

PRINCIPLES OF HYSTEOSALPINGO- CONTRAST SONOGRAPHY (HYCOSY) & SALINE INFUSION SONOGRAPHY (SIS)

PATIENT PREPARATION AND TECHNIQUE

FERTILITY IMAGING COURSE 13/06/26

CARLY PARKINSON



OVERVIEW

- The origins of HyCoSy and cavity assessment
- Department preparation
- Patient preparation and consent
- Procedure
- Pitfalls
- Potential advances



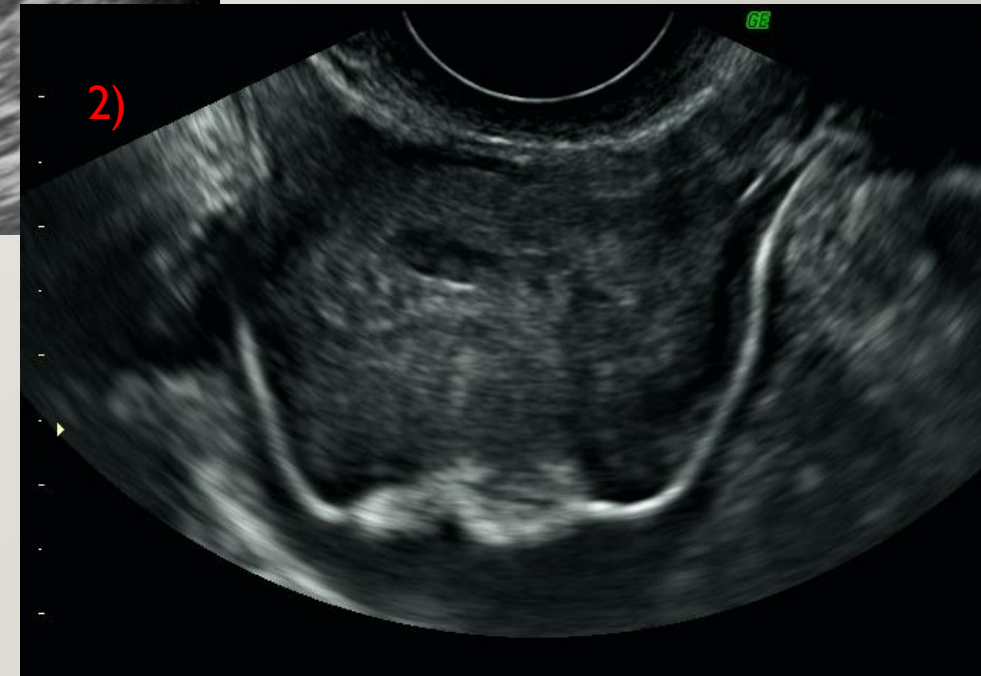
FALLOPIAN TUBE ASSESSMENT BY HYCOSY

Essentially 2 parts:

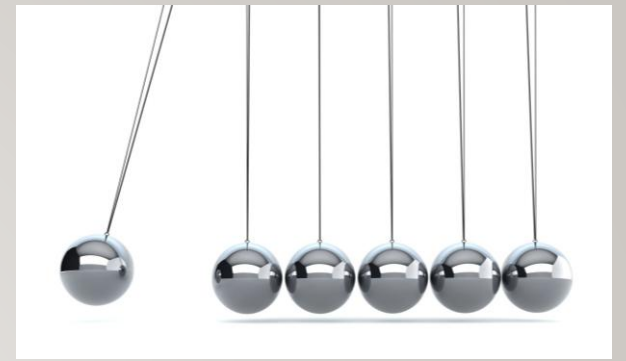
1) Saline infusion sonography (also known as cavity check, 'aqua' scan or hysterosonography)



