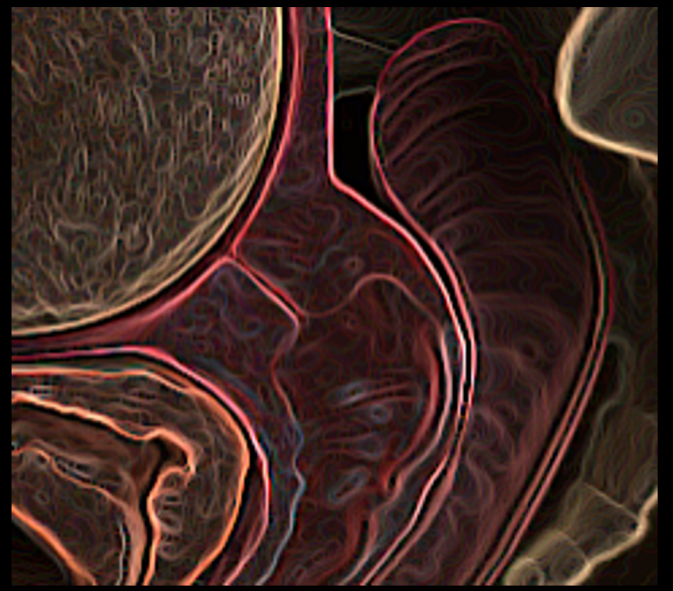
Imaging of Cervix during pregnancy



Dr Livna Shafat Heller

03/2022

המרכז הרפואי
הלל יפה

Imaging of Cervix during Pregnancy

Imaging of the cervix during pregnancy is done everyday in every clinic

Some cases may need a more thorough ultrasound imaging

Some cases may need other imaging modalities , usually MRI .

We will discuss those cases

Cervix imaging during pregnancy

Normal Cervix

Benign Findings

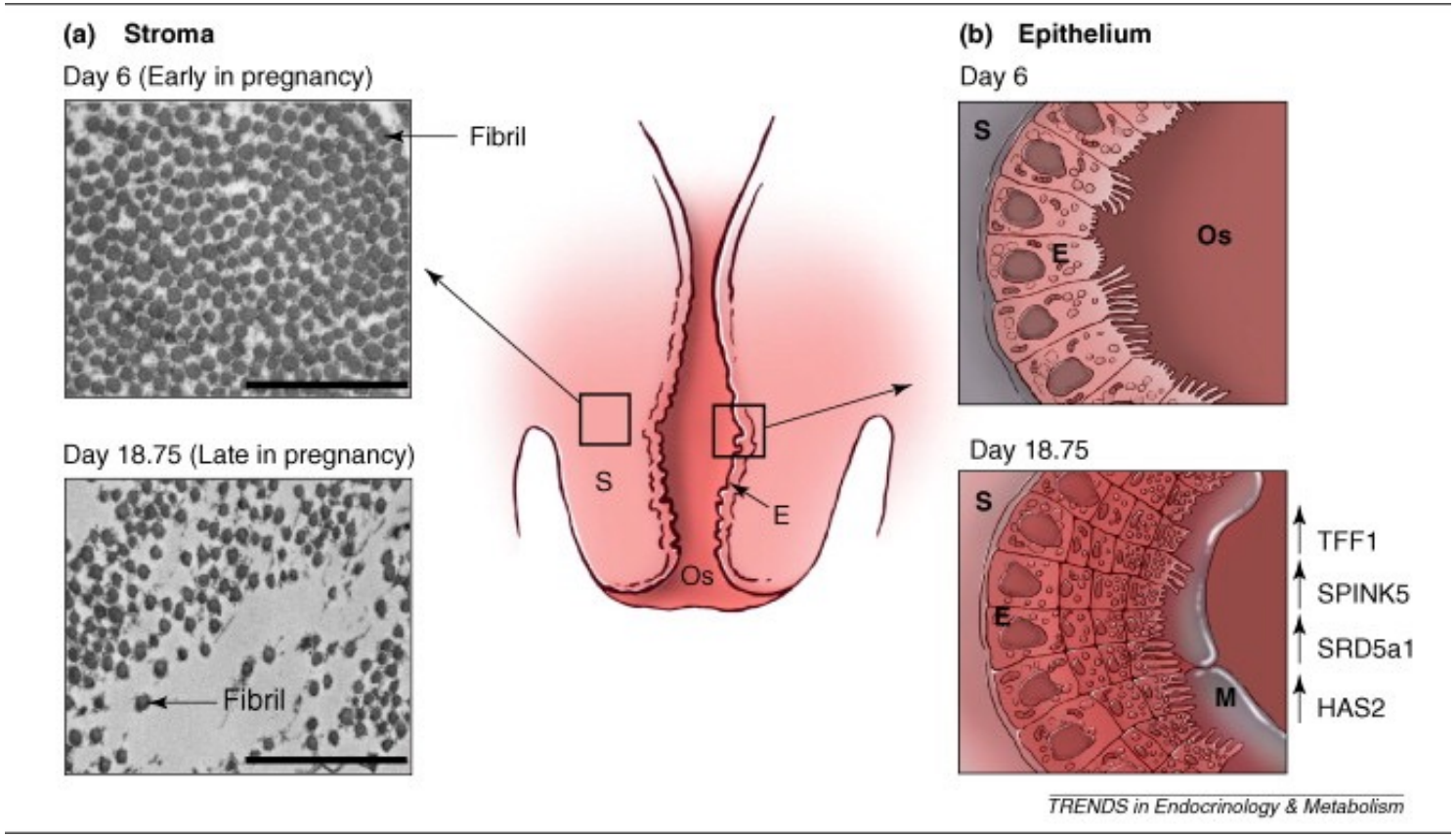
Malignancy

Post Intervention Cervix

Normal cervix during pregnancy

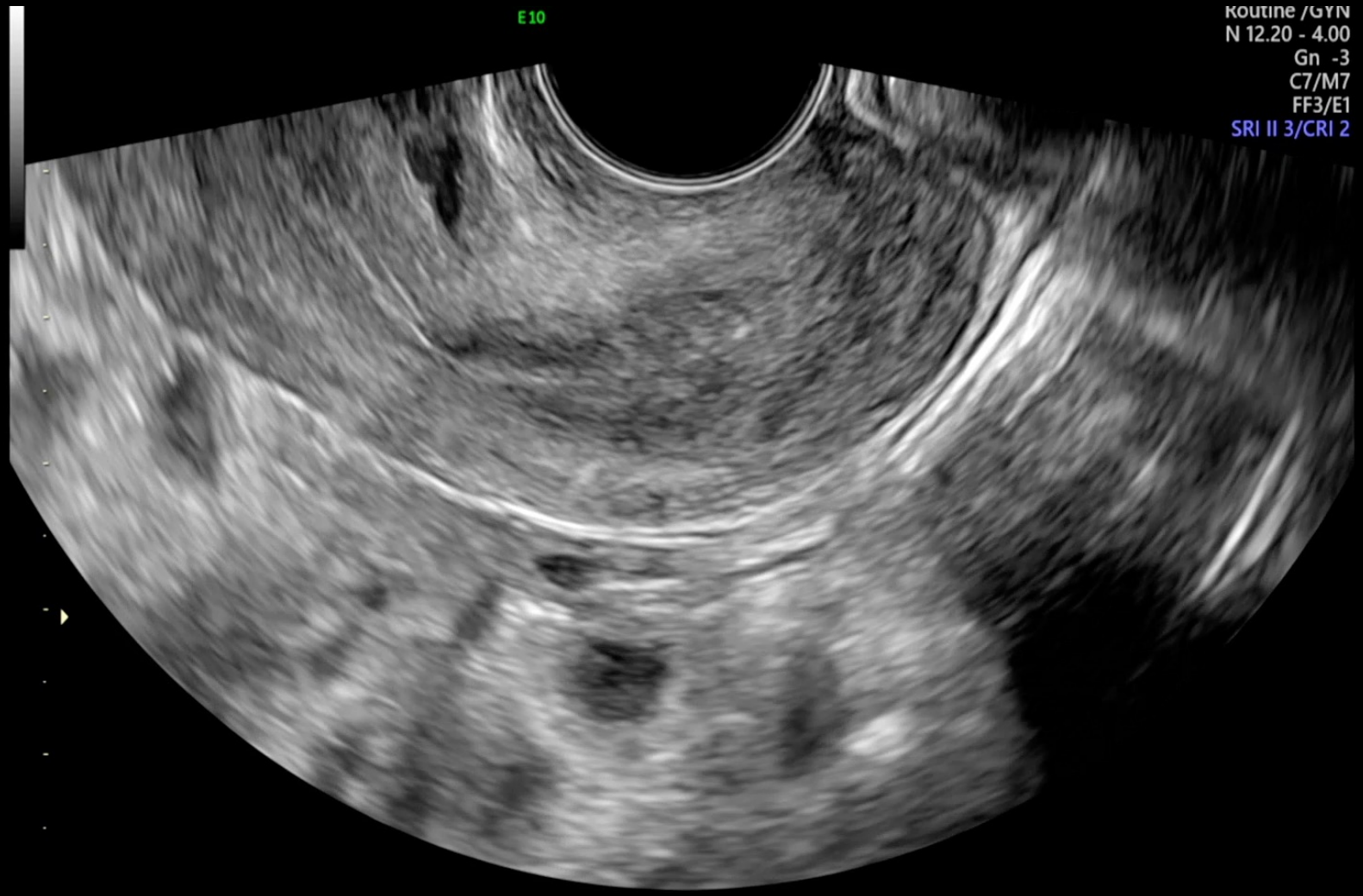
Cervical physiologic changes

- Cell hyperplasia and hypertrophy
- Cell death
- Collagen reorganization
- Hyaluronic acid
- Cytokins
- Elastase

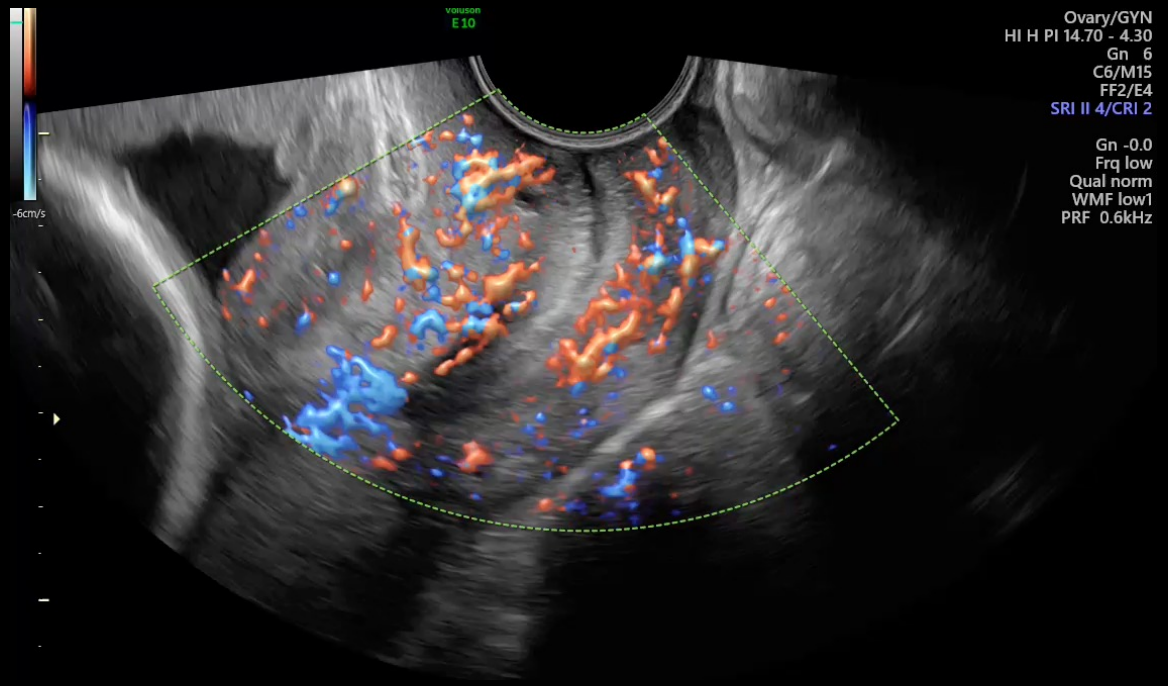


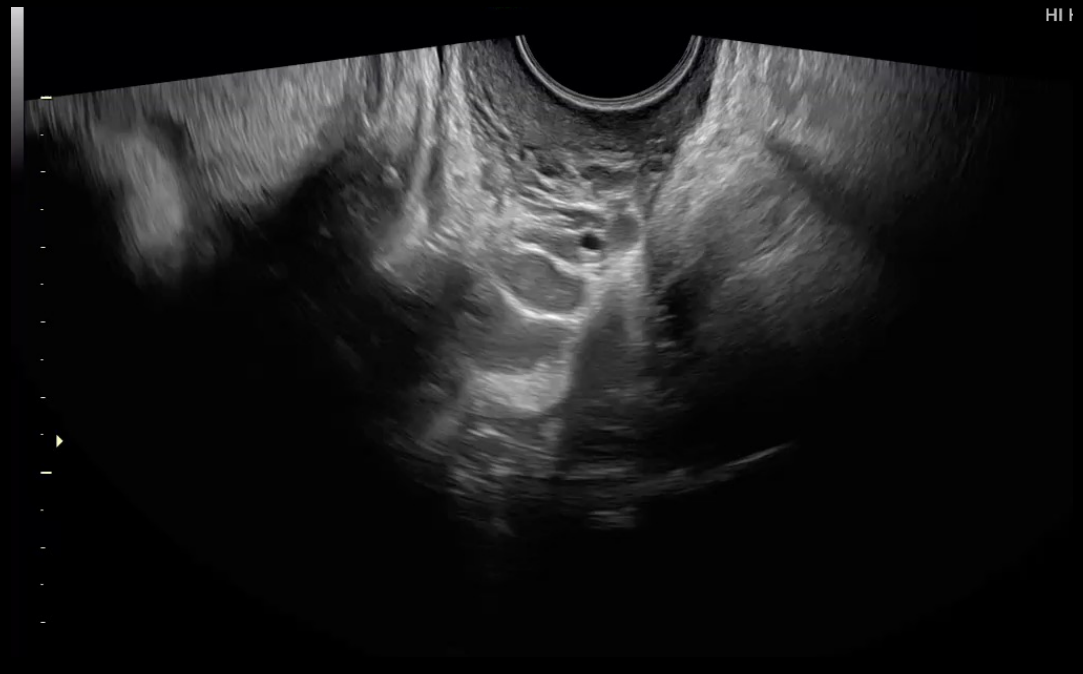
Cervical remodeling during pregnancy and parturition. Timmons B et al. *Trends in endocrinology and metabolism* , 2010

