Interstitial & Scar Pregnancies

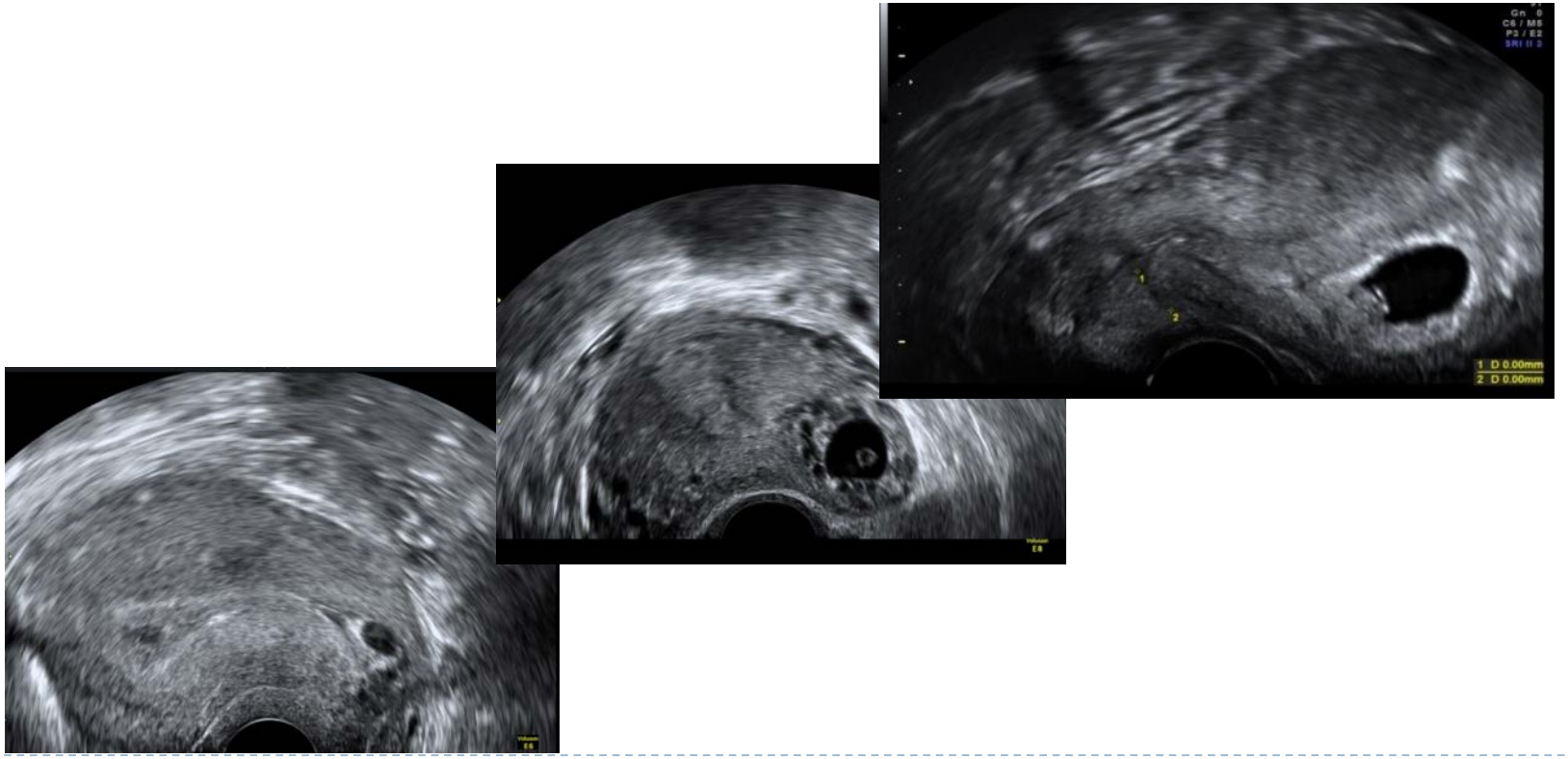
Jackie Ross
Consultant Gynaecologist
King's College Hospital, London

Declaration of financial interests

- I have received payment for teaching on courses in 3D ultrasound on behalf of Cook UK
- I have received travel expenses & meals from:
  - Association of Early Pregnancy Units
  - British Medical Ultrasound Society
  - European Society of Gynaecological Endoscopists
  - Fetal Medicine Foundation
  - ESHRE
- I have received lunch from:
  - RCOG

Scope

- Diagnosis
- Diagnostic dilemmas
- Treatment options



Interstitial ectopic pregnancy

Royal College of Obstetricians & Gynaecologists

Diagnosis and Management of Ectopic Pregnancy

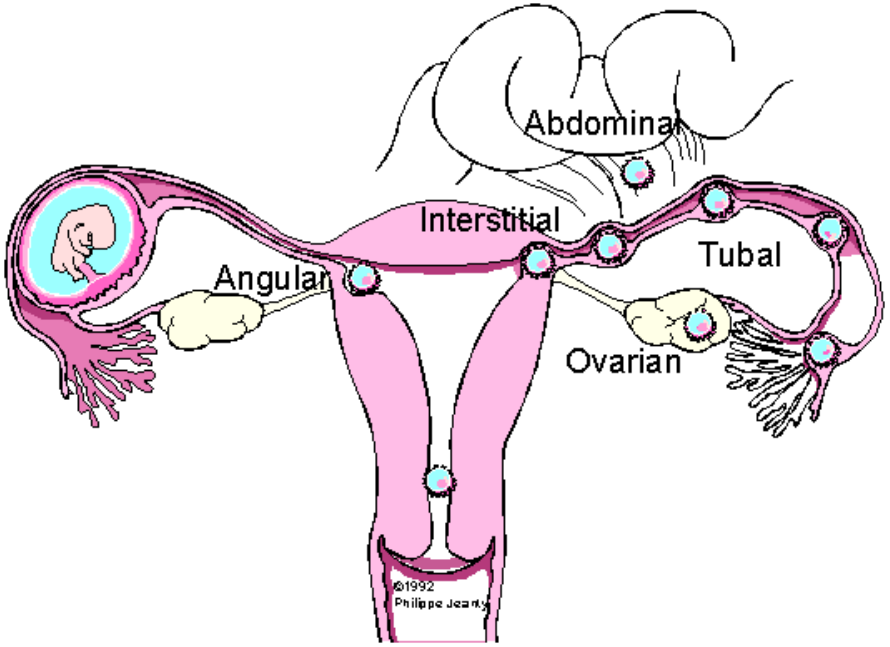
Green-top Guideline No. 21

RCOG/AEPU Joint Guideline | November 2016

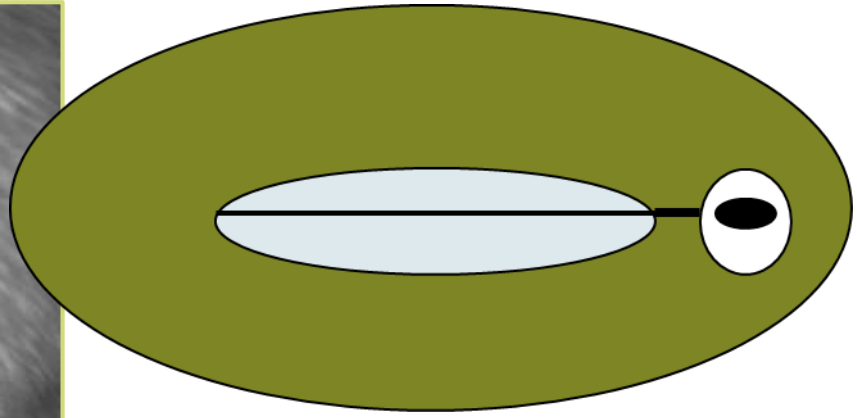
Please cite this paper as: Elson CJ, Salim R, Potdar N, Chetty M, Ross JA, Kirk EJ on behalf of the Royal College of Obstetricians and Gynaecologists. Diagnosis and management of ectopic pregnancy. BJOG 2016;123:e15–e55.

Interstitial pregnancy
Clinical features

- 2-4% ectopic pregnancies
- Previous tubal ectopic/ipsilateral salpingectomy, ART, STI
- Delayed presentation
- 9-12 weeks gestation

