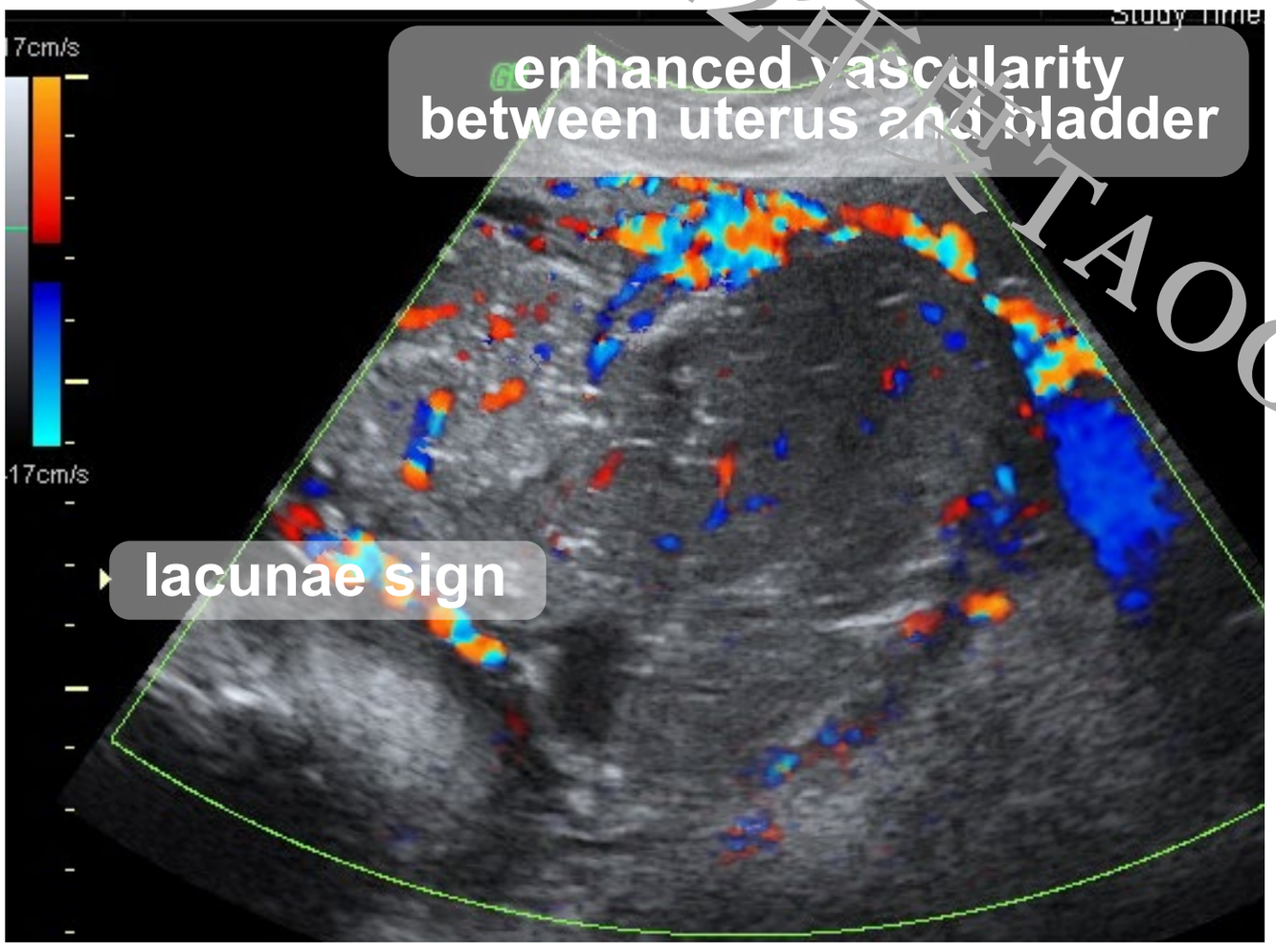
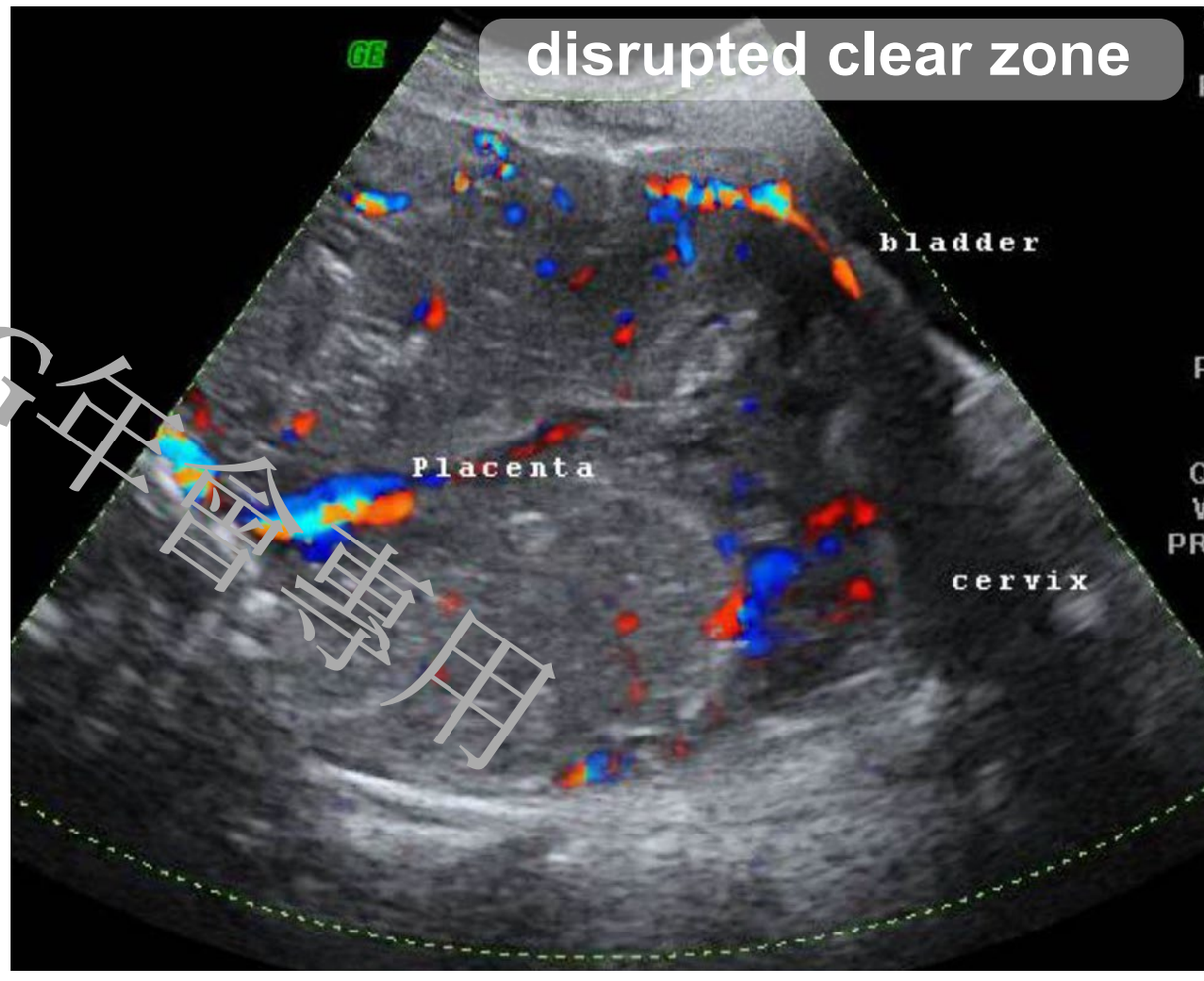
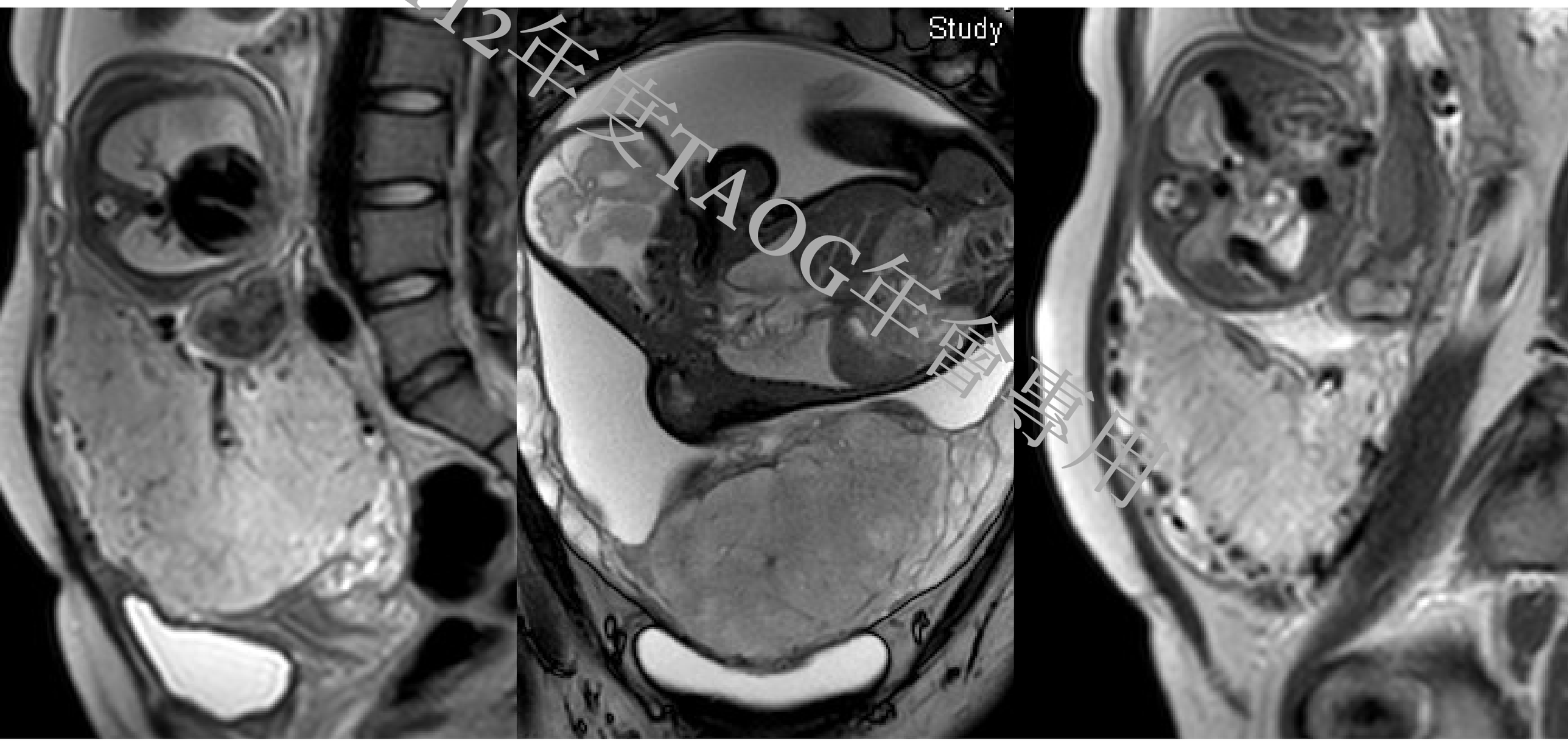




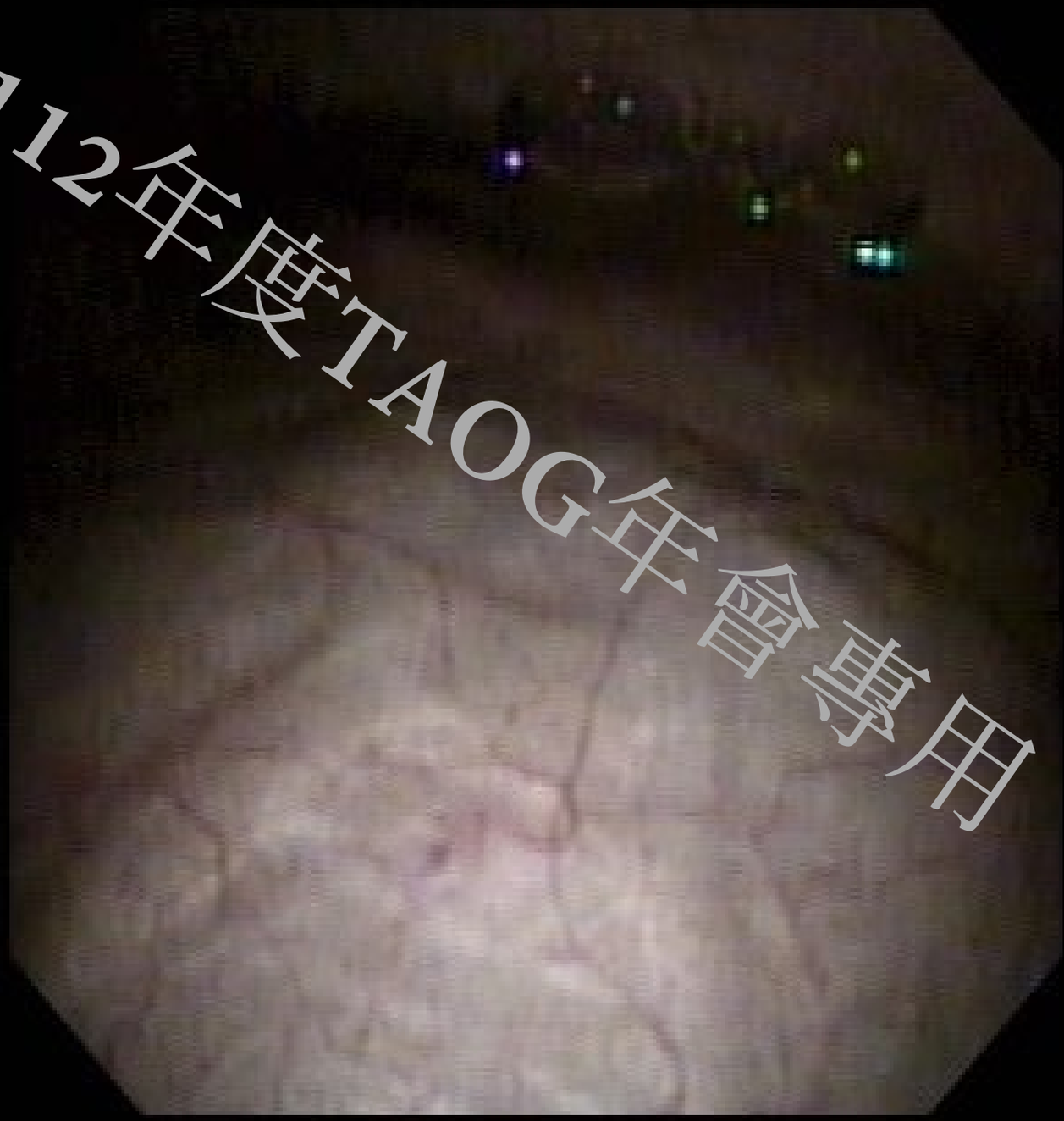
MRI at GA 32 weeks

怎麼判讀這張MRI？



placenta accreta at least

Cystoscopy: focal bulging mass near trigone



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12/27 — GA 35+ weeks scheduled C/S + prophylactic TAE

- Pre-op ultrasound to confirm location of placenta margin
- Right femoral sheath was placed firstly
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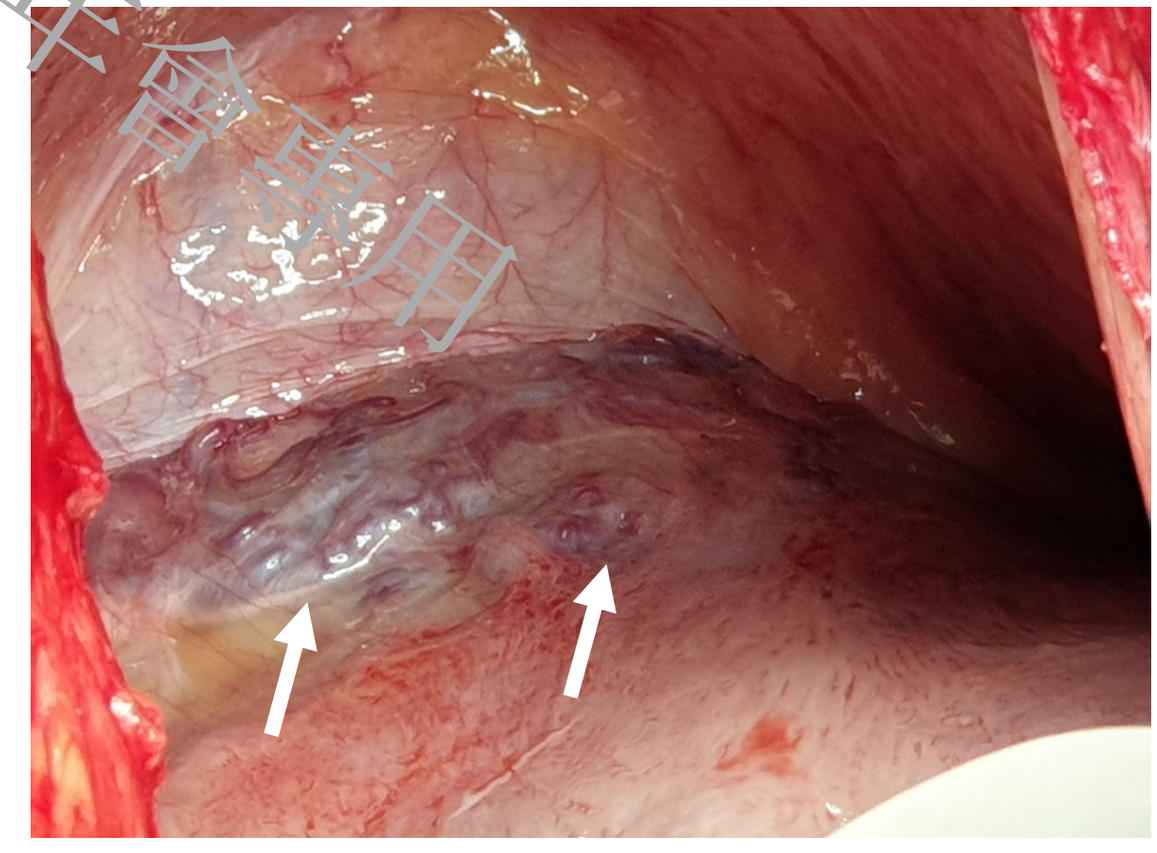

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2019 12/04 — GA 32 weeks referred for suspect placenta accreta

12/27 — GA 35+ weeks scheduled C/S + prophylactic TAE

- Deliver a live female baby, 2740gm, Apgar score 9 → 10
- Placenta was left in situ without extirpation
- Prophylactic TAE was performed after hemostasis
- Blood loss: 200 ml (including amniotic fluid)
- Post-op antibiotic with clindamycin + gentamicin

2019
12/28

Post-op day 1 remove right femoral sheath

Hb= 9.4 g/dL => blood transfusion

12/31

Post-op day 5 Discharge

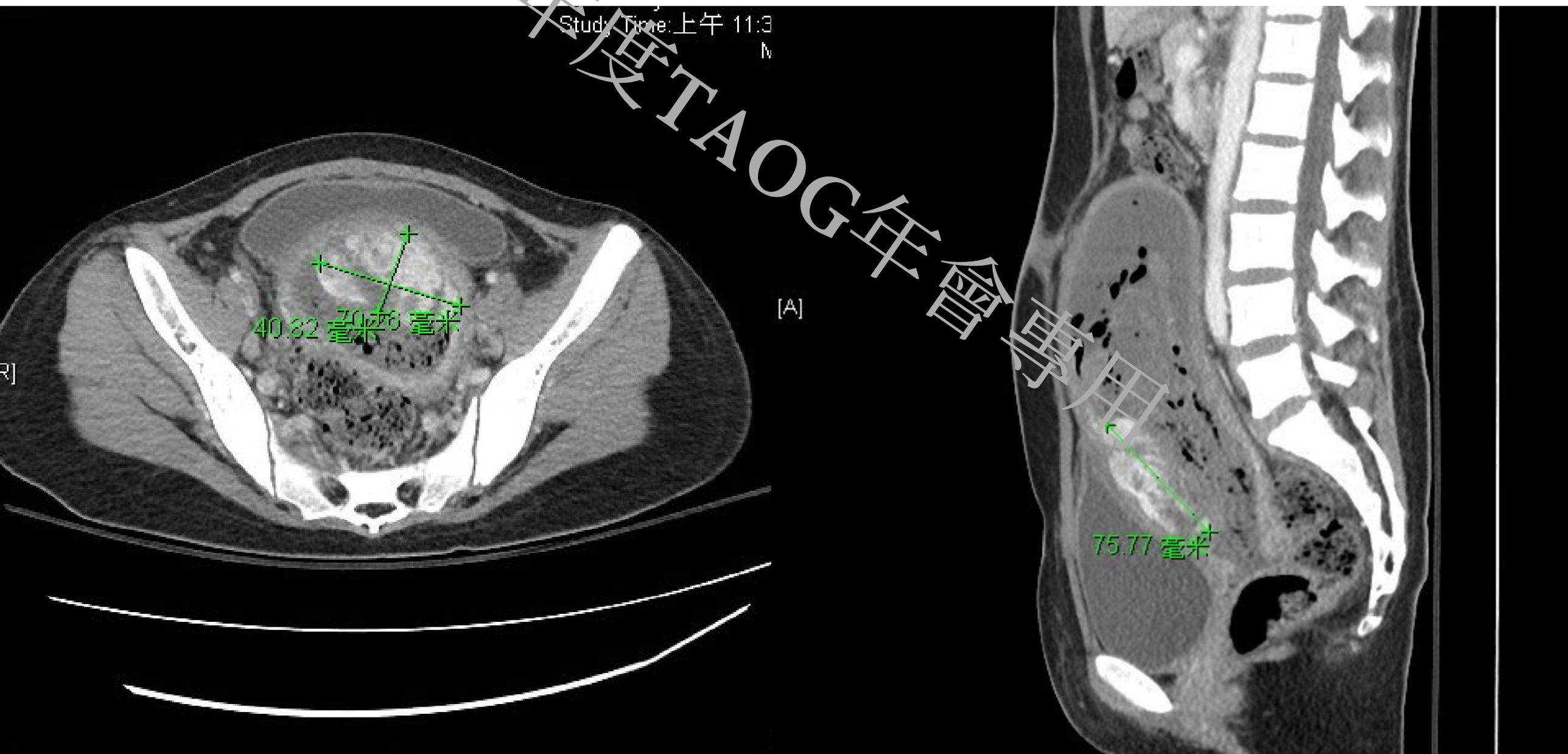
01/10

Post-op day 14 to ER due to sepsis and vaginal bleeding

- WBC=19300/uL, Seg=90.5%, CRP=303 mg/L, Hb=8.6 g/dL
- Antibiotics treatment with Tazocin
- Still intermittent high fever up to 39℃ and progressive lower abdominal pain after Abx
- Pus culture: E. coli and Peptostreptococcus anaerobius
- Blood culture: negative