2) Tubal patency check using ultrasound contrast



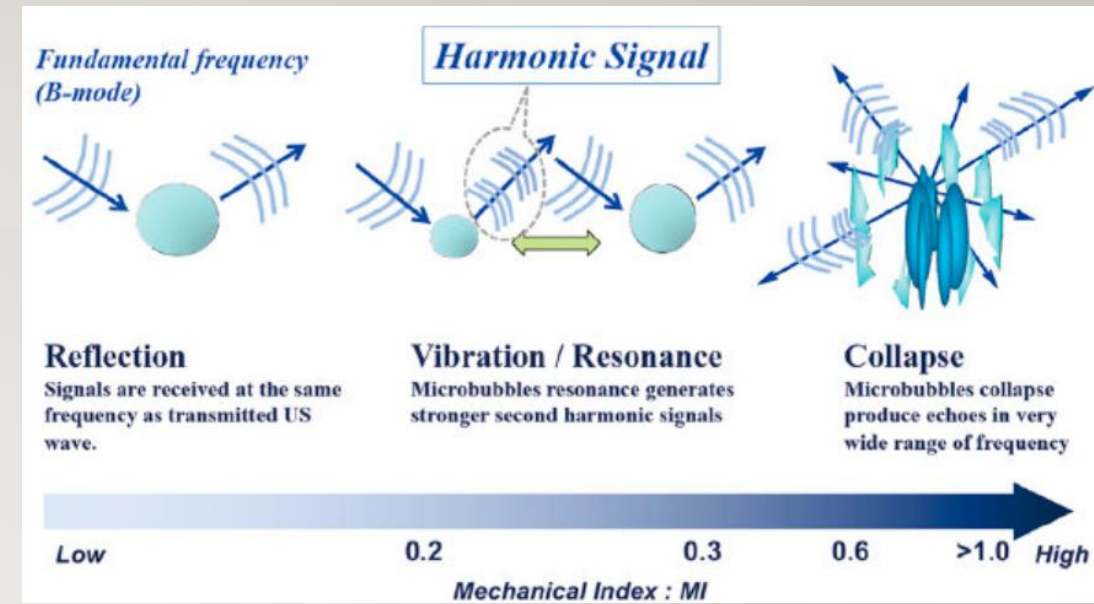
HISTORICAL DEVELOPMENT OF THE HYCOSY TECHNIQUE



- Nanini et al (1981) developed the technique of saline injection into uterine cavity - they noted fluid in POD
- In 1986 Schering produced Echovist for echocardiography
- In 1987 Ulrich Deichert pioneered the HyCoSy technique using Echovist

CONTRAST AGENTS

- **Echovist** - Supersaturated galactose + air
 - Production *suspended* 2009
- **SonoVue** - Lipid & sulphur hexafluoride gas
 - Widely used intravenously
 - Requires permission for use as an unlicensed drug
- **ExEm Foam** - Hydroxyethylcellulose & air
 - New product - medical device so does not require permission for use as an unlicensed drug



Safety and side effects

Review > [Reprod Biomed Online](#). 2014 Nov;29(5):534-40. doi: 10.1016/j.rbmo.2014.07.015.

Epub 2014 Aug 12.

Safety aspects and side-effects of ExEm-gel and foam for uterine cavity distension and tubal patency testing

Niek Exalto ¹, Mario Stassen ², Mark Hans Emanuel ³



Journal of Gynecology Obstetrics and Human
Reproduction

Volume 50, Issue 5, May 2021, 102004



Feasibility, tolerability, and **safety** of hysterosalpingo-foam sonography (hyfosalpingography) multicenter, prospective Spanish study

V Engels ^a ✉, M Medina ^b, E Antolín ^c, C Ros ^d, A Amaro ^b, C De-Guirior ^{c,d}, N Manzour ^e,
L Sotillo ^c, R De la Cuesta ^a, R Rodríguez ^c, L San-Frutos ^a, S Peralta ^b, A Martín-Martínez ^b, JL
Alcázar ^e

Safety (gametes):

- Tested toxicity, influence on sperm, blastocysts, eggs, uterus and tubes of animals and humans
- No known side effects - optimum risk-benefit ratio
- No teratological effects or reactions, but probably best to restrict to ovulatory phase

Side effects:

- Prospective multi-centre study:
- Only 3/915 (0.32 %) reported side effects of HyFoSy; two were vagal episodes, one was a mild urinary infection.