Normal Cervix

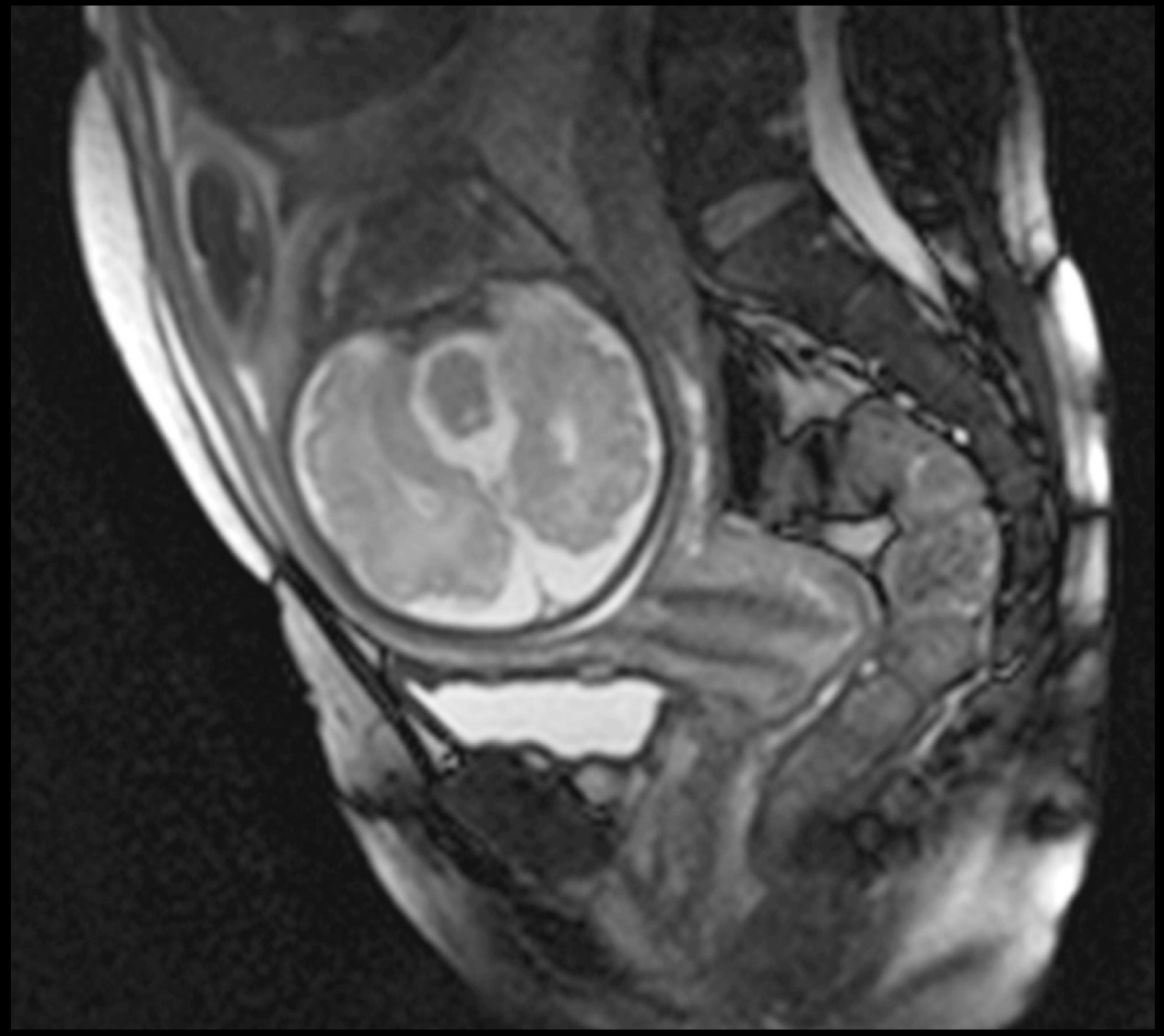


Normal Gravid Cervix





Normal Cervix MRI



Benign Cervical findings

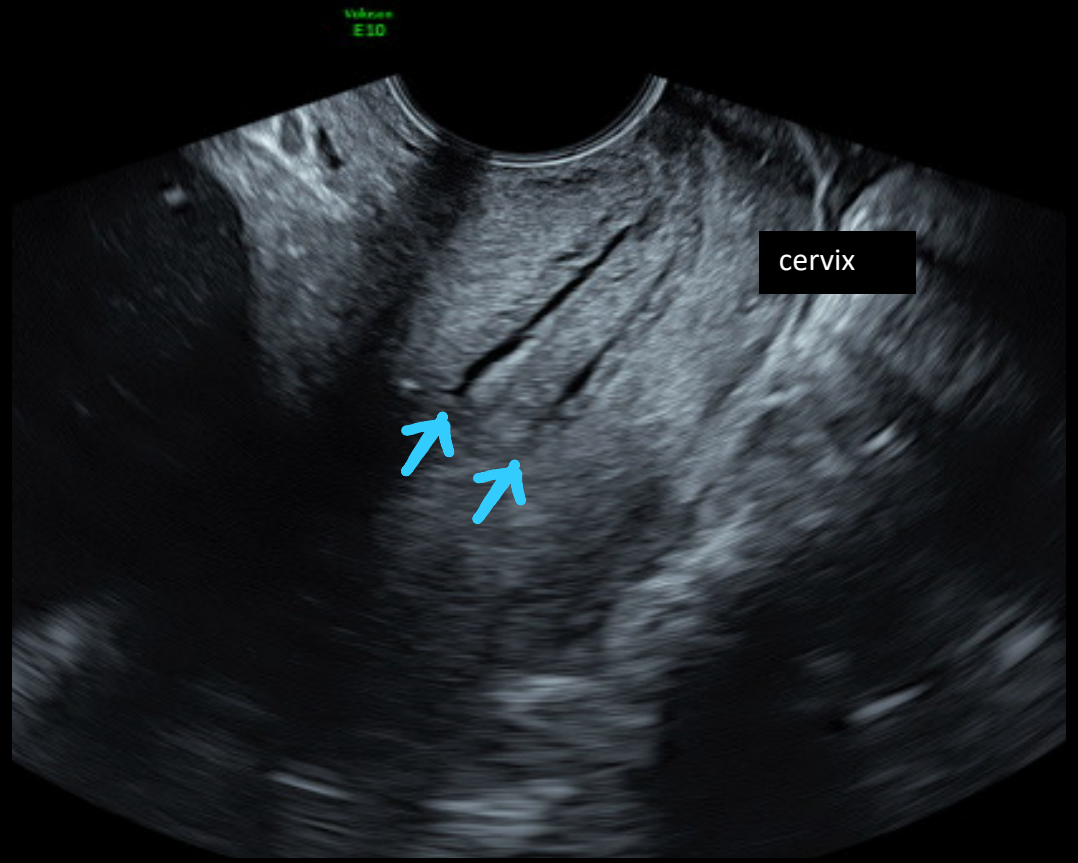
during pregnancy

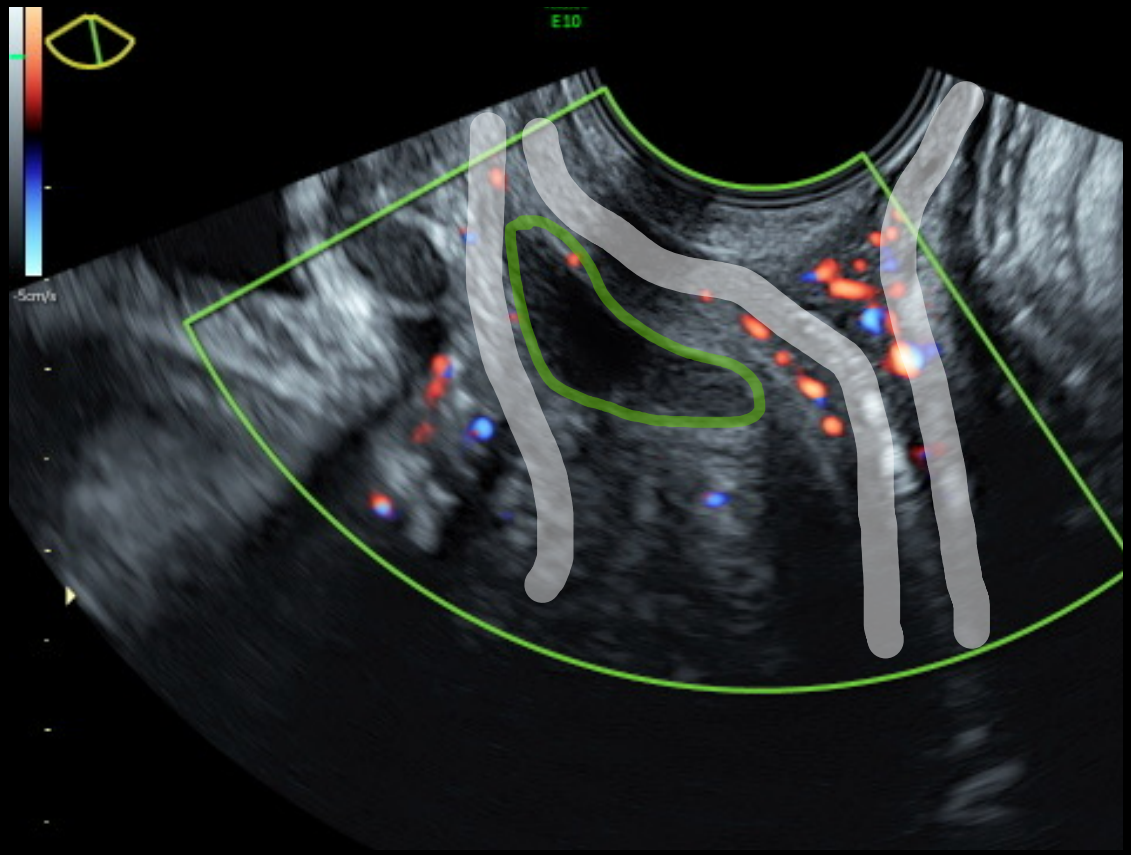
Cervical and vaginal septum

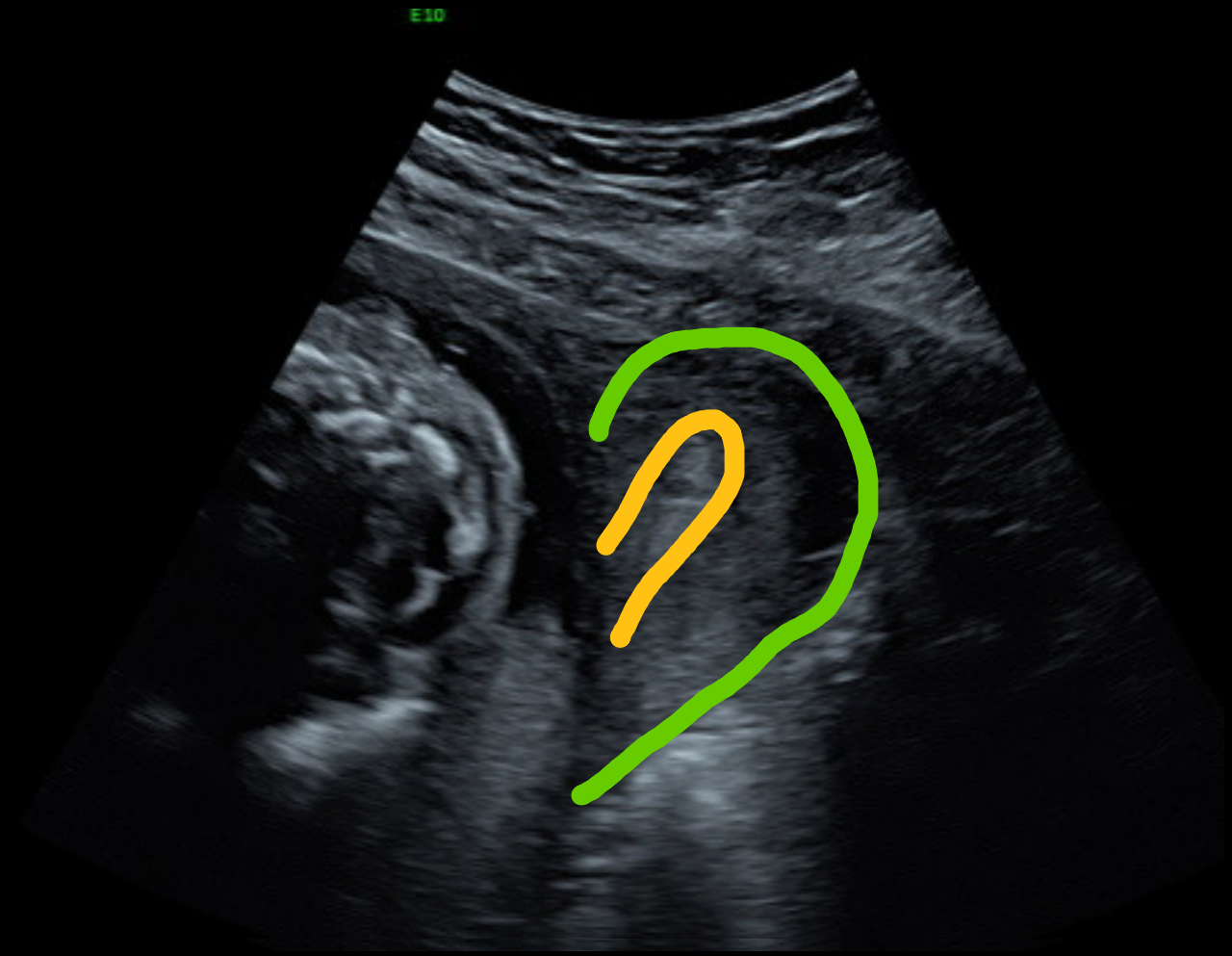
23 y/o , G1

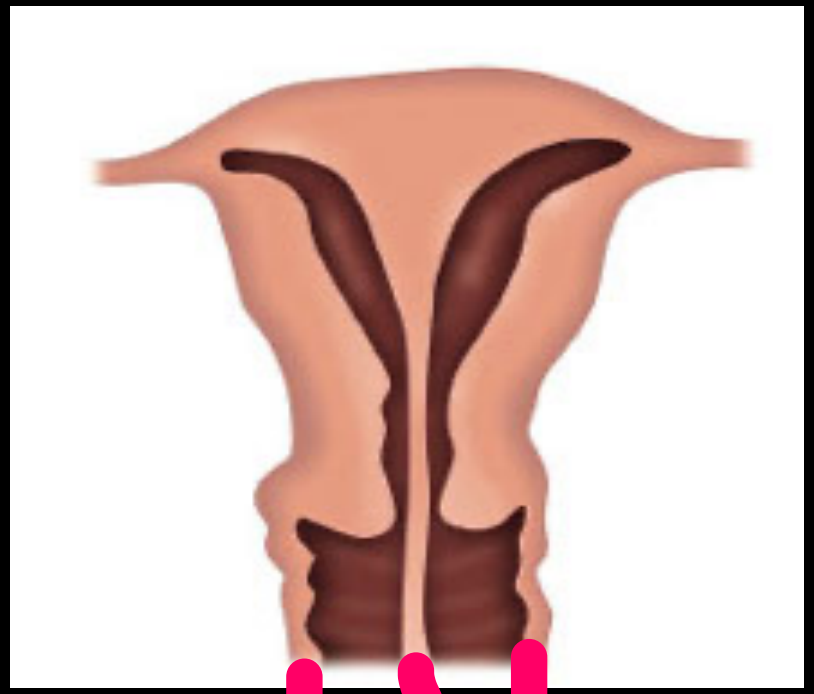
Single kidney

1st trimester us - susp septated uterus

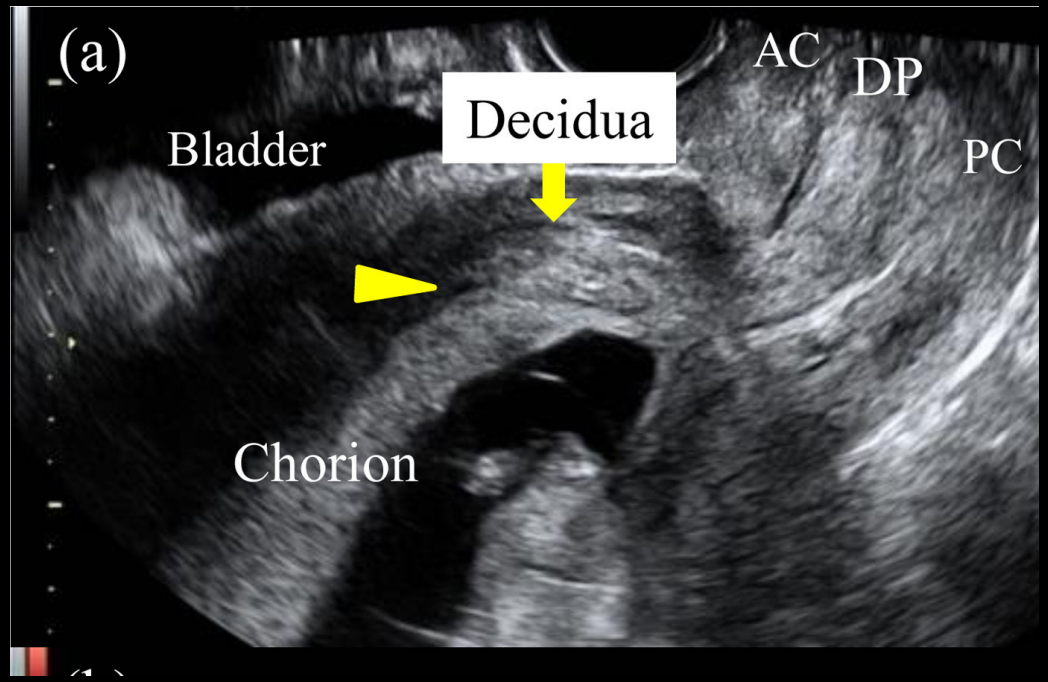


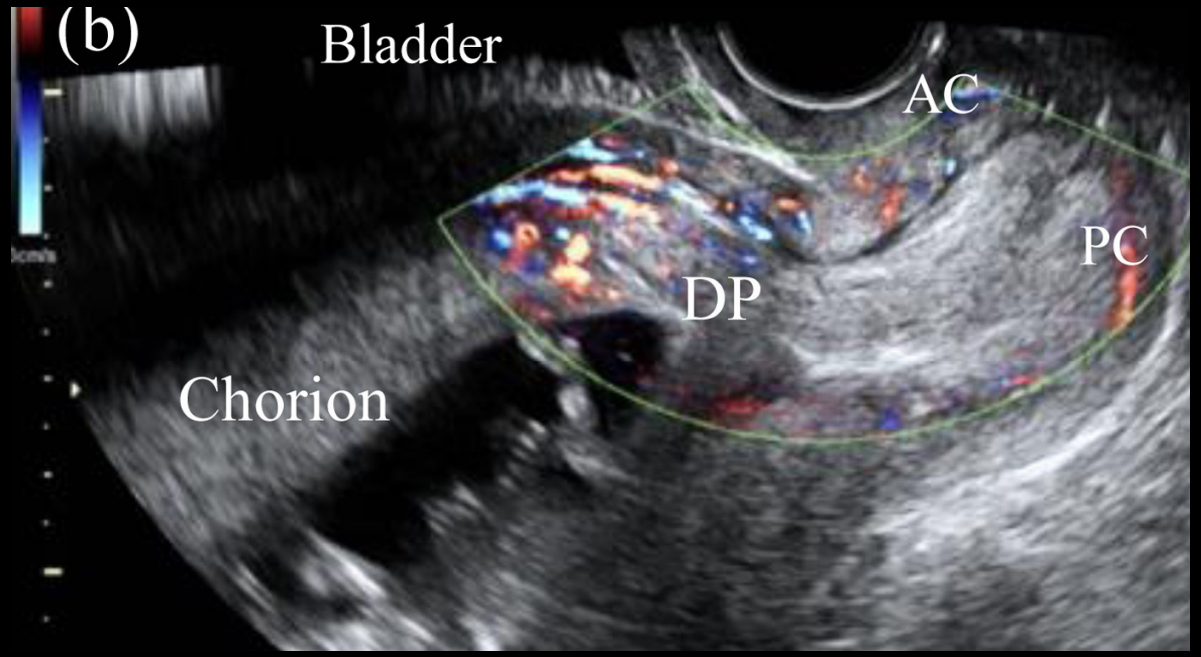

E10
-5cm/s


E10



Decidual Polyp

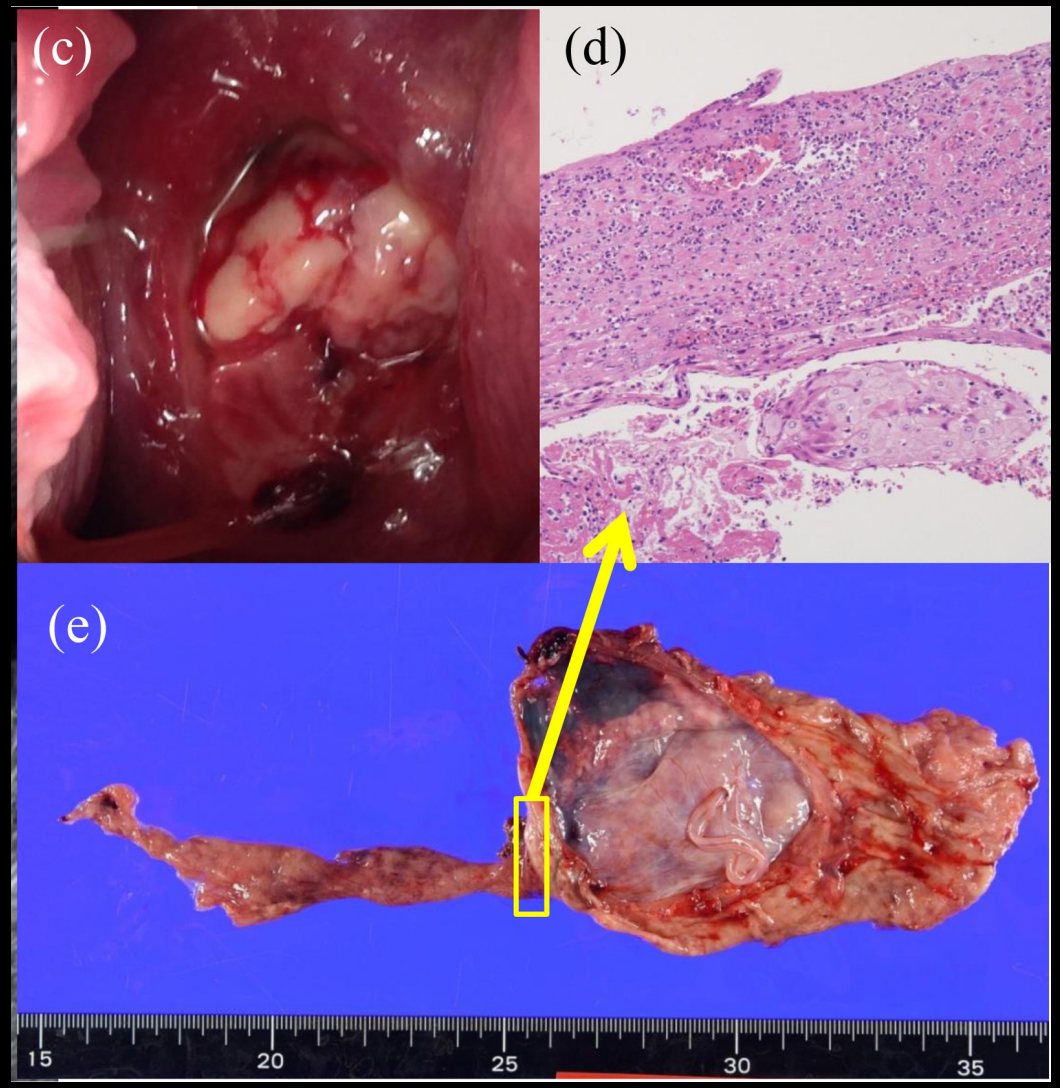




Seo N, Tachibana D, Misugi T, Koyama M, Tanaka S. First trimester findings of decidual polyp: Caution to avoid polypectomy. Eur J Obstet Gynecol Reprod Biol. 2020 Jun.

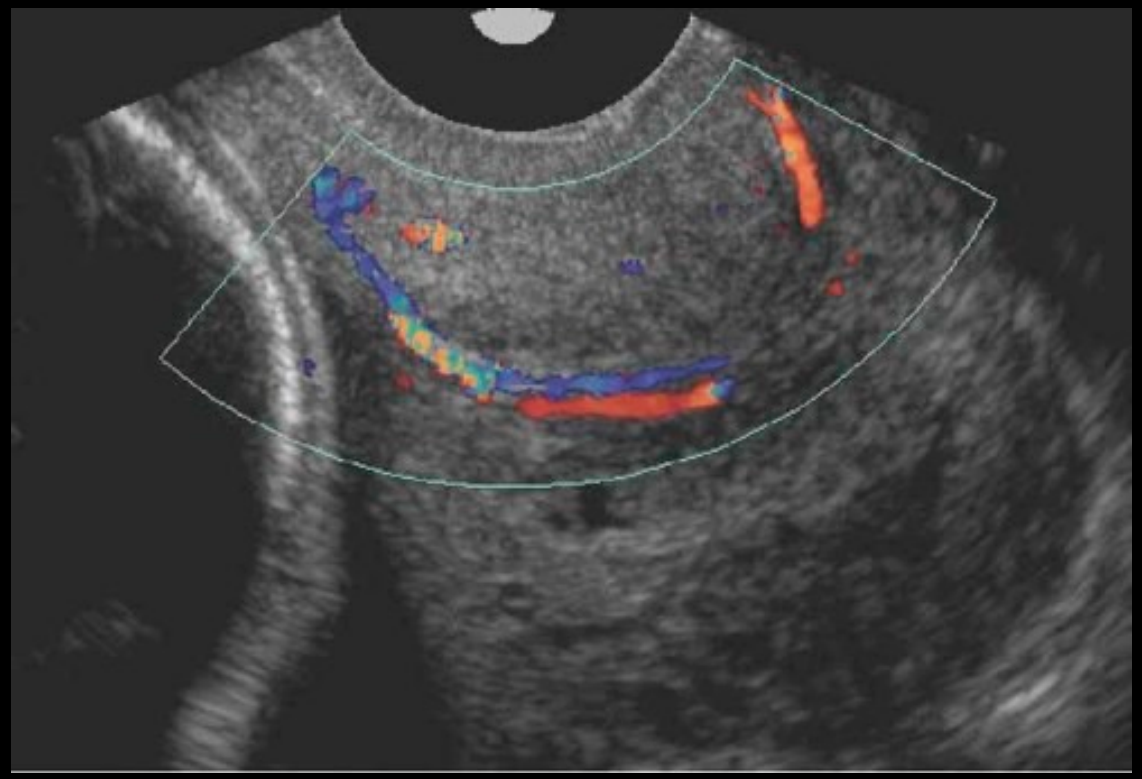
Decidual Polyp

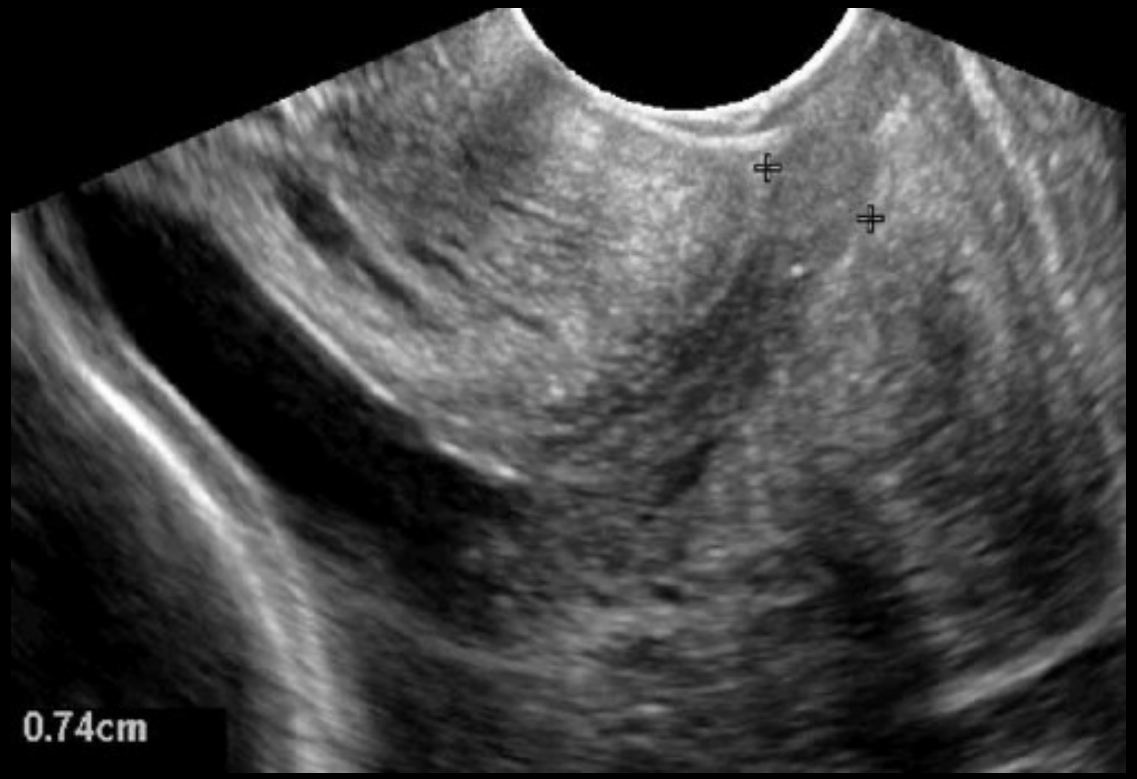
- Case of 28Y G1
- Underwent Cervical Polypectomy at 5W GA
- US performed at 12W d/t bleeding
- Spontanous abortion at 13W



Seo N, Tachibana D, Misugi T, Koyama M, Tanaka S. First trimester findings of decidual polyp: Caution to avoid polypectomy. Eur J Obstet Gynecol Reprod Biol. 2020 Jun.

Decidual Polyp





Robertson M, Scott P, Ellwood DA, Low S. Endocervical polyp in pregnancy: gray scale and color Doppler images and essential considerations in pregnancy. Ultrasound Obstet Gynecol. 2005 Oct

Decidual Polyp