Pelvic CT (C+)

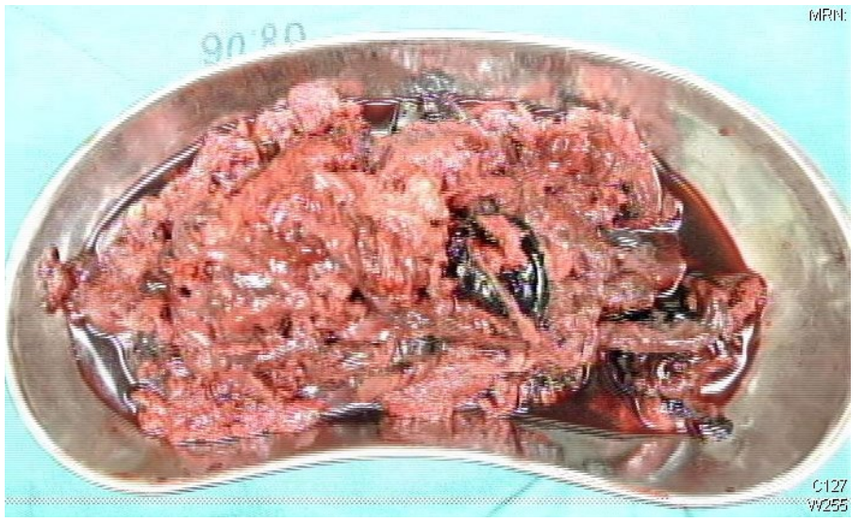
Postpartum endometritis with pus formation



2020
01/13

Arrange prophylactic TAE and surgical evacuation

- Blood loss: 600 ml
- Pathology: necrotic placenta



01/14

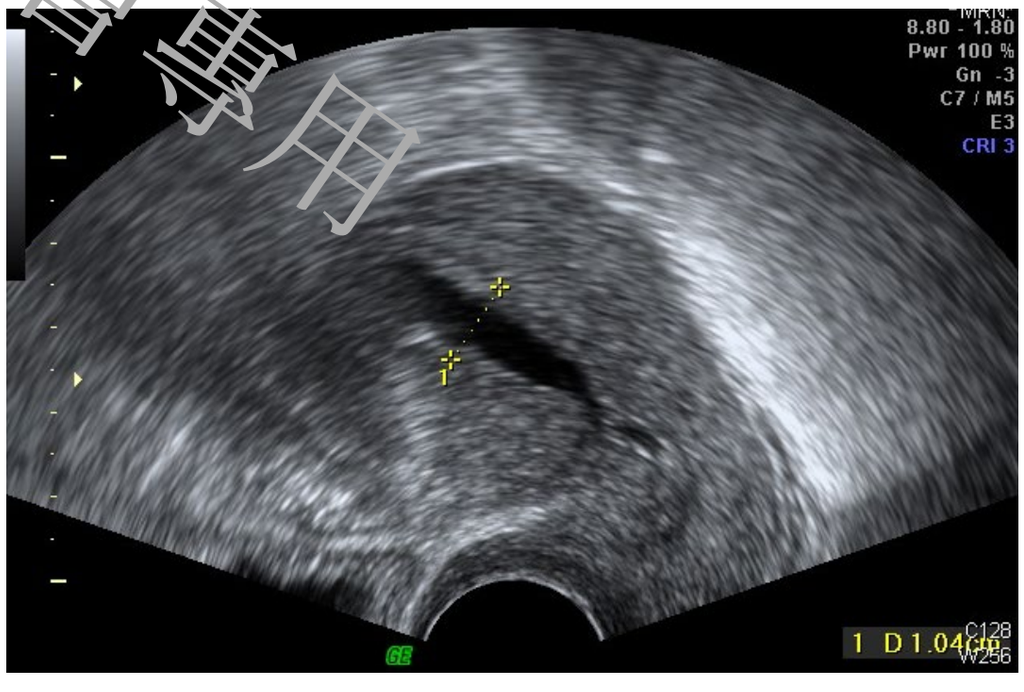
Fever subsided with improved abdominal pain

01/18

Discharge

02/19

OPD F/U: EM 1.04 cm



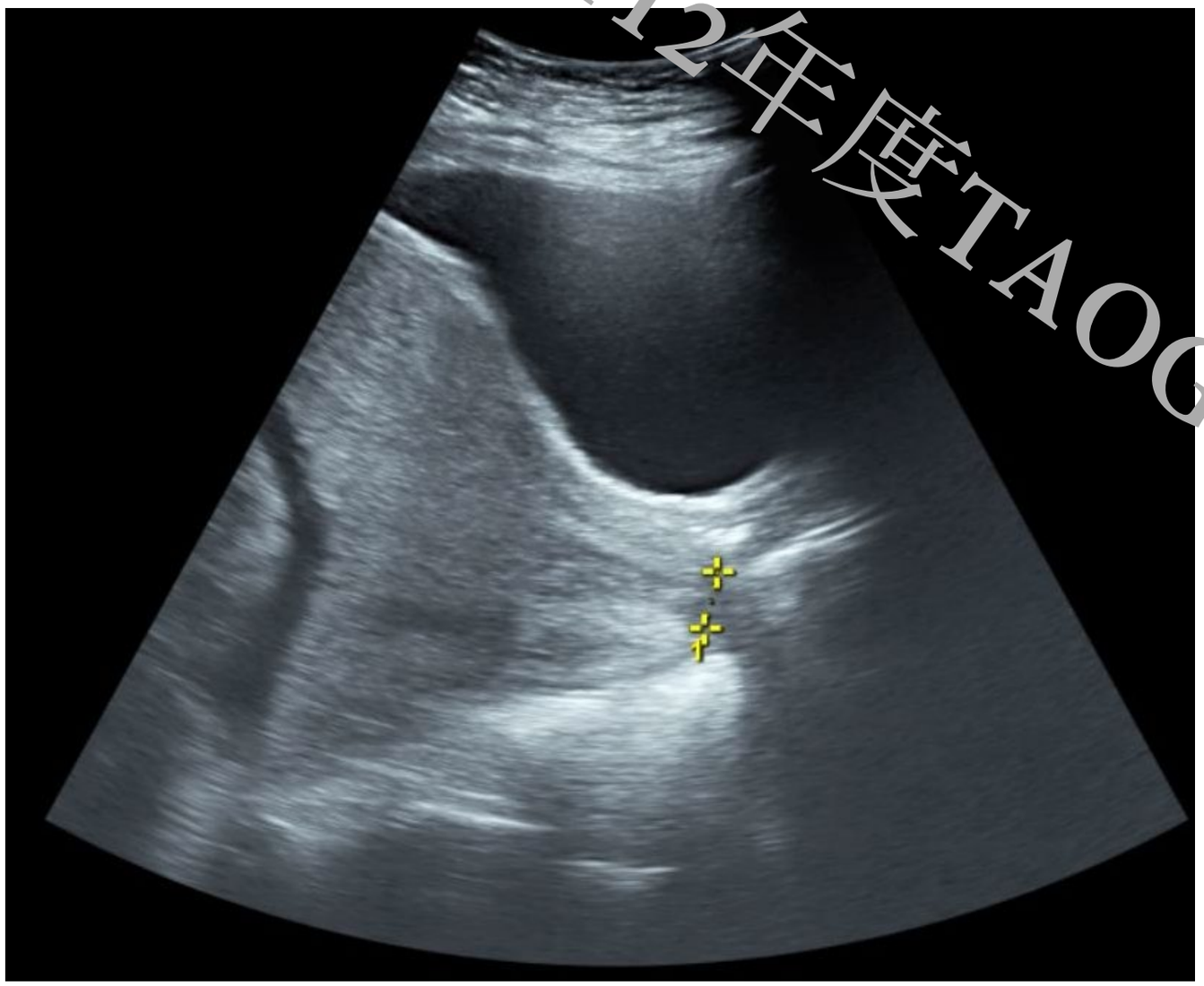
Case 4

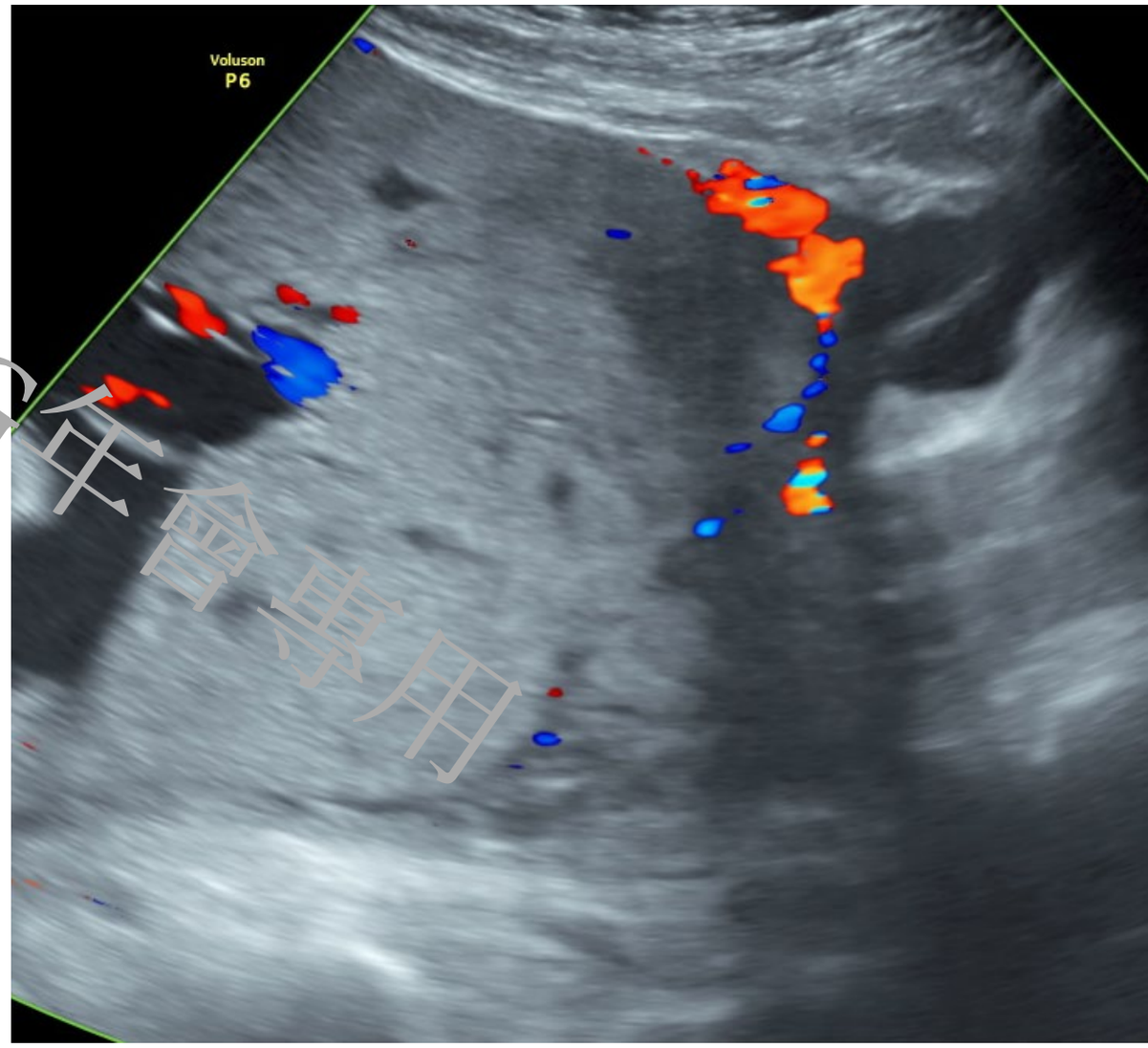
- 37 y/o, G8**P4(all C/S)**SA2AA1, IVF pregnancy, no systemic disease
- Prenatal exams: WNL (amniocentesis: normal karyotype, GDM(-), PIH(-))