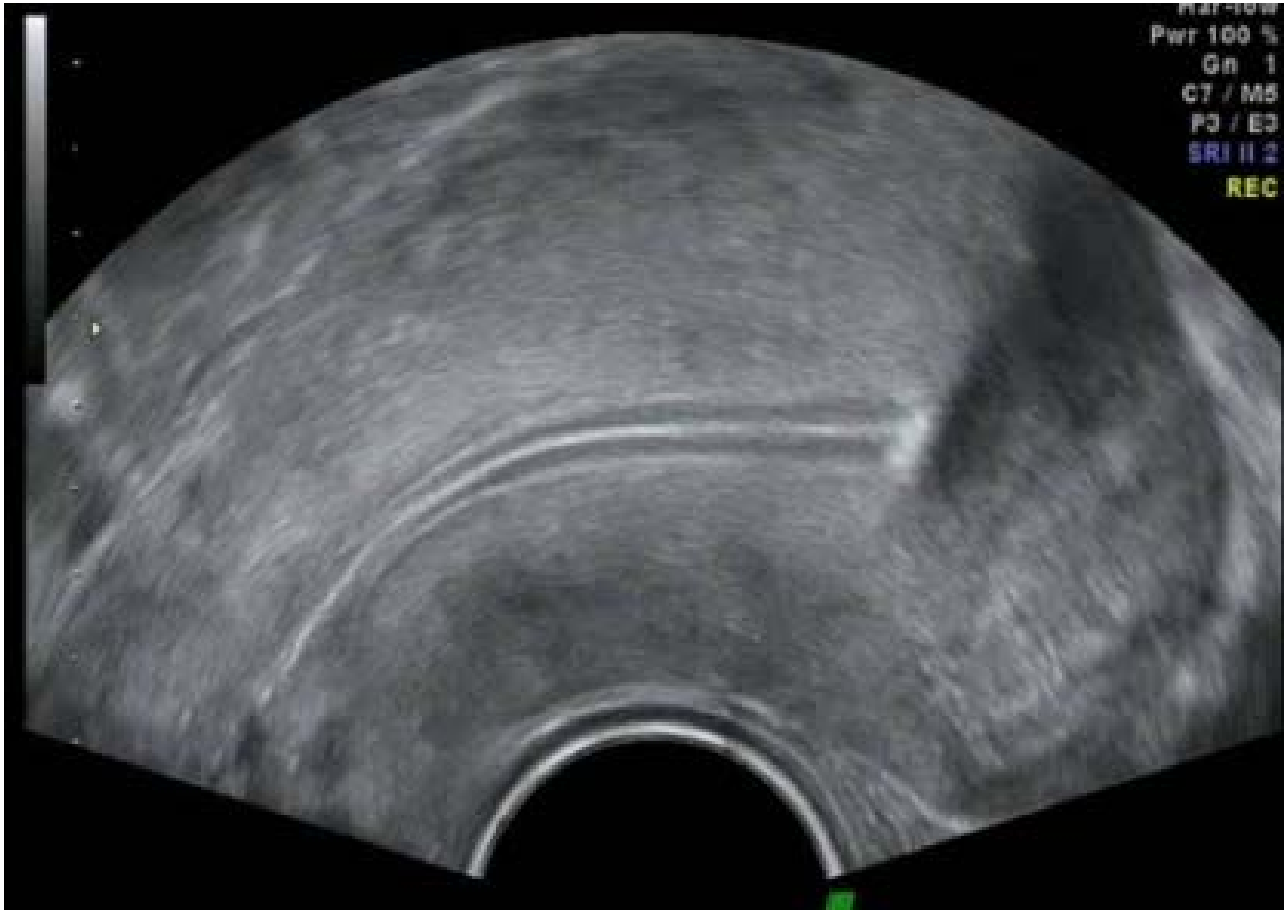


Interstitial ectopic pregnancy: diagnosis

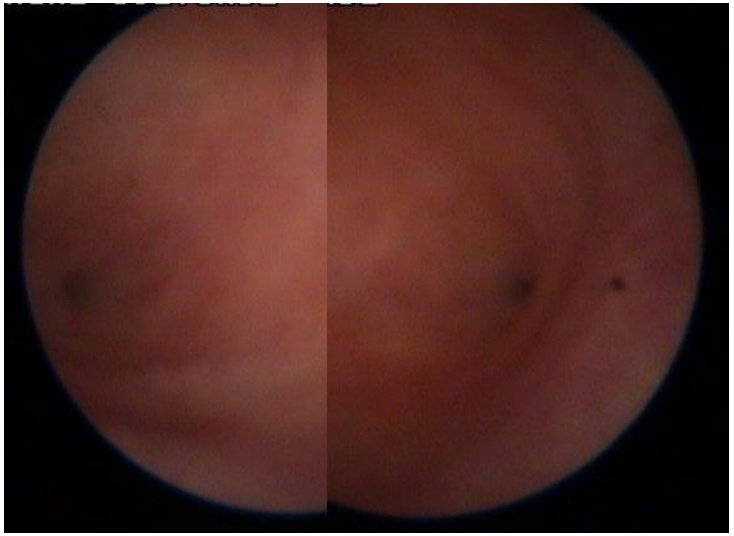


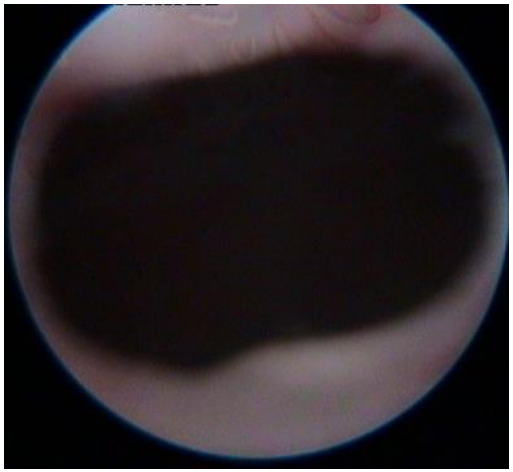
- Empty uterine cavity
- Products of conception/gestational sac located laterally in the interstitial (intramural) part of the tube
- Presence of the ‘ interstitial line sign’
- (Surrounded by less than 5 mm of myometrium in all imaging planes)

How do you define the endometrial cavity?



How do you define the endometrial cavity?

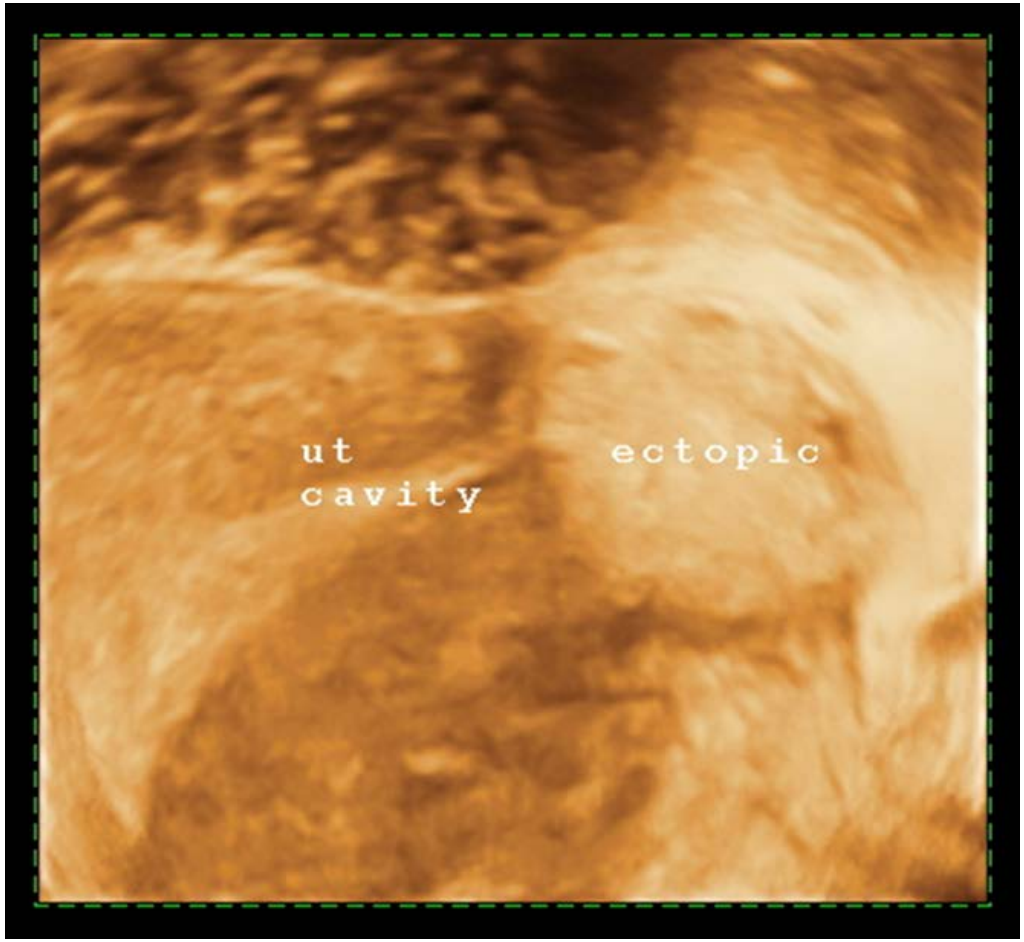




Interstitial ectopic pregnancy

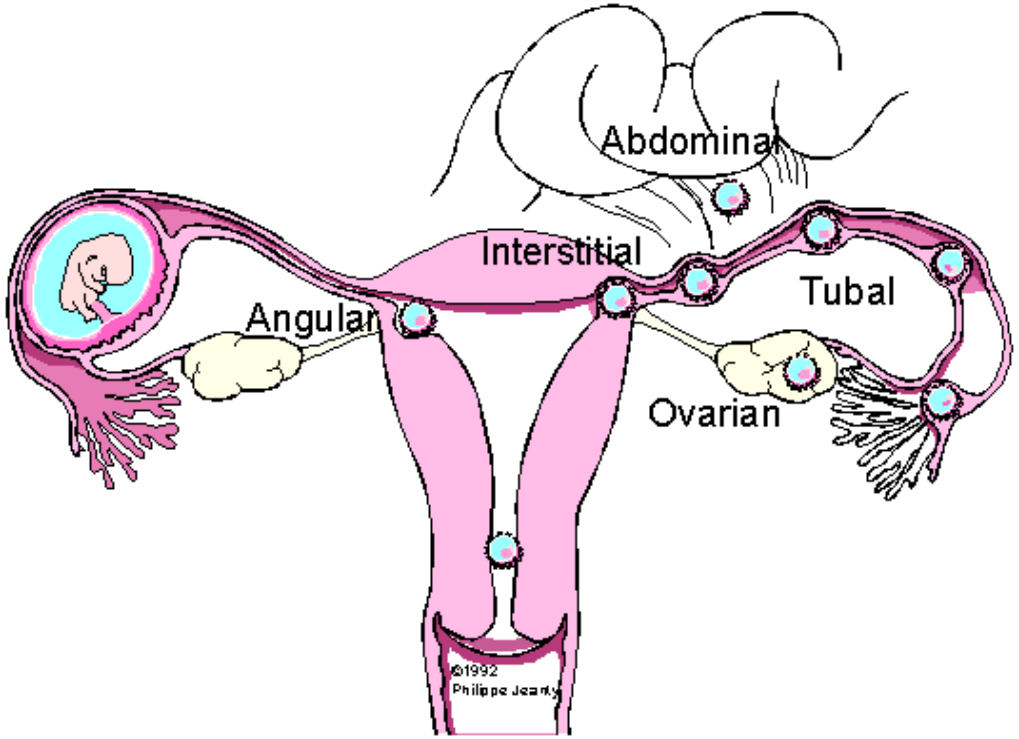
Interstitial ectopic pregnancy

Interstitial ectopic pregnancy



Interstitial pregnancy
Differential Diagnosis

- Angular pregnancy
- Cornual pregnancy
- Intramural pregnancy
- Intrauterine pregnancy in an anomalous uterus
- Fibroid
- Adenomyoma



Interstitial ectopic pregnancy: differential diagnosis

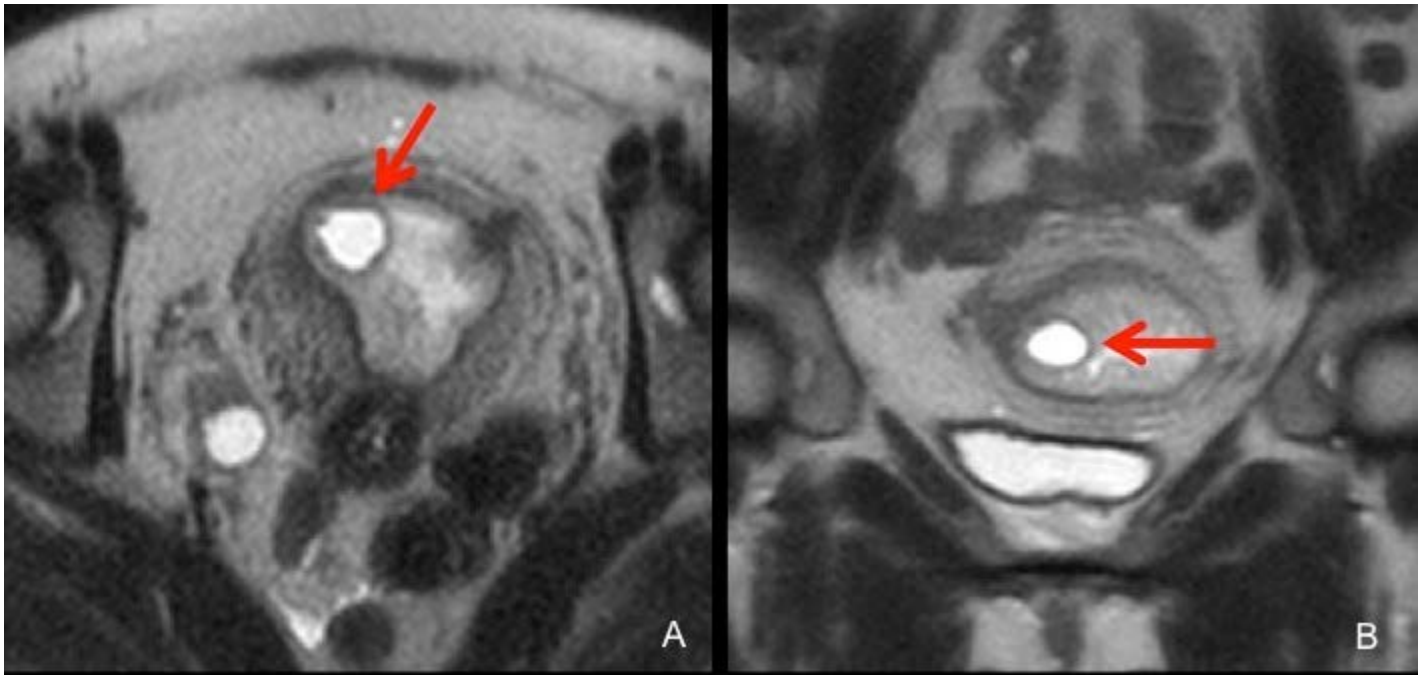
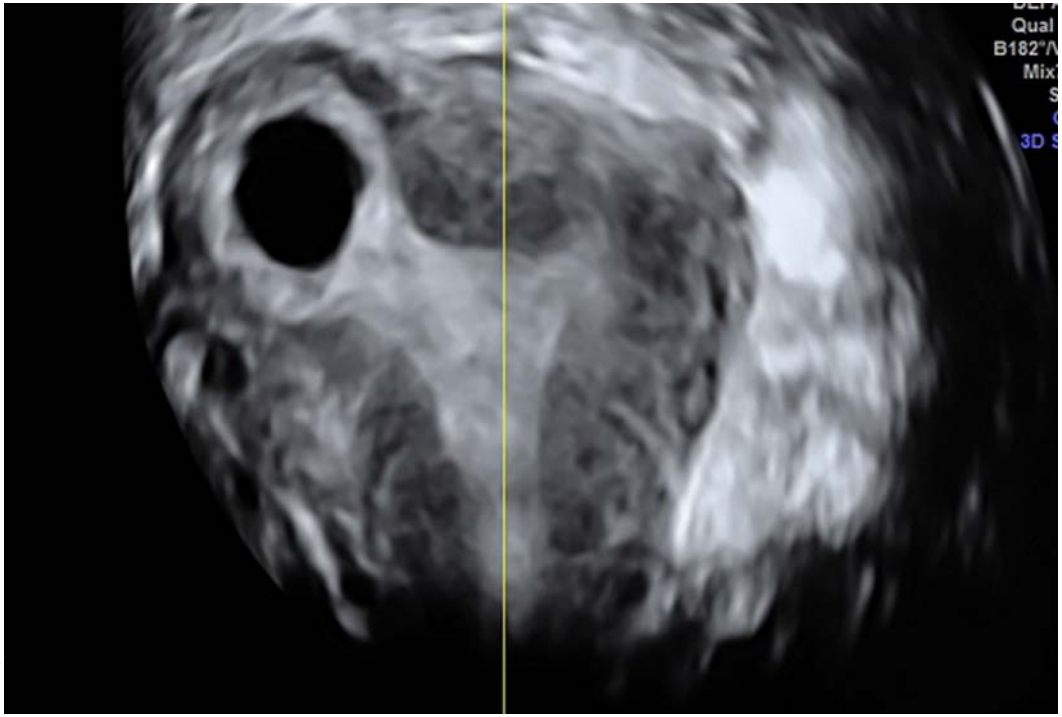