Table 2. Clinical courses and neonatal outcomes of the cases involving decidual and endocervical polyps.

	Decidual polyp $n=41$	Endocervical polyp $n=42$	p value
Maternal			
Gestational days at delivery	247.0 ± 49.8	273.7 ± 13.0	0.002
Spontaneous abortion (<22wks)	12.2% (5)	0 % (0)	0.026
Preterm delivery before 34 weeks' GA	24.4% (10)	4.8% (2)	0.013
Preterm delivery before 37 weeks' GA	34.2% (14)	4.8 % (2)	0.001
Cesarean section	19.5% (8)	23.8% (10)	0.790
Bleeding after polypectomy	29.3% (12)	2.4% (1)	0.002
Preterm PROM	14.6% (6)	0% (0)	0.012
Cerclage	9.8% (4)	0% (0)	0.055
Neonatal			
Birth weight (g)	2554 ± 1009	2861 ± 535	0.092
Placental weight (g)	508 ± 179	563 ± 113	0.101
Apgar score			
1 min.	8 (0–10)	9 (2–10)	0.063
5 min.	9 (0–10)	9.5 (7–10)	0.020
Male	60 % (24)	45.2% (19)	0.184

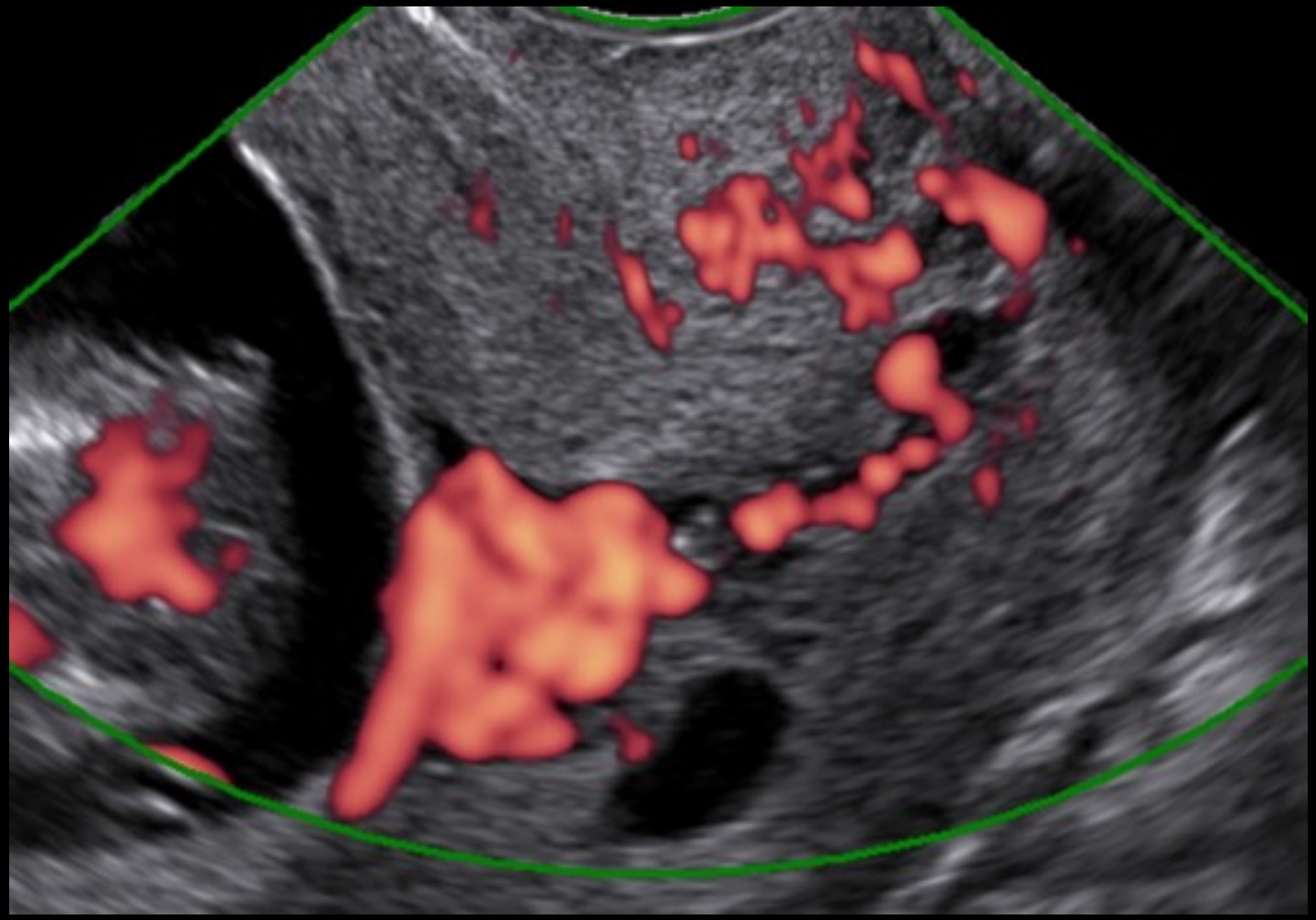
The data indicate the mean ± standard deviation.
GA: gestational age, PROM: preterm rupture of membranes.

Decidual polyps are associated with preterm delivery in cases of attempted uterine cervical polypectomy during the first and second trimester.
Tokunaka M. et al . The journal of maternal-fetal & neonatal 2015

Cervical Varices

- Twin pregnancy 12W
- Marginal placenta
- Vaginal bleeding

- Low segment and cervical Varices diagnosed as probable cause of bleeding



Yoshimura K, Hirsch E, Kitano R, Kashimura M. Cervical varix accompanied by placenta previa in twin pregnancy. J Obstet Gynaecol Res. 2004 Aug.