2019 08/22 — GA 24 weeks referred for suspect placenta accreta

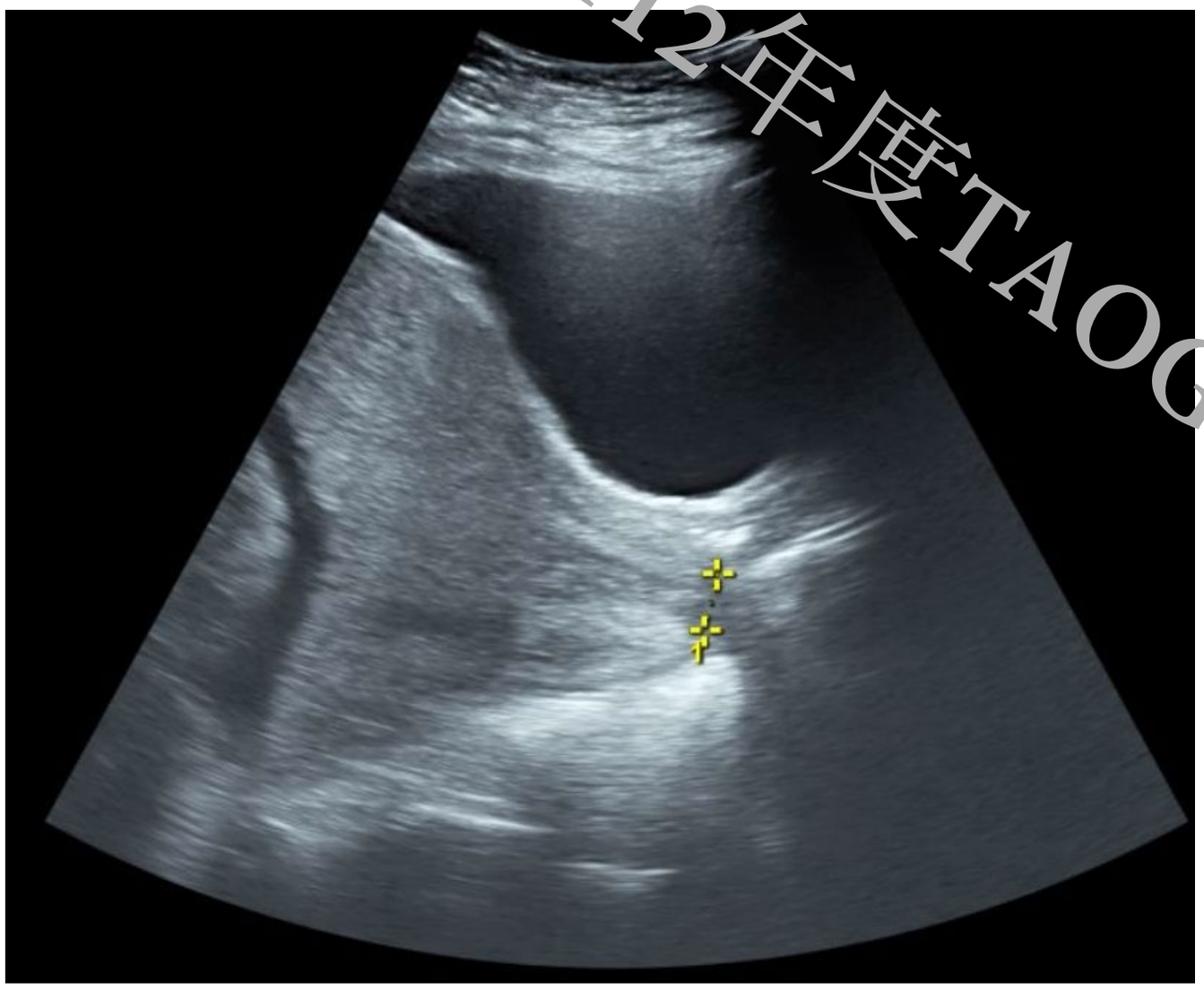
Ultrasound

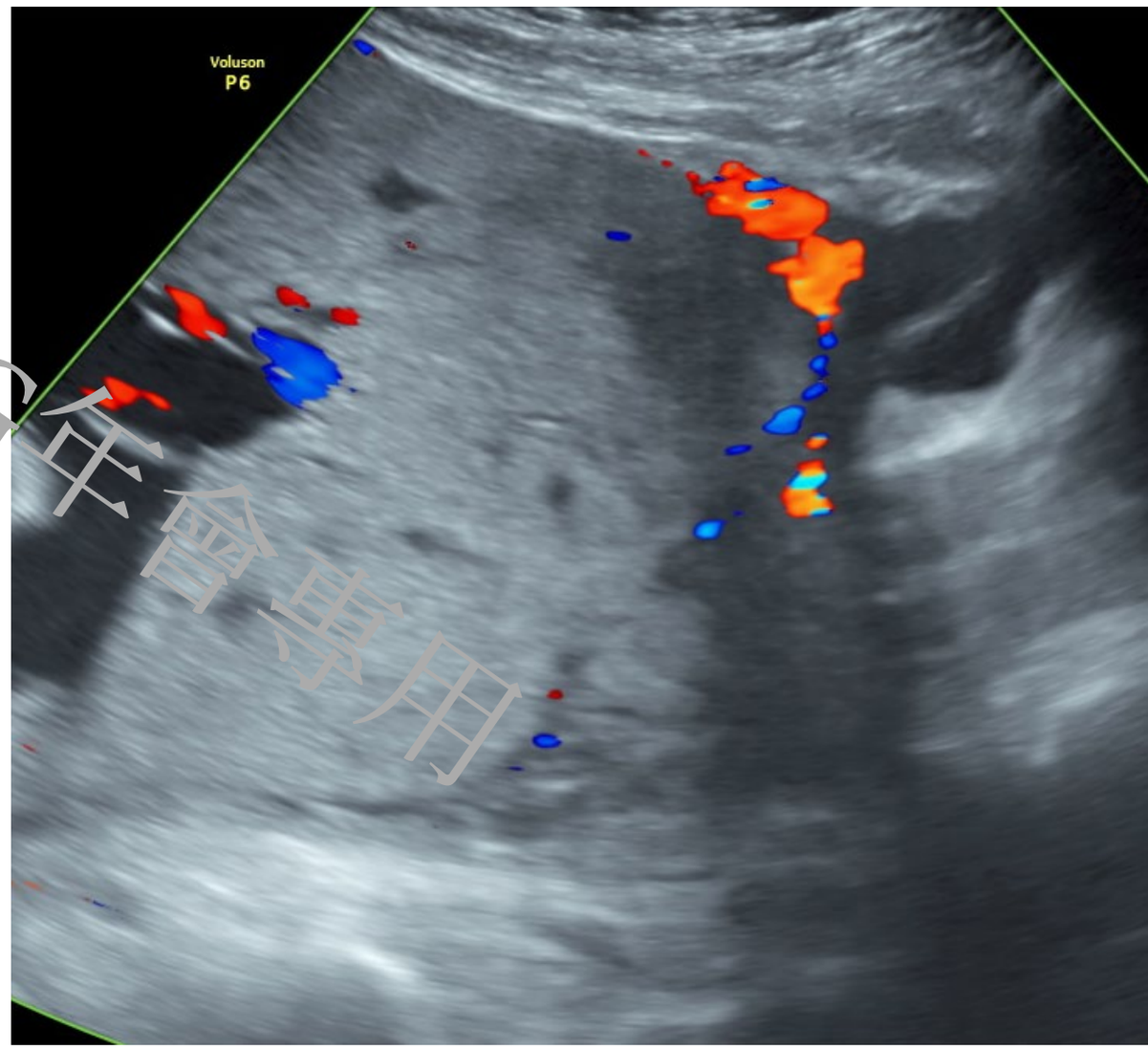
怎麼判讀這2張超音波？





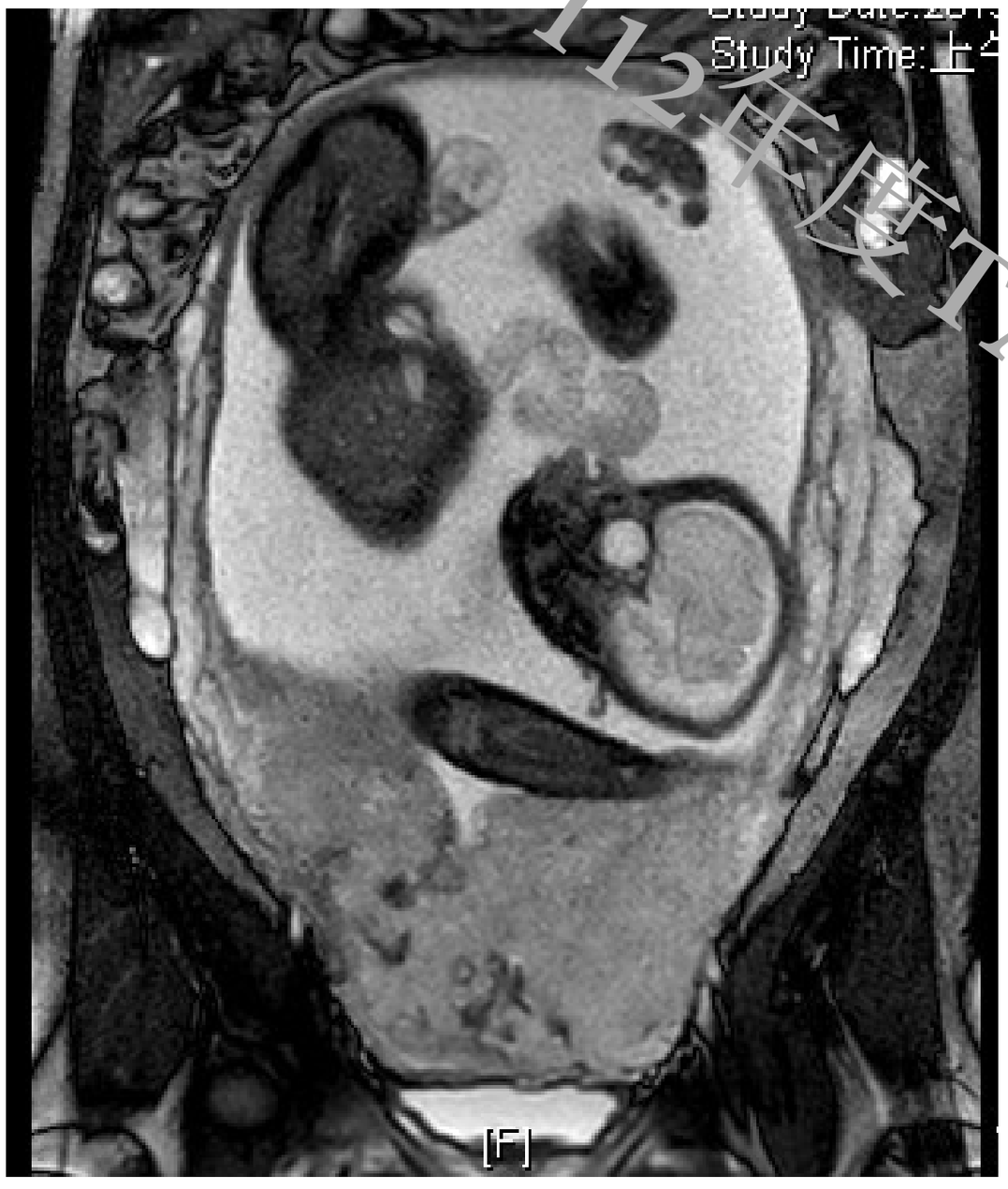
Suspect placenta accreta

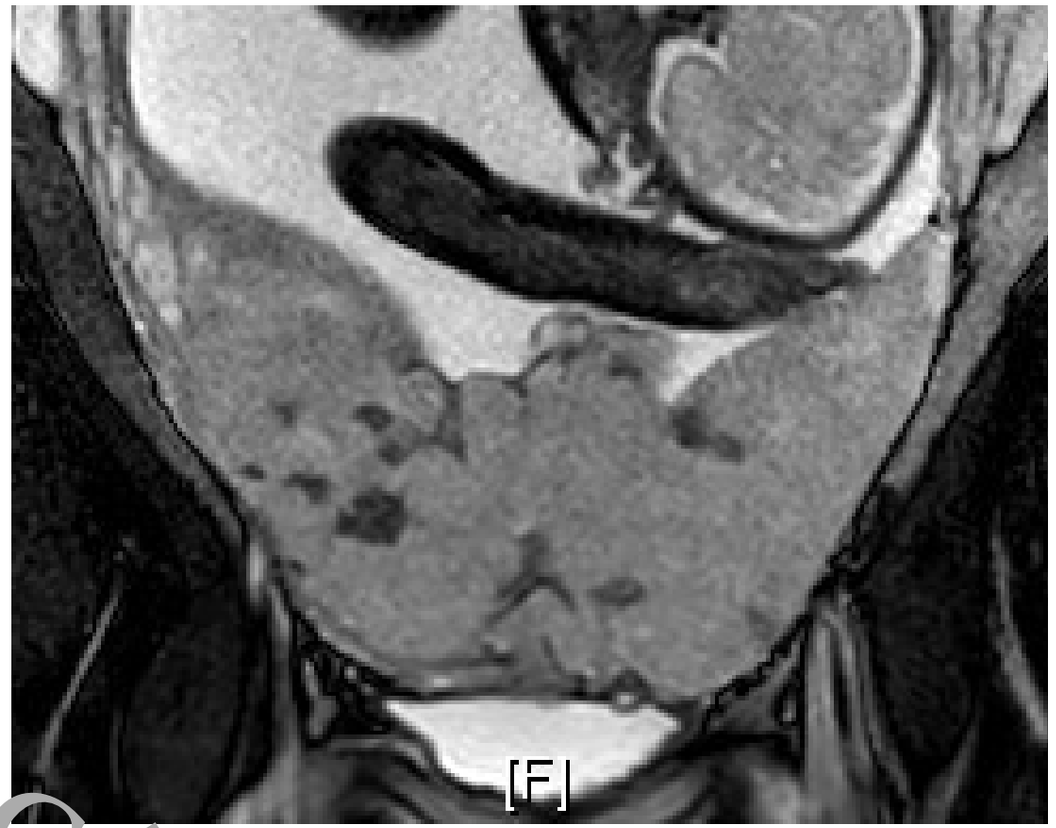


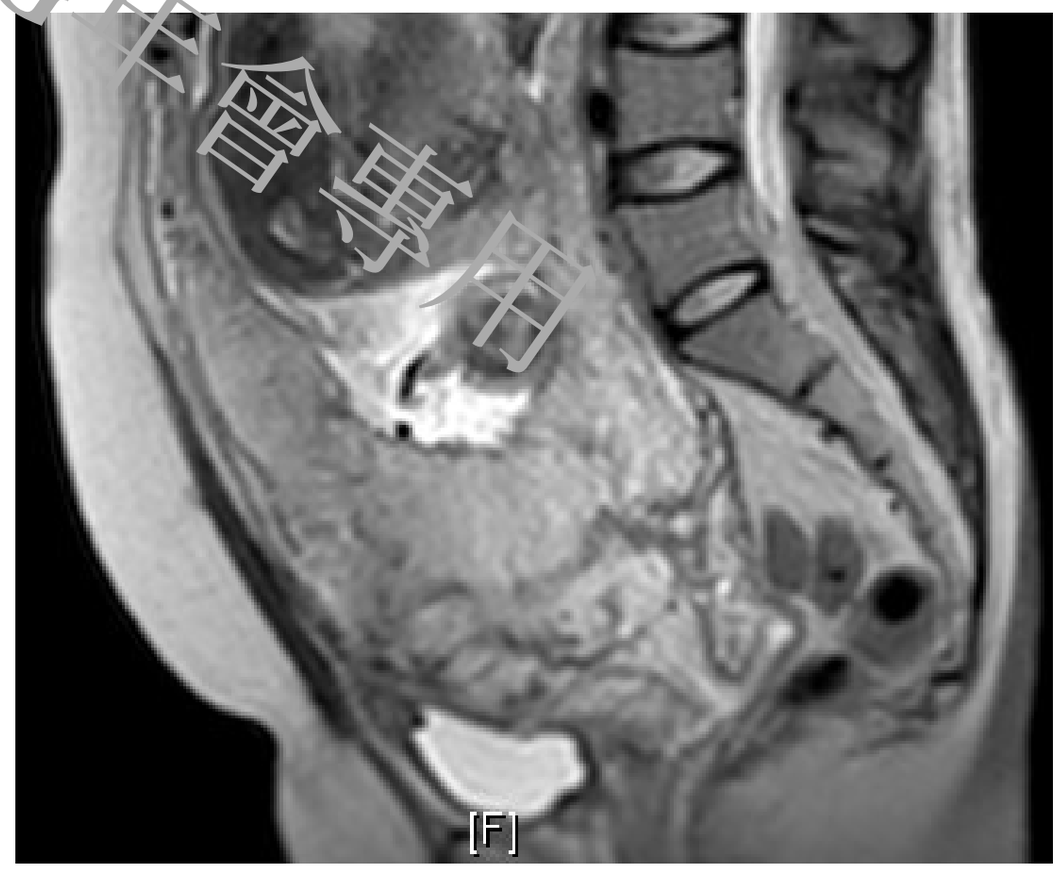


MRI at GA 31 weeks

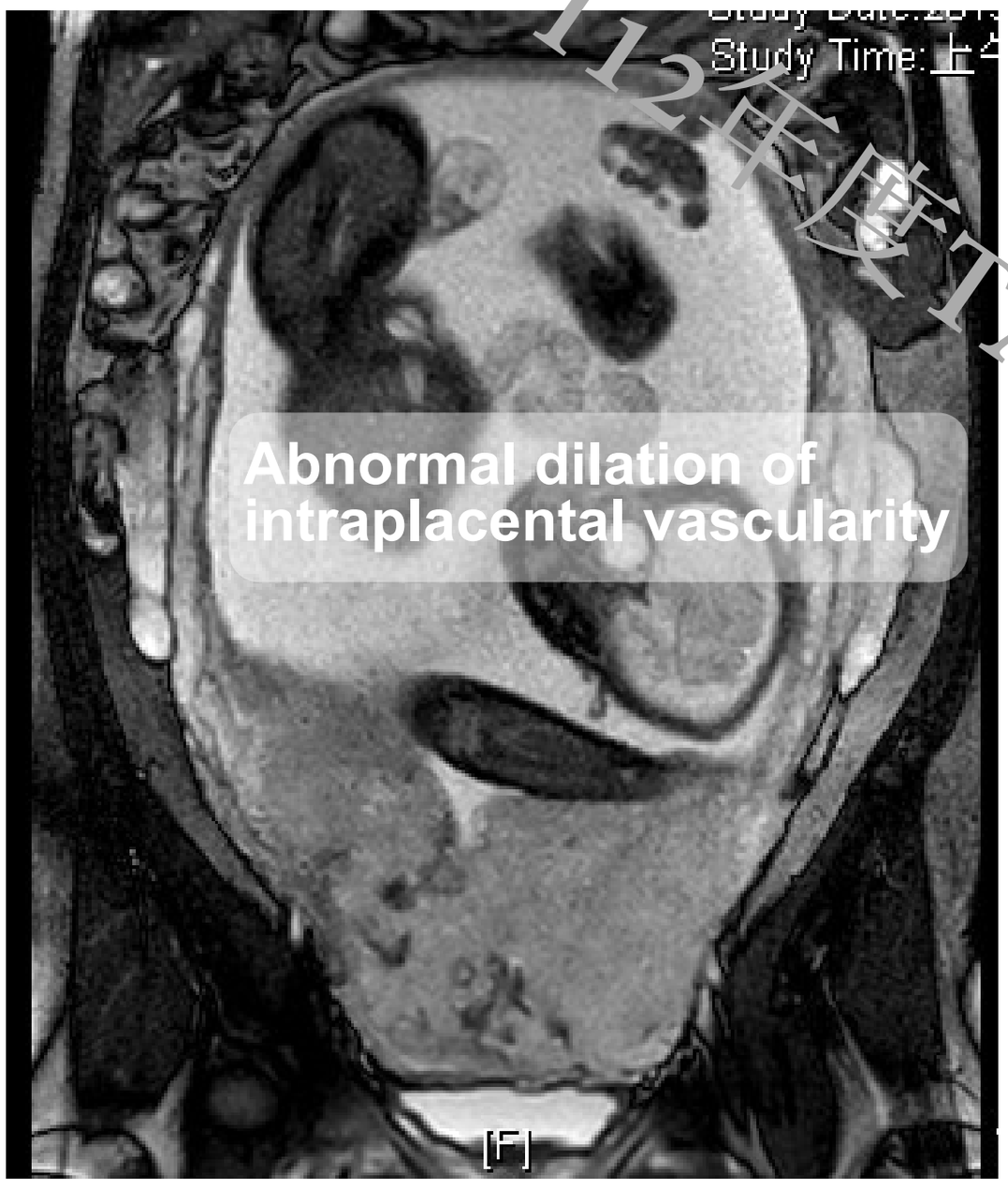
怎麼判讀MRI？

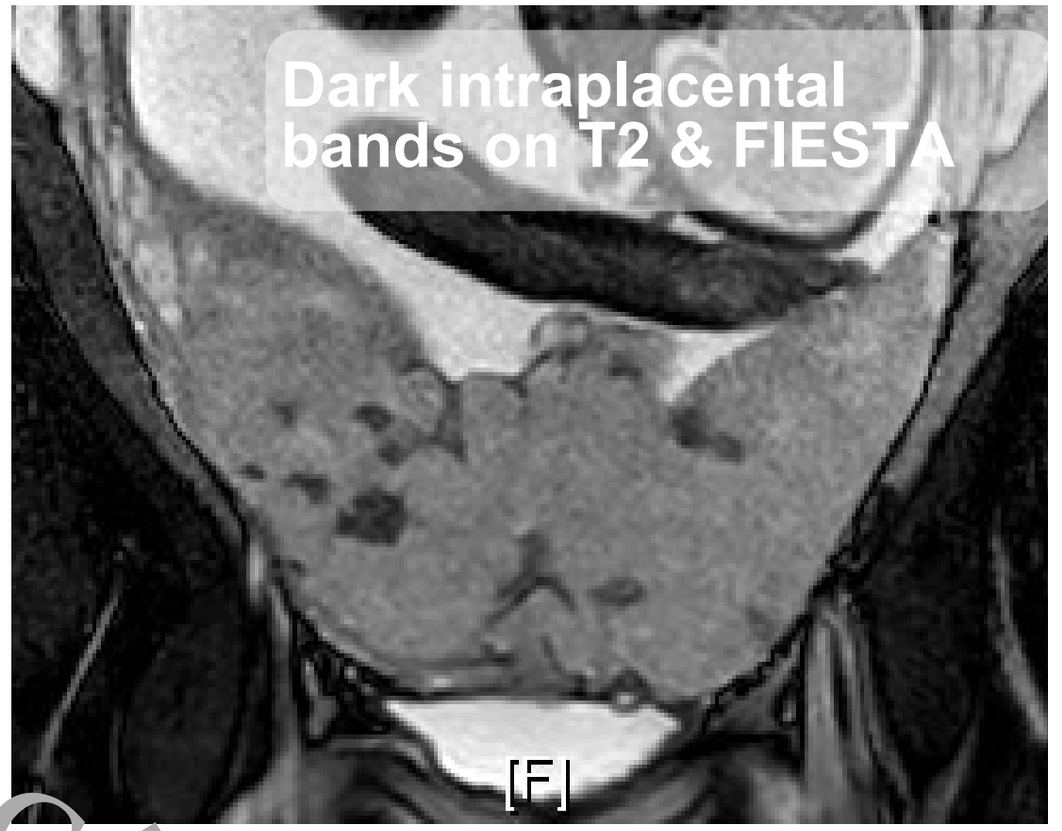


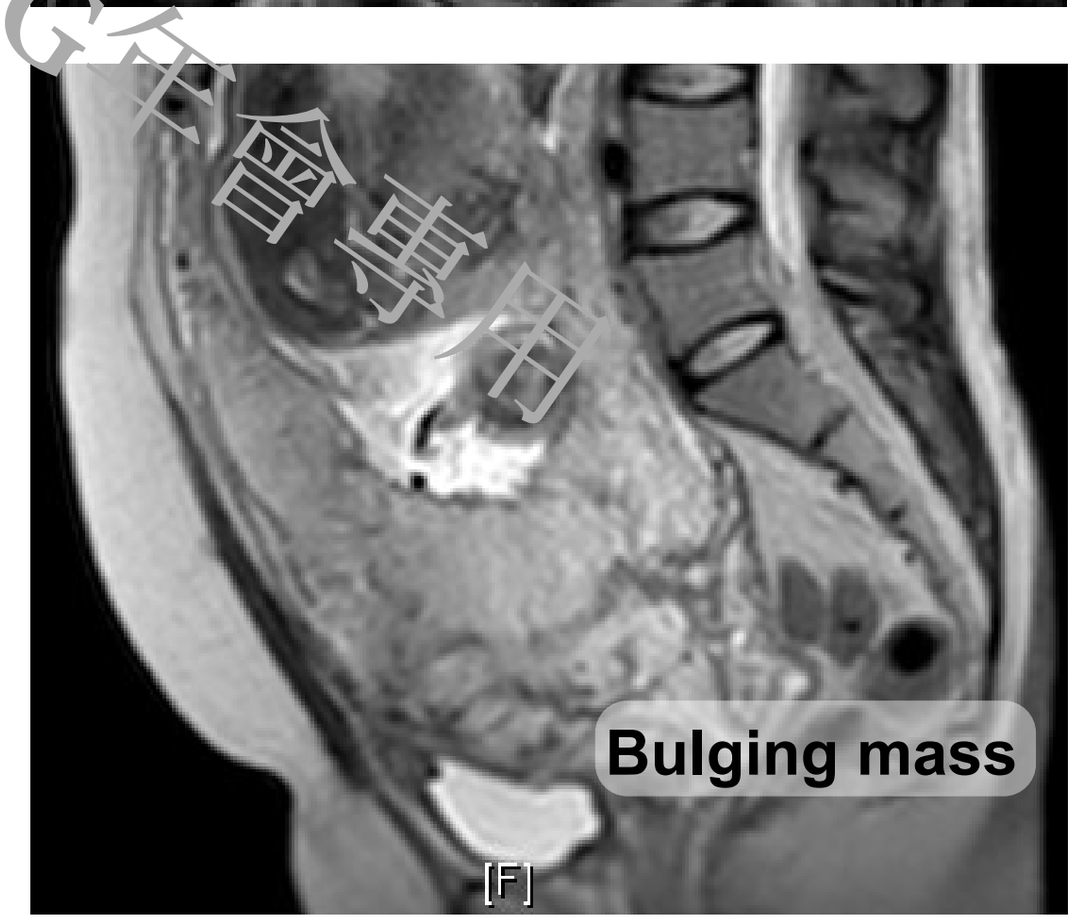




placenta increta at least







Case 4

- 37 y/o, G8**P4(all C/S)**SA2AA1, IVF pregnancy, no systemic disease
- Prenatal exams: WNL (amniocentesis: normal karyotype, GDM(-), PIH(-))

2019 08/22 — GA 24 weeks referred for suspect placenta accreta

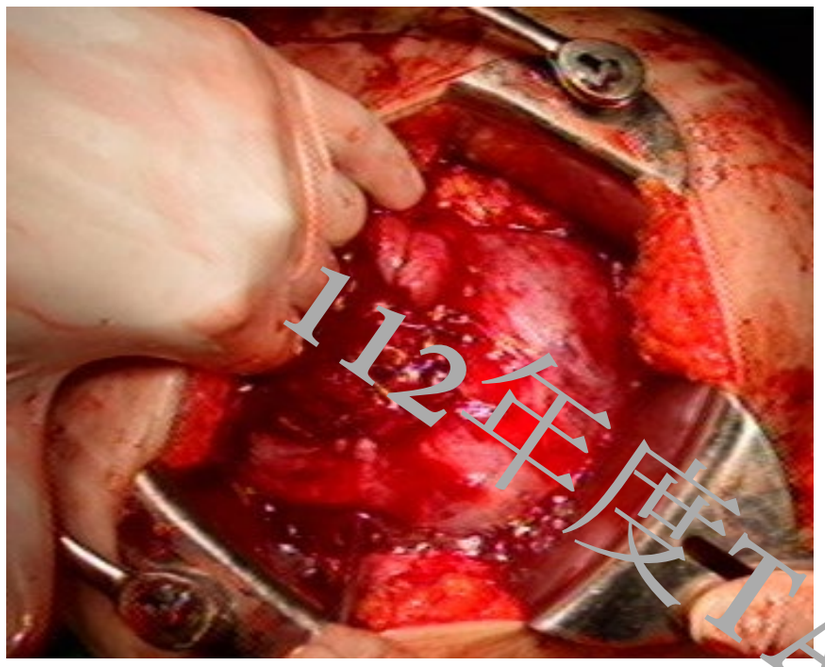
10/19 — GA 32 weeks Admitted due to massive vaginal bleeding

- Complete antenatal corticosteroid with betamethasone

10/28 — GA 33+ weeks Scheduled C/S with prophylactic TAE

- Right femoral sheath was placed firstly
- Longitudinal incision of abdomen and classical incision of uterus

10/28 **GA 33+ weeks** Scheduled C/S with prophylactic TAE



- Deliver a live male baby, 2530gm, Apgar score 7 → 8
- Placenta was left in situ
- Prophylactic TAE was performed after hemostasis
- Blood loss: 3200 ml (含羊水)
- Post-op antibiotic with unasyn

10/30 **Post-op day 2** Remove right femoral sheath

11/05 **Post-op day 8** Discharge

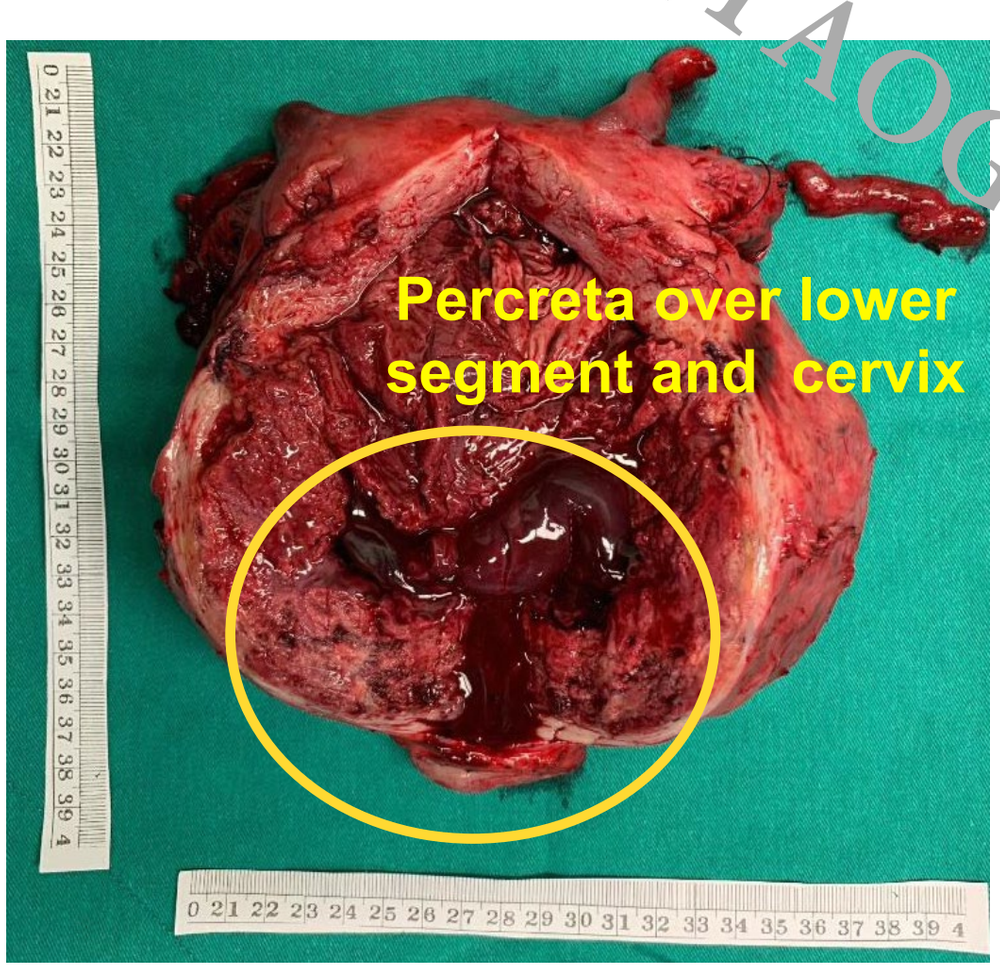
11/20

Post-op day 23 Visited ER due to fever 38.3°C with lower abdominal pain for 10 days