Fig. 18: MRI was performed suspecting interstitial pregnancy by TVUS at 5 weeks' gestation. A,B. Axial (A) and coronal (B) T2-weighted MRI show a GS-like structure (arrows) at the right cornus and it is located inside the junctional zone. References: Radiology, Kobe City Medical Center General Hospital - Kobe/JP

‘Interstitial ectopic pregnancies’

This UltraSonography image of the uterus can show us a gestation sac of 6 weeks 4 days age, in the right cornu of the uterus. 3-D image of the uterus further confirms the findings. These ultrasound images are diagnostic of cornual pregnancy (Which is a type of ectopic pregnancy).

3D image:



Interstitial ectopic pregnancy

Case Report

Successful Laparoscopically Assisted Transcervical Suction Evacuation of Interstitial Pregnancy following Failed Methotrexate Injection in a Community Hospital Setting

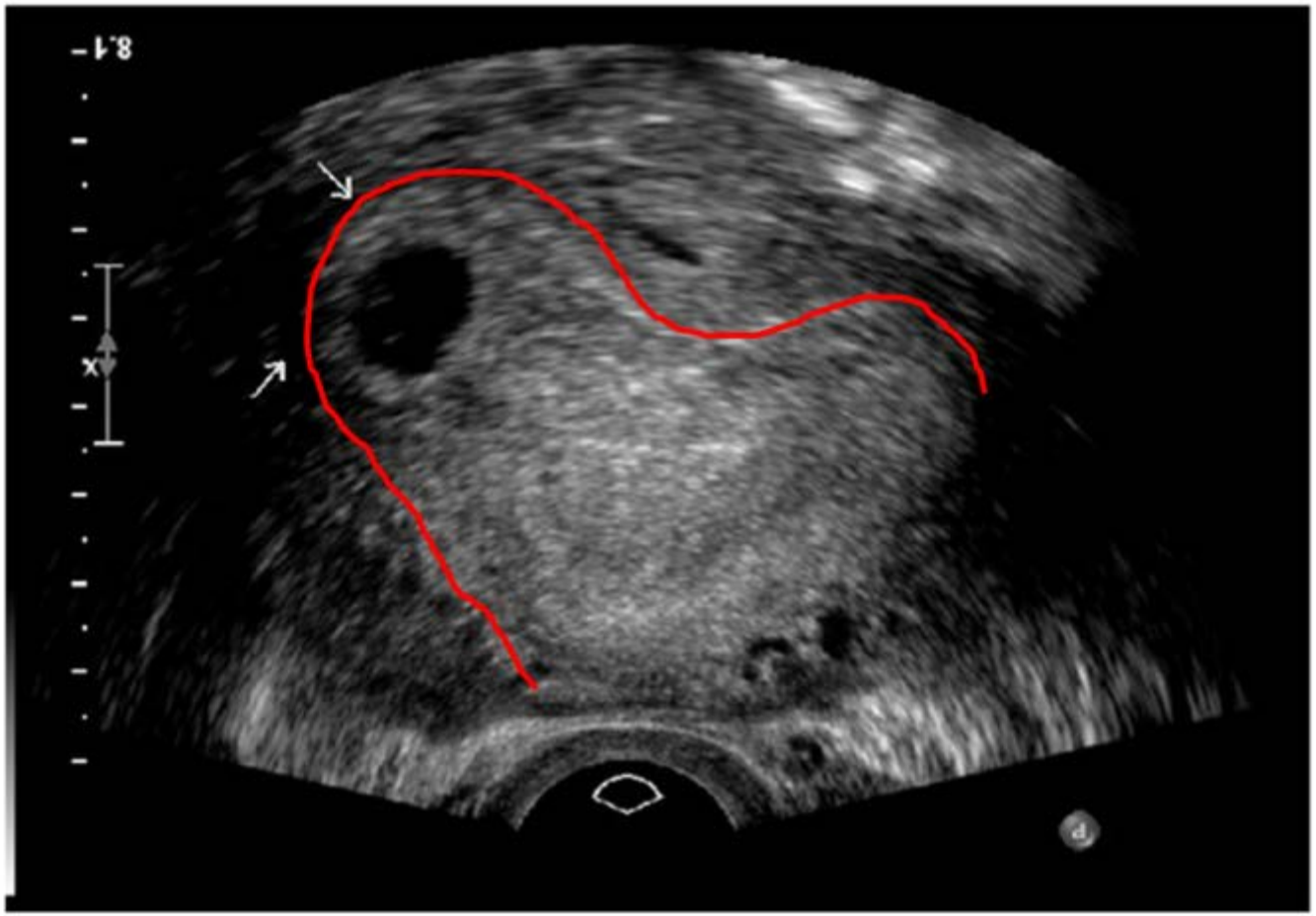
Rani B. Fritz,[1] Neal Rosenblum,[2] Kecia Gaither,[2] Alonzo Sherman,[2] and Alwyn McCalla[2]

[1] *Wayne State University, Detroit, MI 48202, USA*
[2] *Brookdale University Hospital and Medical Center, Brooklyn, NY 11212, USA*

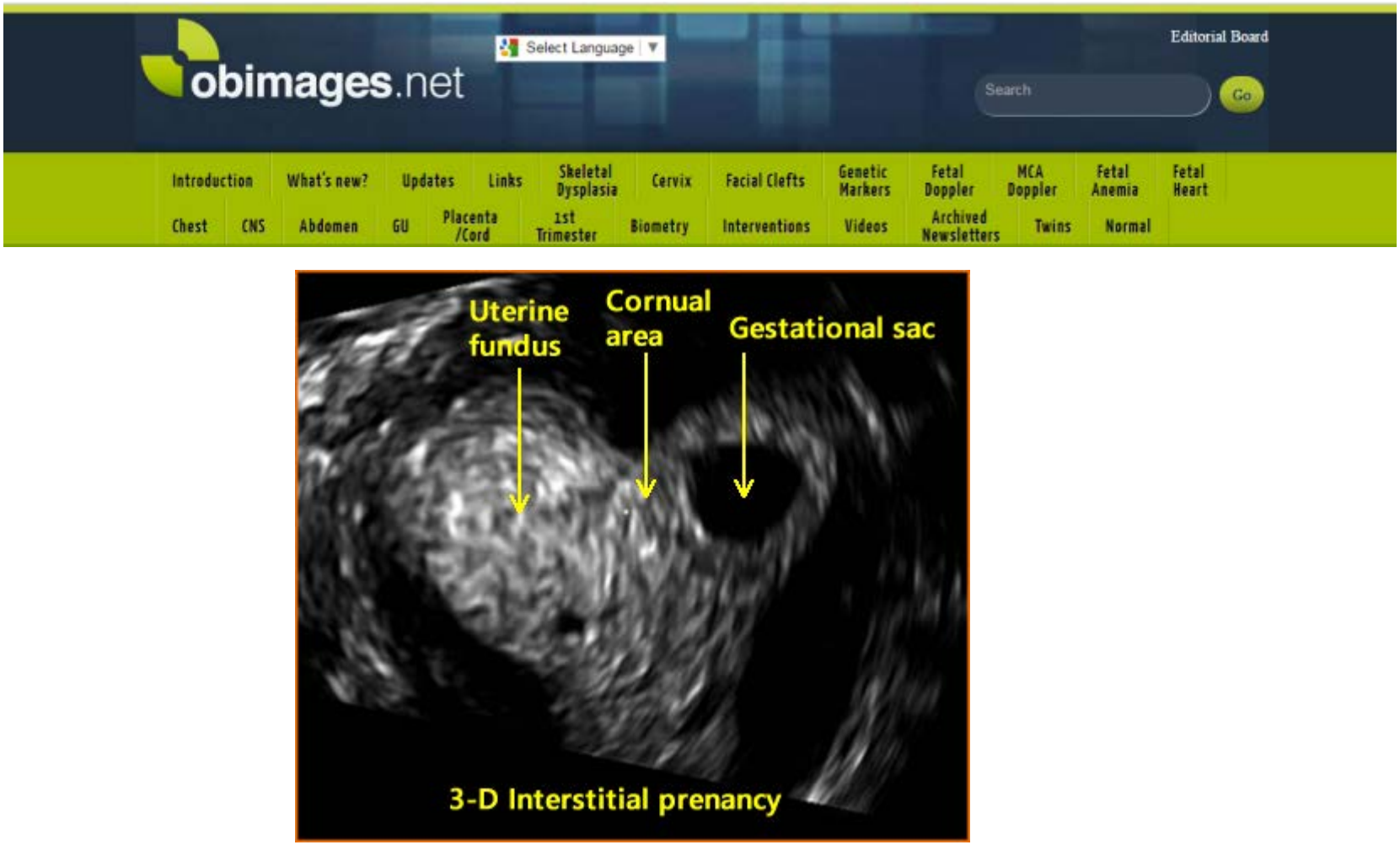
Correspondence should be addressed to Rani B. Fritz; rfritz17@yahoo.com