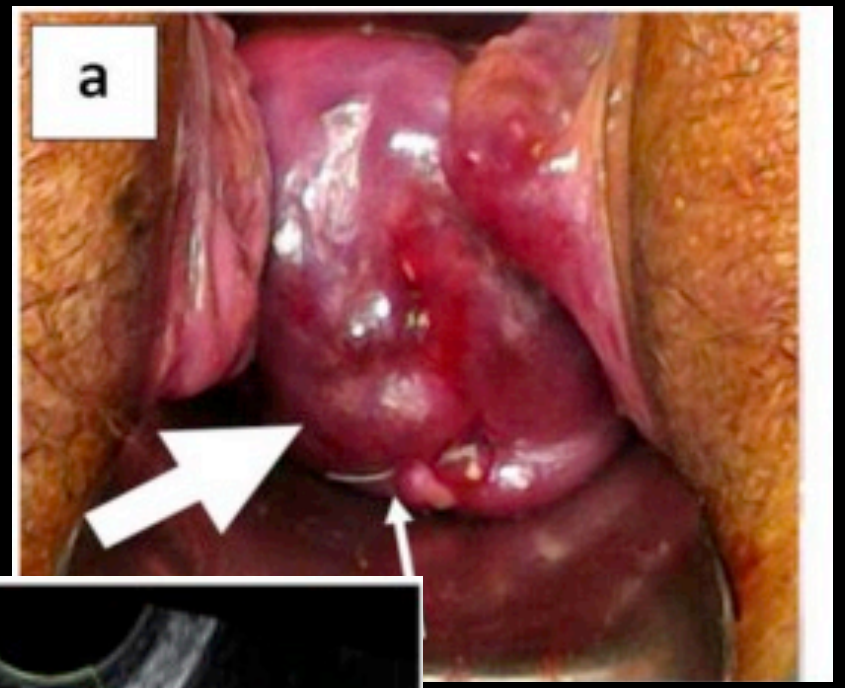
- MRI showed no AVM or thrombosis
- At 22W- normal placental position and no varices demonstrated

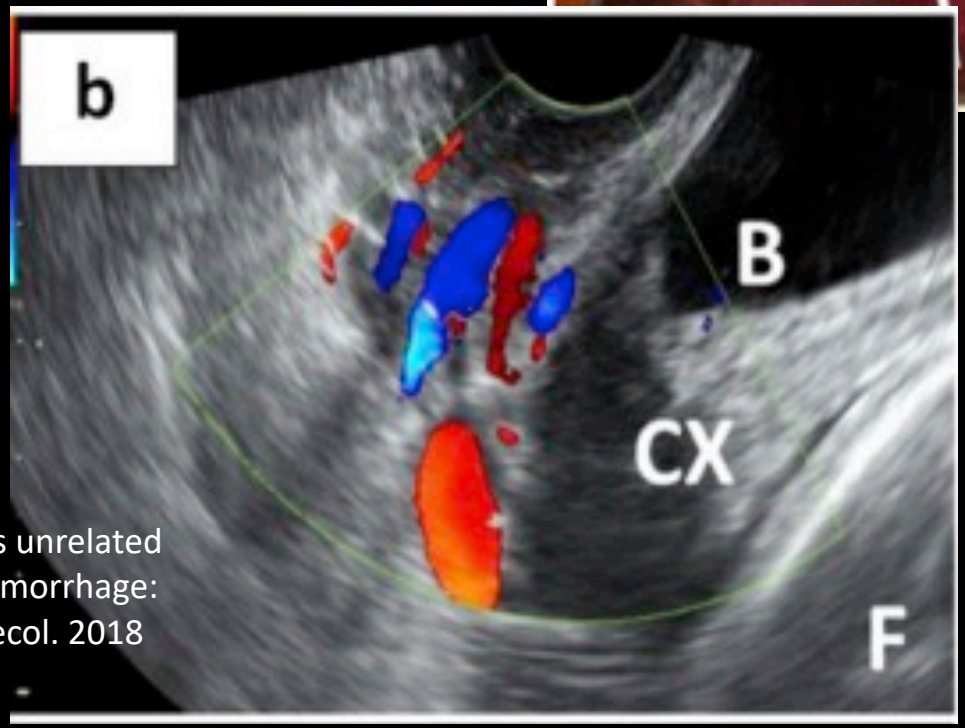
- CS at 33W d/t malpresentation

Yoshimura K, Hirsch E, Kitano R, Kashimura M. Cervical varix accompanied by placenta previa in twin pregnancy. J Obstet Gynaecol Res. 2004 Aug.

Cervical Varices without low placentation

- 34y healthy
- G1 31W
- Vaginal bleeding
- engorged varices with active bleeding was diagnosed and sutured

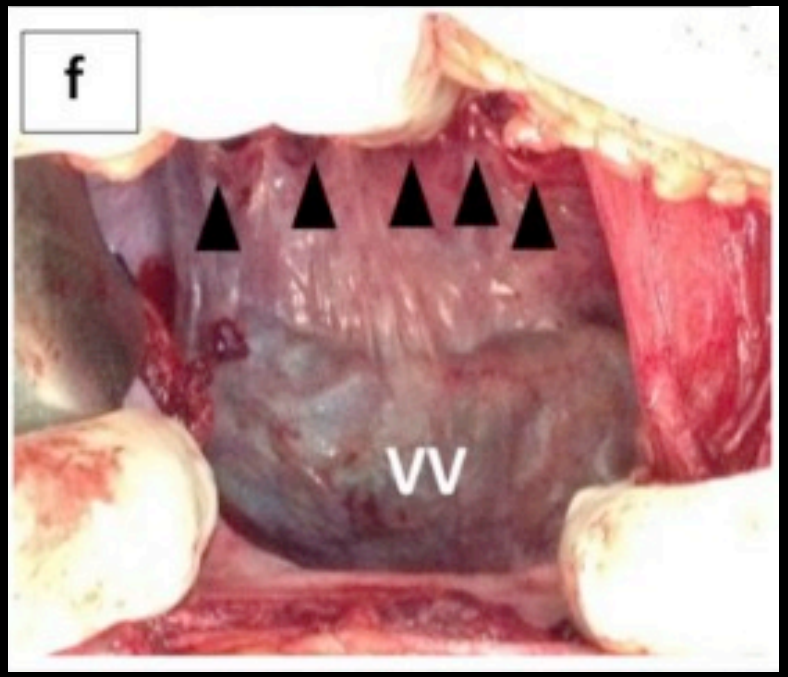




Peng MY, Ker CR, Lee YS, Ho MC, Chan TF. Cervical varices unrelated to placenta previa as an unusual cause of antepartum hemorrhage: A case report and literature review. Taiwan J Obstet Gynecol. 2018 Oct

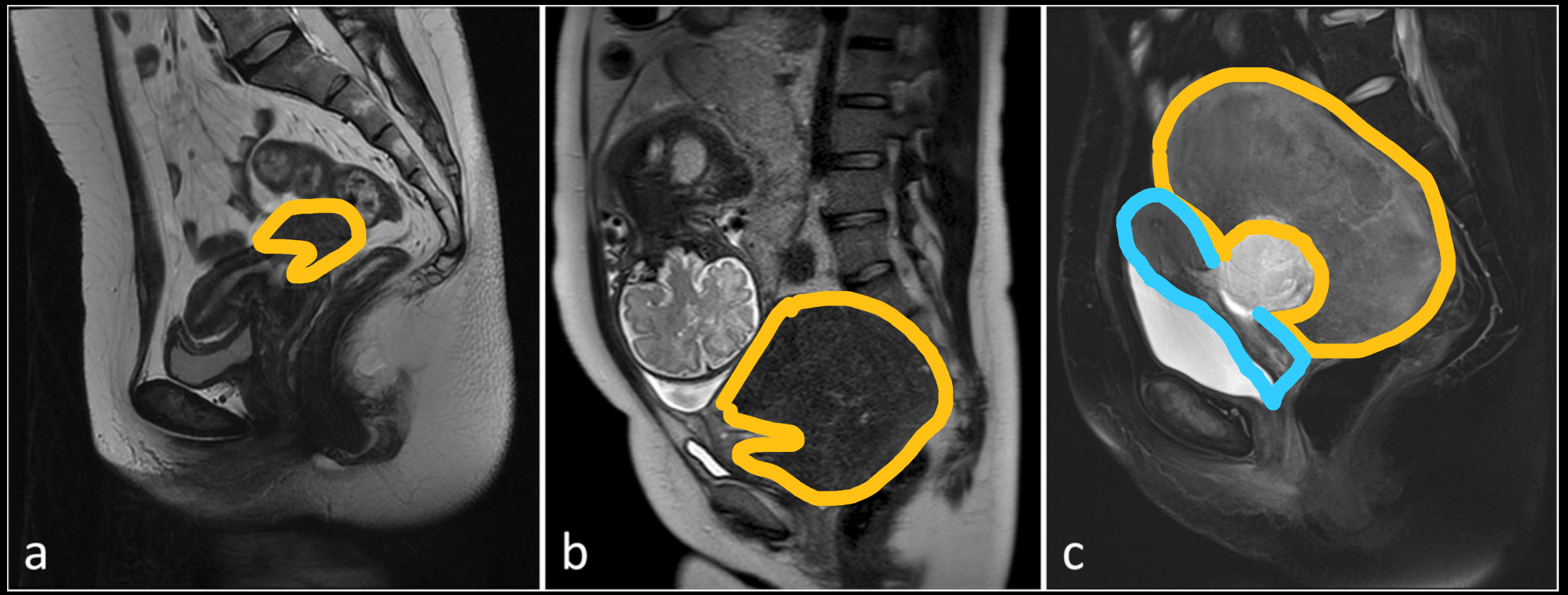
Cervical Varices without low placentation

- US+MRI ruled out any other etiology of bleeding and helped plan CS
- During CS varices where demonstrated
- Varices regressed postpartum

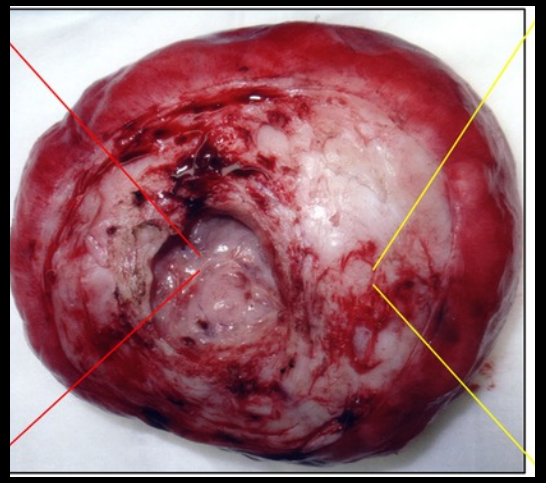


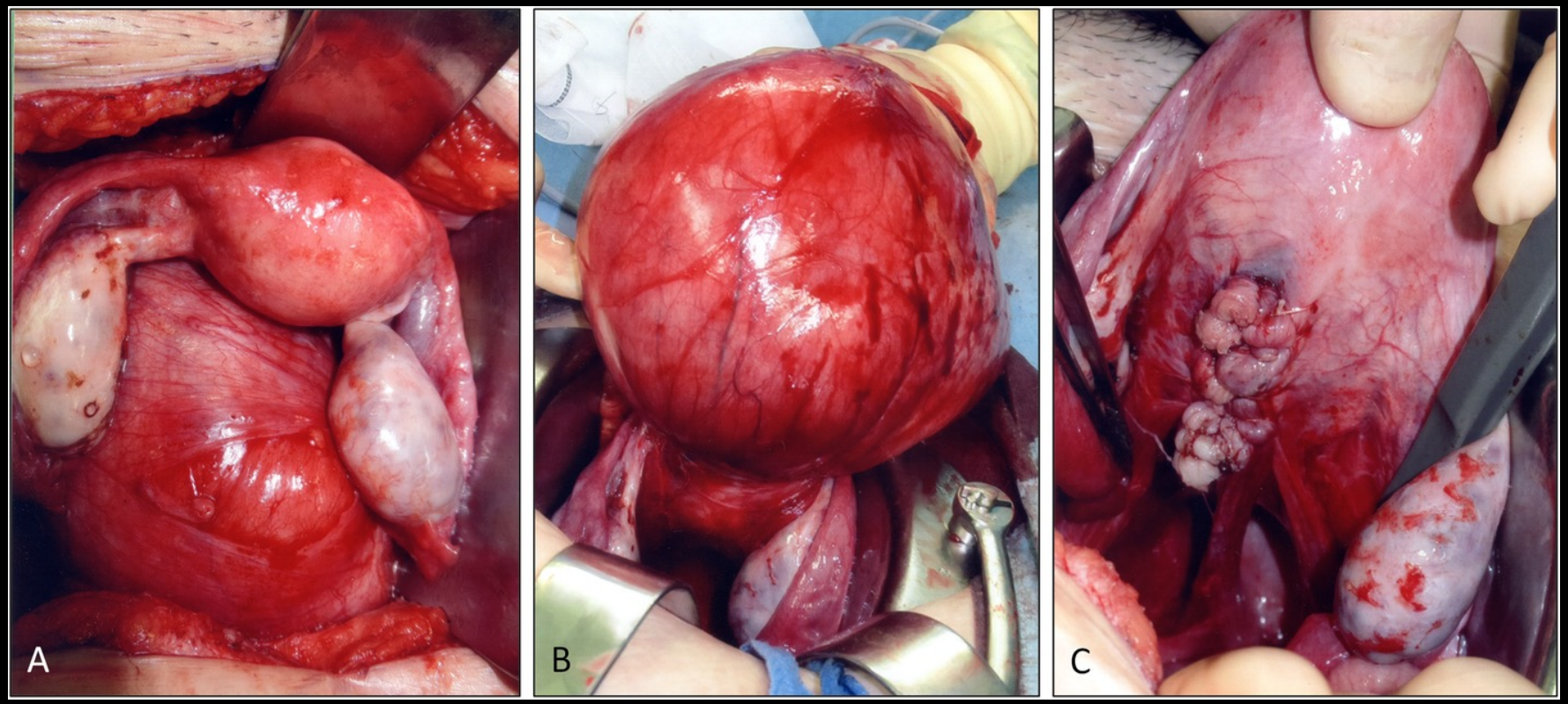
Peng MY, Ker CR, Lee YS, Ho MC, Chan TF. Cervical varices unrelated to placenta previa as an unusual cause of antepartum hemorrhage: A case report and literature review. Taiwan J Obstet Gynecol. 2018 Oct

Fibroid – Tumor Previa



Enlarged uterine fibroid forming uterine diverticulum during pregnancy: a case report. Akashi E et al . BMC Pregnancy Childbirth. 2021





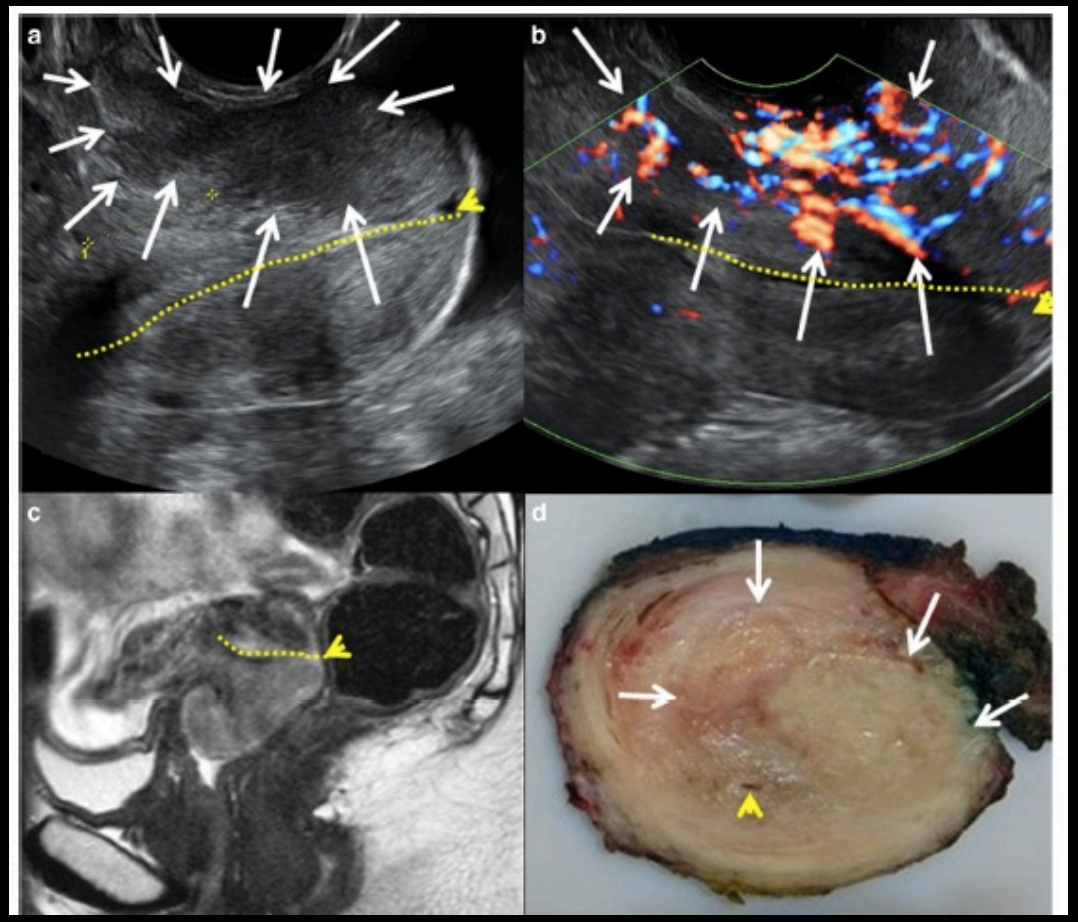
Enlarged uterine fibroid forming uterine diverticulum during pregnancy: a case report. Akashi E et al . BMC Pregnancy Childbirth. 2021