RESEARCH

Open Access

Is hysterosalpingo-foam sonography (HyFoSy) more tolerable in terms of pain and anxiety than hysterosalpingography (HSG)? A prospective real-world setting multicentre study



Lucía Serrano González^{1,5*}, Tirso Pérez-Medina¹, Beatriz Bueno Olalla², Ana Royuela³, María de los Reyes De La Cuesta¹, David Saéz de la Mata², Esther Domínguez-Franjo⁴, Laura Calles-Sastre¹ and Virginia Engels¹

Randomized Controlled Trial > *Fertil Steril.* 2014 Sep;102(3):821-5.

doi: 10.1016/j.fertnstert.2014.05.042. Epub 2014 Jul 1.

Hysterosalpingo-foam sonography, a less painful procedure for tubal patency testing during fertility workup compared with (serial) hysterosalpingography: a randomized controlled trial

Kim Dreyer¹, Renée Out², Peter G A Hompes³, Velja Mijatovic³

Pain

- 210 patients recruited – multicentre study
- Vas scores : HyCoSy – 2, HSG – 5
- *“HyFoSy shows higher tolerability to both pain and anxiety. It is related to less pain and less post-test anxiety than HSG”*

- 2 centre randomised control trial
- 40 subfertile women
- Vas scores: HyCoSy -1.7 HSG - 3.7

Pregnancy outcome following HyCoSy/HyFoSy : ?therapeutic

> J Minim Invasive Gynecol. 2015 Nov-Dec;22(6S):S238. doi: 10.1016/j.jmig.2015.08.836.

Epub 2015 Oct 15.

Can Tubal Flushing With Hysterosalpingo-Foam Sonography (HyFoSy) Media Increase Women's Chances of Pregnancy?

C Exacoustos ¹, F Tiberio ², B Szabolcs ¹, V Romeo ¹, E Romanini ¹, E Zupi ³

- 111 followed up for 6 months
- 50% of women spontaneously conceived within 6 months of procedure
- 46.1% of these women did so in the first 30 days

- 157 patients
- Primary Infertility: pregnancy rate 30% within 6 months
- Secondary infertility: pregnancy rate 38% within 6 months

> Aust N Z J Obstet Gynaecol. 2018 Feb;58(1):114-118. doi: 10.1111/ajo.12716. Epub 2017 Sep 26.

Hysterosalpingo-foam sonography (HyFoSy): Tolerability, safety and the occurrence of pregnancy post-procedure

Keisuke Tanaka ¹, Jackie Chua ^{2 3}, Robert Cincotta ^{2 3}, Emma L Ballard ⁴, Gregory Duncombe ^{2 5}

EQUIPMENT PRACTICAL REQUIREMENTS

- Scan room with motorised couch
- Stirrups
- Spotlight
- Catheter 7fr or 5.5fr
(integrated stylet/non integrated)
- Simple sterile pack
- Speculum, Rampley sponge holder,
saline, 10ml and 20ml syringe
- Contrast agent
+ Tenaculum (if required)



PREPARATION - PATIENT

- Exclusion criteria
- Patient information given
- Chlamydia screen
- Analgesia prescribed
- Instructions for booking test



- History of PID, endometriosis or previous surgery
- Risk of undetected pregnancy
- Intolerance of uterine catheterization

PATIENT INFORMATION SHEET

Having hystero contrast sonography (HyCoSy)

The aim of this information sheet is to answer some of the questions you may have about having hystero-contrast sonography (or HyCoSy for short). It explains the benefits, risks and alternatives of the procedure as well as what you can expect when you come to hospital. If you have any further questions and concerns, please speak to a doctor, nurse or healthcare specialist caring for you.

What is HyCoSy?