Received 24 September 2013; Accepted 24 December 2013; Published 5 February 2014

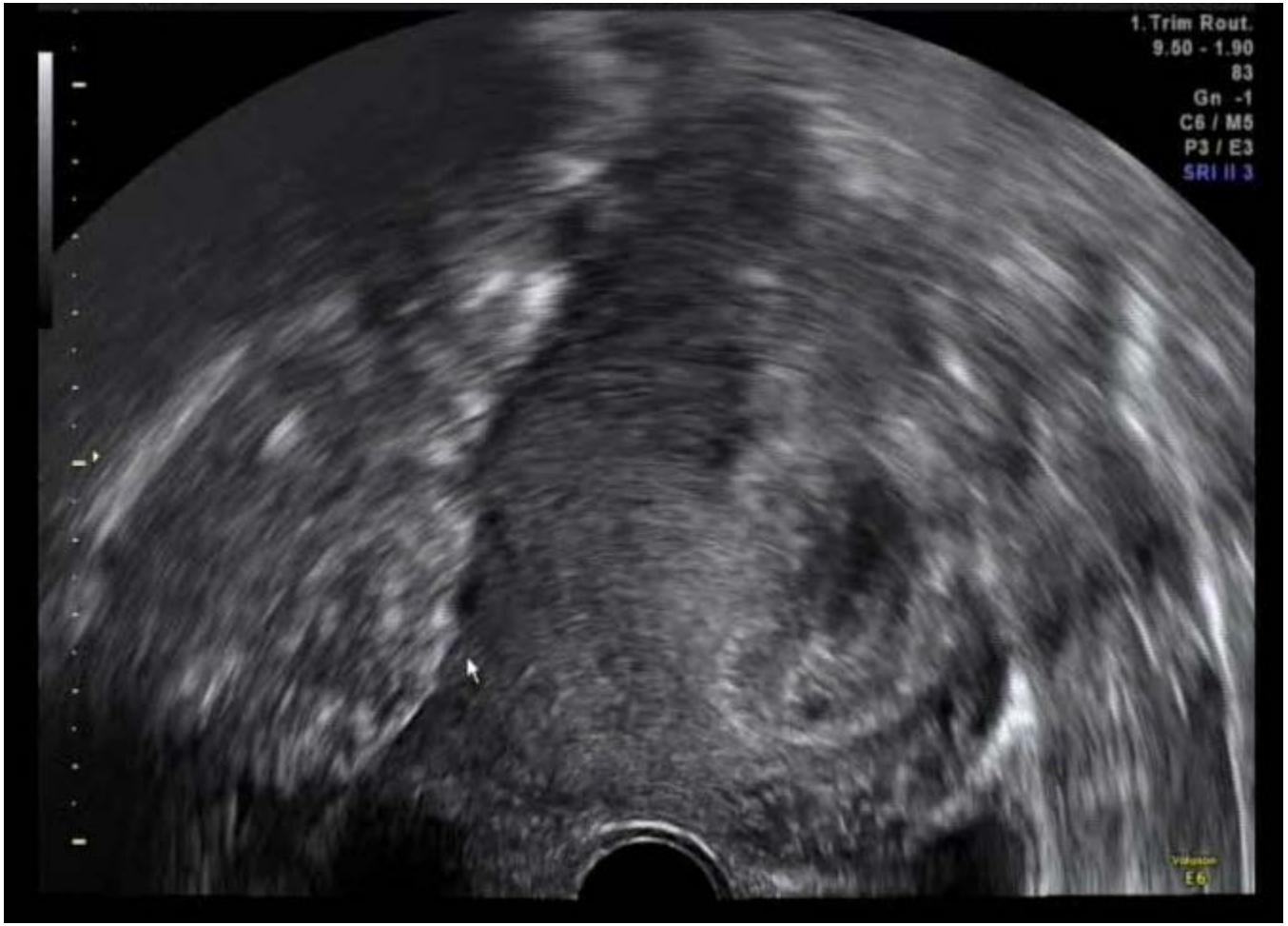
‘Interstitial ectopic pregnancy’



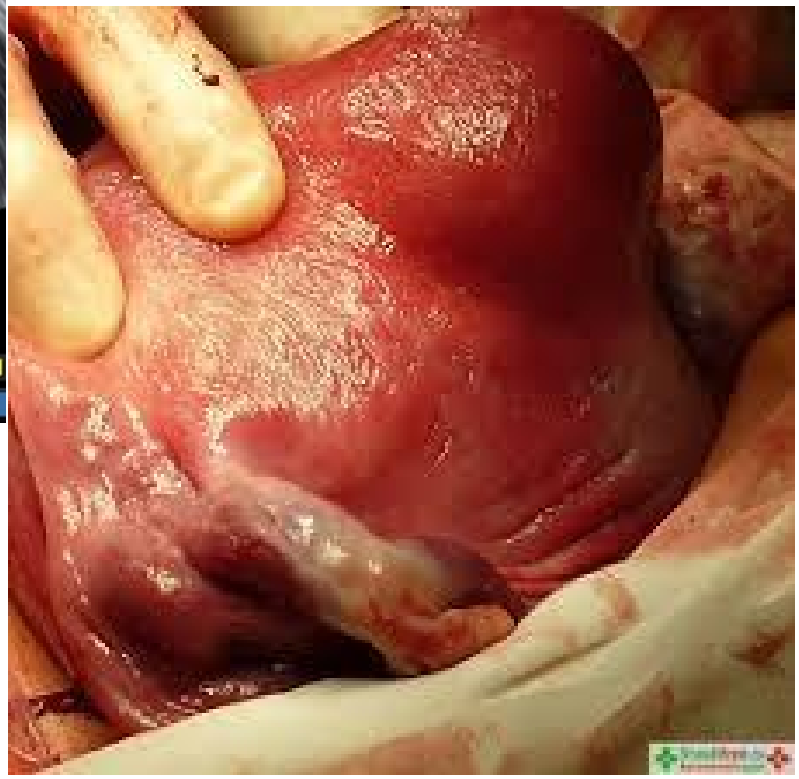
‘Interstitial ectopic pregnancy’ – beware arcuate uteri



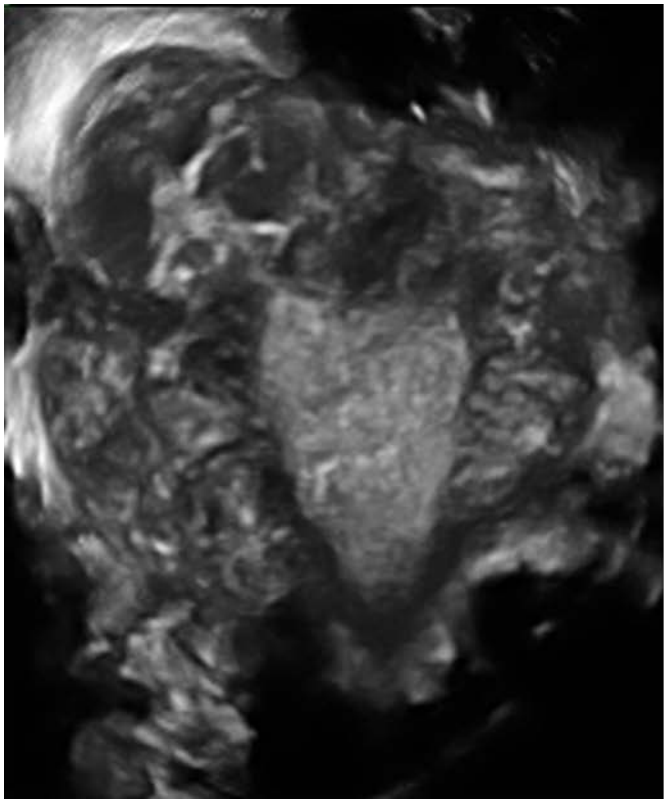
Interstitial ectopic pregnancy – advised to terminate at another hospital – sent for a third opinion

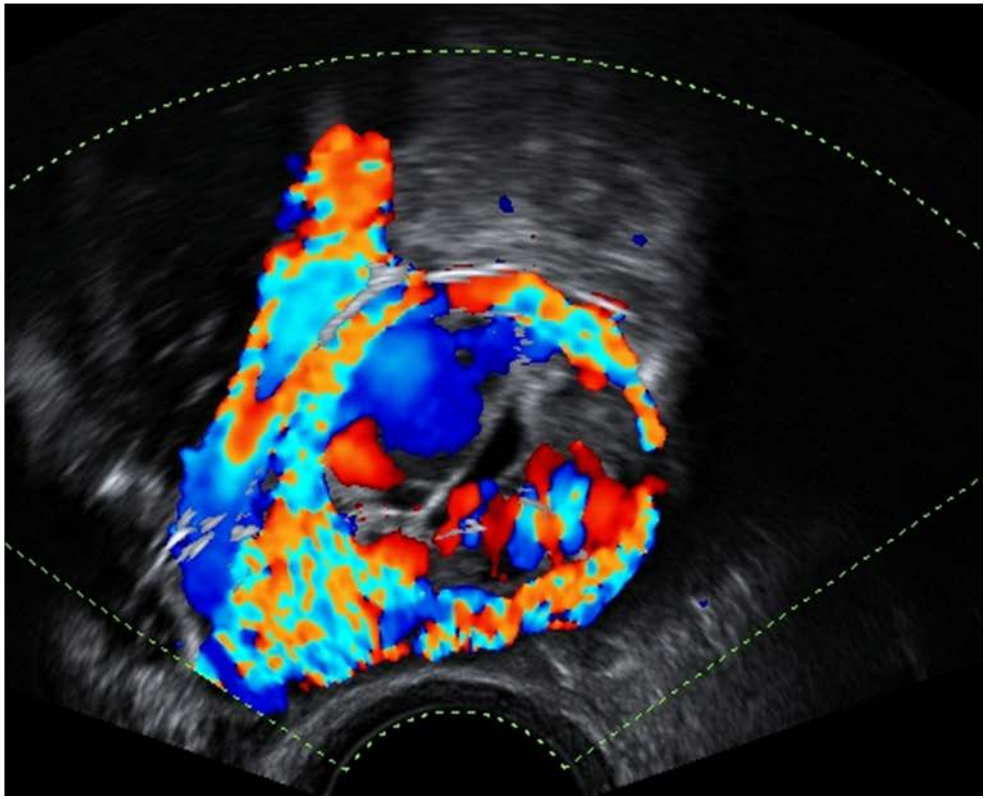


Interstitial ectopic pregnancy: differential diagnosis

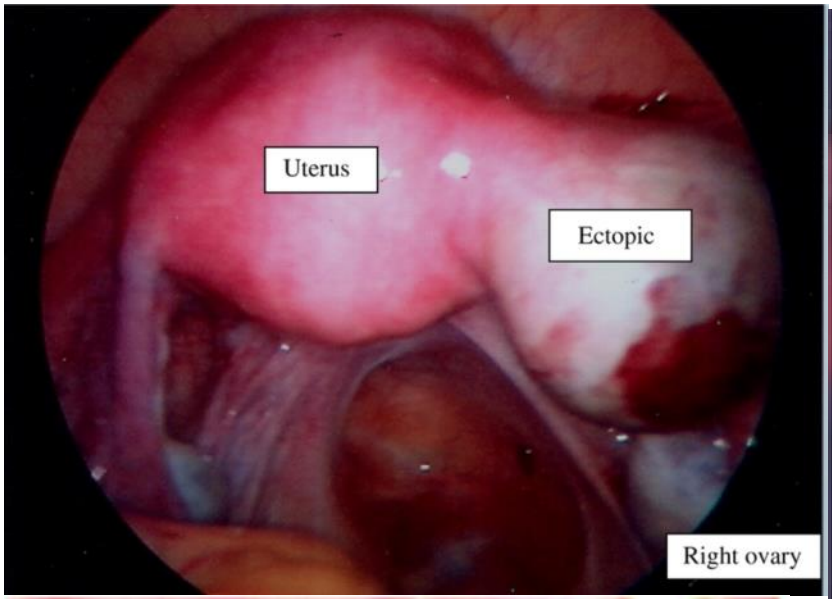


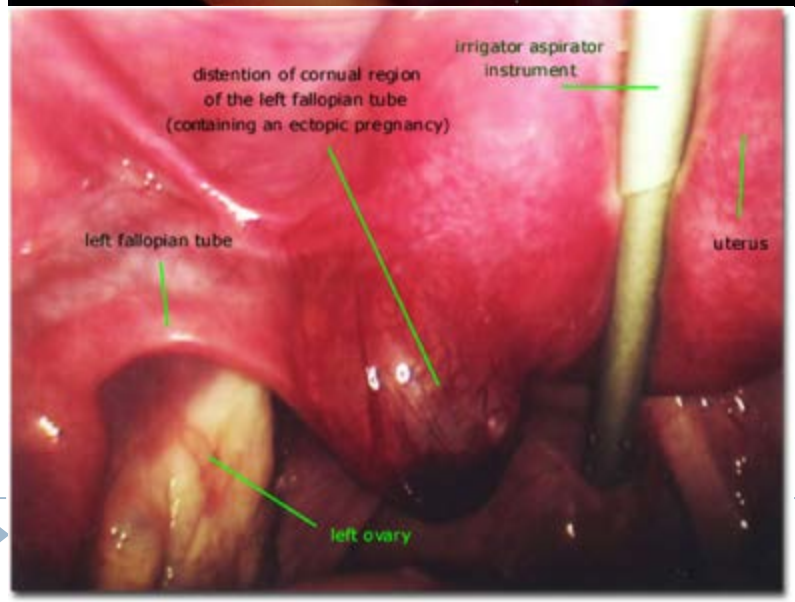
Interstitial ectopic pregnancy – chronic = hypoechoic but very vascular