- Antibiotic with gentamicin + clindamycin
- Discussed with patient about scheduled operation of hysterectomy
- Culture: Enterococcus

11/25

Operation: ATH + BS



Summary

	Age	C/S	Placenta type	Blood loss	Management	PPH	Postpartum infection	Hysterectomy	Resorption time
Case 1	32	1	Acreta	550	Placenta extirpation				
Case 2	41	1	Percreta	1350	LPIS				6個月
Case 3	25	2	Percreta	200	LPIS	✓	✓		
Case 4	37	4	Percreta	3200	LIPS	✓	✓	✓	

LPIS: leaving placenta in situ

Pus/blood cultures

Pus culture (aerobic)	**Number (%)**
Escherichia coli	6 (50%)
Pus culture (anaerobic)	**Number (%)**
Peptostreptococcus species	5 (41.7%)
Bacteroides species	4 (33.3%)
Clostridium species	2 (16.7%)
Finegoldia magna	2 (16.7%)
Enterococcus species	1 (8.3%)
Enterobacter cloacae	1 (8.3%)
Streptococcus gallolyticus	1 (8.3%)
Propionibacterium species	1 (8.3%)
Gardnerella vaginalis	1 (8.3%)
Blood culture (aerobic)	**Number (%)**
Escherichia coli	2 (16.7%)
Blood culture (anerobic)	**Number (%)**
Enterobacter cloacae	1 (8.3%)

Placenta accreta spectrum (PAS)

2018年FIGO已”不建議”使用morbidly adherent placenta

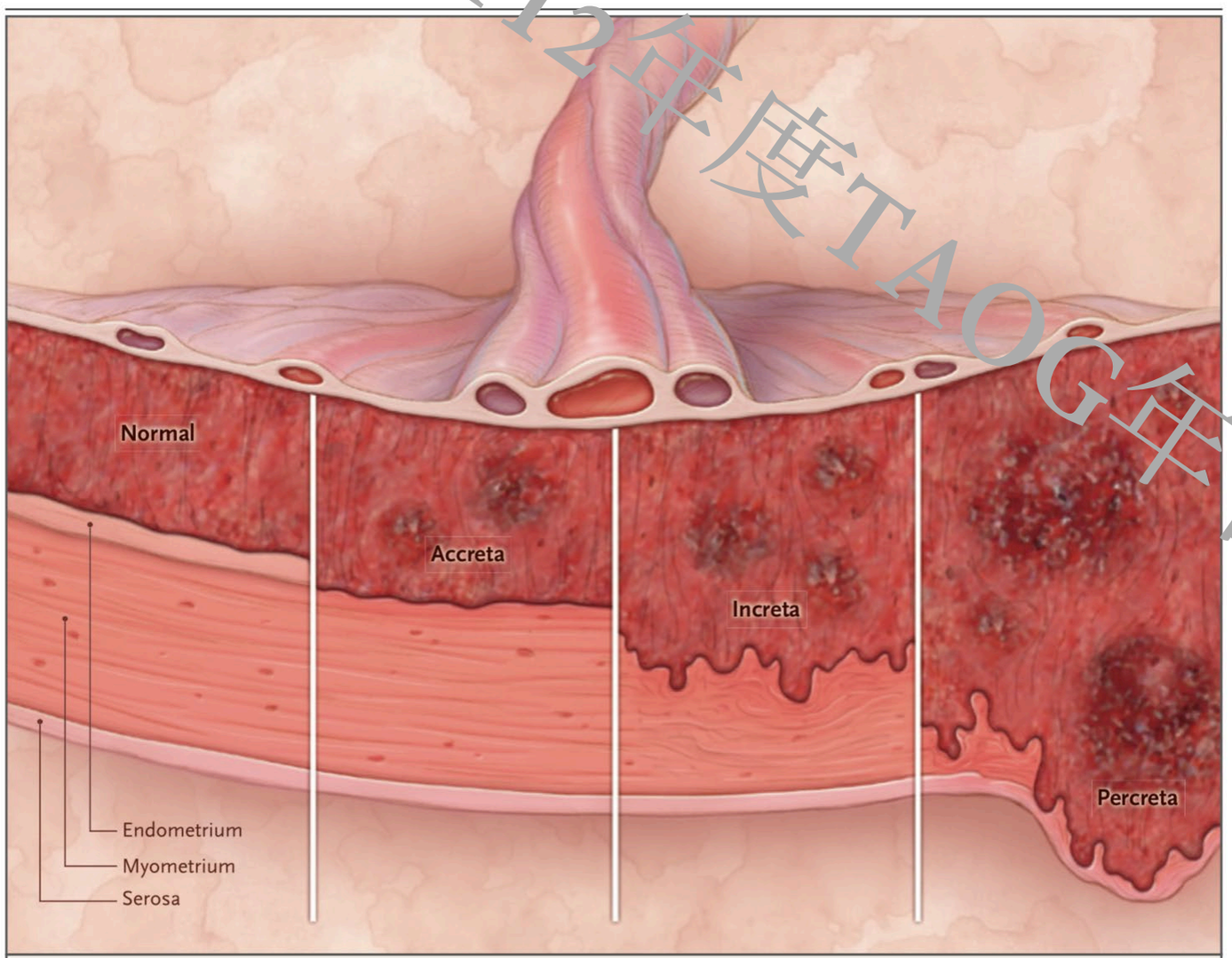


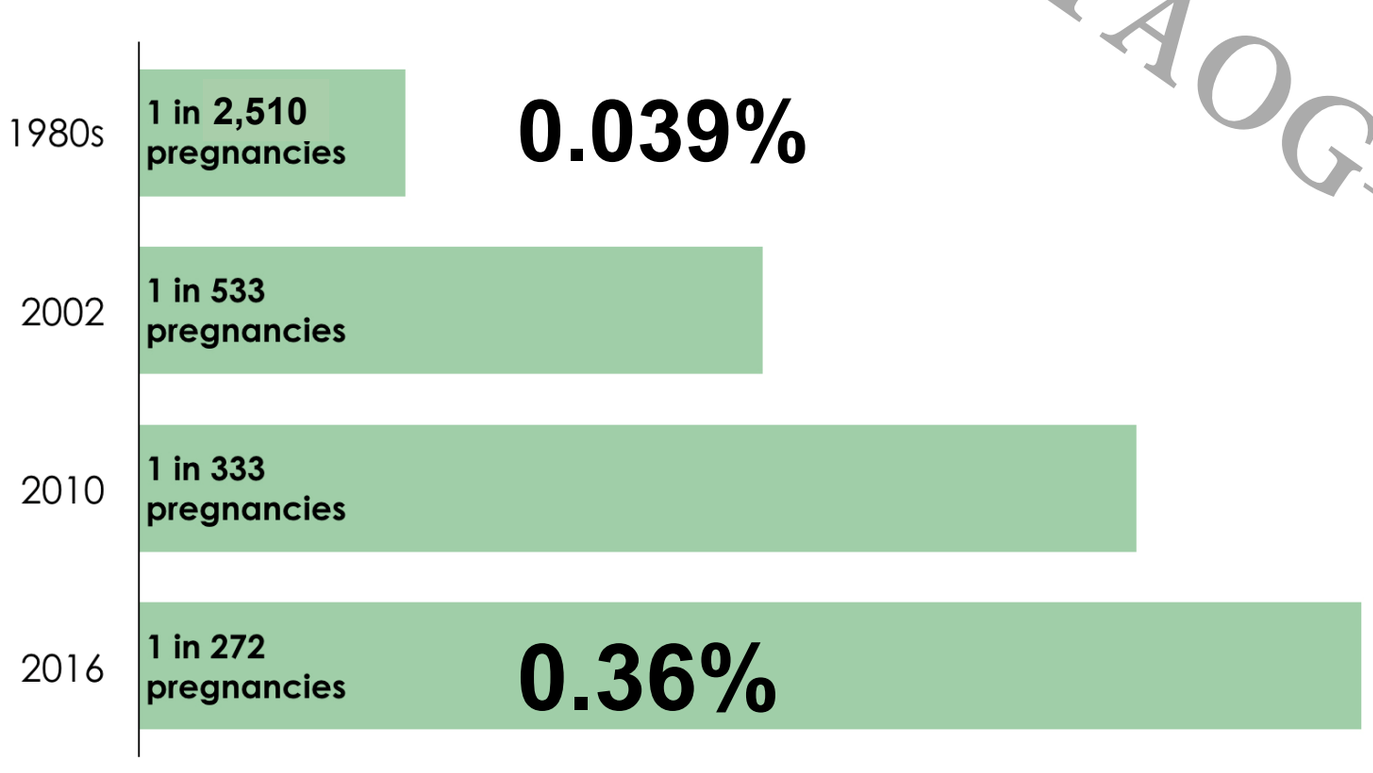
Figure 1. Placenta Accreta, Increta, and Percreta.

- Placenta **Accreta**
- Placenta **Increta**
- Placenta **Percreta**

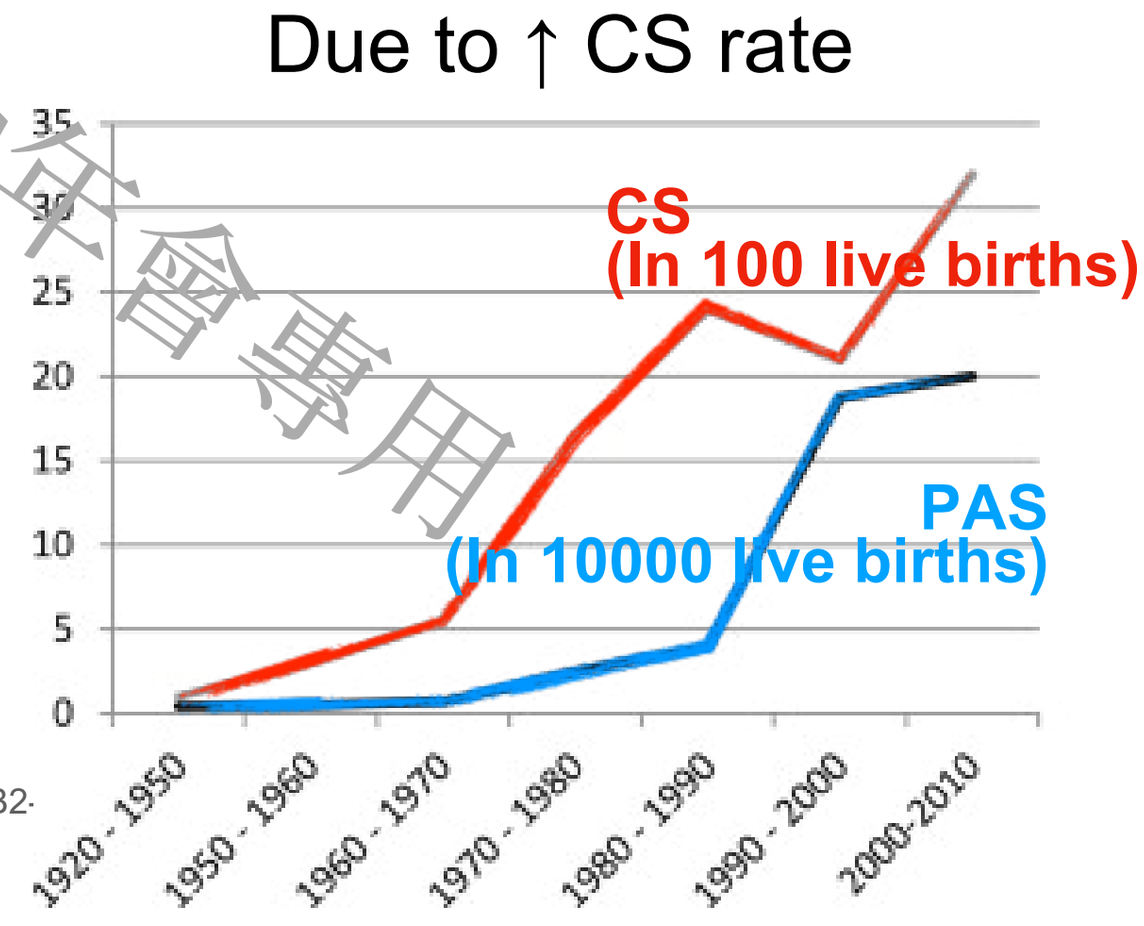
Luke RK, Sharpe JW, Greene RR. Placenta accreta: The adherent or invasive placenta. Am J Obstet Gynecol. 1966;95:660–668.

Incidence

- Result from deciduomyometrium defect, usually due to surgical trauma
- Incidence in the US increased dramatically over the past 4 decades



Placenta Accreta Spectrum. Am J Obstet Gynecol. 2018 Dec;219(6):B2-

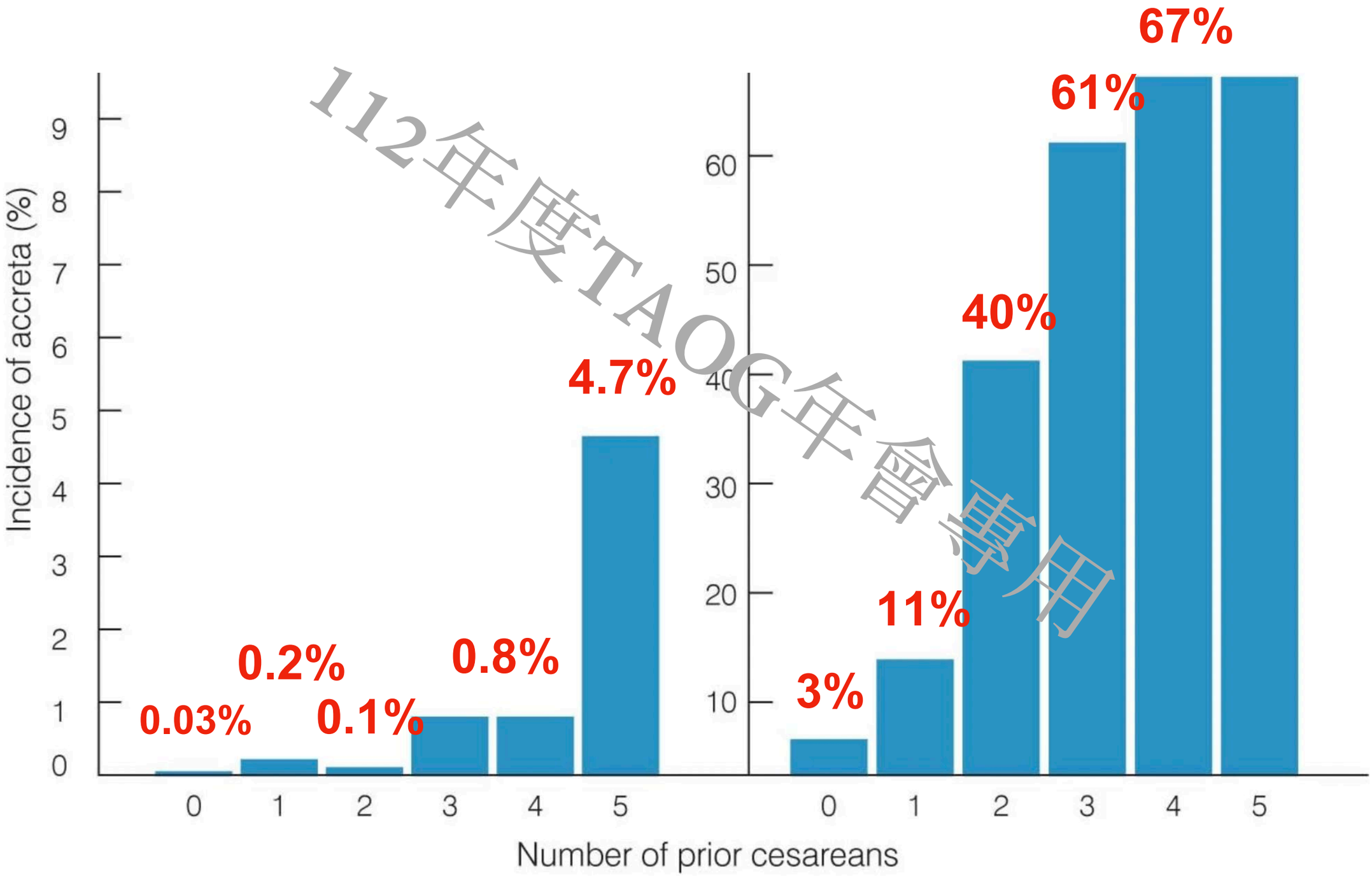


Obstet Gynecol Clin North Am. 2013 Mar;40(1):137-54.

Most important risk factor is placenta previa after a prior C/S

Without current previa

With current previa



Obstet Gynecol. 2006;107(6):1226

WILEY International Journal of Gynecology Obstetrics FIGO

DOI: 10.1002/ijgo.12407

FIGO consensus guidelines on placenta accreta spectrum disorders: Epidemiology☆,★

TABLE 3 Primary and secondary uterine pathologies reported to be associated with placenta accreta spectrum (PAS) disorders.[a]

Classification	Type of uterine pathologies
1 Direct surgical scar	Cesarean delivery
	Surgical termination of pregnancy
	Dilatation and curettage
	Myomectomy
	Endometrial resection
	Asherman's syndrome
2 Nonsurgical scar	IVF procedures
	Uterine artery embolization
	Chemotherapy and radiation
	Endometritis
	Intra-uterine device
	Manual removal of placenta
	Previous accreta
3 Uterine anomalies	Bicornuate uterus
	Adenomyosis
	Submucous fibroids
	Myotonic dystrophy

Possible microscopic endometrial defects

- IVF / ICSI
  - Cryopreserved ET, HRT cycle

Fertility and sterility 103.5 (2015): 1176-1184.
Journal of Obstetrics and Gynaecology Research 45.12 (2019): 2394-2399.

- May explain the rare occurrence in primi-women with no hx of uterine surgery
- Lack of clear evidence

PAS診斷

Risk factors

+

Ultrasound

- women with risk factors for PAS should be evaluated ultrasound by expertise
- Equally important as predictor of PAS by ultrasound findings

PAS診斷

Risk factors

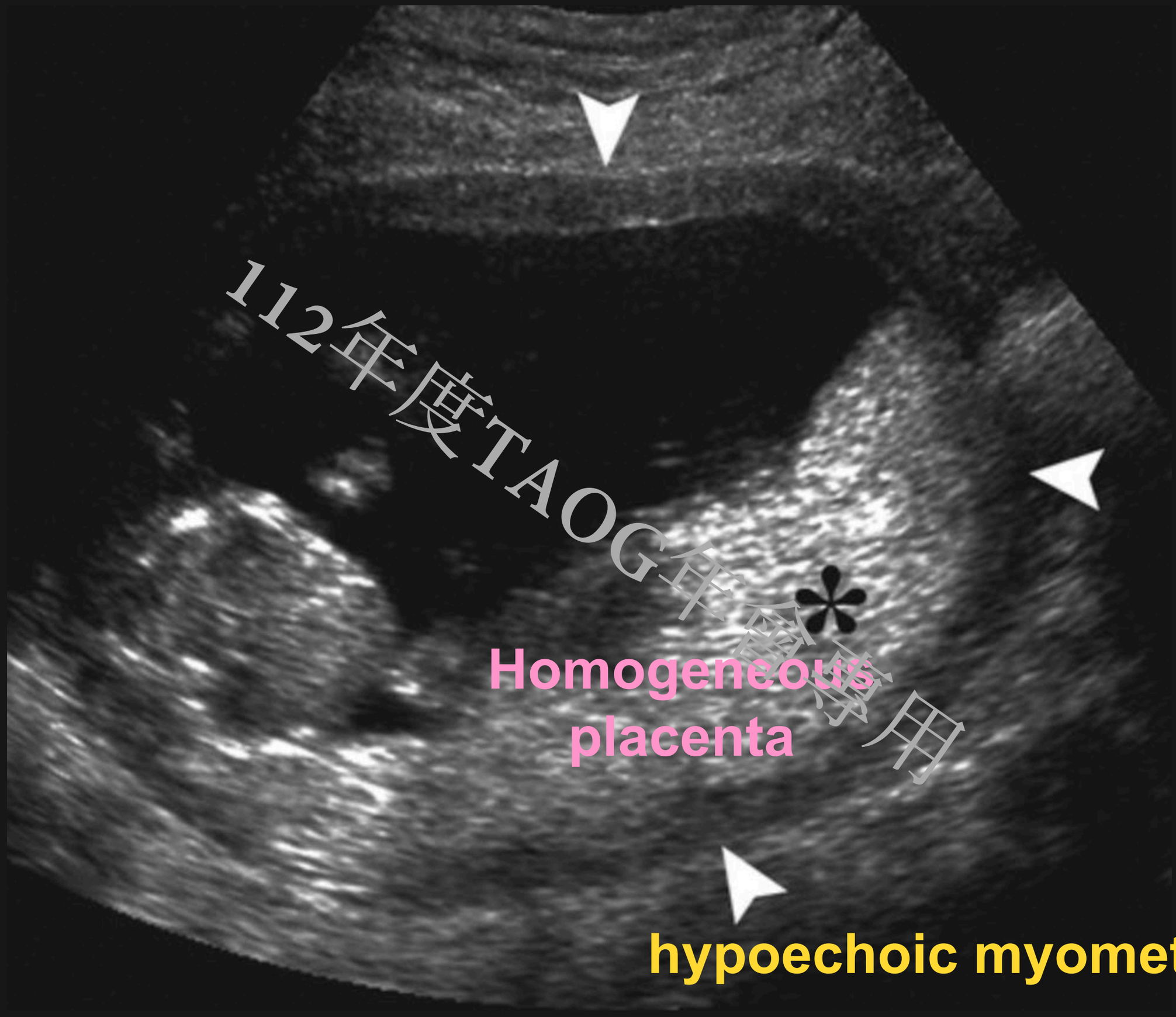
+

Ultrasound

MRI ?