HyCoSy is an examination of your fallopian tubes. It is here in the fallopian tubes that the female egg meets with the male sperm to fertilize the egg.

It is important that your fallopian tubes are open so this can happen - if there is a blockage, it might stop you becoming pregnant. Fallopian tubes can become blocked i.e. following a pelvic infection, or after surgery.

What are the benefits of having a HyCoSy?

HyCoSy can show if your fallopian tubes are open or closed. The test also allows us to examine the cavity of your uterus (womb) to check that there are no problems that might affect getting pregnant.

Are there any risks associated with a HyCoSy?

There is a small risk of a pelvic infection from this test. To minimize this, you will be provided with a prescription for 5 days of an oral antibiotic when you are seen in the fertility clinic. It is essential that you bring this with you to your appointment, as it can only be dispensed at the hospital pharmacy. If you do not bring your prescription the day of your test, it will have to be rescheduled. In the 5 days following the test, you should contact your GP or call 111 if you begin feeling unwell, and tell them you have had this test.

You may feel some pelvic discomfort during HyCoSy (it's like a mild period cramp). We suggest you take two Ibuprofen 200mg tablets, or two 500mg tablets of Paracetamol one hour before the procedure, in order to reduce the amount of discomfort you may experience.

Occasionally this test may cause you to bleed slightly once it has finished. The bleeding will not be heavy and should settle down in a day or two. Please use pads during this time and do not insert a tampon.

In about 5% of HyCoSy tests, the pictures produced are unclear. If this is the case, you may need further tests.

Are there any alternatives?

There is another test called a Hysterosalpingogram (HSG), which looks at the fallopian tubes using X-rays instead of ultrasound. This test is used for patients who have had previous pregnancies, pelvic infections or pelvic surgery.

The fallopian tubes can also be assessed by a simple operation called a laparoscopy, which involves a general anaesthetic. This test is reserved for patients with severe pelvic pain, or as a further test when the ultrasound or X-ray test is unclear.

What do I need to do to prepare for a HyCoSy?

On the first day of your period, telephone 01752 439 287 between 9.00am and 3.00pm to book your test. Please ring on Monday if this falls on a weekend. The test will usually be done within ten days of your period starting but if there is a shortage of appointments, you may be asked to ring back when your next period starts.

You may eat and drink normally before and after your appointment.

As already mentioned you may have slight vaginal bleeding after the test, and you are advised to bring a panty-liner or sanitary towel.

From the first day of your period on the month of your appointment, please use protection (a condom) if you have sex. You need to do this from the time you book the test, until after your subsequent period.

Asking for your consent

We want to involve you in all the decisions about your care and treatment. If you decide to go ahead, you will be asked to sign a consent form on the day. This confirms that you agree to have the procedure and understand what it involves.

What happens during the HyCoSy test?

The person who carries out the test will be an ultrasonographer or a doctor or nurse. He or she will:

1. Ask you to lie down (the first part of the test is very similar to a smear test). Your legs will be supported in stirrups and we will ensure you are comfortable at all times.
2. Gently insert a speculum into your vagina (a speculum is a plastic device to allow us to see the neck of your womb).

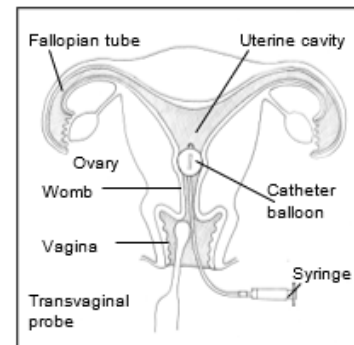
Author: Angela Clough Issue Date: 15/03/2021 Authorisation:
Version: 1 Page 2 of 4

3. Slowly insert a narrow plastic tube (catheter) through the neck of your womb (cervix).

4. Slowly inflate a tiny balloon on the catheter in order to keep it in position.

5. Pass a small amount of water through the catheter to show up the lining and cavity of your uterus. We will then carry out an internal ultrasound scan of the uterus.