Interstitial ectopic pregnancy: laparoscopic diagnosis





‘Interstitial / cornual ectopic pregnancy’

Cornual ectopic pregnancy

Products removed

Interstitial Pregnancy
Treatment

- Traditionally surgical
  - Previously diagnosed at laparotomy
  - Often extensive resection required
  - Higher risk of requiring hysterectomy
- More conservative approach with earlier diagnosis
  - Medical – local or systemic MTX
  - Expectant

Interstitial ectopic pregnancy

Surgical

Laparotomy

- Hysterectomy
- Cornual resection
- Uterine artery ligation and repair of ruptured uterine cornu

Laparoscopic procedures

- Cornual resection
- Salpingostomy
- Cornual resection and salpingectomy
- Endoloop® and encircling suture[25]

Hysteroscopic procedures

- Hysteroscopic endometrial resection under laparoscopic control
- Hysteroscopic cornual evacuation aided by polyp forceps under ultrasound (USS) or laparoscopic guidance

Medical

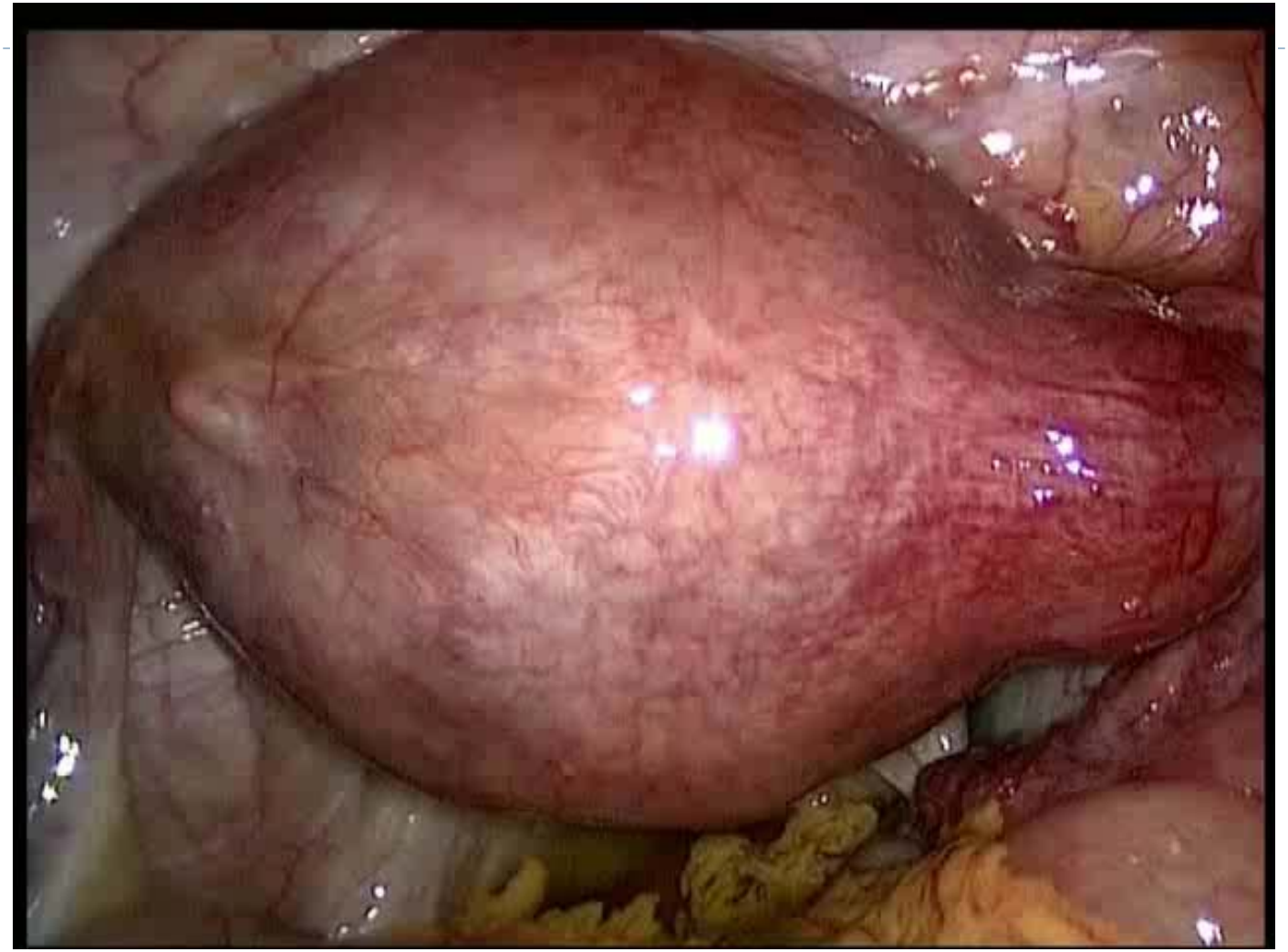
Systemic methotrexate

USS guided methotrexate

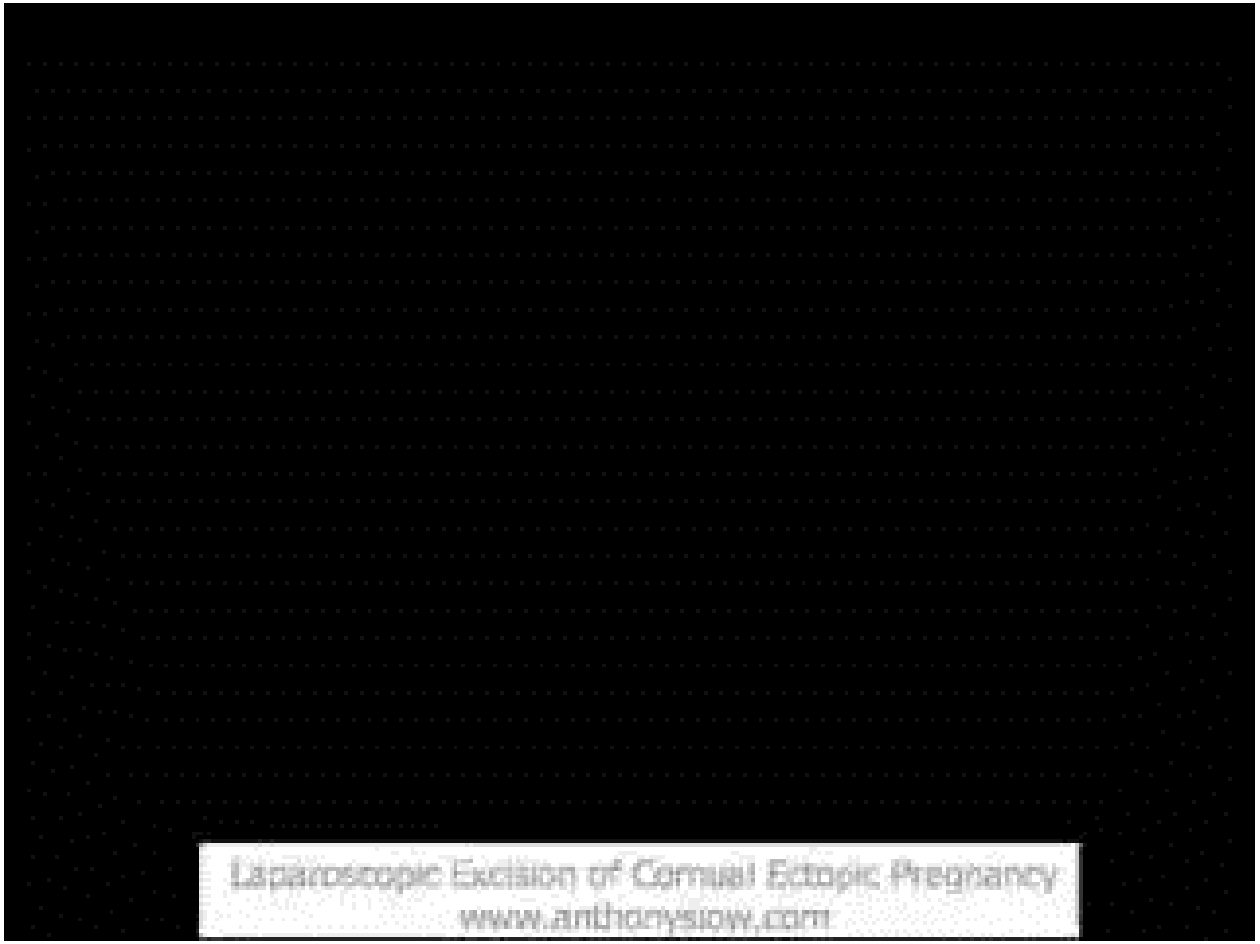
Laparoscopic guided methotrexate/potassium chloride

Systemic methotrexate followed by selective uterine artery embolisation[46]

https://www.youtube.com/watch?v=i4d5o1oUOrk



Interstitial ectopic pregnancy



Interstitial Pregnancy
Management

- Medical – risk is rupture during treatment
  - Systemic methotrexate
    - Range 50-100% success rate
    - More side effects
    - Operator independent
  - Local methotrexate
    - Range 91-100% success rate
    - +/- KCl
    - Fewer side effects
    - Operator dependent

Interstitial Pregnancy
Management

- Expectant
  - Non-viable interstitials
  - Declining hCG
  - Should be abandoned if signs of rupture
  - Pain should be investigated to exclude intra-abdominal bleeding
  - Requires unit with facilities for ongoing follow-up
  - Compliance and communication
  - Long term – ipsilateral ectopic
  - Prolonged follow up – USS resolution may take a year with non surgical Rx

Caesarean scar ectopic pregnancy

Royal College of Obstetricians & Gynaecologists

Diagnosis and Management of Ectopic Pregnancy

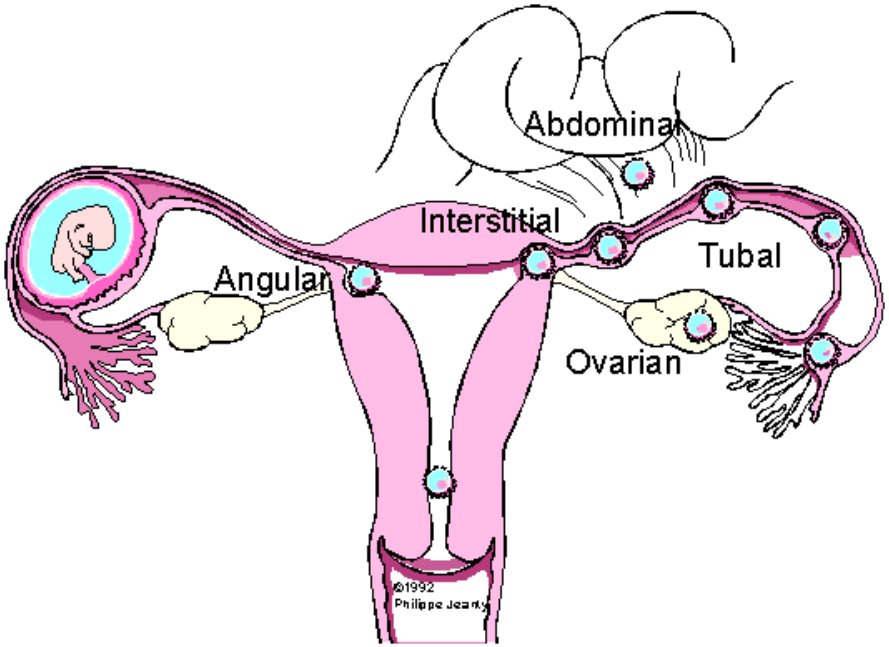
Green-top Guideline No. 21

RCOG/AEPU Joint Guideline | November 2016

Please cite this paper as: Elson CJ, Salim R, Potdar N, Chetty M, Ross JA, Kirk EJ on behalf of the Royal College of Obstetricians and Gynaecologists. Diagnosis and management of ectopic pregnancy. BJOG 2016;.123:e15–e55.