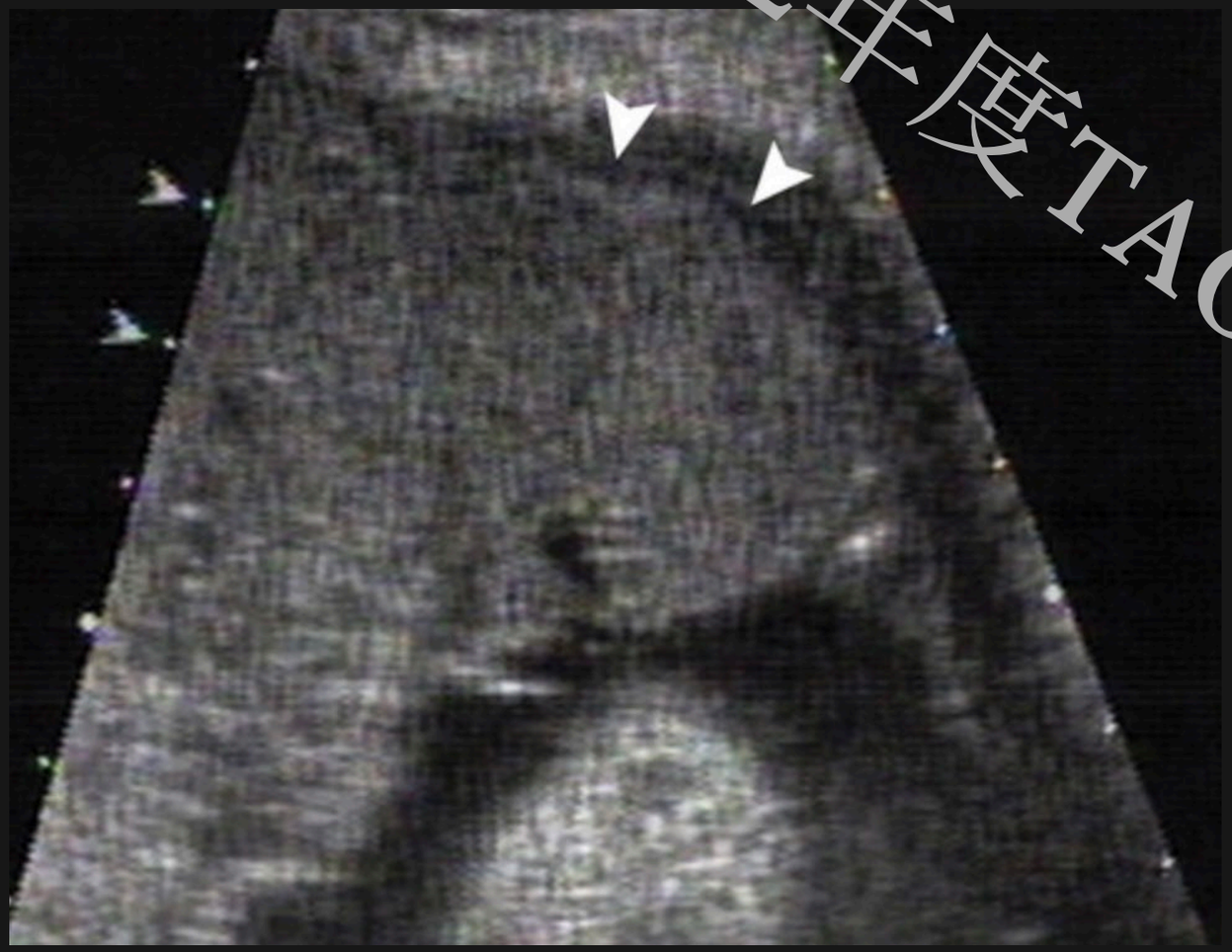
- MRI is being increasingly used both as a diagnostic adjunct and for pre-procedural planning
- provides valuable information on the topography and depth of placental invasion

What is normal ?

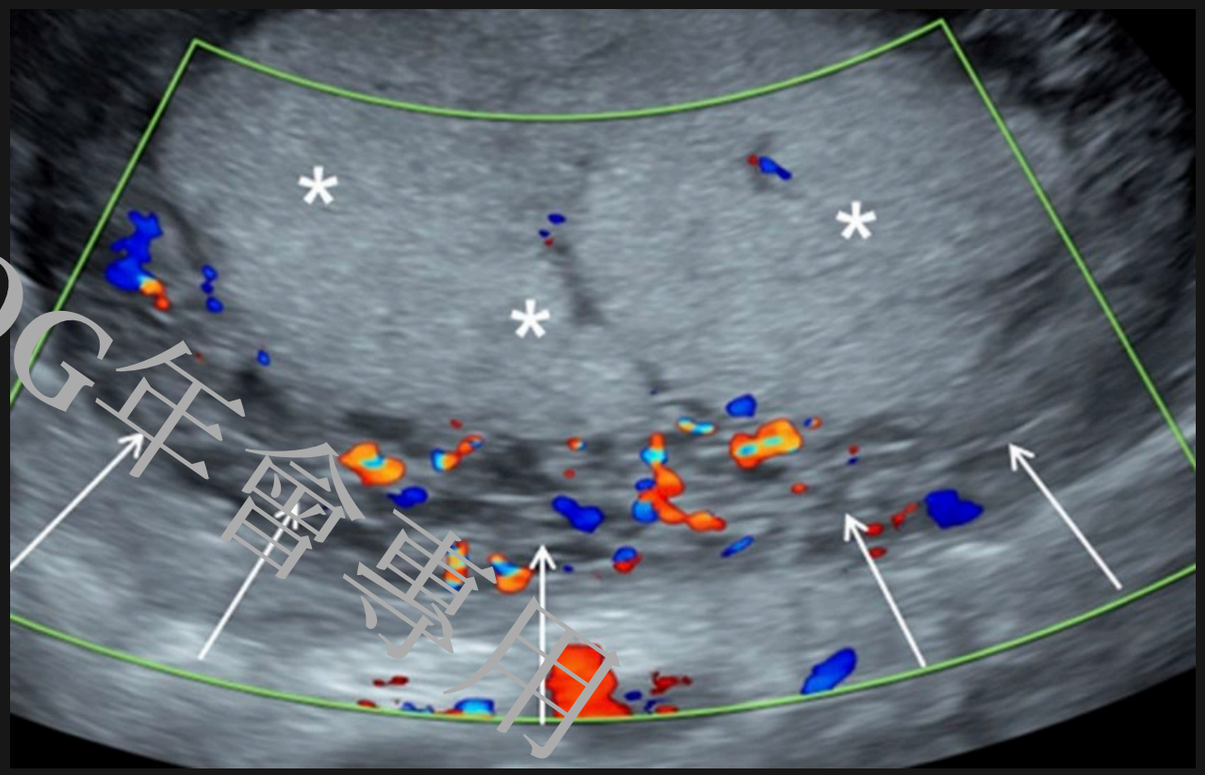


Radiographics 28.7 (2008): 1905-1916

subplacental clear zone



organized pattern of subplacental blood flow



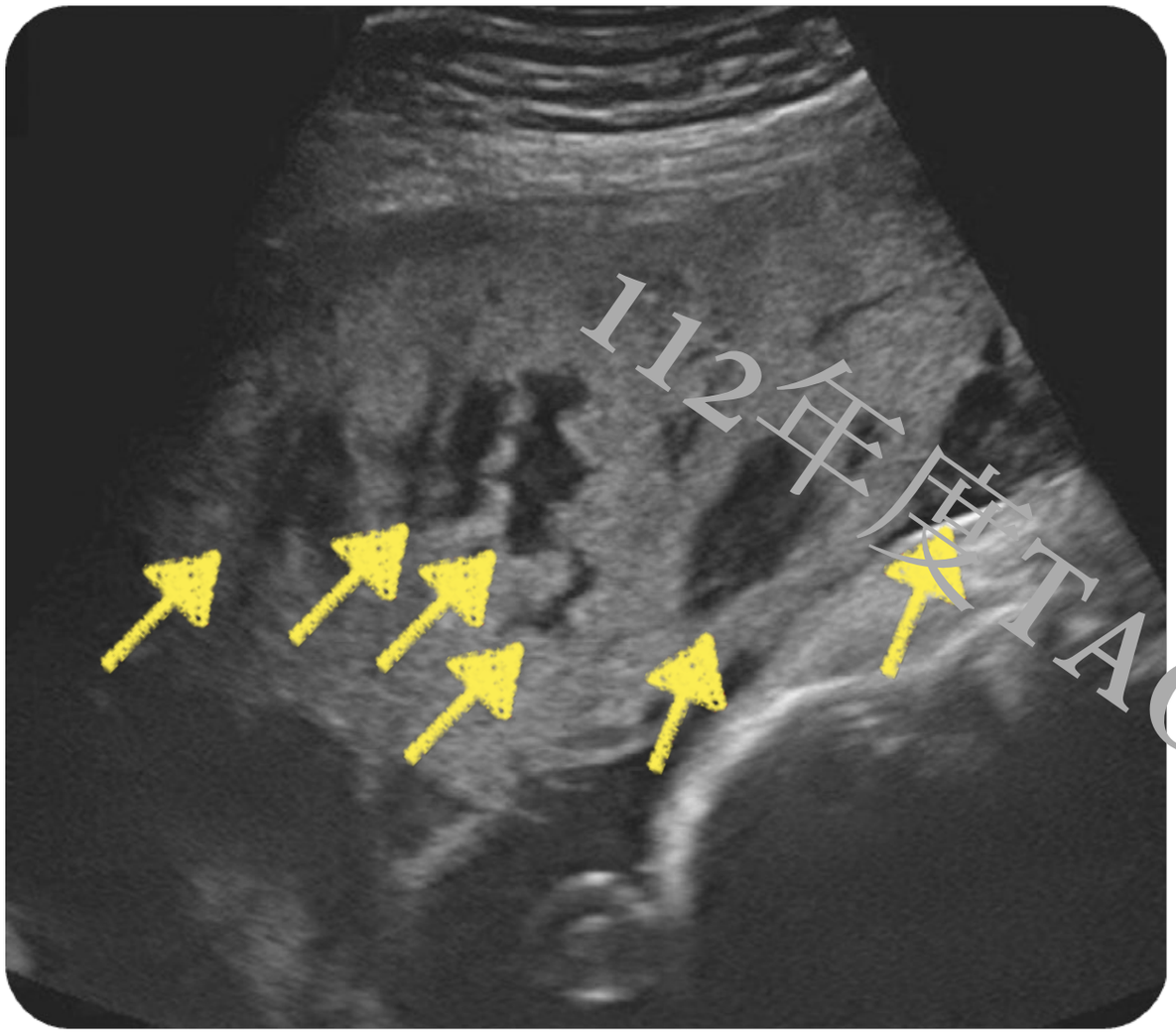
Radiographics 28.7 (2008): 1905-1916
Curr Radiol Rep (2019) 7:11

Standardized descriptions of ultrasound signs in PAS

by the European Working Group on Abnormally Invasive Placenta (WE-AIP)

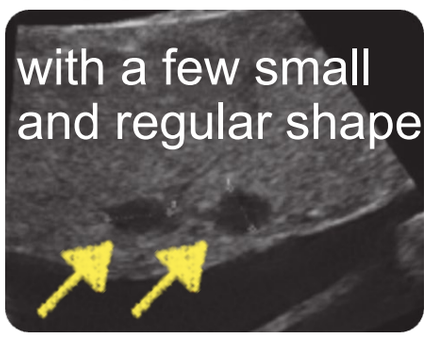
US finding	*EW-AIP suggested standardized definition*
2D grayscale	
Loss of 'clear zone' (Figure 1)	Loss, or irregularity, of hypoechoic plane in myometrium underneath placental bed ('clear zone')
Abnormal placental lacunae (Figure 2)	Presence of numerous lacunae including some that are large and irregular (Finberg Grade 3), often containing turbulent flow visible on grayscale imaging
Bladder wall interruption (Figure 3)	Loss or interruption of bright bladder wall (hyperechoic band or 'line' between uterine serosa and bladder lumen)
Myometrial thinning (Figure 4)	Thinning of myometrium overlying placenta to < 1 mm or undetectable
Placental bulge (Figure 5)	Deviation of uterine serosa away from expected plane, caused by abnormal bulge of placental tissue into neighboring organ, typically bladder; uterine serosa appears intact but outline shape is distorted
Focal exophytic mass (Figure 6)	Placental tissue seen breaking through uterine serosa and extending beyond it; most often seen inside filled urinary bladder
2D color Doppler	
Uterovesical hypervascularity (Figure 7)	Striking amount of color Doppler signal seen between myometrium and posterior wall of bladder; this sign probably indicates numerous, closely packed, tortuous vessels in that region (demonstrating multidirectional flow and aliasing artifact)
Subplacental hypervascularity (Figure 8)	Striking amount of color Doppler signal seen in placental bed; this sign probably indicates numerous, closely packed, tortuous vessels in that region (demonstrating multidirectional flow and aliasing artifact)
Bridging vessels (Figure 9)	Vessels appearing to extend from placenta, across myometrium and beyond serosa into bladder or other organs; often running perpendicular to myometrium
Placental lacunae feeder vessels (Figure 10)	Vessels with high-velocity blood flow leading from myometrium into placental lacunae, causing turbulence upon entry
3D ultrasound ± power Doppler	
Intraplacental hypervascularity (Figure 11)	Complex, irregular arrangement of numerous placental vessels, exhibiting tortuous courses and varying calibers
Placental bulge	(as in 2D)
Focal exophytic mass	(as in 2D)
Uterovesical hypervascularity	(as in 2D)
Bridging vessels	(as in 2D)

Abnormal placental lacunae

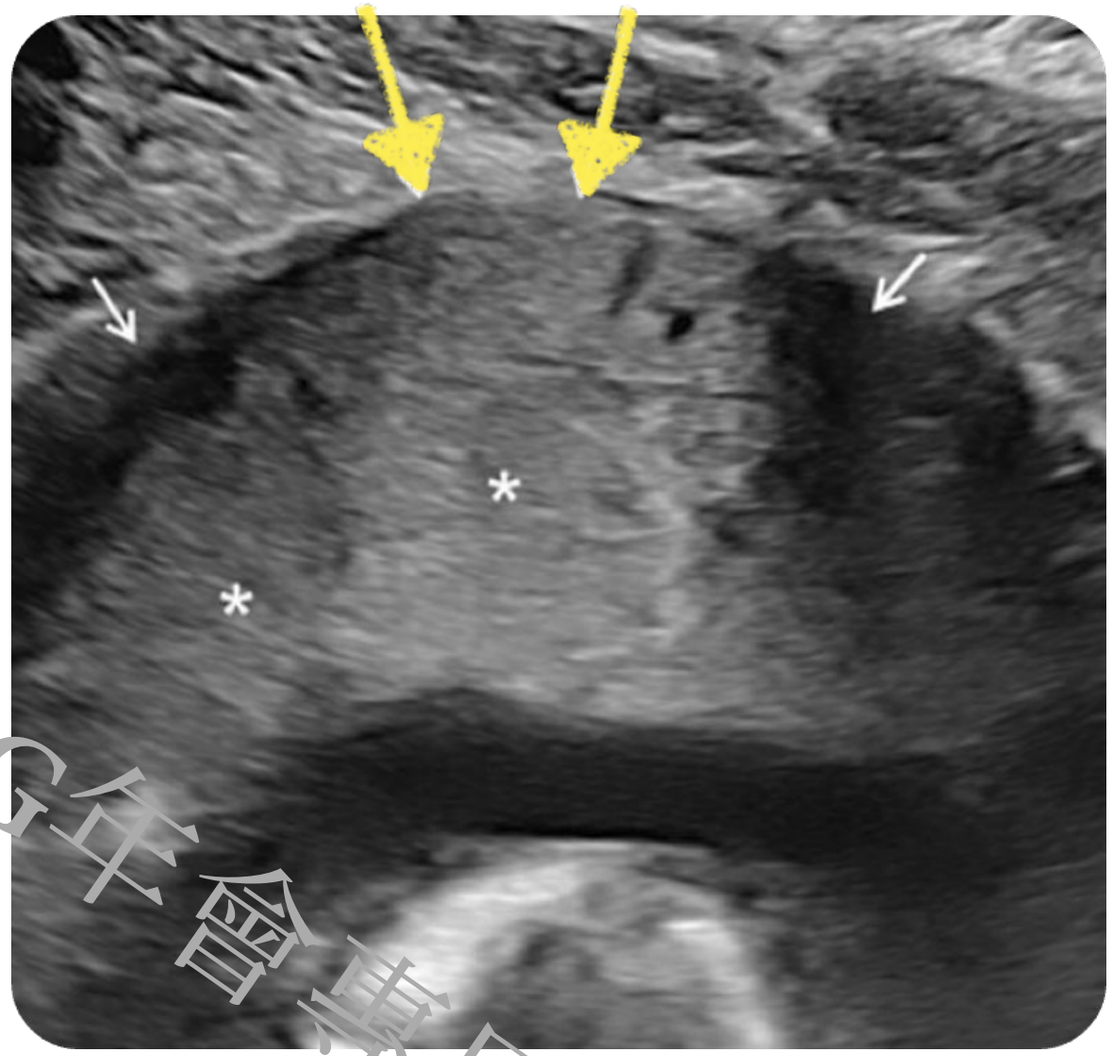


- Multiple **irregular** sonolucent spaces
- Moth-eaten appearance

- Normal:



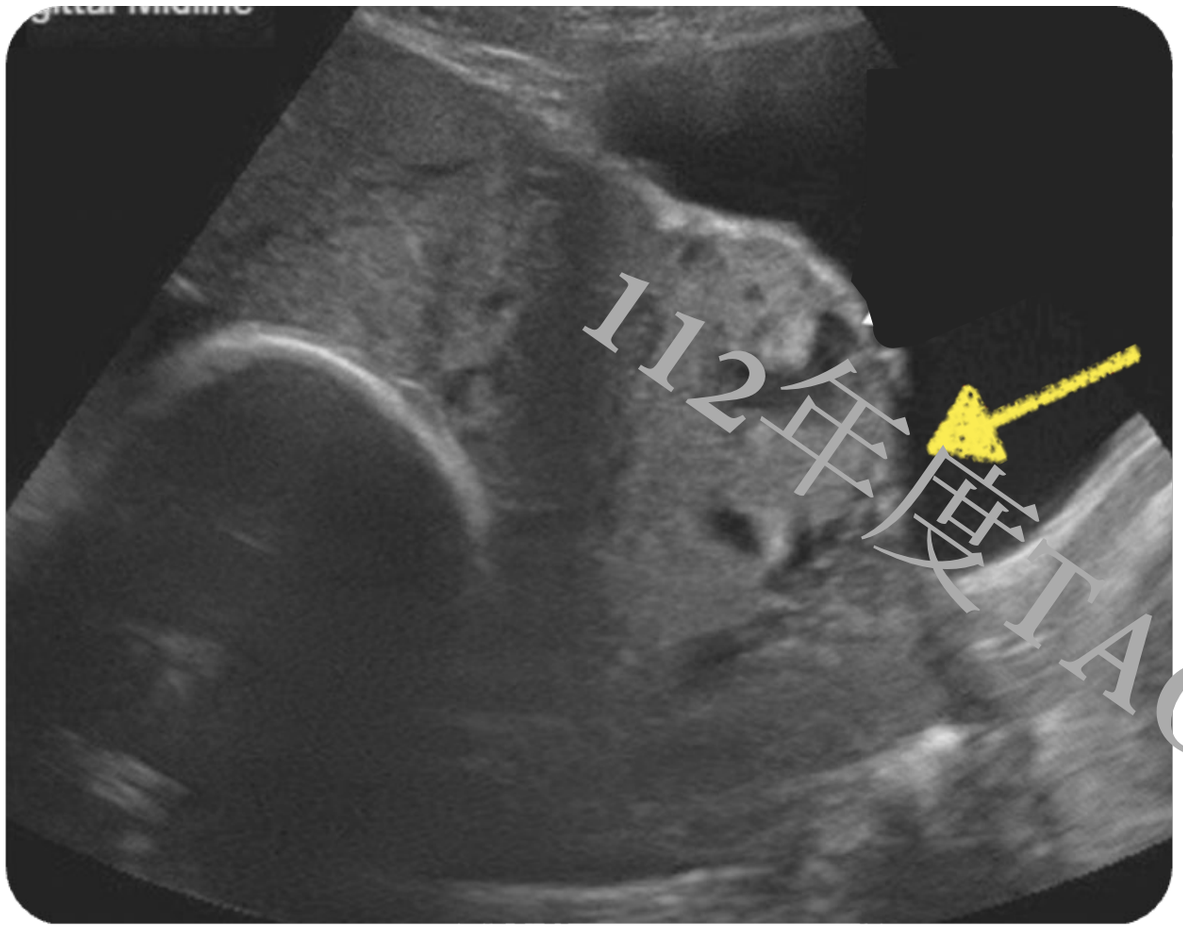
Loss of the clear zone



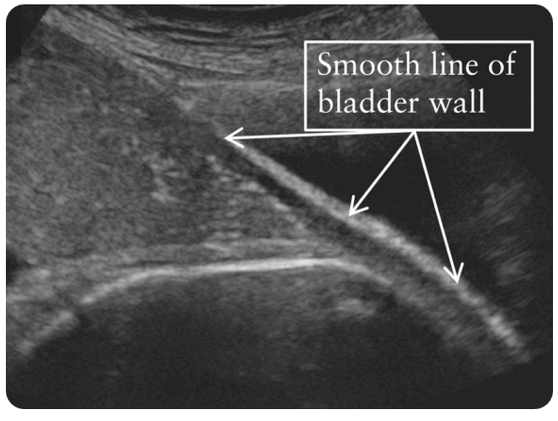
- clear zone may be missing or irregular
- This sign can be obscured by
  - pressure from the ultrasound probe
  - bladder filling
  - advancing GA

J Ultrasound Med 1992;11:333-43.
Current Radiology Reports, 2019, 7.4: 1-9
Proposal for standardized ultrasound descriptors of abnormally invasive placenta (AIP). 2016