Cervical Malignancy

during pregnancy

Non pregnant patient

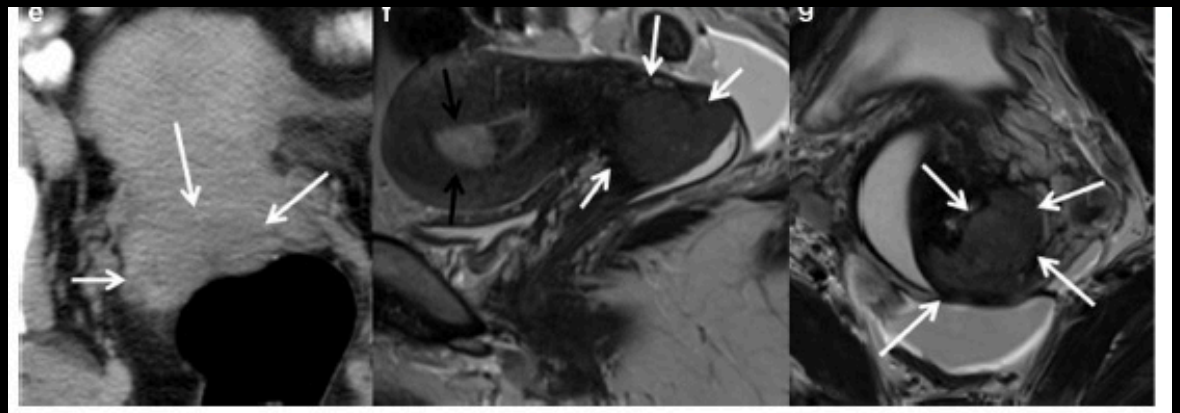
1B2



1B1

CT

MRI

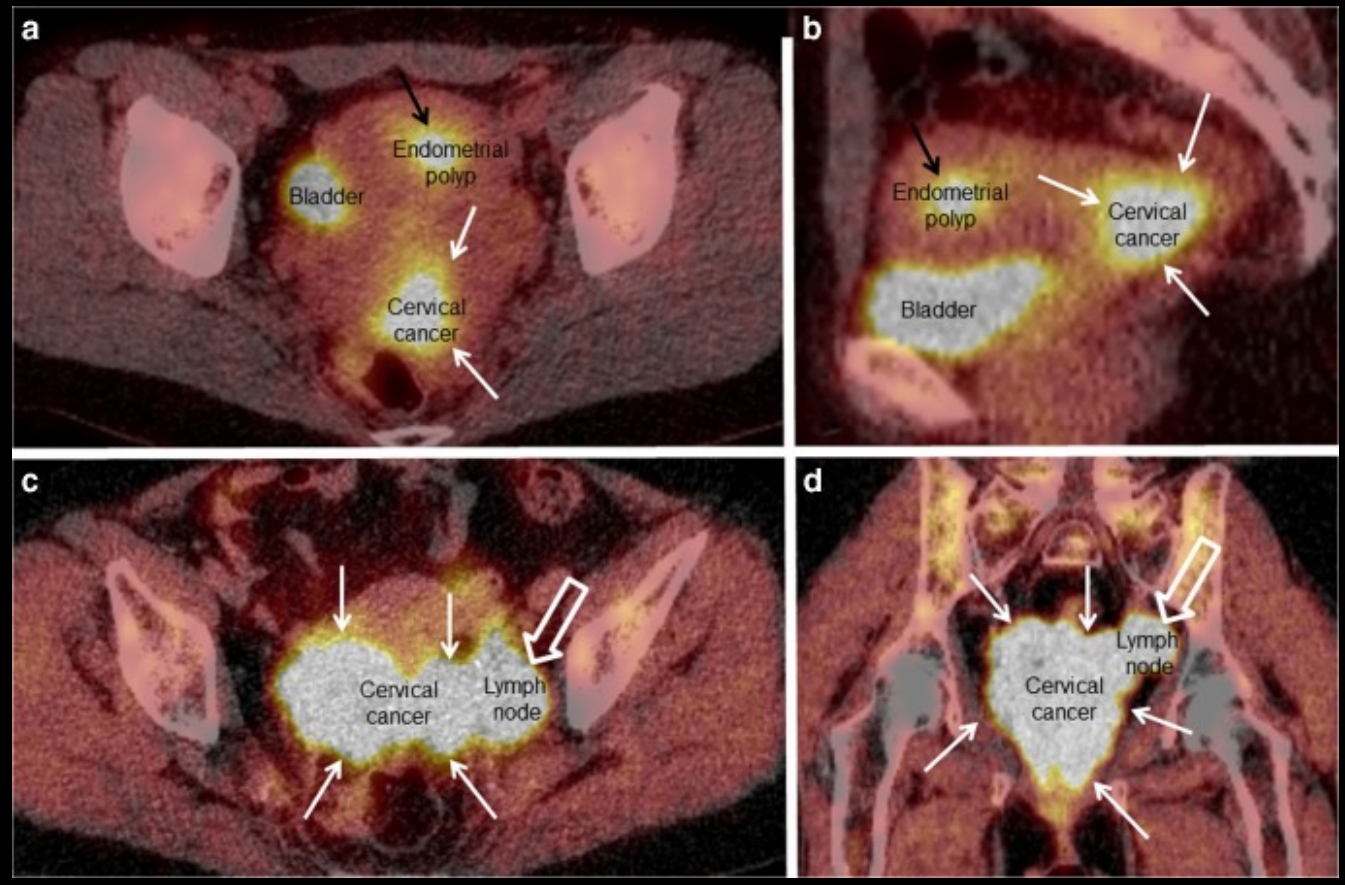


Haldorsen IS et al . What Is the Role of Imaging at Primary Diagnostic Work-Up in Uterine Cervical Cancer? Curr Oncol Rep. 2019

Non pregnant patient

1B1

3B



Haldorsen IS et al . What Is the Role of Imaging at Primary Diagnostic Work-Up in Uterine Cervical Cancer? Curr Oncol Rep. 2019

Pregnancy CX malignancy - Ultrasound

Minimal published data of ultrasound for cx malignancy during pregnancy

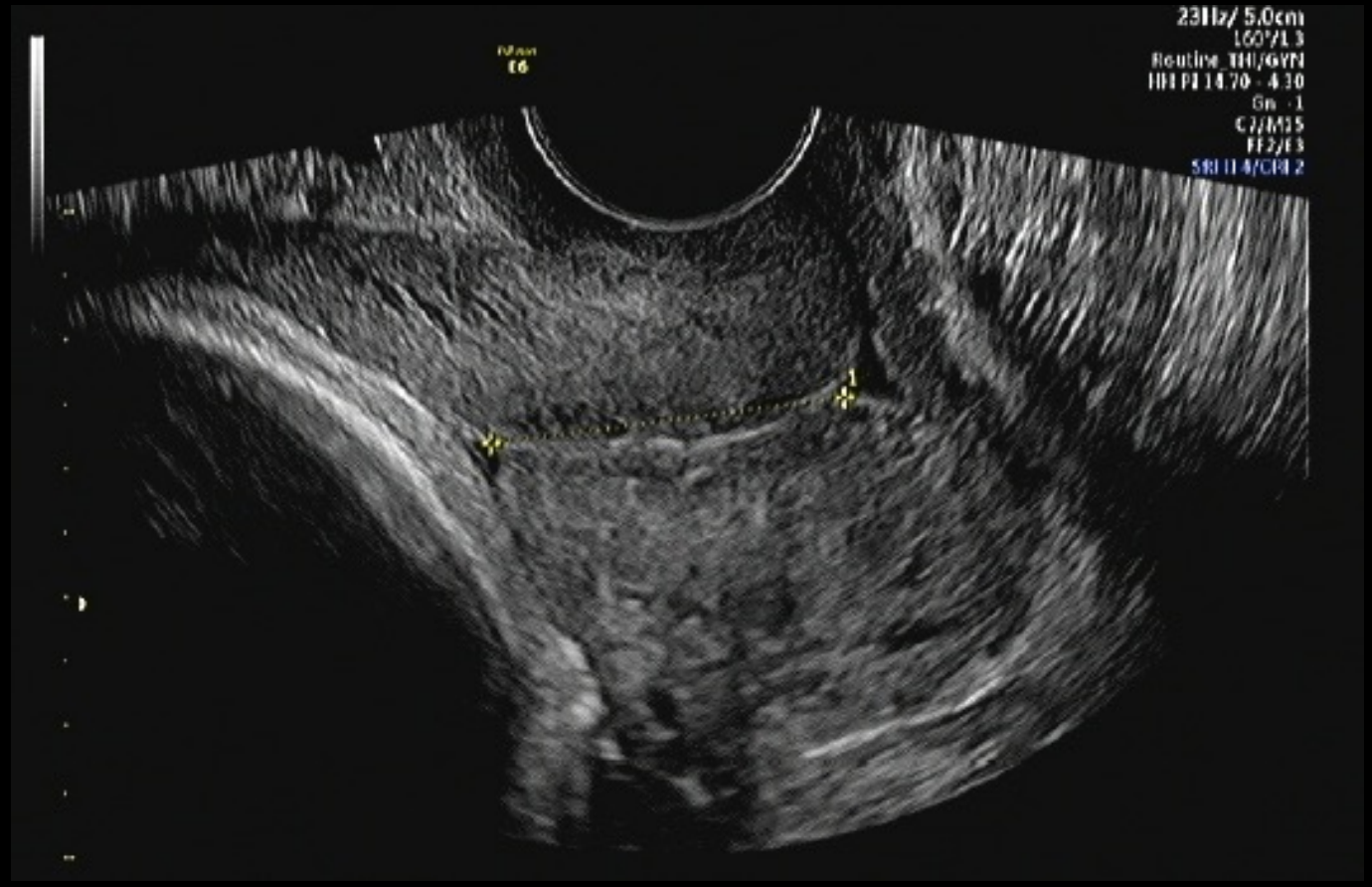
OUR CASE –

35W , G3P2

SCC in colposcopy biopsy

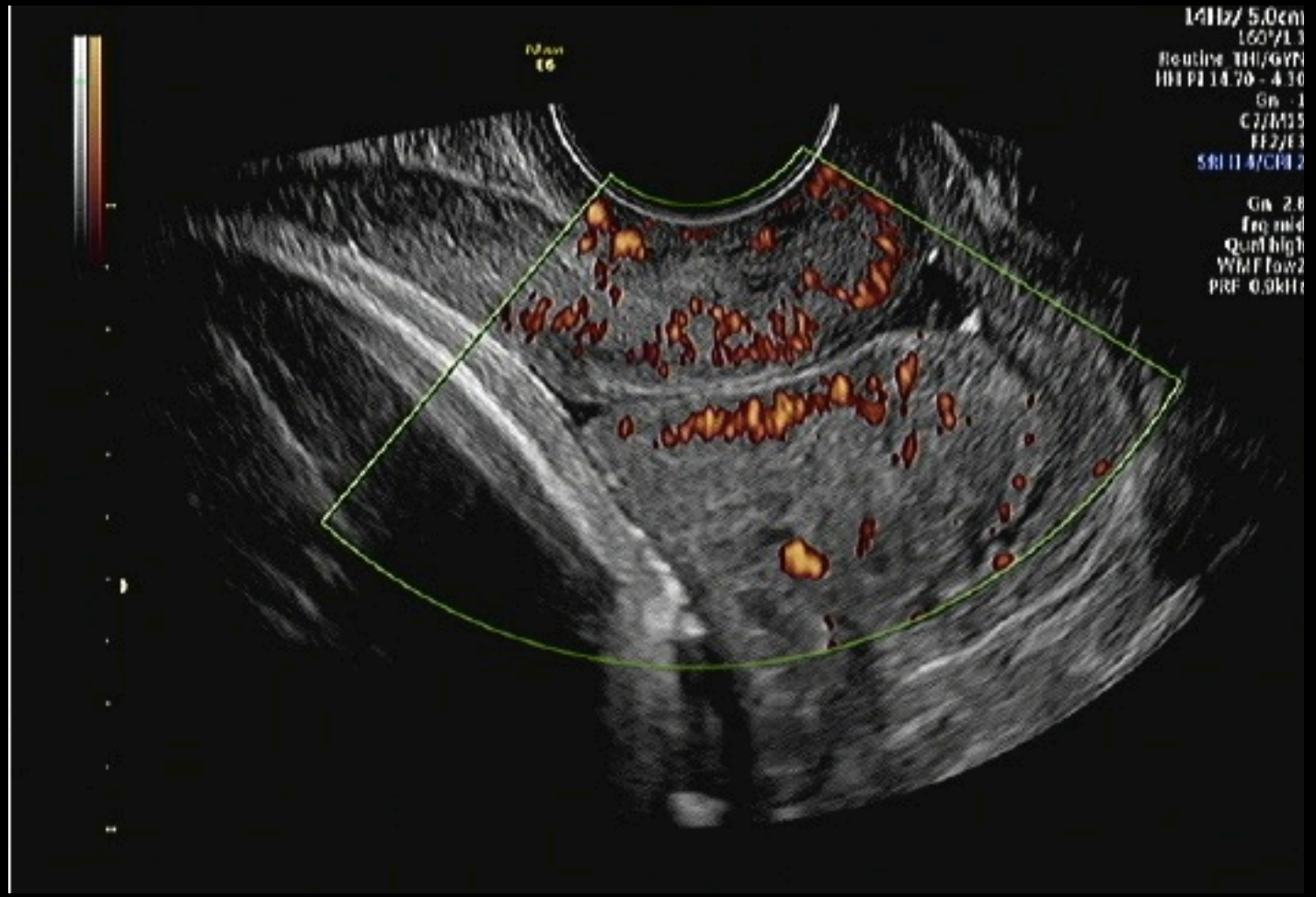
No evidence in ultrasound

Stage 1A1 SCC



Pregnancy CX malignancy - Ultrasound

Doppler



Pregnancy CX malignancy - Ultrasound

Good resolution

but:

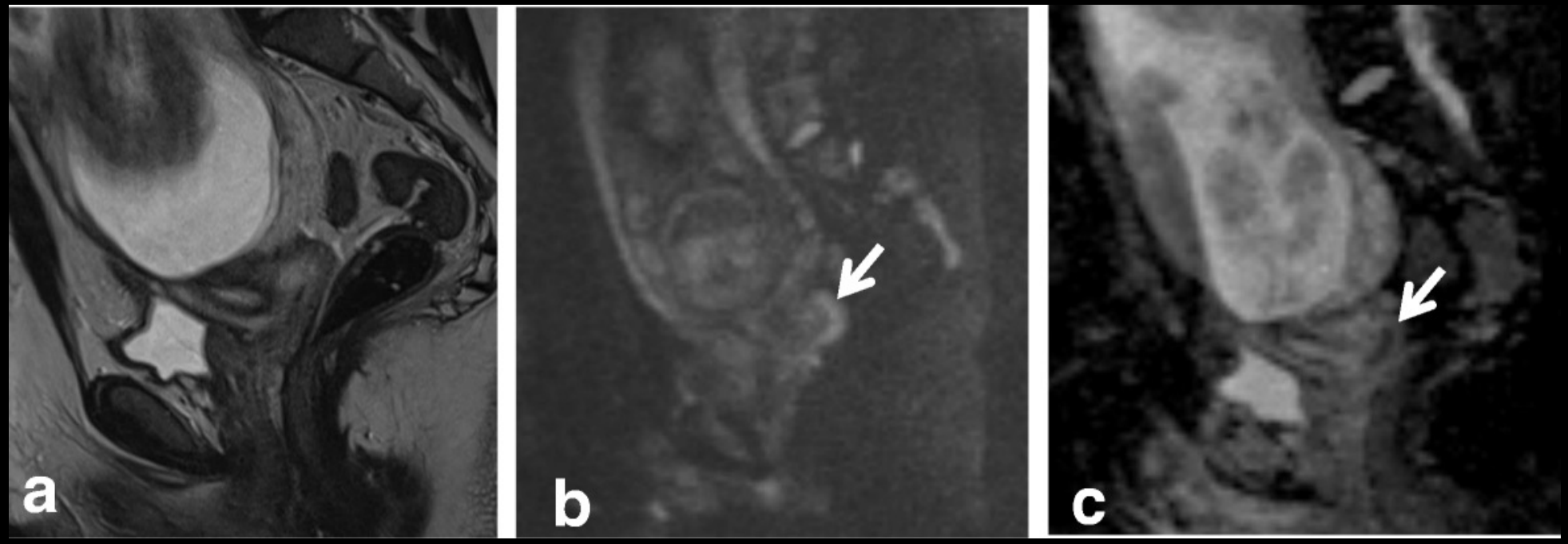
Certain type of cancer are not clearly separated from cervical tissue