Caesarean scar pregnancy

Diagnosis



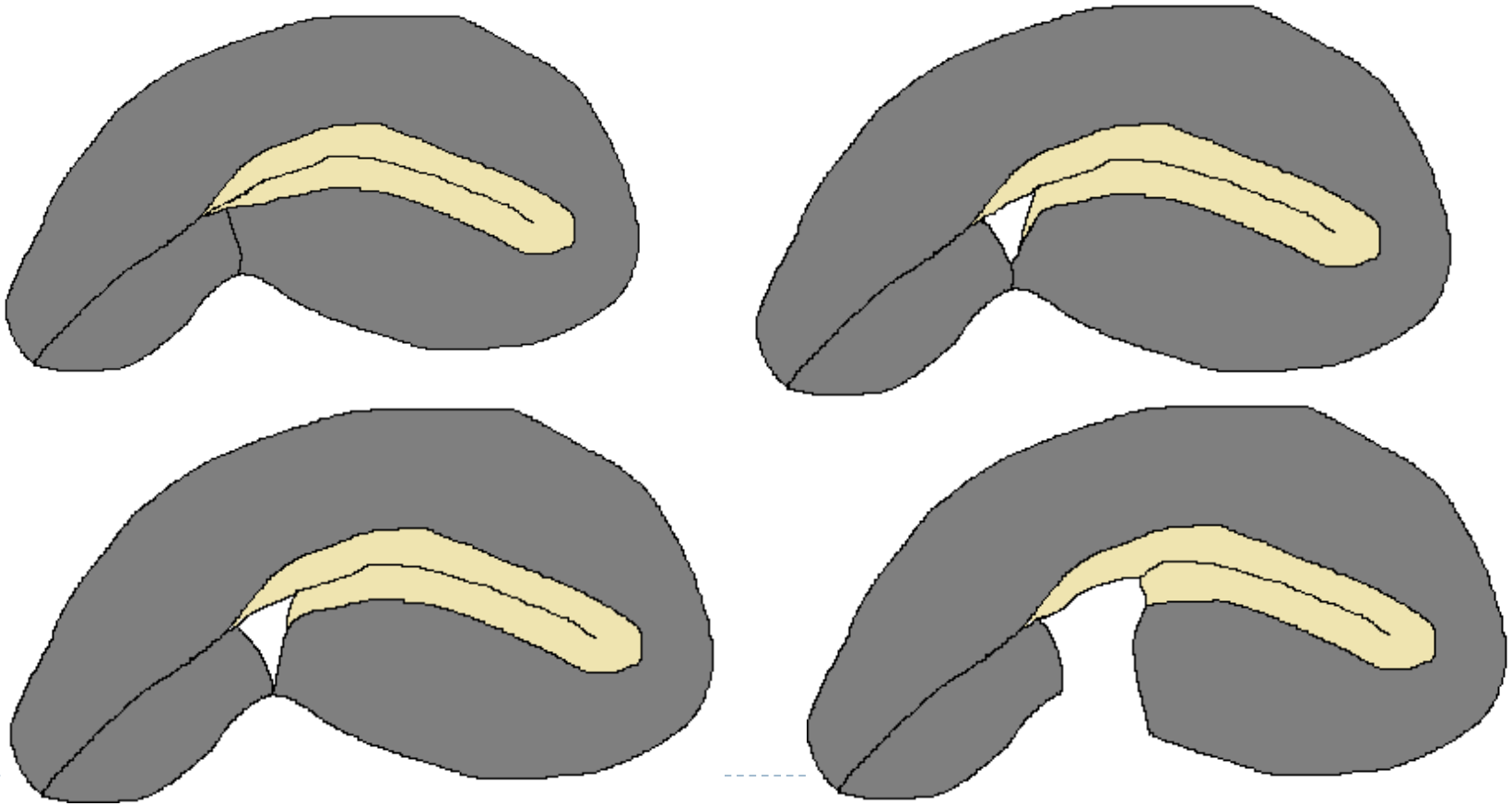
Diagnosis: scar implantation

- Empty uterine cavity
- Entire fetus located outside uterus
- Discontinuity of the anterior uterine wall on longitudinal section of the uterus
- Gestational sac located anteriorly at the level of the internal os covering the visible or presumed site of the previous lower uterine segment Caesarean section scar

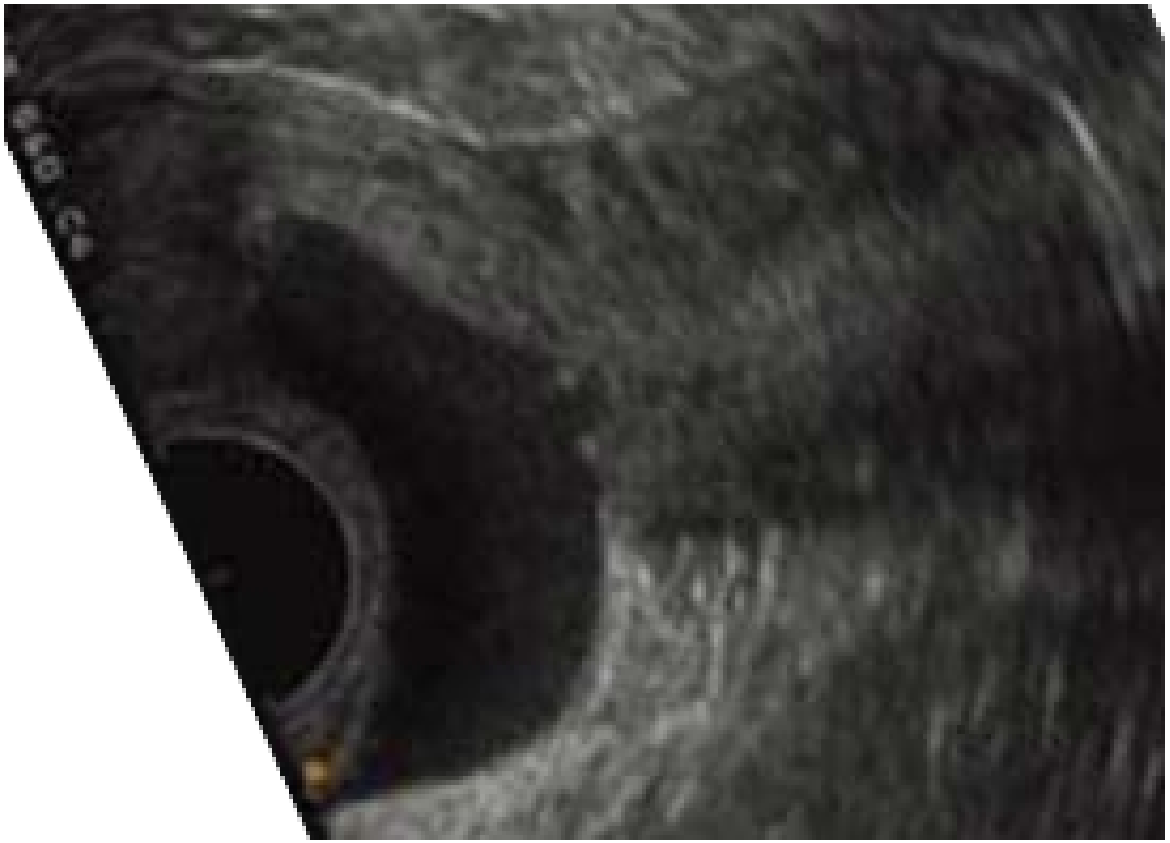
Diagnosis: scar implantation

- Sac ‘completely surrounded by myometrium and fibrous tissue of the scar in the prior low uterine segment’
- Demonstrable peritrophoblastic blood flow within the scar
- Disruption of endometrial / myometrial interface by trophoblast
- Placental lacunae