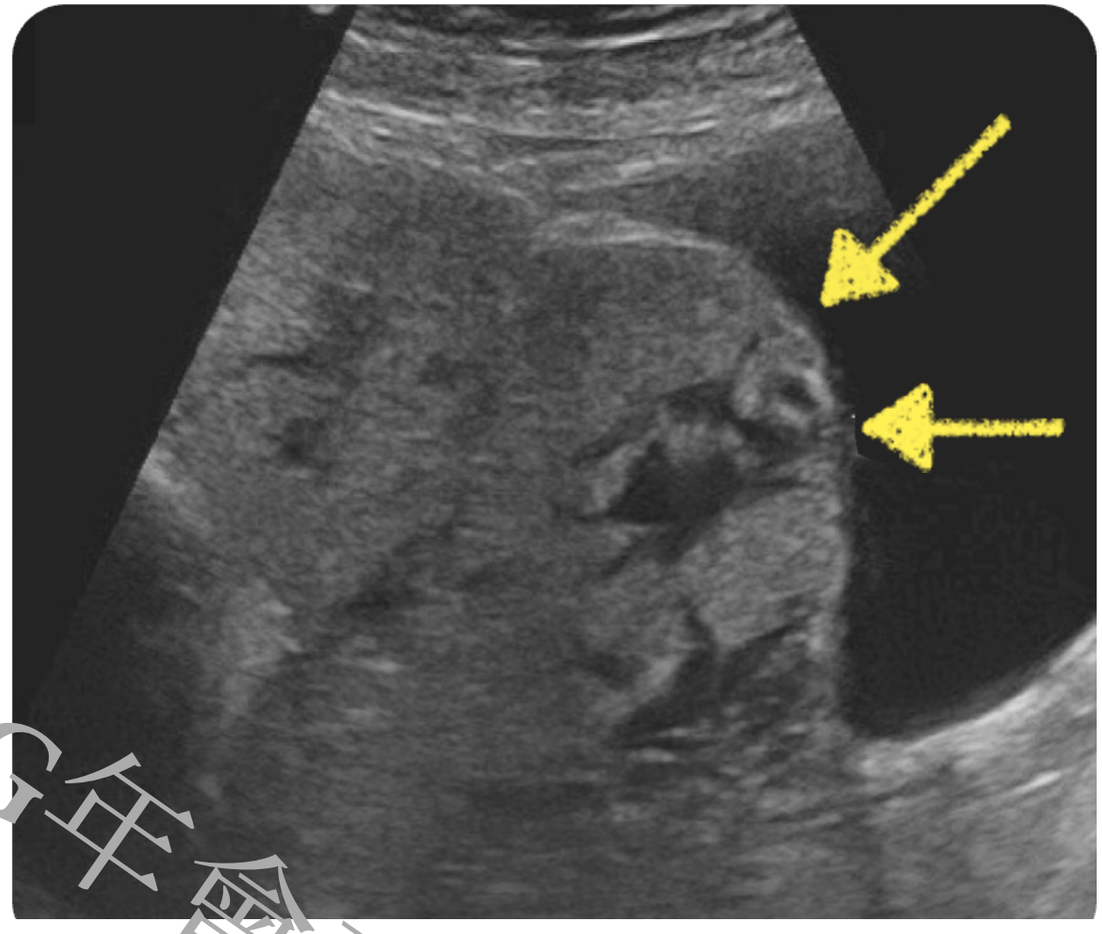
Bladder wall interruption



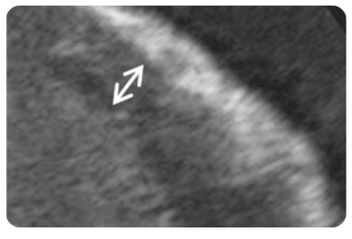
- Loss or interruption of bright bladder wall
- Normal:

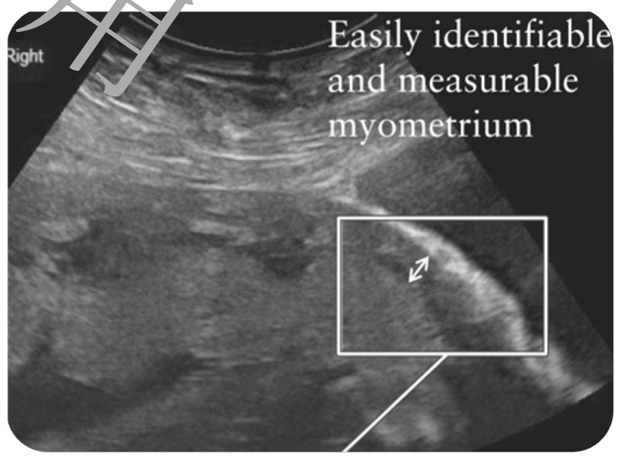


Myometrial thinning



- < 1 mm
- Normal:





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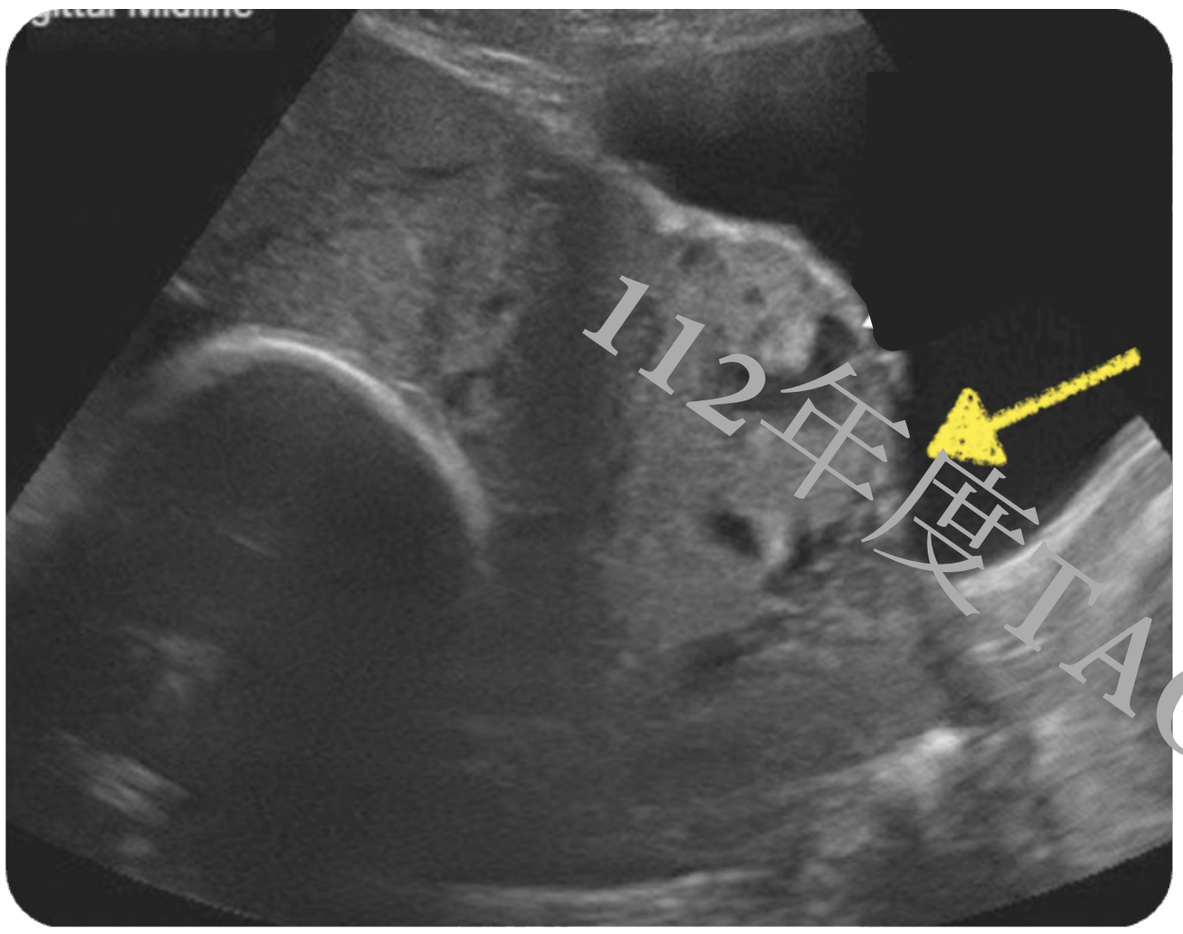
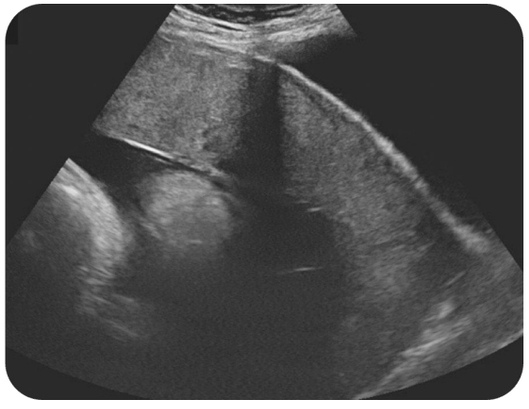
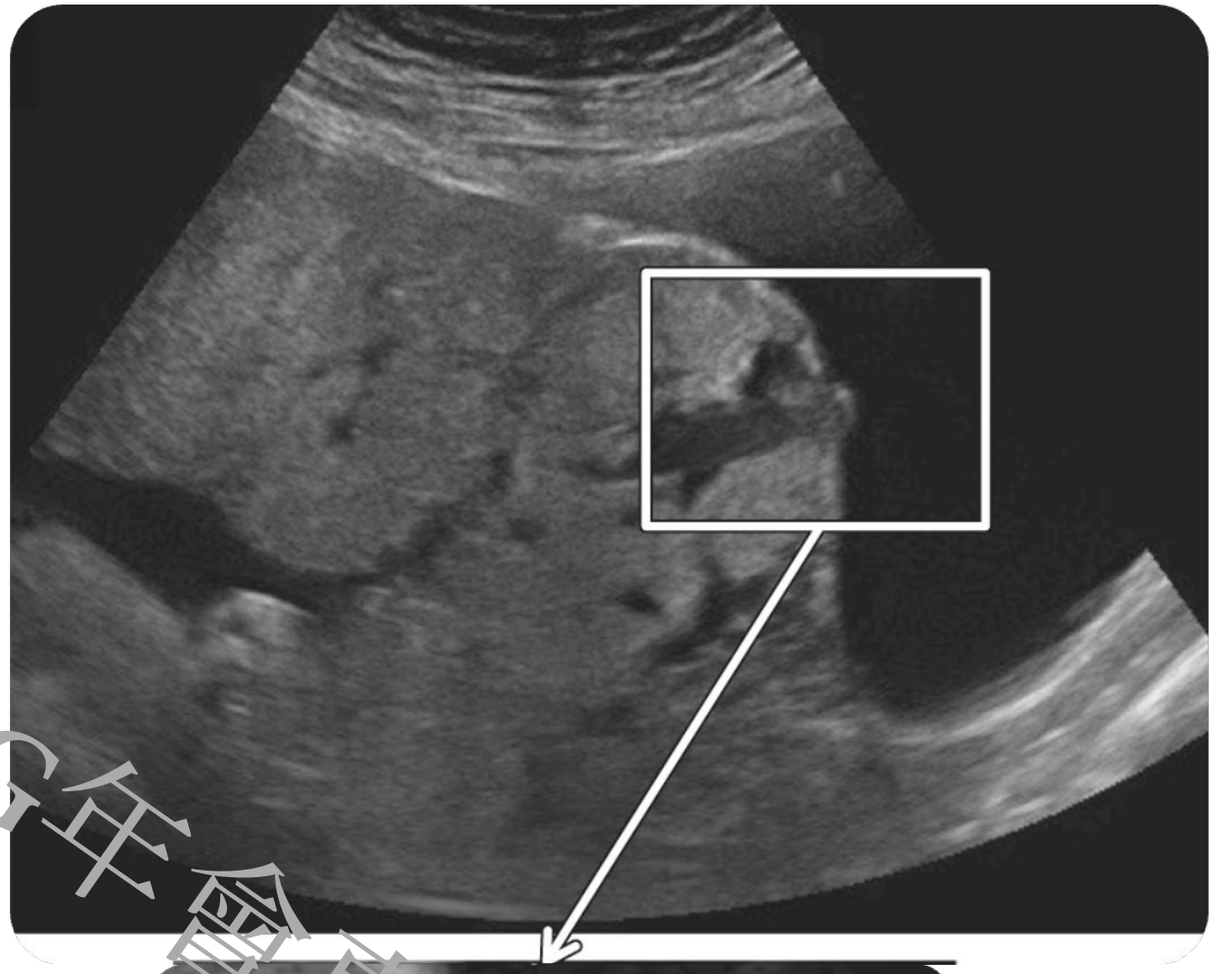
Placental bulge

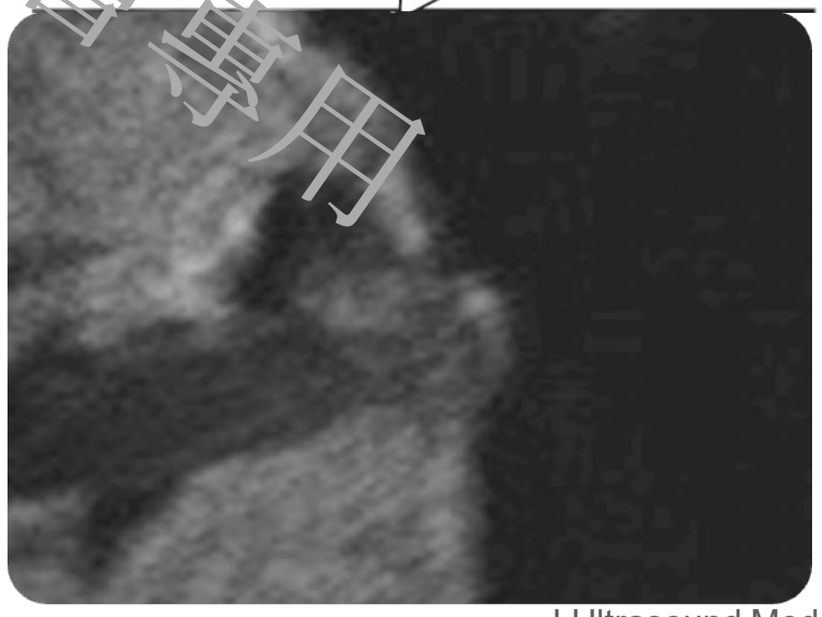


- Deviation of uterine serosa away from expected plane
- Normal:



Focal exophytic mass





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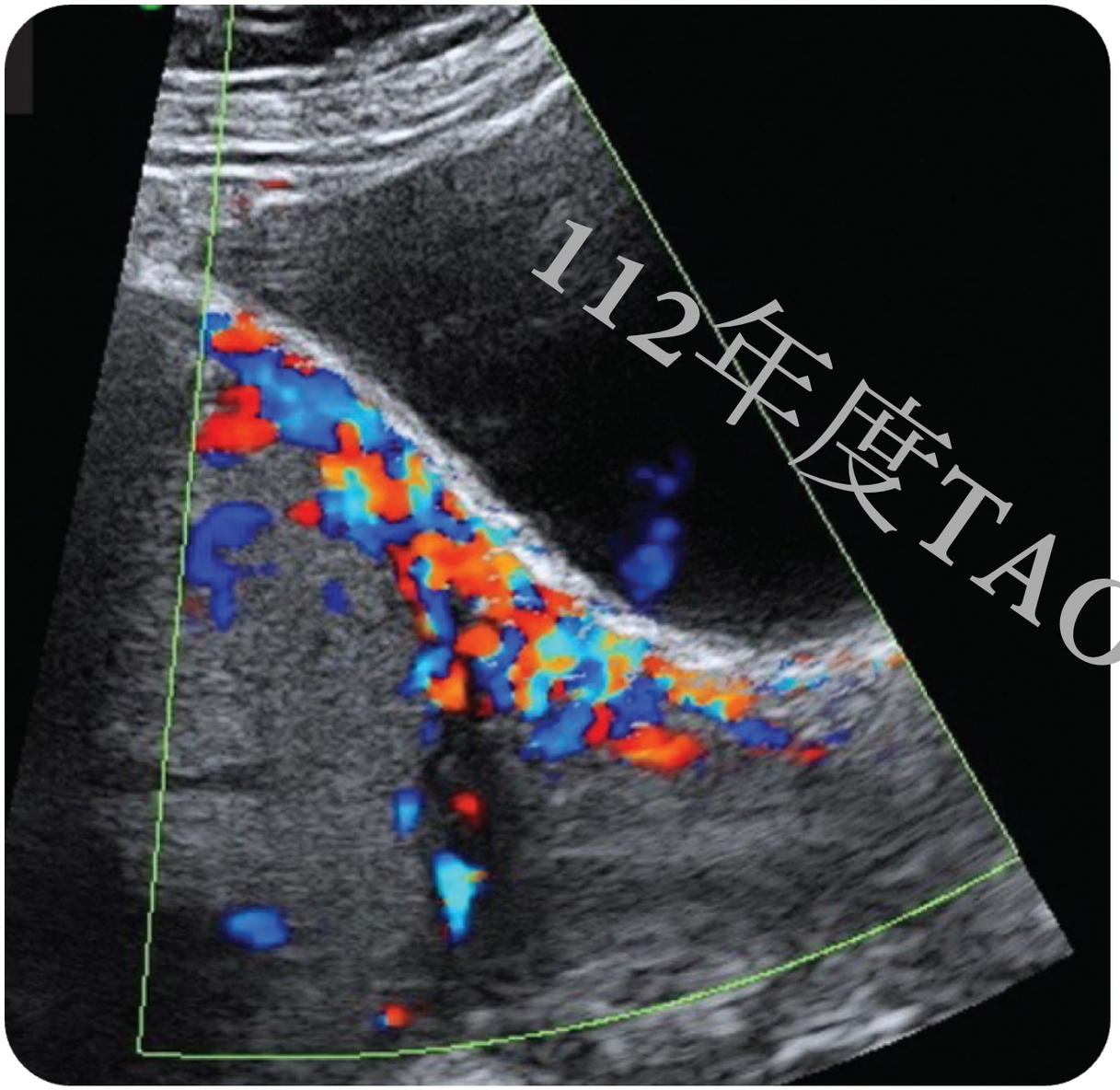
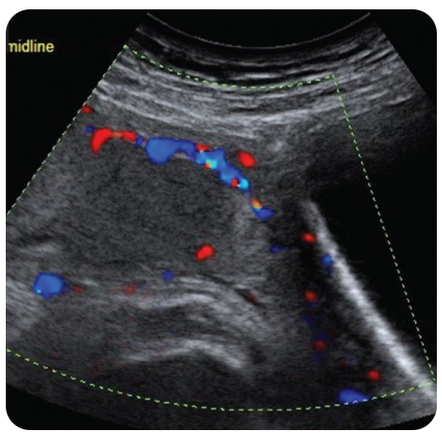
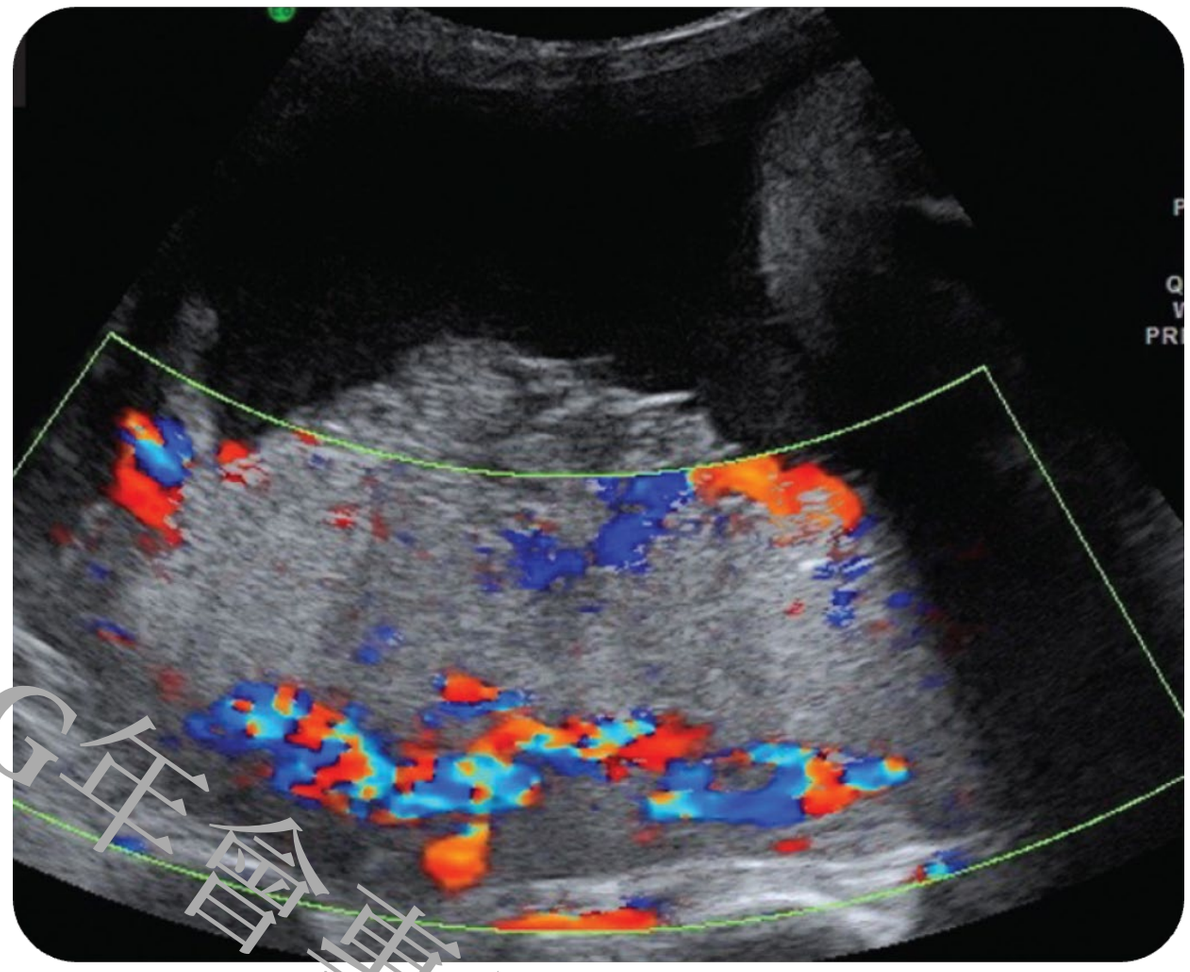
Uterovesical hypervascularity



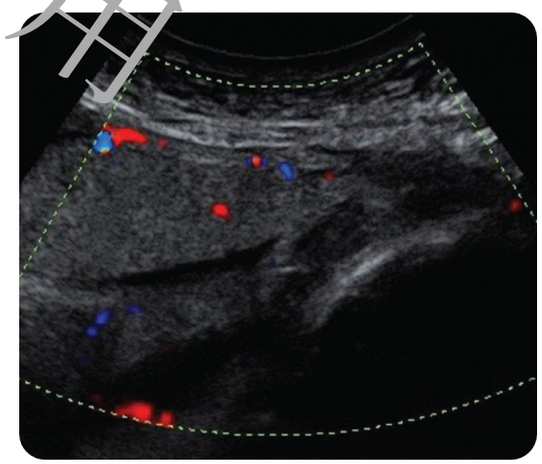
- Normal:



Subplacental hypervascularity

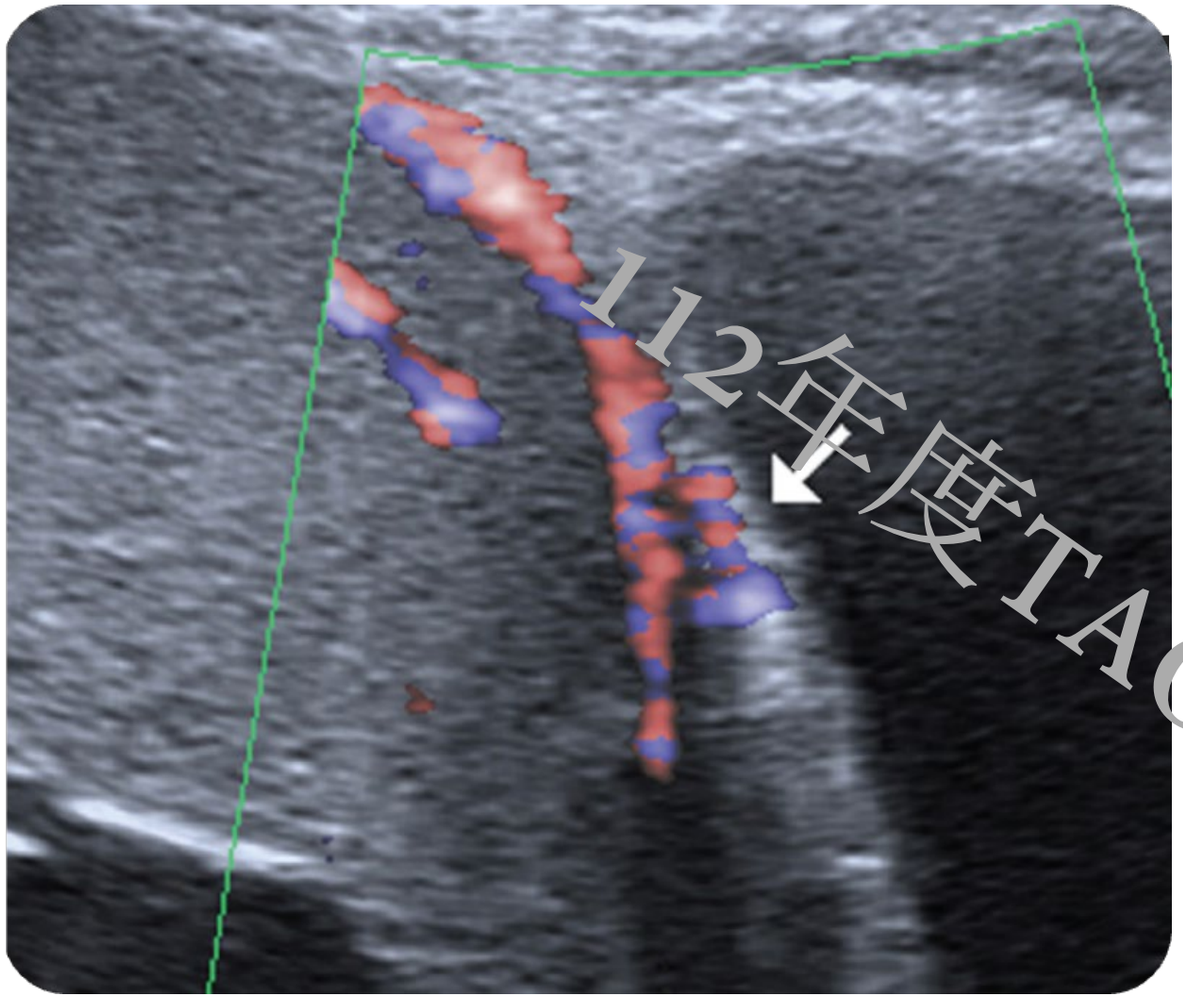


- Normal:



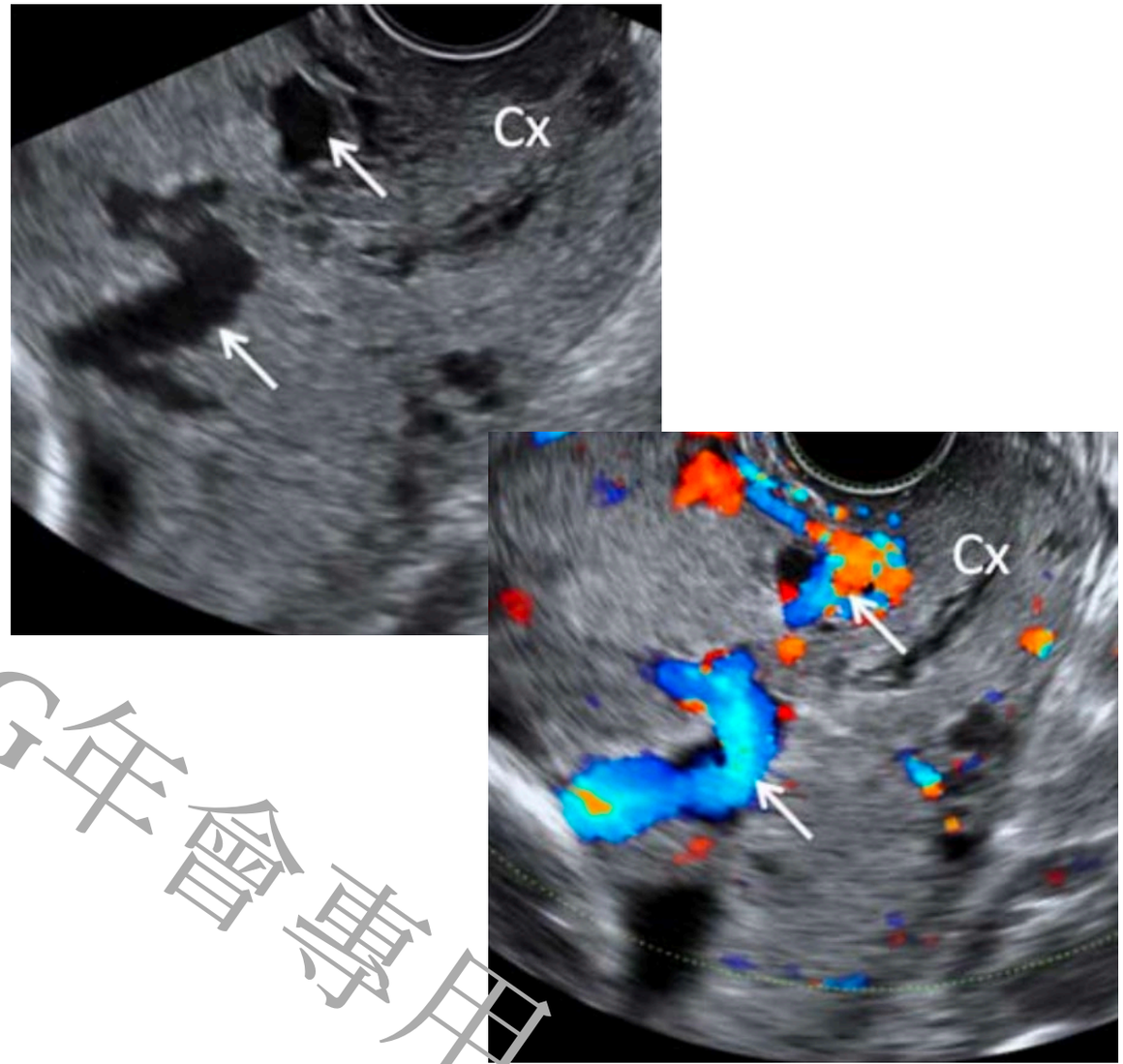
J Ultrasound Med 1992;11:333-4
Current Radiology Reports, 2019, 7.4:
Proposal for standardized ultrasound descriptors of abnormally invasive placenta (AIP

Bridging vessels



- Vessels extend from into bladder or other organs
- often perpendicular to myometrium

Placental lacunae vessels



- Vessels with high-velocity blood flow leading from myometrium into placental lacunae, causing turbulence upon entry

J Ultrasound Med 1992;11:333-4
Current Radiology Reports, 2019, 7.4:
Proposal for standardized ultrasound descriptors of abnormally invasive placenta (AIP

MRI signs

Gross morphologic signs

- Placental/uterine bulge
- Bladder wall interruption
- Focal exophytic mass
- Asymmetric thickening/shape of placenta (SAR-ESUR uncertain)

Interface signs

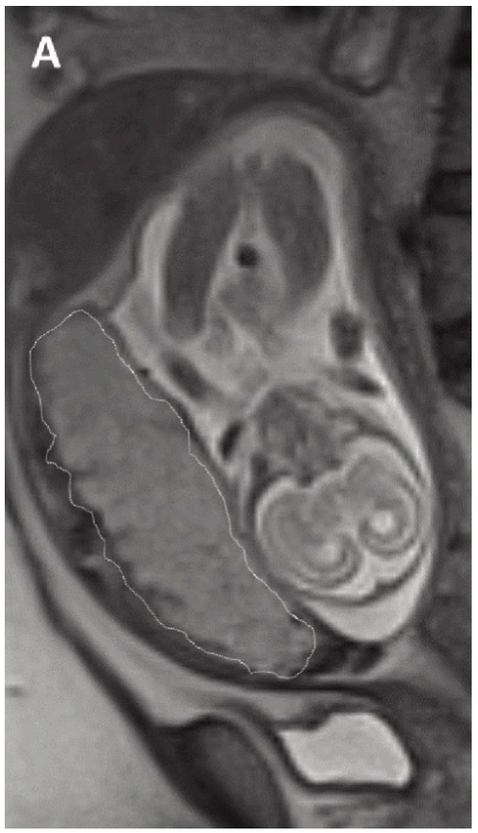
- Myometrial thinning
- Loss of T2 hypointense interface
- Abnormal vascularization of the placental bed
- Placental ischemic infarction (SAR-ESUR uncertain)

Tissue architecture signs

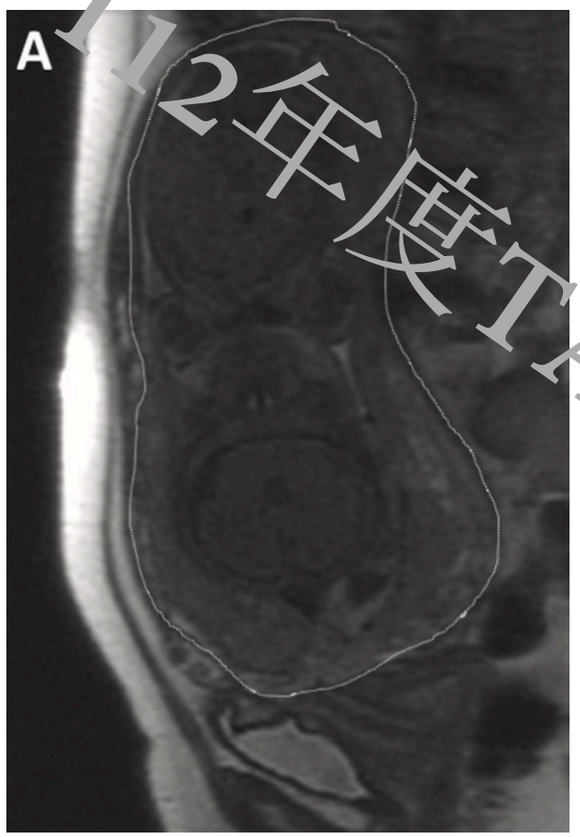
- T2 dark bands
- Abnormal intraplacental vascularity (SAR-ESUR uncertain)
- Placental heterogeneity (SAR-ESUR uncertain)