Patient discomfort

Poor imaging of lymph nodes during pregnancy

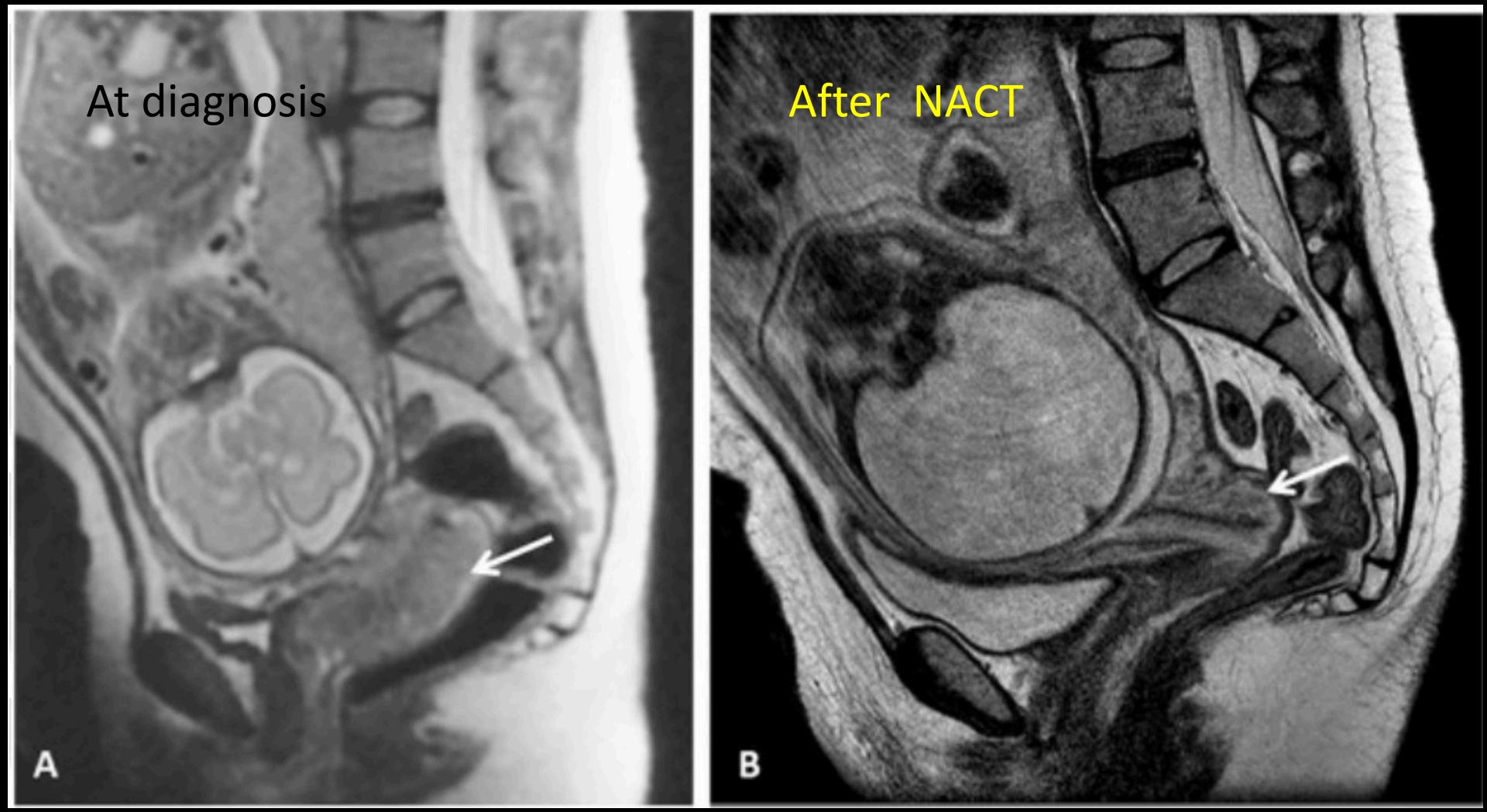
Pregnancy - MRI

- Good imaging for local and distant disease
- different sequences have different accuracy



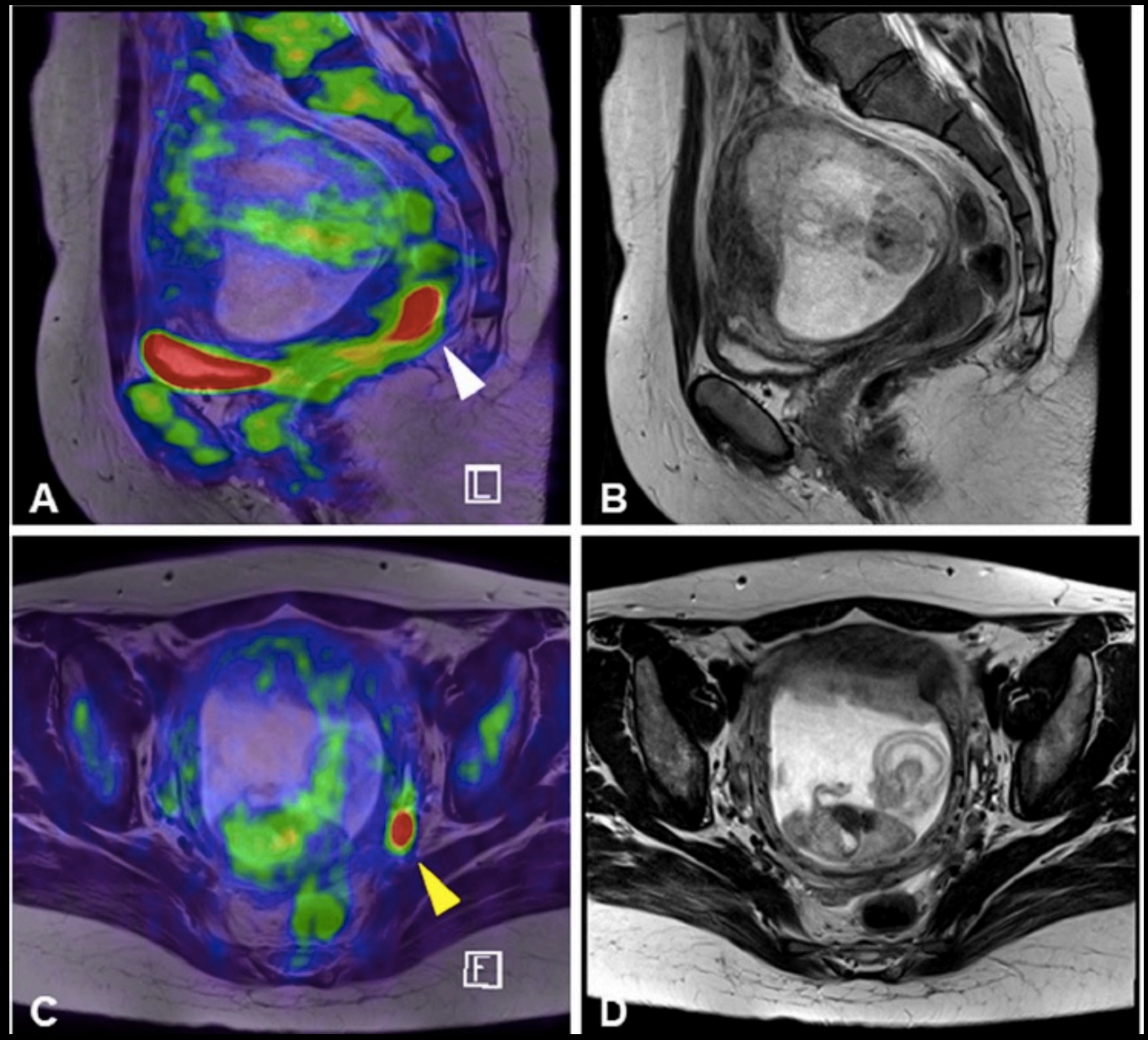
Otero-García, M.M. et al. Role of MRI in staging and follow-up of endometrial and cervical cancer: pitfalls and mimickers. Insights Imaging . (2019).

- 27w
- Figo 1b2



Locally advanced cervical cancer complicating pregnancy: A case of competing risks from the Catholic University of the Sacred Heart in Rome. R. De Vincenzo, et al . Gynecologic Oncology, 2018

FDG PET MRI



- Ishiguro T, Nishikawa N, Ishii S, Yoshihara K, Haino K, Yamaguchi M, Adachi S, Watanabe T, Soeda S, Enomoto T. PET/MR imaging for the evaluation of cervical cancer during pregnancy. BMC Pregnancy Childbirth. 2021 Apr

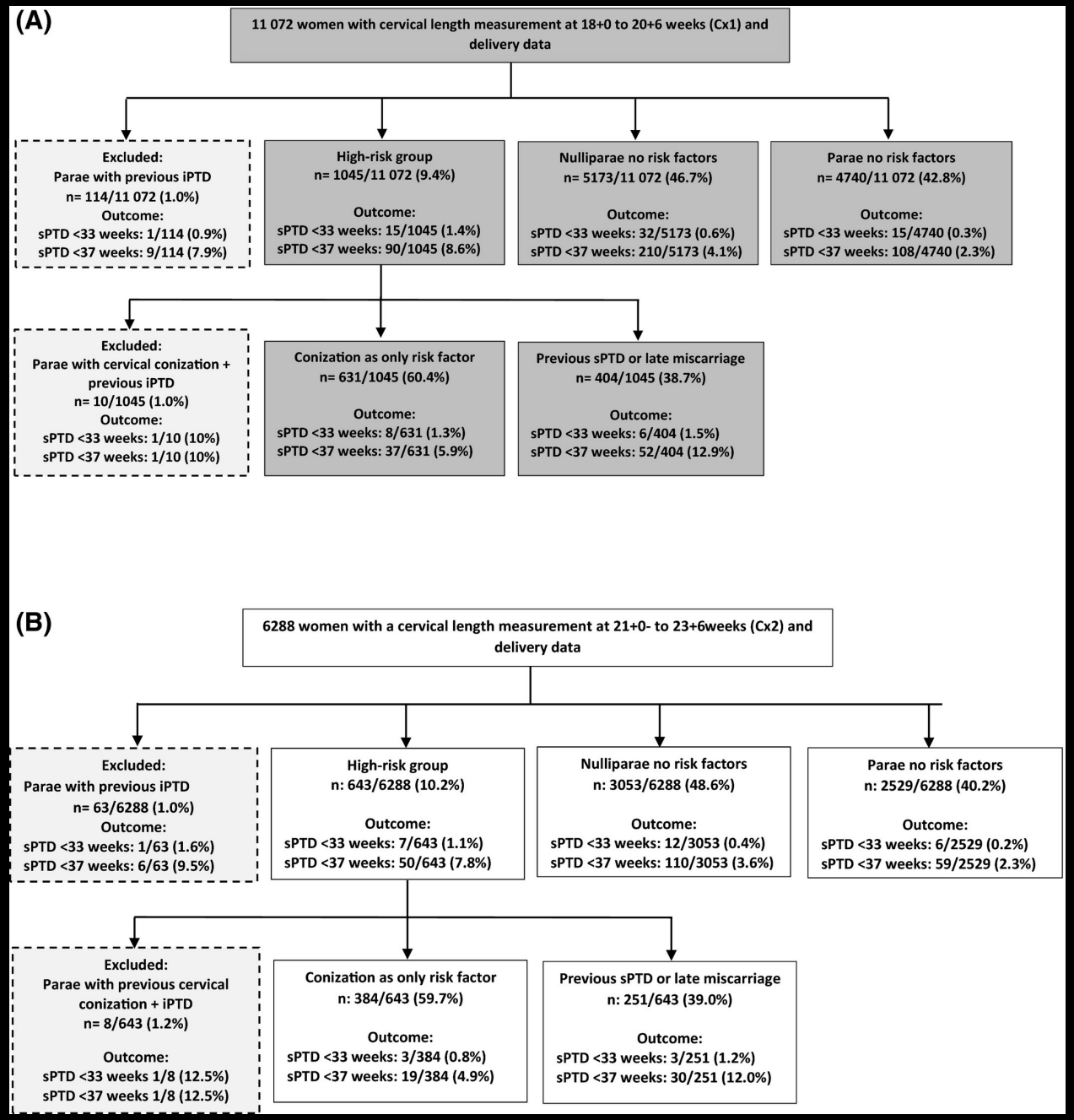
Table 1 Description of the seven pregnant cervical cancer patients

Case	Stage	PET-MRI			Pathology					Treatment				Outcome	
		GA at PET-MRI, wk	SUV max		stage	histology	tumor size, mm	LVSI	pelvic LN metastasis	surgical procedure	GA at surgery, wk	GA at termination, wk	Adjuvant treatment	status	Period after surgery, y
			cervical cancer	pelvic LN											
#1	IB1	13 + 1	4.5	–	pT1b1N0	SCC	18	–	0/32	ART-DP	15 + 6	33 + 4	Cx	NED	5.6
#2	IB1	9 + 1	8.4	–	pT1b1N0	adenocarcinoma	22	–	0/15	ART-DP	15 + 1	37 + 1	–	NED	5.1
#3	IB1	15 + 6	6.6	–	pT1b1N0	SCC	15	–	0/24	ART-DP	17 + 0	33 + 0	–	NED	4.1
#4	IB1	13 + 0	10	–	pT1b1N0	SCC	20	–	0/30	ART-DP	15 + 4	37 + 3	–	NED	3.1
#5	IB1	18 + 3	6.4	–	pT1b1N0	SCC	30	ly (+)	0/22	C/S and ARH	31 + 4	31 + 4	Cx	NED	5.5
		24 + 2	7	–											
#6	IIIC	14 + 5	16	8	pT1b1N1	adenosquamous carcinoma	28	ly (+)	2/27	ARH	16 + 3	16 + 3	CCRT	NED	3.0
#7	IA1	14 + 5	–	–	pT1A1	SCC	2	–	–	conization	16 + 3	39 + 6	–	NED	2.8

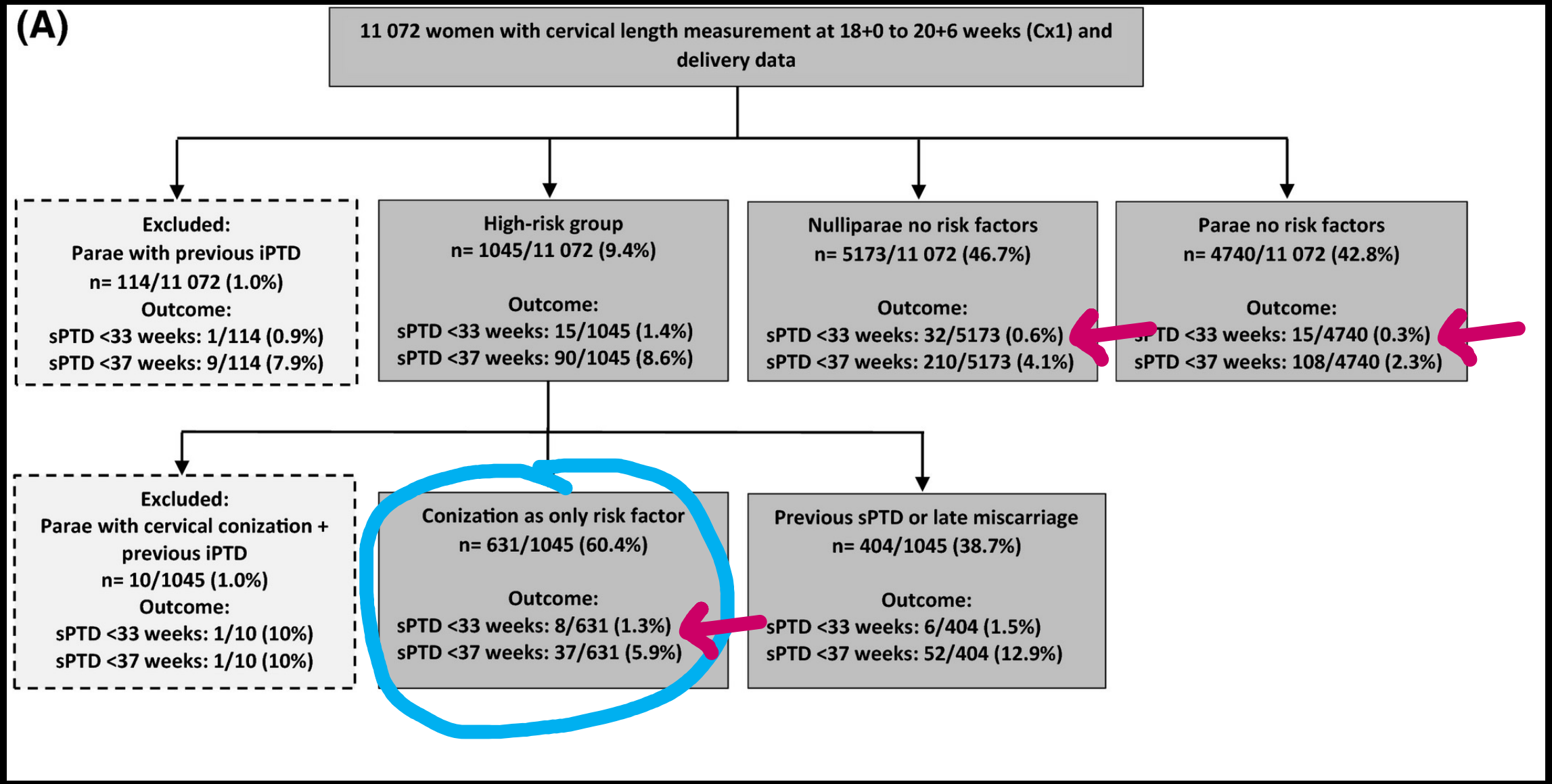
Abbreviations: *GA* gestational age, *LN* lymph nodes, *SCC* squamous cell carcinoma, *LVSI* lymphovascular space invasion, *C/S* Cesarean section, *ART-DP* abdominal radical trachelectomy during pregnancy, *ARH* abdominal radical hysterectomy, *Cx* chemotherapy, *CCRT* concurrent chemoradiotherapy, *NED* no evidence of disease