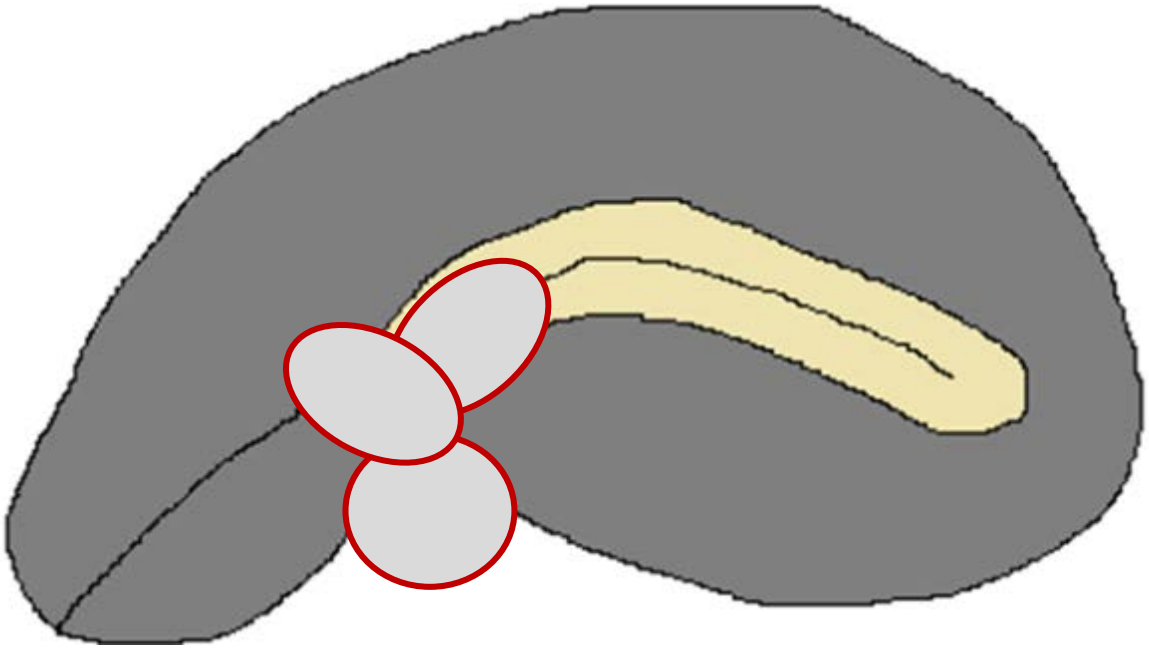
Caesarean section scars: identification



Diagnosis: appearance of scars

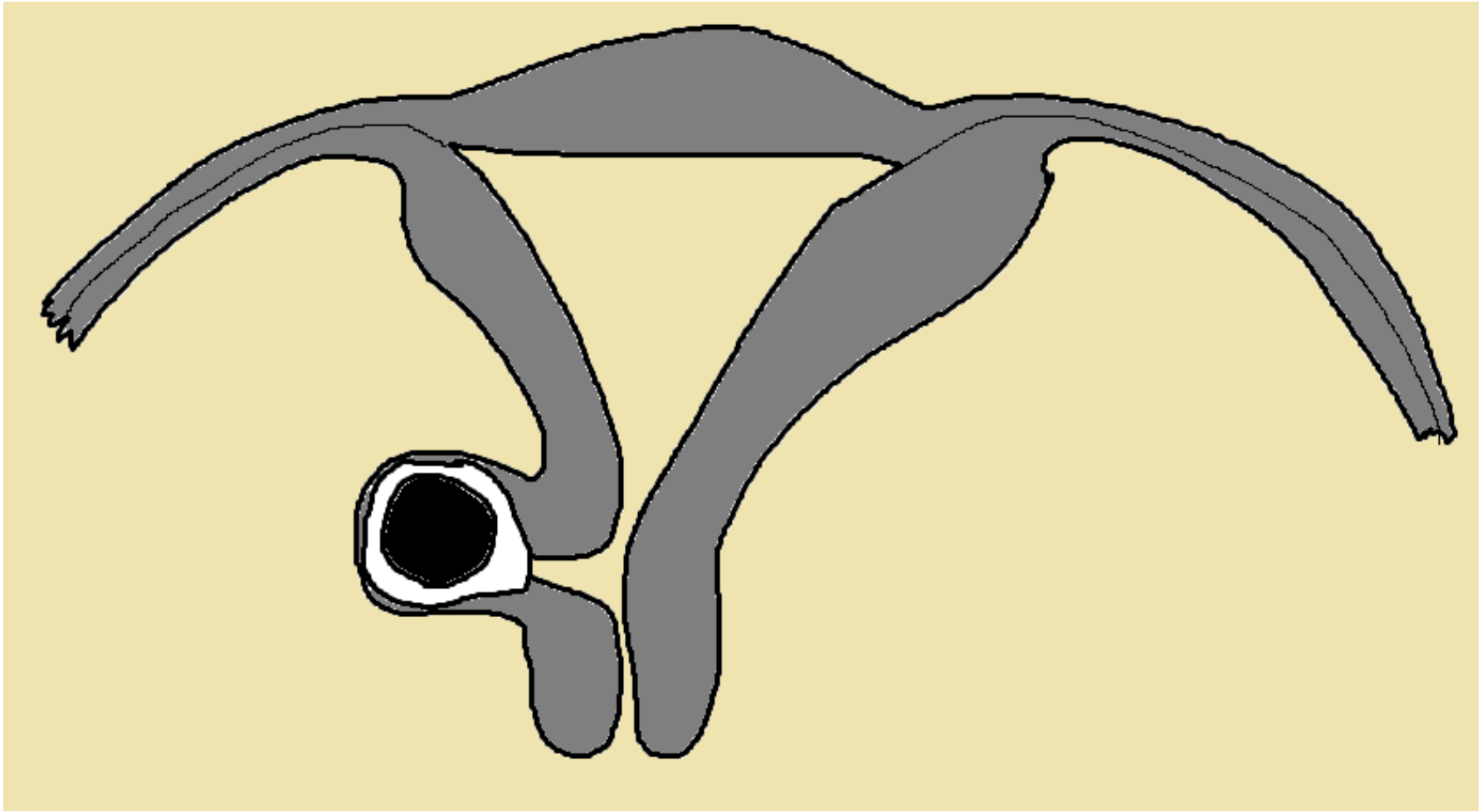


Prognosis: scar implantation



Diagnosis: scar implantation

Diagnosis: scar implantation

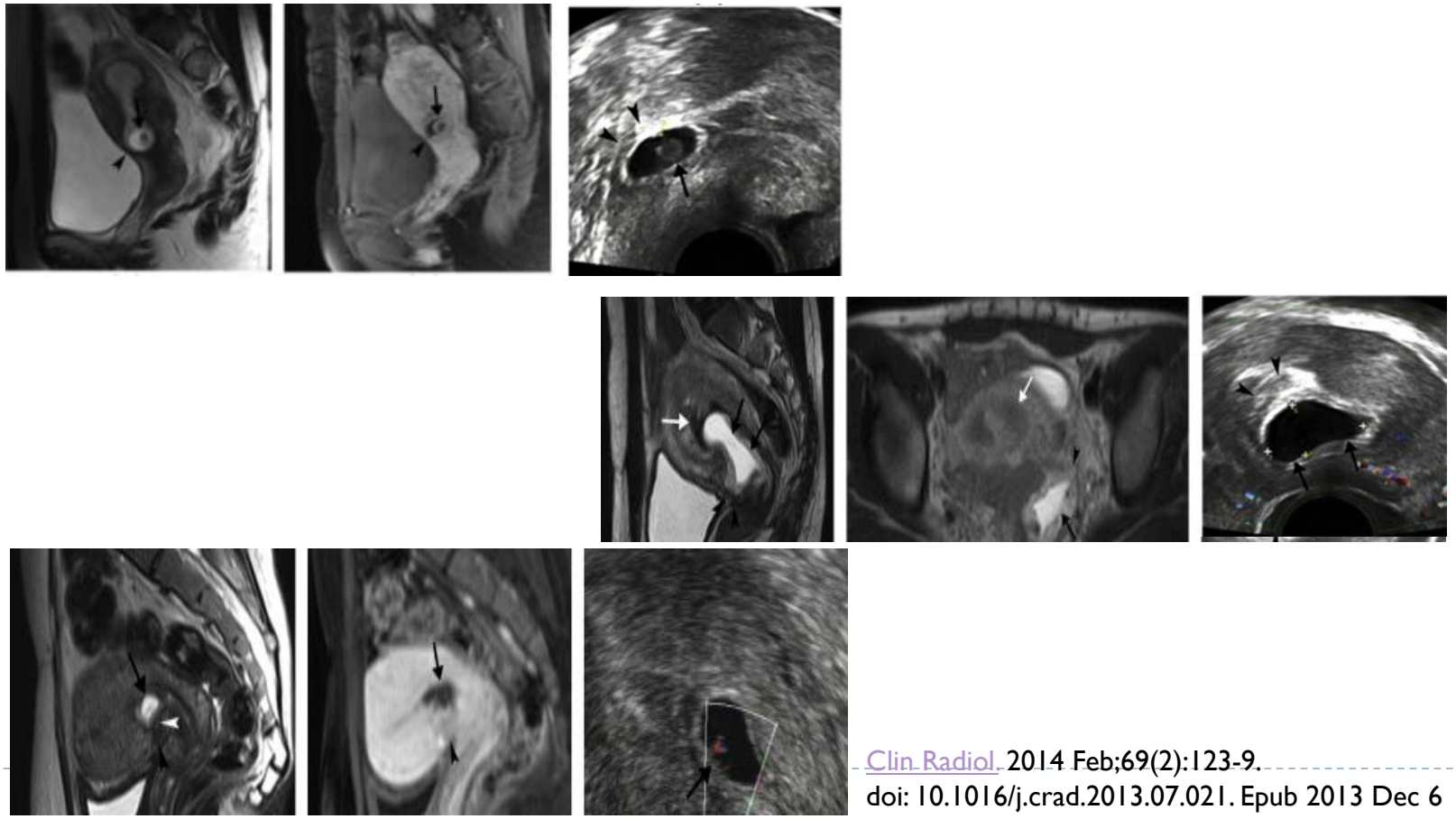


Diagnosis: scar implantation

Diagnosis: scar implantation

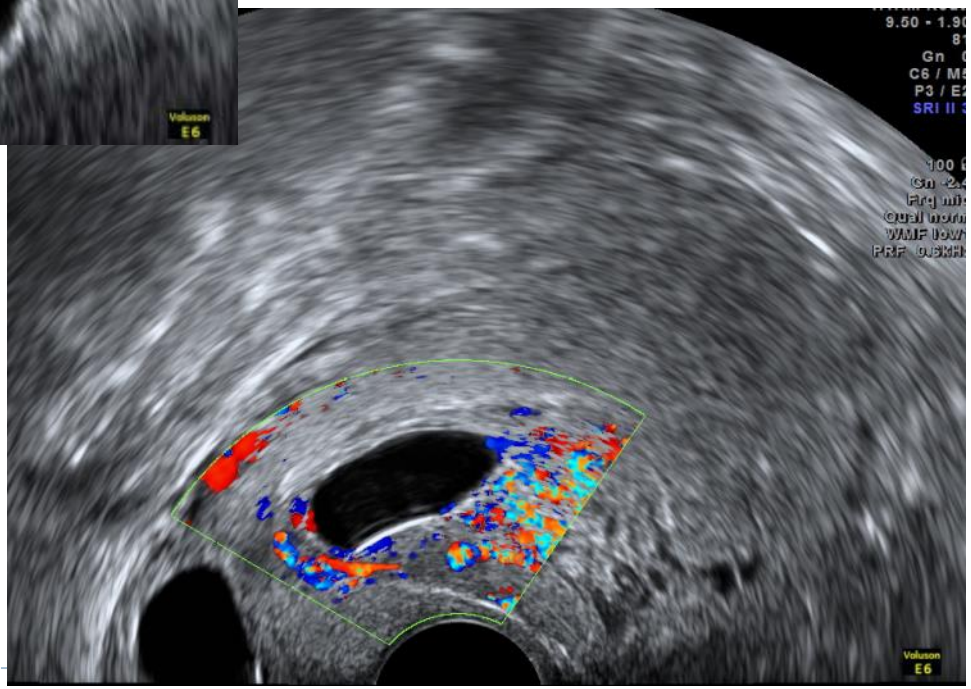
Diagnosis: scar implantation

First trimester caesarean scar ectopic pregnancy evaluation using MRI



Clin Radiol. 2014 Feb;69(2):123-9.
doi: 10.1016/j.crad.2013.07.021. Epub 2013 Dec 6


NABOTHIAN FOLLICLE



Natural History?

- Some will be non viable pregnancies
  - Spontaneous miscarriage
  - Surgical intervention – with or without haemorrhage / perforation
  - Gradual resolution of a highly vascular mass of trophoblast ('AVM') over months +/- PV bleeding

- Viable pregnancies
  - Uterine rupture
  - Miscarriage with haemorrhage
  - Placenta praevia +/- accreta /percreta

Natural History

How do we counsel patients?

King's College Hospital: ongoing pregnancies

- 10 women diagnosed <12 weeks
- Wishing to continue pregnancy
- 2011-2013
- All 10 diagnosed with morbidly adherent placenta pre-delivery (all confirmed at surgery)

Ultrasound Obstet Gynecol 2015; **46**: 367–375
Published online 6 August 2015 in Wiley Online Library (wileyonlinelibrary.com). **DOI:** 10.1002/uog.14775

Natural history of early first-trimester pregnancies implanted in Cesarean scars

N. ZOSMER*, J. FULLER*, H. SHAIKH†, J. JOHNS* and J. A. ROSS*

**Early Pregnancy Unit, Kings College Hospital, London, UK; †Department of Histopathology, Kings College Hospital, London, UK*

KEYWORDS: Cesarean section scar pregnancy; morbidly adherent placenta; placenta accreta; placenta previa; ultrasonography

Table 3 Summary of ultrasound findings in first trimester and later in pregnancy, and delivery outcome of 10 women diagnosed with Cesarean scar pregnancy