MRI signs - Gross morphologic signs

正常的子宮是
倒梨型

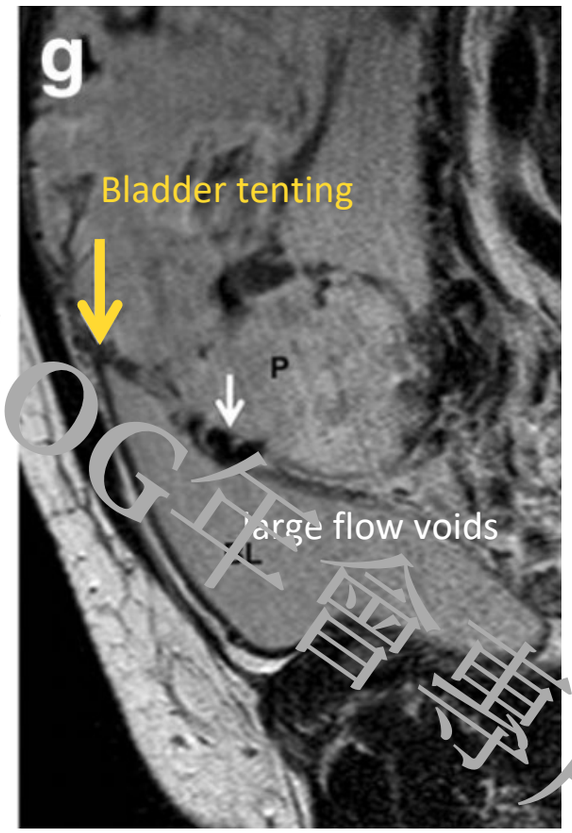


Placental bulge
變沙漏型



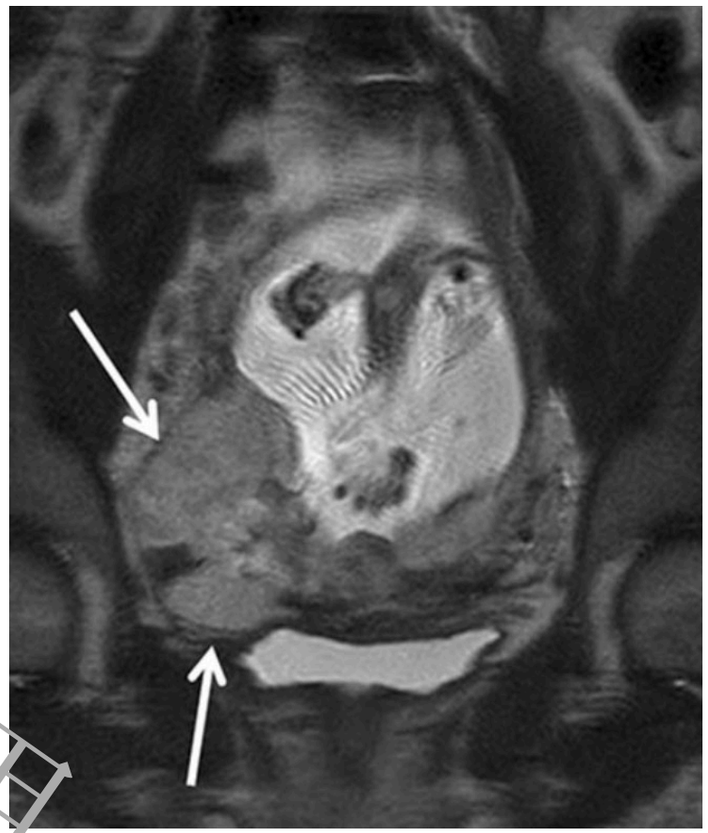
可能有increta or
percreta

Bladder wall
interruption



有bladder invasion

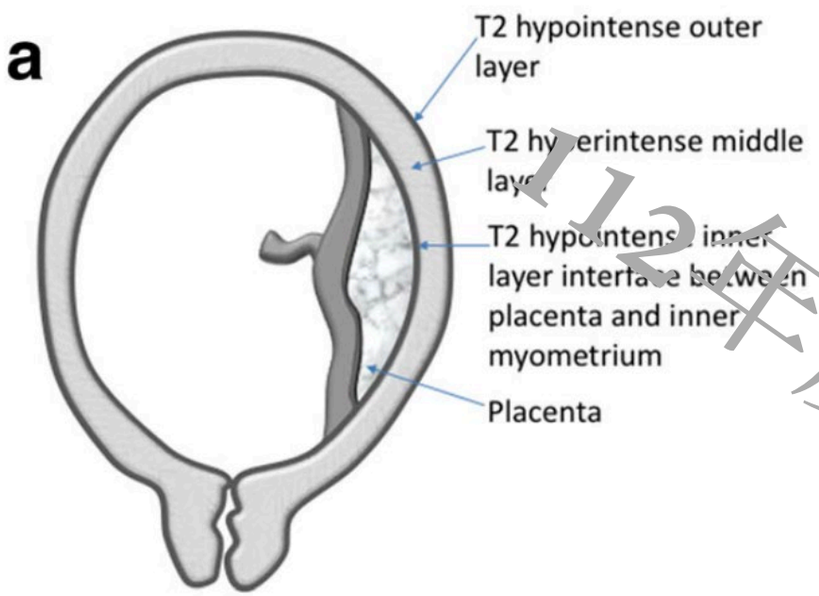
Focal exophytic mass



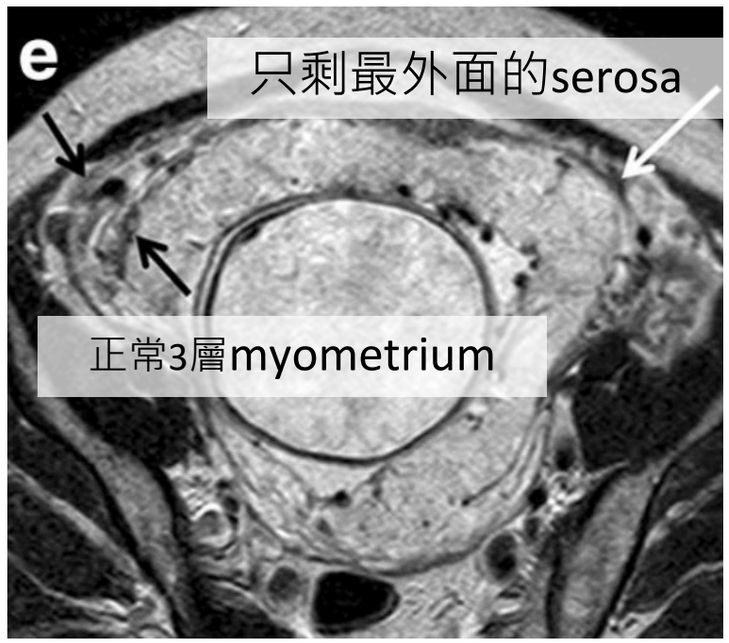
代表percreta

MRI signs - interface signs

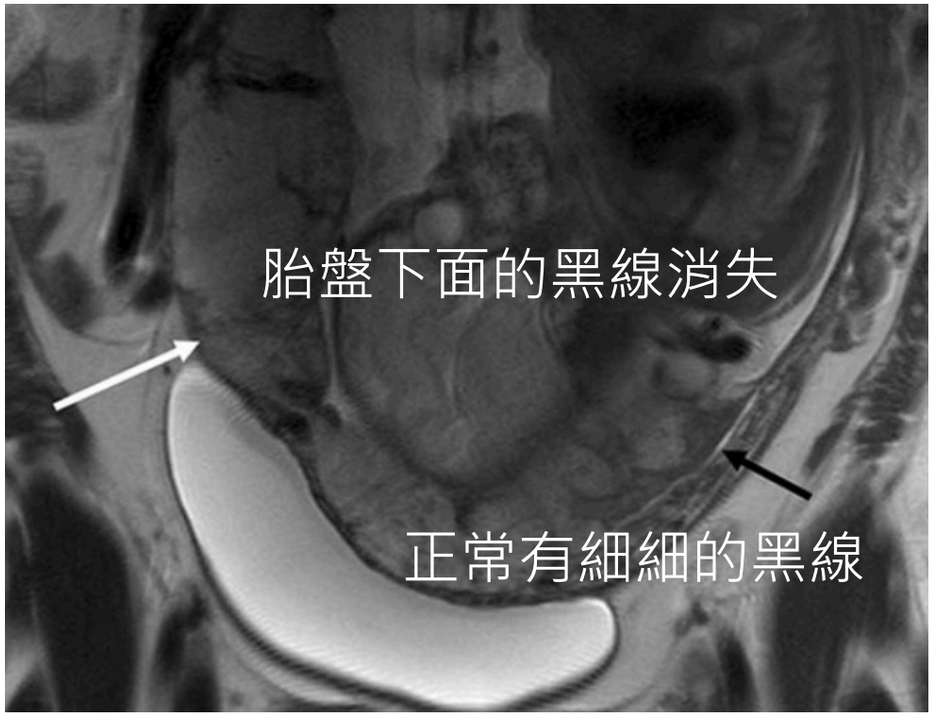
正常myometrium 在GA
24-30 wks時有3層



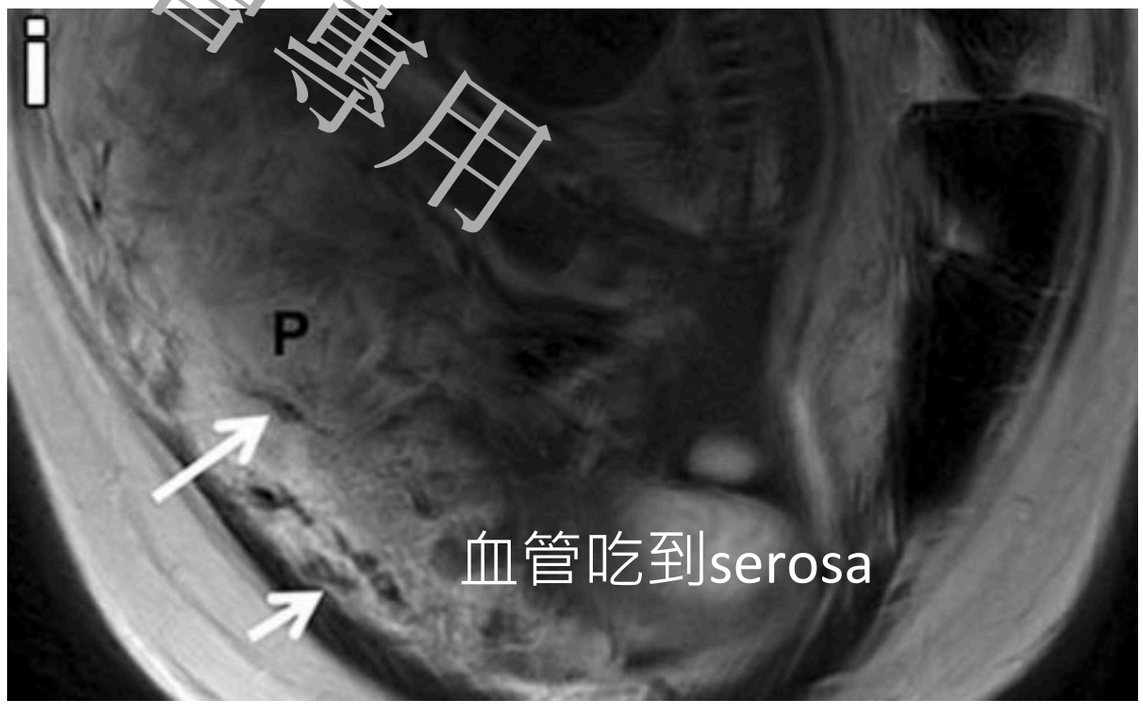
Myometrial thinning



Loss of T2 hypointense interface

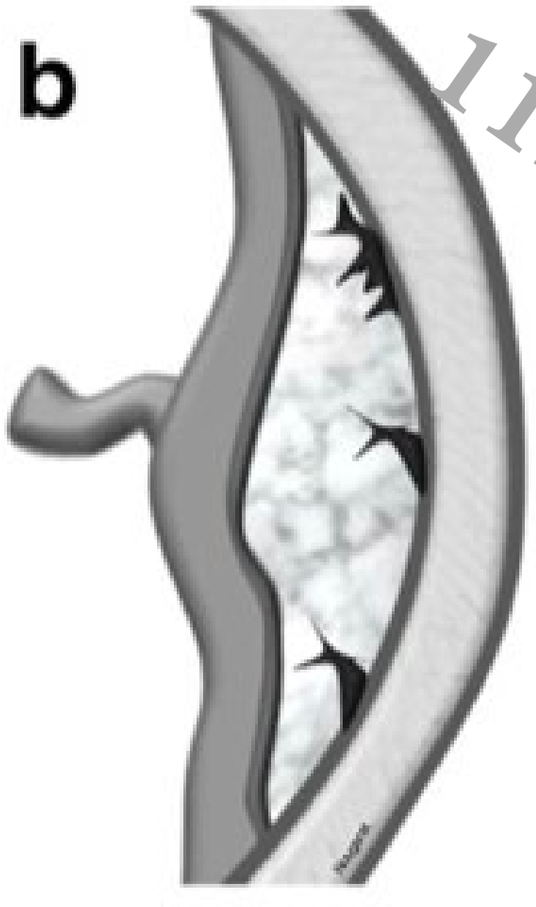


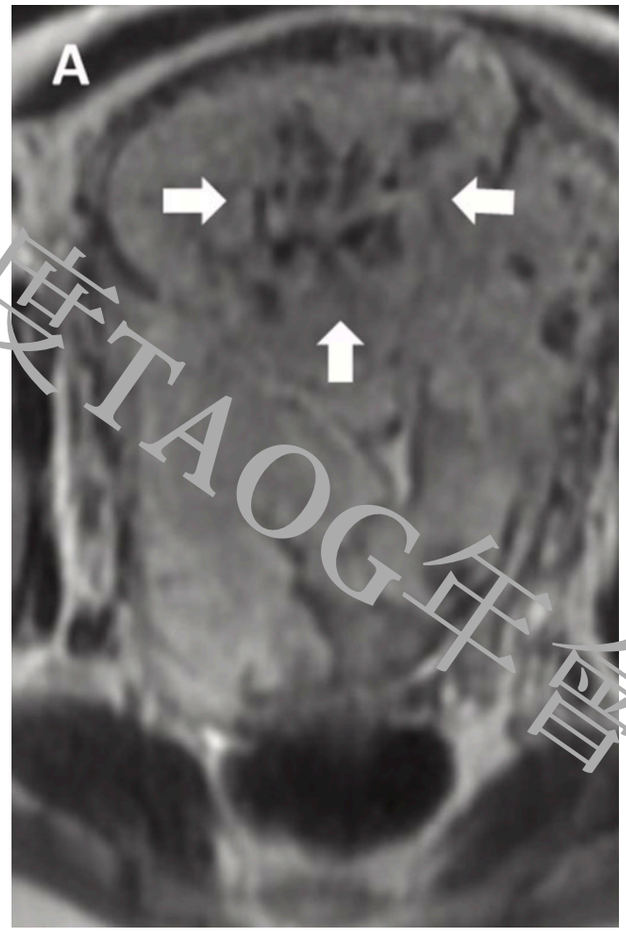
Abnormal vascularization of the placental bed

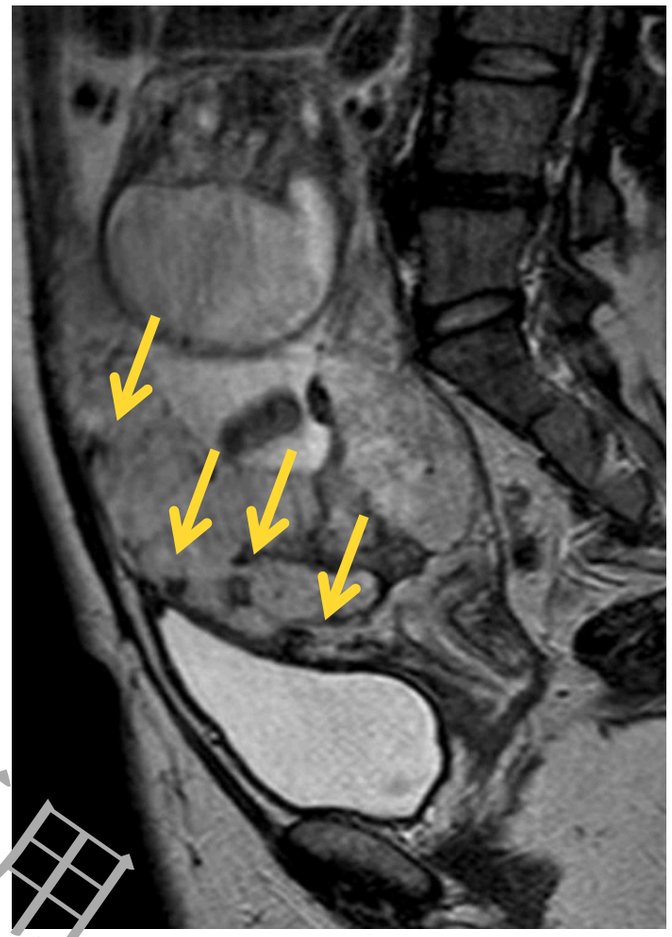


MRI signs - Tissue architecture signs

T2 dark band







1. 之前反覆intraplacental hemorrhage or infartion後形成的fibrin 沈積
2. Dark band體積越多代表invasion深度越深
3. 可預測poor prognosis，和術中blood loss增加、hysterectomy risk上升有關
4. Most sensitive sign for PAS

Ultrasound or MRI ?

ACOG:

- Ultrasound: sensitivity of 90.72% (95% CI, 87.2–93.6)
  specificity of 96.94% (95% CI, 96.3–97.5%)

- MRI: sensitivities of 94.4% (95% CI, 86.0–97.9)
  specificities of 84.0% (95% CI, 76.0–89.8)

- MRI is **comparable** to ultrasonography

- It is unclear whether MRI improves diagnosis of PAS beyond ultrasonography.

- MRI may be useful for diagnosis of difficult cases, such as **posterior placenta previa**, and to assess **depth of invasion** in suspected percreta

2018 systematic review and meta-analysis

MRI診斷PAS的sen. & spe.

	N. studies (sample)	References	Sensitivity % (95% CI)	Specificity % (95% CI)
1. Placenta accreta	5 (175)	33,35,37–39	94.4 (15.8–99.9)	98.8 (70.7–100)
2. Placenta increta$^{\Psi}$	3 (163)	33,35,38	100 (75.3–100)	97.3 (93.3–99.3)
3. Placenta accreta+increta	8 (261)	28,31,33–35,37–39	95.0 (86.0–99.0)	96.0 (92.3–98.3)
4. Placenta percreta	(26)	28,29,31,33,34,37,38	86.5 (74.2–94.4)	96.8 (93.5–98.7)

不同MRI sign診斷placenta acreta的sen.& spe.

MRI sign	N. studies	References	Sensitivity % (95% CI)	Specificity % (95% CI)
1. Intraplacental dark bands	7$^{\Omega}$	25–27,29,35–37	89.7 (44.2–99.0)	49.5 (26.9–72.3)
2. Uterine bulging	6$^{\Omega}$	25,25–27,27,29	54.5 (32.2–75.6)	58.8 (49.8–67.3)
3. Heterogeneous placental signal intensity	4$^{\Omega}$	25,27,36,37	75.0 (42.8–94.5)	65.9 (54.6–76.0)
4. Focal myometrial interruption	5$^{\Omega}$	25,25–27,29	63.6 (40.7–82.8)	72.2 (62.8–80.4)
5. Bladder tenting	2$^{\Psi}$	25,29	42.9 (9.90–81.6)	75.6 (59.7–87.6)
6. Abnormal intraplacental vascularity	5$^{\Omega}$	25–27,29,36	53.8 (28.3–77.4)	80.9 (68.9–89.0)

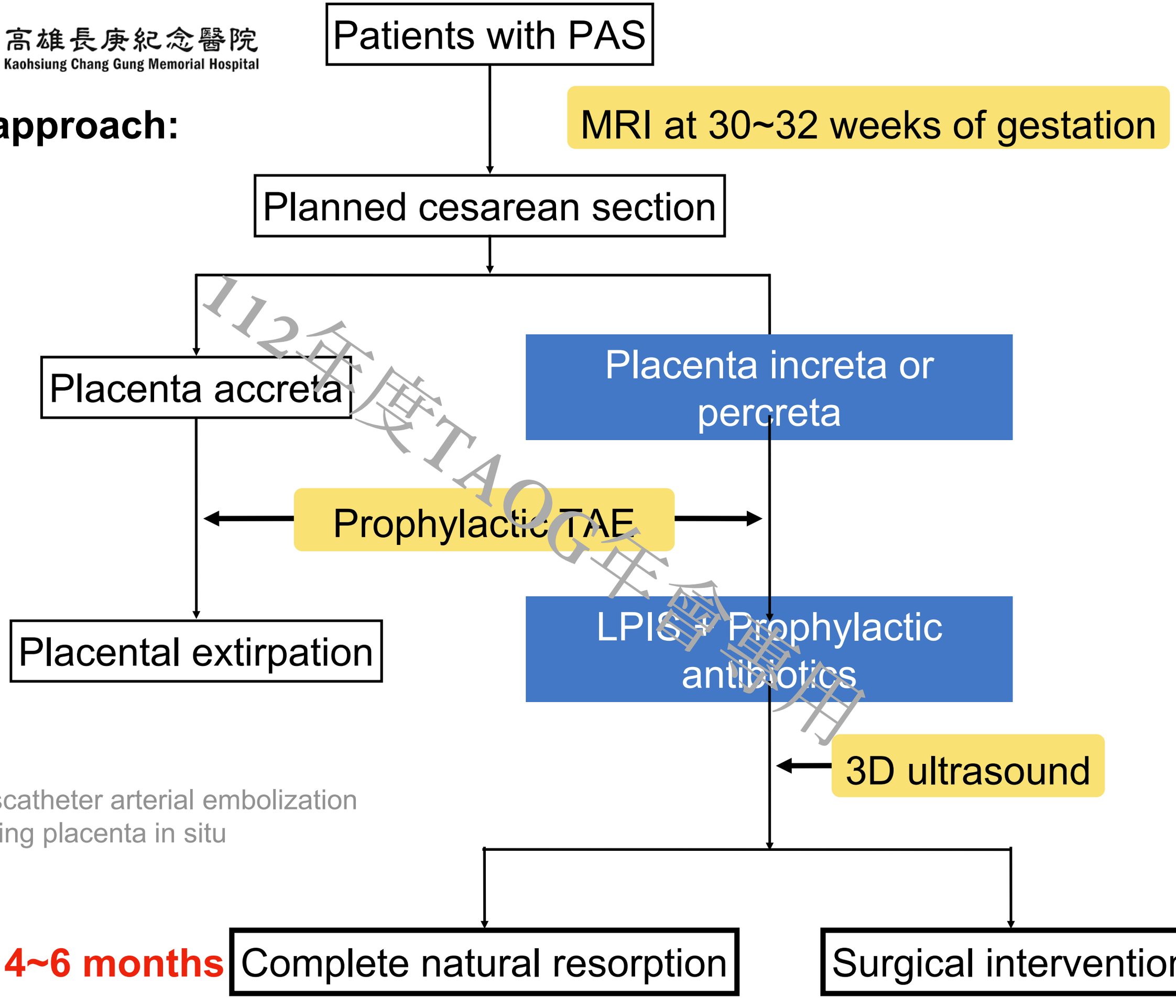
不同MRI sign診斷placenta percreta的sen.& spe.

MRI sign	No. of studies	References	Sensitivity % (95% CI)	Specificity % (95% CI)
1. Intraplacental dark bands	9$^{\Omega}$	25–29,32,35–37	82.6 (68.6–91.1)	58.5 (38.3–76.2)
2. Uterine bulging	8$^{\Omega}$	25–29,32,35,37	77.4 (62.6–87.5)	64.7 (50.3–76.9)
3. Heterogeneous placental signal intensity	6$^{\Omega}$	25,27,28,32,36,37	73.9 (39.7–92.4)	62.7 (43.8–78.4)
4. Focal myometrial interruption	6$^{\Omega}$	25–28,32,35	78.6 (59.0–91.7)	70.2 (62.7–77.0)
5. Bladder tenting	3$^{\Psi}$	25,29,32	52.6 (28.9–75.6)	90.2 (79.8–96.3)
6. Abnormal intraplacental vascularity	6$^{\Omega}$	25–27,29,32,36	46.4 (26.4–67.7)	79.8 (68.7–87.7)
7. Direct invasion/ focal exophitic mass	5$^{\Omega}$	25,28,29,31,37	69.2 (41.8–87.5)	98.9 (57.8–100)

Familiari, A, *Acta Obstet Gynecol Scand* 2018; 97: 507–520.

高雄長庚紀念醫院
Kaohsiung Chang Gung Memorial Hospital

Our approach:



TAE: transcatheter arterial embolization
LPIS: leaving placenta in situ

Outcome for increta and percreta

Placenta 97 (2020) 51–57

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Planned conservative management of placenta increta and percreta with prophylactic transcatheter arterial embolization and leaving placenta in situ for women who desire fertility preservation

Kun-Long Huang [a,1], Leo Leung-Chit Tsang [b,1], Yu-Fan Cheng [b], Fu-Jen Huang [a], Hung-Chun Fu [a], Fu-Tsai Kung [a,c], Ching-Chang Tsai [a], Hsin-Hsin Cheng [a], Yun-Ju Lai [a], Chia-Yu Ou [a], Wei-Ting Chen [b], Yu-Shun Tong [b], Yu-Chen Chen [a], Yu-Jen Huang [a], Te-Yao Hsu [a,*]

US findings: placenta previa and suspicious PAS (n = 34)

MRI at 30~32 weeks of gestation

One patient was excluded for lost of follow up

Placenta accreta (n = 10)

Placenta increta or percreta (n = 23)

Planned cesarean section (n = 18)
Emergent cesarean section (n = 5)

Prophylactic TAE

2 patient was excluded*:
one for cesarean hysterectomy
one for placental extirpation

LPIS + Prophylactic antibiotics (n = 21)

21位接受保守性治療：
胎盤留置與預防性血管栓塞

Patient profiles.

Maternal Profile	Value
Mean maternal age (years)[a]	35.6 ± 5.6 (31.5, 35.0, 40.5)
Median gravida[b]	3 (2, 6)
Median parity[b]	1 (0, 4)
Mean gestational age (weeks)[a]	34.9 ± 3.3 (34, 36, 37)
Numbers of Previous Cesarean Sections[c]	**Number of patients (percentage)**
0	1 (4.7%)[d]
1	10 (47.6%)
2	6 (28.6%)
3	3 (14.3%)
4	1 (4.7%)
Type of PAS[c]	**Number of patients (percentage)**
Placenta increta	8 (38.1%)
Placenta percreta	13 (61.9%)
Mode of Uterine Incision[c]	**Number of patients (percentage)**
Classical	20 (95.2%)
High corpus transverse	1 (4.8%)

Type of PAS was diagnosed by MRI.

PAS: placenta accrete spectrum.

MRI: magnetic resonance imaging.

[a] Values are presented as the means ± SDs (interquartile ranges: Q1, Q2, Q3).

[b] Values are presented as medians (minima, maxima).

[c] Values are presented as number of patients (percentages).

[d] This patient (G2P0) had a history of surgical evacuation due to a missed abortion.

病人特色：

1. 平均生產週數34.9週
2. 大部分剖腹產次數一次
3. 主要胎盤類型：percreta
4. 子宮切直的傷口為主

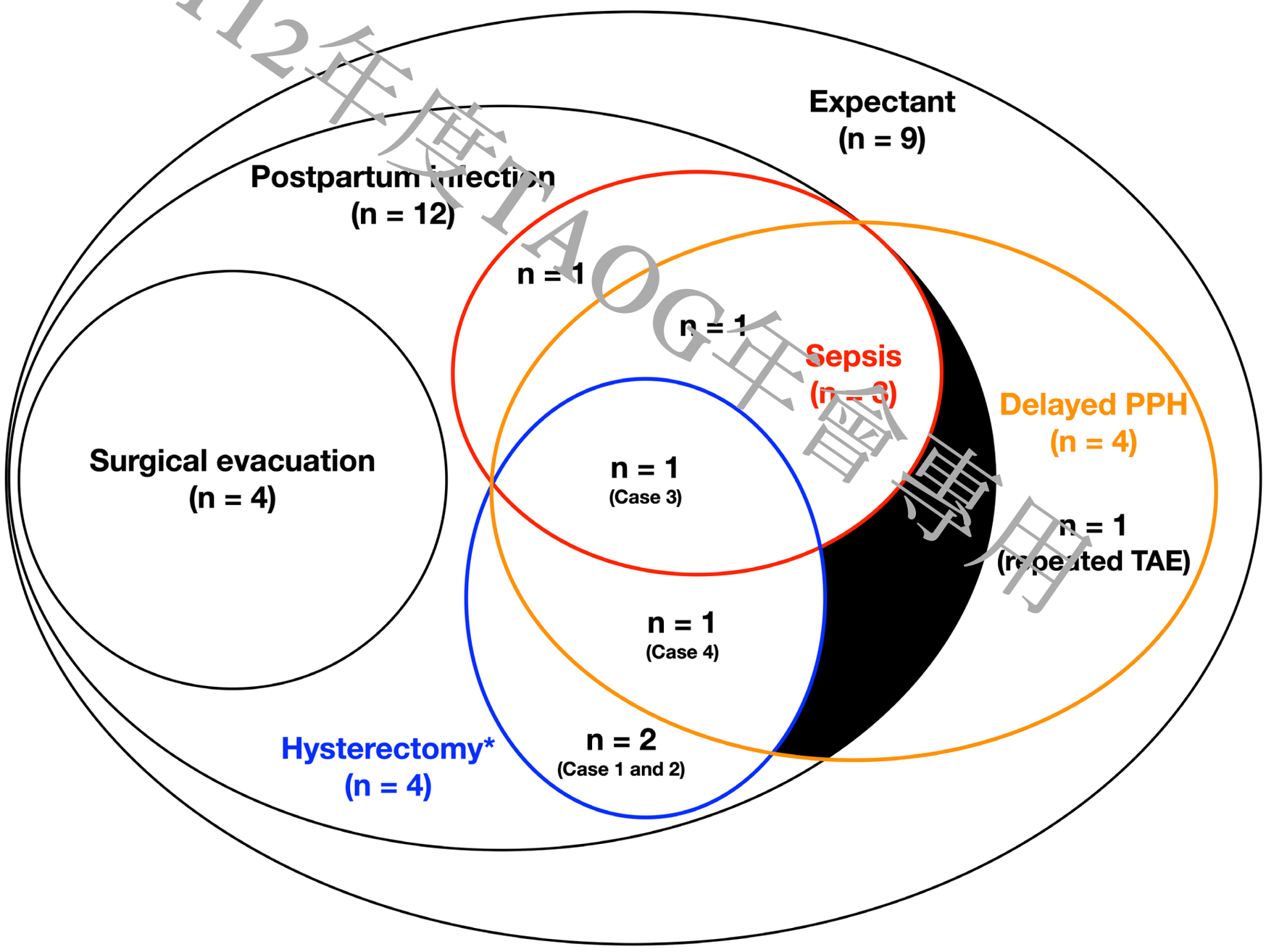
Maternal and neonatal outcomes.

Maternal outcomes	Value
Mean intraoperative blood loss (ml)[a]	854.7 ± 478.2 (450, 700, 1175)
Mean units of pRBCs transfused[a]	2.1 ± 2.0 (0, 2, 4)
Blood transfusion with > 4 units of pRBCs, FFP or platelets[b]	2 (9.5%)
Mean operative time (minutes)[a]	188.1 ± 54.5 (151.5, 184.0, 222.0)
Transfer to ICU[b]	2 (9.5%)
Mean hospitalization stay (days)[a]	6.5 ± 2.1 (5, 7, 7)
Mean natural resorption time (months)[a,d]	4.69 ± 1.65 (3, 6, 6)
Return of menstruation[b,e]	16 (76.1%)
Subsequent pregnancies and live births[b,f]	1 (4.7%)

Neonatal outcomes	**Value**
Mean birth weight (gm)[a]	2631.1 ± 687.5 (2267.5, 2640.0, 2930.0)
Apgar score < 7 at the 1st minute[b]	7(33.3%)
Apgar score < 7 at the 5th minute[b]	3(14.2%)
Transfer to NICU[b]	12 (57.1%)
Median NICU admission days[c]	7 (5,38)
Respiratory distress[b]	10 (47.6%)
Hypoglycemia[b]	1 (4.8%)
Bradycardia[b]	1 (4.8%)

Complications

Uterine preservation rate was 81% (17/21)!



Conclusion

- In our approach, **the placenta accreta was extirpated** but **the placenta increta & percreta was left in situ**. (MRI diagnosis)

- **Uterine preservation rate was 81%** in conservative management.

- The major maternal complication is **postpartum infection**.

- The natural resorption time was about **6 months**.

- No gold standard management for PAS but **individualized**.

高雄長庚紀念醫院
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Thanks for your attention !!