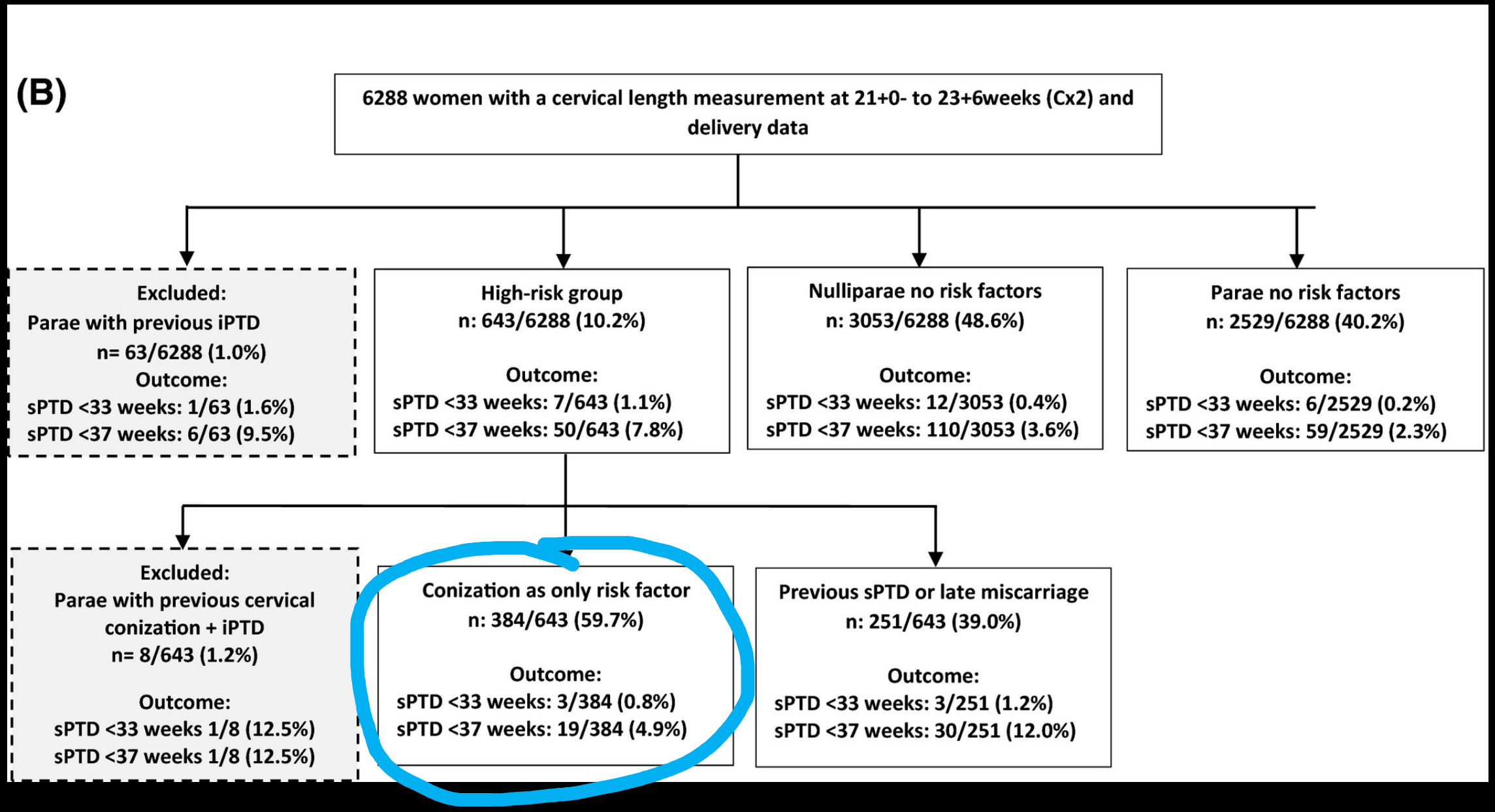
Post intervention cervix

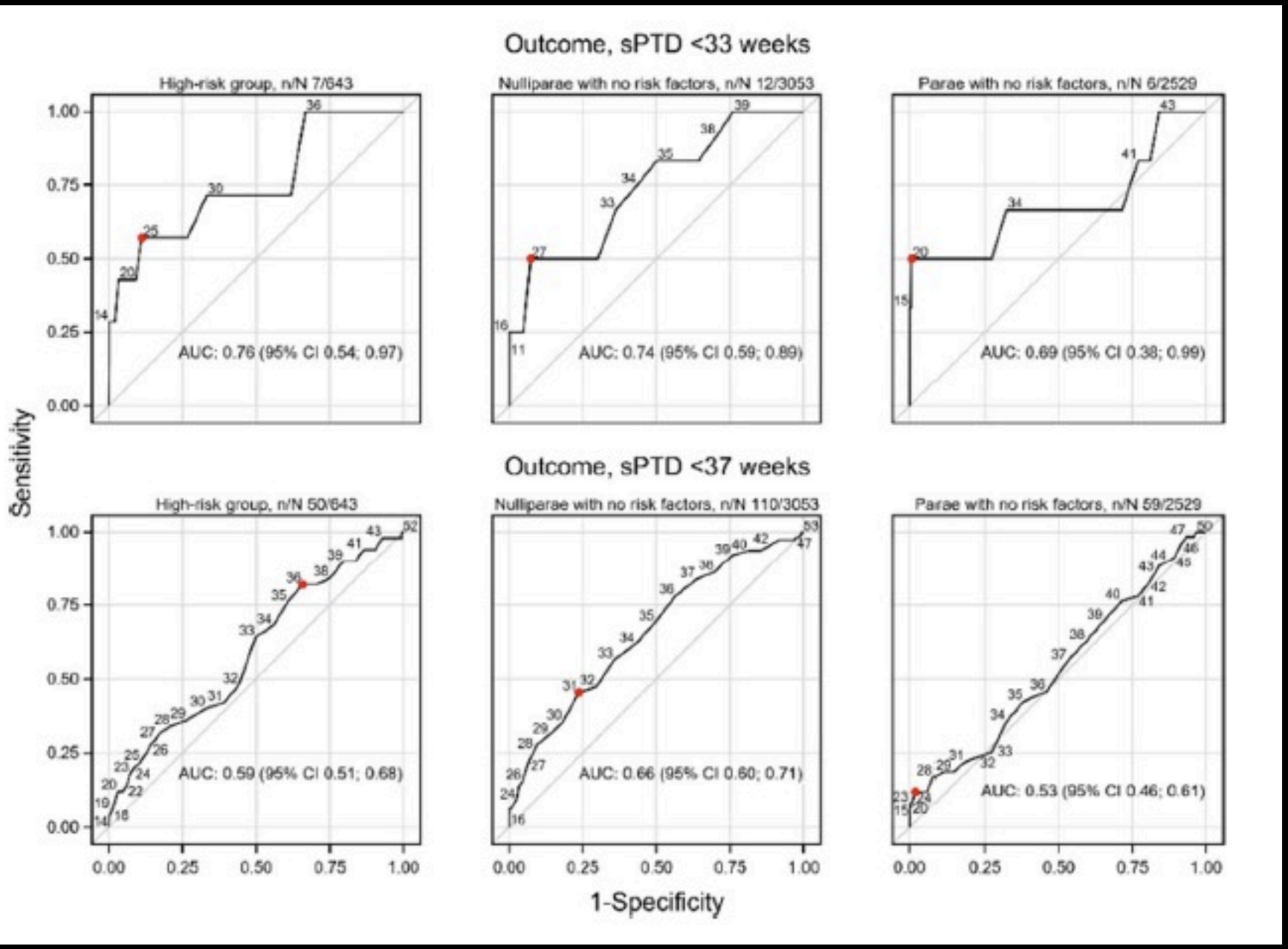
Post conization risk of PTB and CL follow up ability to predict PTB



- Wikström T, Hagberg H, Jacobsson B, Kuusela P, Wesström J, Lindgren P, Fadl H, Wennerholm UB, Valentin L. Effect of second-trimester sonographic cervical length on the risk of spontaneous preterm delivery in different risk groups: A prospective observational multicenter study. Acta Obstet Gynecol Scand. 2021 Sep;


(A)
11 072 women with cervical length measurement at 18+0 to 20+6 weeks (Cx1) and delivery data
Excluded:
Parae with previous iPTD
n= 114/11 072 (1.0%)
Outcome:
sPTD <33 weeks: 1/114 (0.9%)
sPTD <37 weeks: 9/114 (7.9%)
High-risk group
n= 1045/11 072 (9.4%)
Outcome:
sPTD <33 weeks: 15/1045 (1.4%)
sPTD <37 weeks: 90/1045 (8.6%)
Nulliparae no risk factors
n= 5173/11 072 (46.7%)
Outcome:
sPTD <33 weeks: 32/5173 (0.6%)
sPTD <37 weeks: 210/5173 (4.1%)
Parae no risk factors
n= 4740/11 072 (42.8%)
Outcome:
TD <33 weeks: 15/4740 (0.3%)
sPTD <37 weeks: 108/4740 (2.3%)
Excluded:
Parae with cervical conization + previous iPTD
n= 10/1045 (1.0%)
Outcome:
sPTD <33 weeks: 1/10 (10%)
sPTD <37 weeks: 1/10 (10%)
Conization as only risk factor
n= 631/1045 (60.4%)
Outcome:
sPTD <33 weeks: 8/631 (1.3%)
sPTD <37 weeks: 37/631 (5.9%)
Previous sPTD or late miscarriage
n= 404/1045 (38.7%)
Outcome:
sPTD <33 weeks: 6/404 (1.5%)
sPTD <37 weeks: 52/404 (12.9%)


(B)
6288 women with a cervical length measurement at 21+0- to 23+6weeks (Cx2) and delivery data
Excluded:
Parae with previous iPTD
n= 63/6288 (1.0%)
Outcome:
sPTD <33 weeks: 1/63 (1.6%)
sPTD <37 weeks: 6/63 (9.5%)
High-risk group
n: 643/6288 (10.2%)
Outcome:
sPTD <33 weeks: 7/643 (1.1%)
sPTD <37 weeks: 50/643 (7.8%)
Nulliparae no risk factors
n: 3053/6288 (48.6%)
Outcome:
sPTD <33 weeks: 12/3053 (0.4%)
sPTD <37 weeks: 110/3053 (3.6%)
Parae no risk factors
n: 2529/6288 (40.2%)
Outcome:
sPTD <33 weeks: 6/2529 (0.2%)
sPTD <37 weeks: 59/2529 (2.3%)
Excluded:
Parae with previous cervical conization + iPTD
n= 8/643 (1.2%)
Outcome:
sPTD <33 weeks 1/8 (12.5%)
sPTD <37 weeks 1/8 (12.5%)
Conization as only risk factor
n: 384/643 (59.7%)
Outcome:
sPTD <33 weeks: 3/384 (0.8%)
sPTD <37 weeks: 19/384 (4.9%)
Previous sPTD or late miscarriage
n: 251/643 (39.0%)
Outcome:
sPTD <33 weeks: 3/251 (1.2%)
sPTD <37 weeks: 30/251 (12.0%)


Outcome, sPTD <33 weeks
High-risk group, n/N 7/643
AUC: 0.76 (95% CI 0.54; 0.97)
Nulliparae with no risk factors, n/N 12/3053
AUC: 0.74 (95% CI 0.59; 0.89)
Parae with no risk factors, n/N 6/2529
AUC: 0.69 (95% CI 0.38; 0.99)
Outcome, sPTD <37 weeks
High-risk group, n/N 50/643
AUC: 0.59 (95% CI 0.51; 0.68)
Nulliparae with no risk factors, n/N 110/3053
AUC: 0.66 (95% CI 0.60; 0.71)
Parae with no risk factors, n/N 59/2529
AUC: 0.53 (95% CI 0.46; 0.61)
Sensitivity
1-Specificity
0.00
0.25
0.50
0.75
1.00

Post Vaginal Trachelectomy

case report

28Y G0, Cervical Cancer SCC , Figo stage 1B1 After Conization

- PET CT no Mets
- laparoscopic LND + ECC both negative
- Vaginal Radical Trachelectomy (2/3) + Cerclage

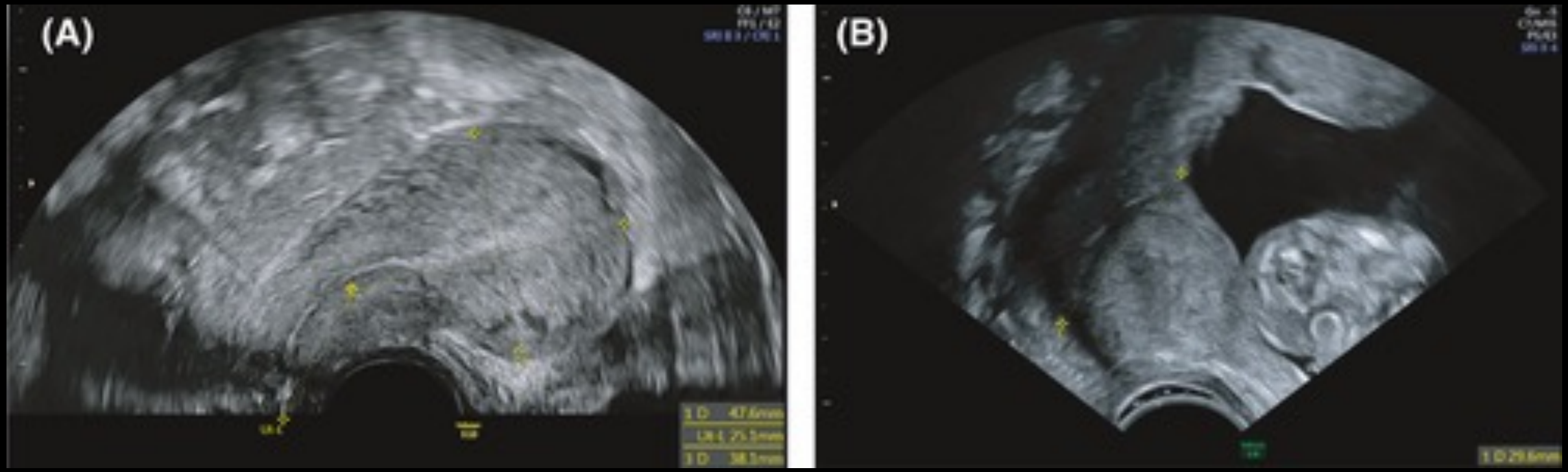
4 Deliveries at 34-36 weeks (during 4+ years)

Planned for hysterectomy

First case of four spontaneously conceived successful pregnancies after fertility-sparing surgery for cervical cancer.
Metzler JM, et al. Clin Case Rep. 2021.