	Case									
Parameter	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10**
First-trimester findings										
GA at presentation (weeks)	4+4	5+0	8+0	9+1	5+4	6+1	7+5	11+6	8+4	8+5
Indication for first scan	Dating	Pain	Pain	Dating	Bleeding	Pain	Bleeding	Pain and bleeding	Bleeding	Bleeding
GA at index scan (weeks)	8+2	8+4	8+0	9+1	9+2	8+0	7+5	11+6	9+5	9+1
Uterine position	A/V	A/V	A/V	A/V	A/V	A/V	A/V	A/V	A/V	R/V
Myometrial thickness over scar (mm)	6	3	1	3	1	3	2	2	1	2
Site of deficiency in myometrium	None	Left	Left	Left	Left	Right	Central	Central	Central	Left
Proportion of trophoblast in scar deficiency	No deficiency	Partial	All	Partial	All	Partial	All	Partial	Partial	Partial
Location of cord insertion and thickest part of trophoblast	Central	High	Central	High	Central	High	Central	Central	High	High
Placental lakes	No	Yes	Yes	No	Yes	No	No	No	No	No
GS bulging out of uterus	No	No	No	No	Yes	No	No	No	Yes	No
Findings later in pregnancy										
GA at final scan (weeks)	32	22	31	32	28	34	34	33	26	N/A
Placental location	Complete placenta previa	Left anterior	Left lateral	Left anterior	Complete placenta previa	Anterior	Complete placenta previa	Complete placenta previa	Anterior	N/A
Cord insertion site	Unknown	High	Low	Low	Velamentous, low	Central	Low	Low	Low	N/A
Placental lakes (*n*)	4	2	3	4	> 6	2	> 6	2	4	N/A
Estimated proportion of MAP (%)	≥ 50	≤ 25	≥ 50	≤ 25	≥ 50	≤ 25	25–50	25–50	≥ 50	N/A
Interruption of uterus–bladder interface	No	No	Yes	Yes	Yes	No	Yes	No	Yes	N/A
Myometrial thickness (mm)	0	1.9	2.3	0	0	0	0	2	0	N/A
Absent clear space	Yes	No	No	Yes	Yes	Yes	Yes	No	Yes	N/A
Arterial blood flow behind placenta (PSV > 15 cm/s)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	N/A
Findings at delivery										
GA at delivery (weeks)	32	26	37	37	29	35	35	38	29	37
Indication for delivery	Vaginal bleeding	Labor	Elective	Elective	Abdominal pain, uterine rupture	Labor	Abdominal pain	Elective	Pain and vaginal bleeding	Elective
Hysterectomy	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Estimated blood loss (mL)	3500	1400	2500	3500	13000	1000	1500	3000	2500	1500
Urinary tract injury	None	None	Bladder	Bladder	Bladder and ureter	None	Bladder	None	Bladder	None
Histology	Accreta	None	Accreta	None	Percreta	Accreta†	Increta	None	Percreta	None

*Case 10 returned to referring hospital for second- and third-trimester follow-ups. †Placental histology showed smooth-muscle fibers on maternal side, positive for smooth-muscle actin immunostain, confirming smooth-muscle nature and diagnosing placenta accreta. A/V, anteverted; GA, gestational age; GS, gestational sac; MAP, morbidly adherent placenta; N/A, not applicable; PSV, peak systolic velocity; R/V, retroverted.

Treatment options CS pregnancies

- Expectant
  - Suitable for small, failed pregnancies
  - Women who refuse termination of pregnancy
- Medical
  - Local/systemic MTX (with or without UAE)
  - Suitable for CS ectopics outside uterus
- Surgical (with or without adjuvant MTX)
  - Abdominal: open or laparoscopic
  - Transcervical: hysteroscopic resection or suction evacuation (+/-) tamponade
  - Transvaginal

Medical treatment

- Advantages
  - Preservation of fertility
  - Reduced risk of intraoperative haemorrhage
- Disadvantages
  - Up to 12 months to resolve
  - Prolonged bleeding
  - Risk of sudden haemorrhage during follow up

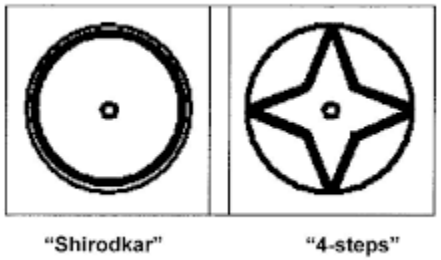
Litwicka 2011

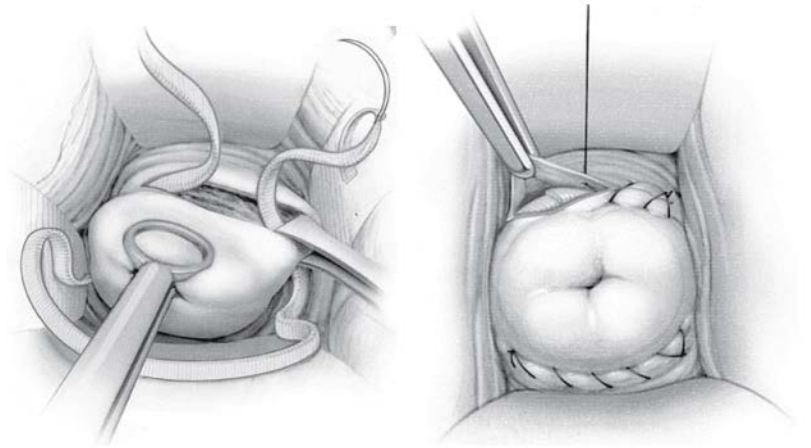
Ideal surgical treatment

- Fertility sparing
- Minimal complications
- Technically simple
- Reduce risk of recurrence
- Reduce morbidity in future pregnancies

Suction evacuation: technique

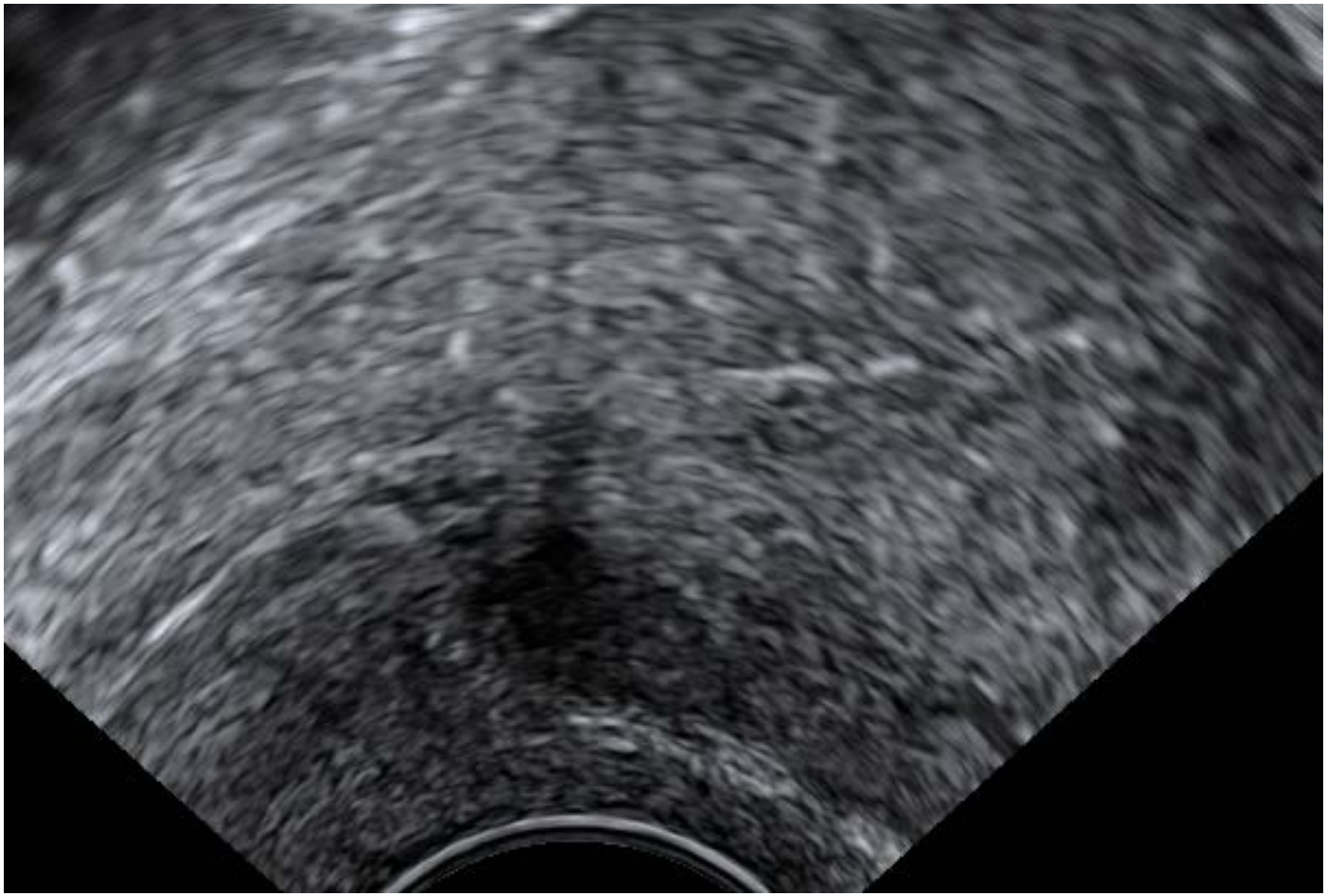
- Misoprostol PR
- Infiltrate with bupivocaine 0.5% & adrenaline
- Insert modified Shirodkar suture without tying tape
- Continuous USS guidance
- Suction to remove decidua in cavity as per routine ERPC
- Gentle rotation of suction curette at level of scar
- Check with TVS / PRS for RPOC
- Tie suture if heavy bleeding, remove if not
- Remove suture in 3-7 days
- Prophylactic antibiotics





Suction evacuation

Suction evacuation



King's & UCH patients

- 232 women with scar pregnancies
- gestation by dates (wks) = 7+4 (4+1-14+4)
- 191/232 (82.3%) of women were treated surgically

King's & UCH patients: extended case series

Characteristic	**n=232**
Ongoing pregnancy	123 (53%)
Heterotopic	9/232 (3.9%)
GSD (mm)* n=209	17.3 (3.0-74.0)
size of POC (mm) n=23	36.0 (15.0-58.0)
CRL (mm)* n=151	6.7 (1.3-72.0)
Surgical management	191 (82.3%)

* median, range

1997 – 2013

King's & UCH patients: outcome

Outcome	**n=191**
Success	190 (99.5%)
Suture tied	82 (42.9%)
Foley catheter	3 (1.6%)
EBL (ml) med (range)	100 (10-3000)
EBL > 1000 ml	20/191 (10.5%)
Blood transfusion	9/191 (4.7%)
Hysterectomy	1/191 (0.5%)
RPOC (n=116 attended)	18/116 (15.5%)
ERPC/rpt procedure	7/116 (6.0%)

Summary

- Complications tend to occur in undiagnosed / misdiagnosed cases
- The earlier the diagnosis of CSP the less complicated the treatment & more time for decision making
- Natural history poorly understood
- Suction evacuation +/- prophylactic cerclage simple technique – safe and effective
- Less invasive & fewer potential complications than excision or hysteroscopic resection
- Scar revision of uncertain benefit

References

- Elson CJ, Salim R, Potdar N, Chetty M, Ross JA, Kirk EJ on behalf of the Royal College of Obstetricians and Gynaecologists. Diagnosis and management of ectopic pregnancy. BJOG 2016;.123:e15–e55.
- Edward P. Lin, MD, Shweta Bhatt, MD, and Vikram S. Dogra, MD. Diagnostic Clues to Ectopic Pregnancy. Radiographics. 2008 Oct;28(6):1661-71. doi: 10.1148/rg.286085506
- Faioli R, Berretta R, Dall'Asta A, Di Serio M, Galli L, Monica M, Frusca T. Endoloop technique for laparoscopic cornuectomy: A safe and effective approach for the treatment of interstitial pregnancy. J Obstet Gynaecol Res. 2016 Aug;42(8):1034-7. doi: 10.1111/jog.13005. Epub 2016 Apr 28.
- Poon LC, Emmanuel E, Ross JA, Johns J. How feasible is expectant management of interstitial ectopic pregnancy? Ultrasound Obstet Gynecol. 2014 Mar;43(3):317-21. doi: 10.1002/uog.12565. Epub 2014 Feb 12
- Zosmer N, Fuller J, Shaikh H, Johns J, Ross JA. Natural history of early first-trimester pregnancies implanted in Cesarean scars. Ultrasound in obstetrics & gynecology : the official journal of the International Society of Ultrasound in Obstetrics and Gynecology. 2015; 46(3):367-75
- Jurkovic D, Knez J, Appiah A, Farahani L, Mavrelos D, Ross JA. Surgical treatment of Cesarean scar ectopic pregnancy: efficacy and safety of ultrasound-guided suction curettage. Ultrasound Obstet Gynecol. 2016 Apr;47(4):511-7. doi: 10.1002/uog.15857. PubMed PMID: 26764166