Non pregnant

4th pregnancy



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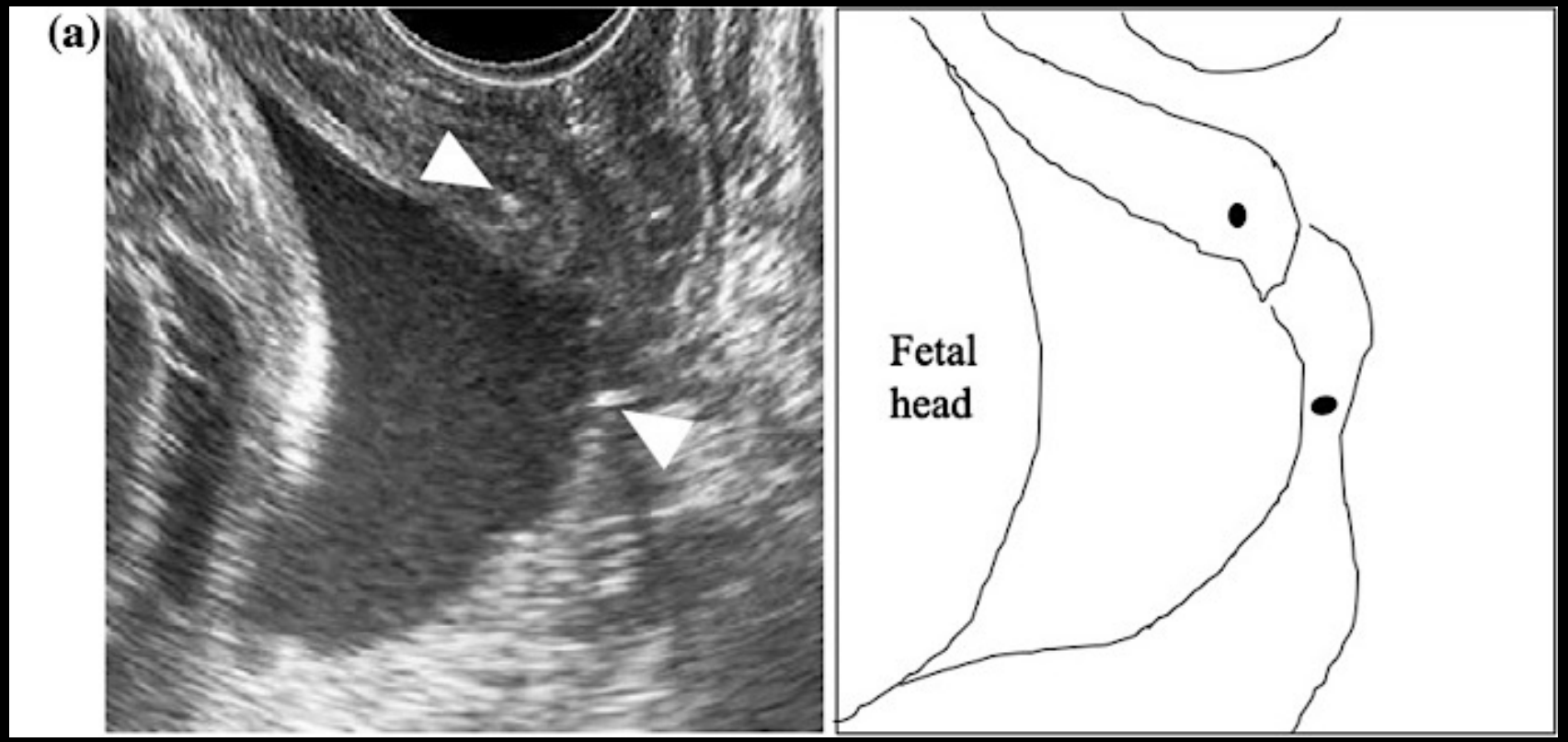
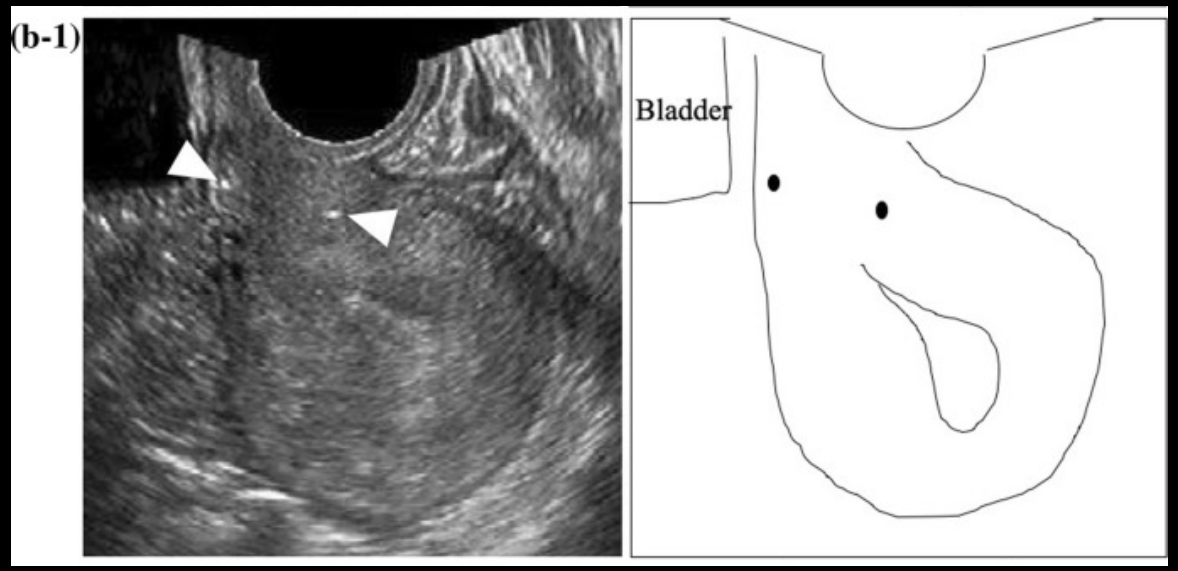
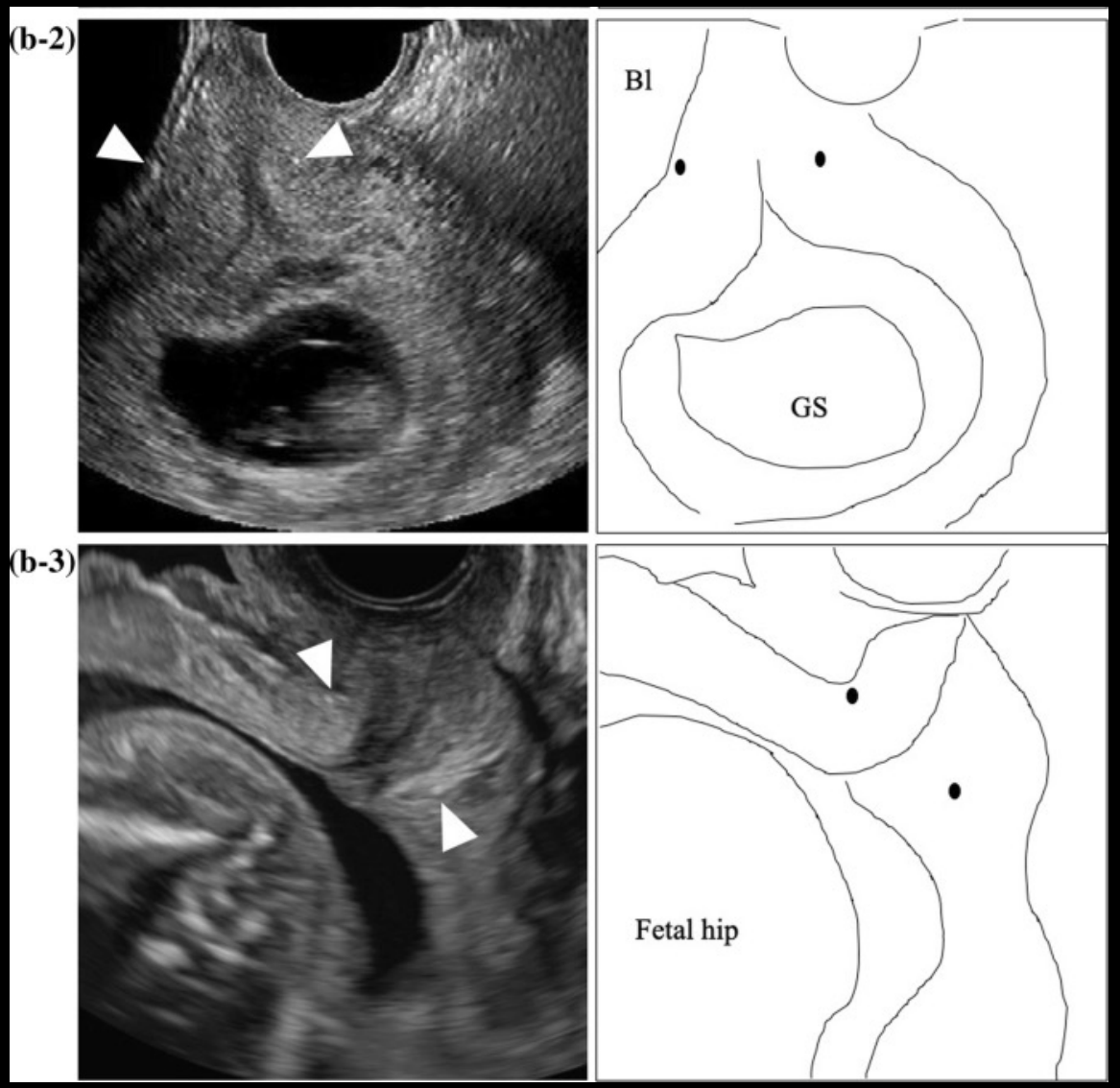
Cervix ultrasound after Abdominal Radical Trachelectomy



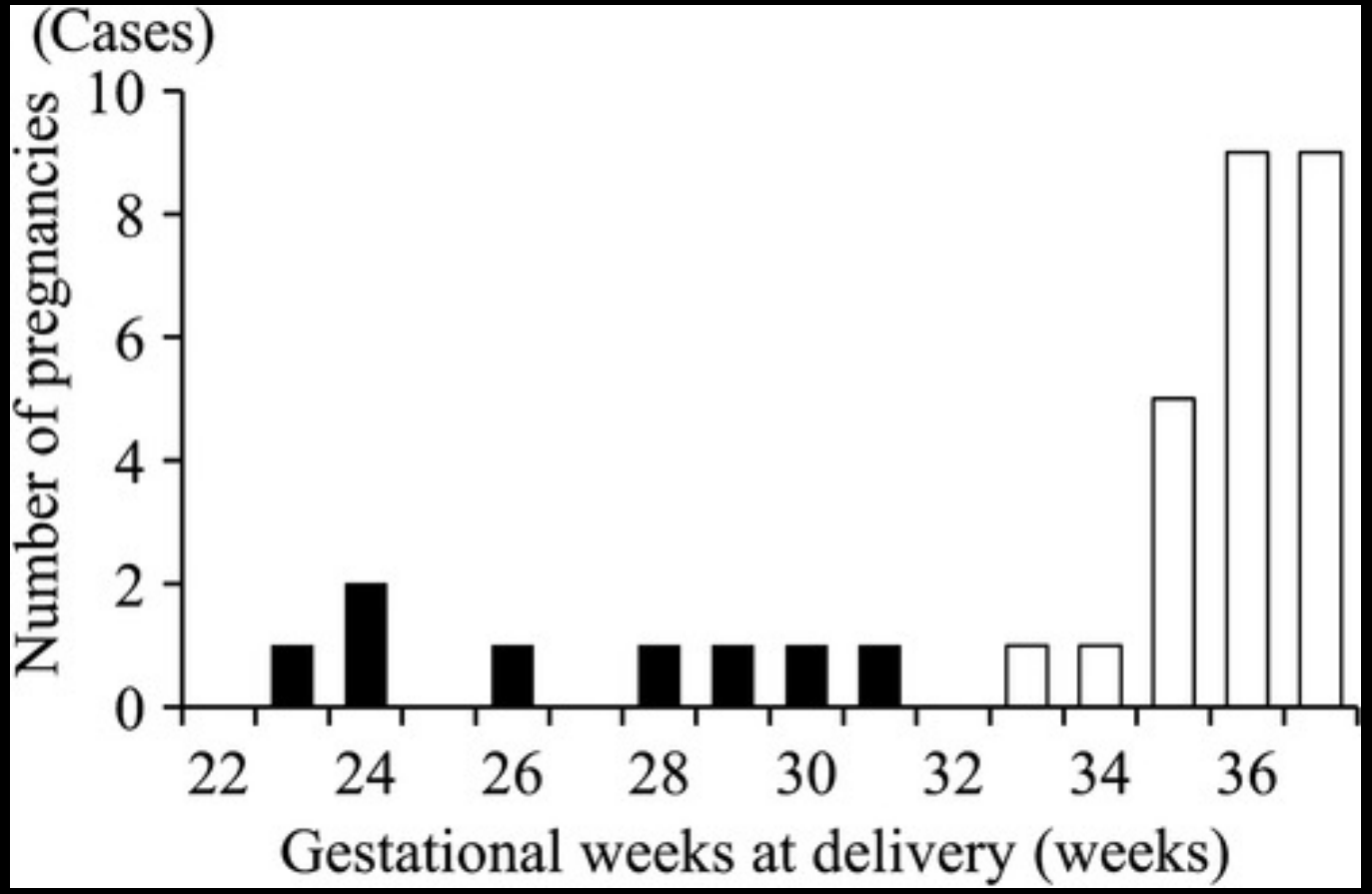
23W

short cervix

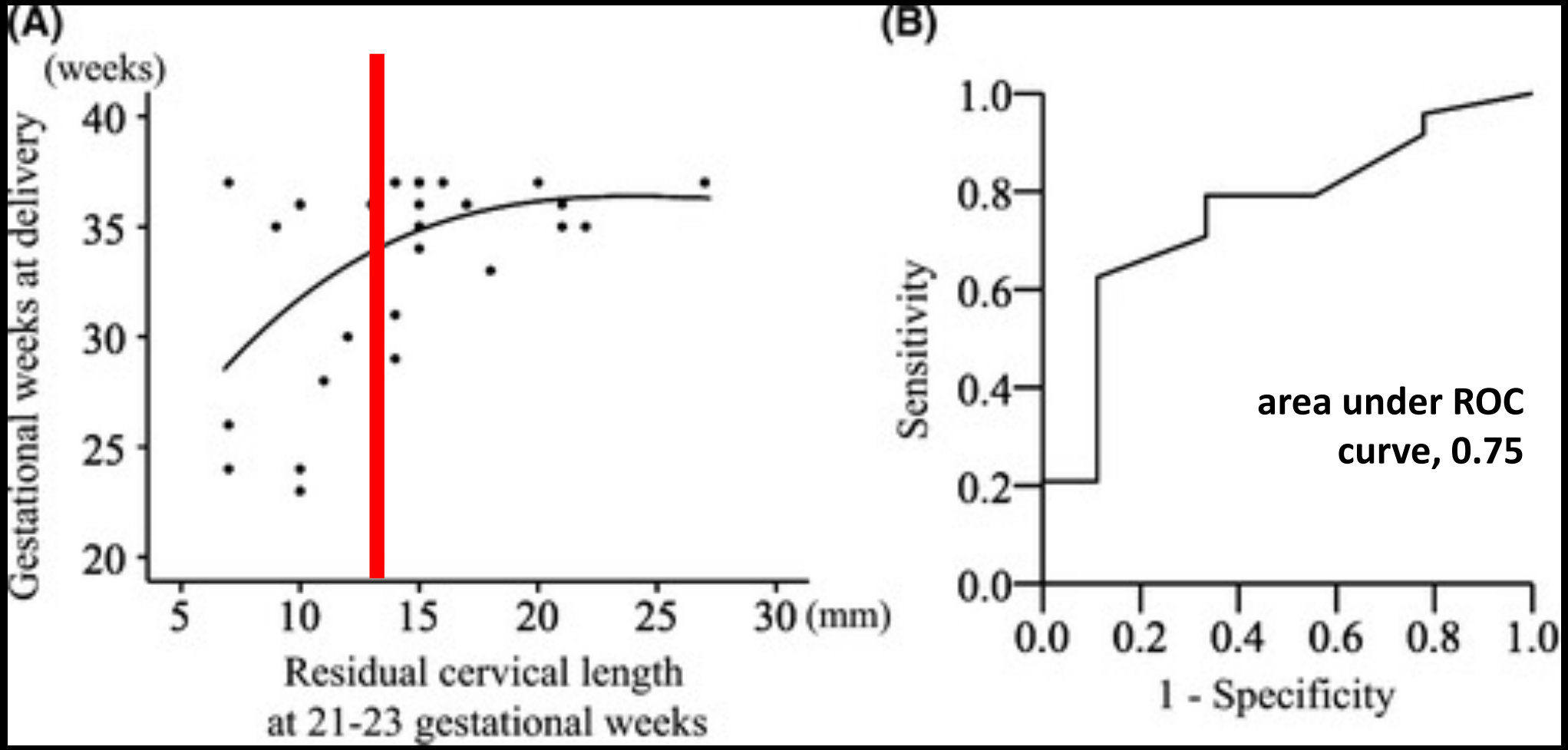




Transvaginal ultrasound features of the residual cervix in pregnancy after radical trachelectomy. Kasuga Y et al .Journal of medical ultrasonics (2001)



Kasuga Y et al . Mid-trimester residual cervical length and the risk of preterm birth in pregnancies after abdominal radical trachelectomy: a retrospective analysis. BJOG. 2017.



Kasuga Y et al . Mid-trimester residual cervical length and the risk of preterm birth in pregnancies after abdominal radical trachelectomy: a retrospective analysis. BJOG. 2017.

Take Home Message

Take a better look at the cervix

Better Intel → **Better Management** → **Better Outcome**

QUESTIONS ?

THANK YOU