6. Pass a special ultrasound fluid called EXEM foam through the catheter to show the outline of your fallopian tubes. We will then carry out an internal ultrasound scan of the fallopian tubes. EXEM foam is made up of a harmless solution, which will be absorbed by your body after the scan.



The test takes 15 to 20 minutes. It takes place in the ultrasound department, which is in X Ray West at Derriford Hospital. If you have any questions or concerns before the examination, please phone us on 01752 439 287

What happens after the test?

At the end of the test we can usually let you know the findings. If any further tests need to be done, these will be organized after the day of the test.

If your fallopian tubes are blocked, or there are problems with your uterus, your doctor will explain the options for treatment.

What do I need to do after I go home?

You can go home immediately after the test. You can carry out normal daily activities, and continue having protected intercourse until after your next period. Please complete your course of antibiotics. If you feel unwell, or notice a discharge, please call your GP or 111 for advice immediately, and tell them about this test.

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HYCOSY PROCEDURE

- **Pre-Procedure** - Obtain informed written consent
 - Check patient preparation
 - Antibiotics (100mg Doxycyclone BD 5 days)
 - Allergies
- **Procedure: '4 stages'**
 1. Perform baseline scan
 2. Catheterization of the uterus
 3. Ultrasound assessment of cavity with saline
 4. Ultrasound assessment of tubes with contrast

Checklist for women undergoing Hysterosalpingocontrast sonography (HyCoSy)

It is important that there is no chance of pregnancy prior to performing a HyCoSy examination

Affix ID label

Date: _____ Pain score _____ /10

ID Check Y / N

Brief explanation of the procedure given Y / N

Date of first day of last menstrual period: _____

Was the last period a normal? Y / N *

Has the bleeding stopped (or reduced to spotting)? Y / N

Has any analgesia been taken prior to the test? Y/N

Have you a prescription and/or collected antibiotics required to take after procedure Y / N

Has there been protected intercourse since start of last period? Y / N

Do not proceed if answer is No

Have there been any previous surgery, ectopic pregnancy or infection Y / N

Details if Yes.....

Any Allergies?.....

Contrast used: _____ Amount: _____ Expiry date: _____ Lot No: _____

Operator: _____

Assistant and chaperone: _____

Signature of operator.....

Signature of patient.....

* If No discuss with Ocean Suite staff – pregnancy test may need to be performed

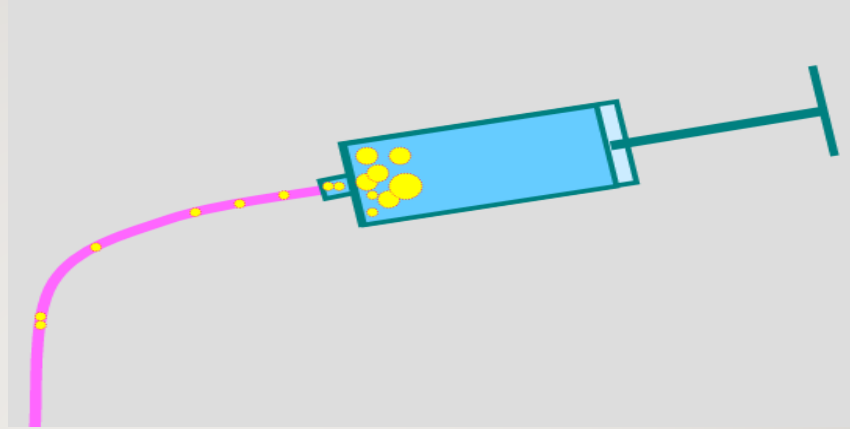
STAGE I - BASELINE SCAN

- Full pelvic scan performed prior to test
- Assess for pelvic pathology and uterine/ovarian location.
Ensure no evidence of ovulation (Day 12 rule – be careful of short cycles)
- Perform Antral Follicle Count +/- 3D uterus

STAGE 2 – UTERINE CATHETERIZATION

Prepare contrast and catheter:

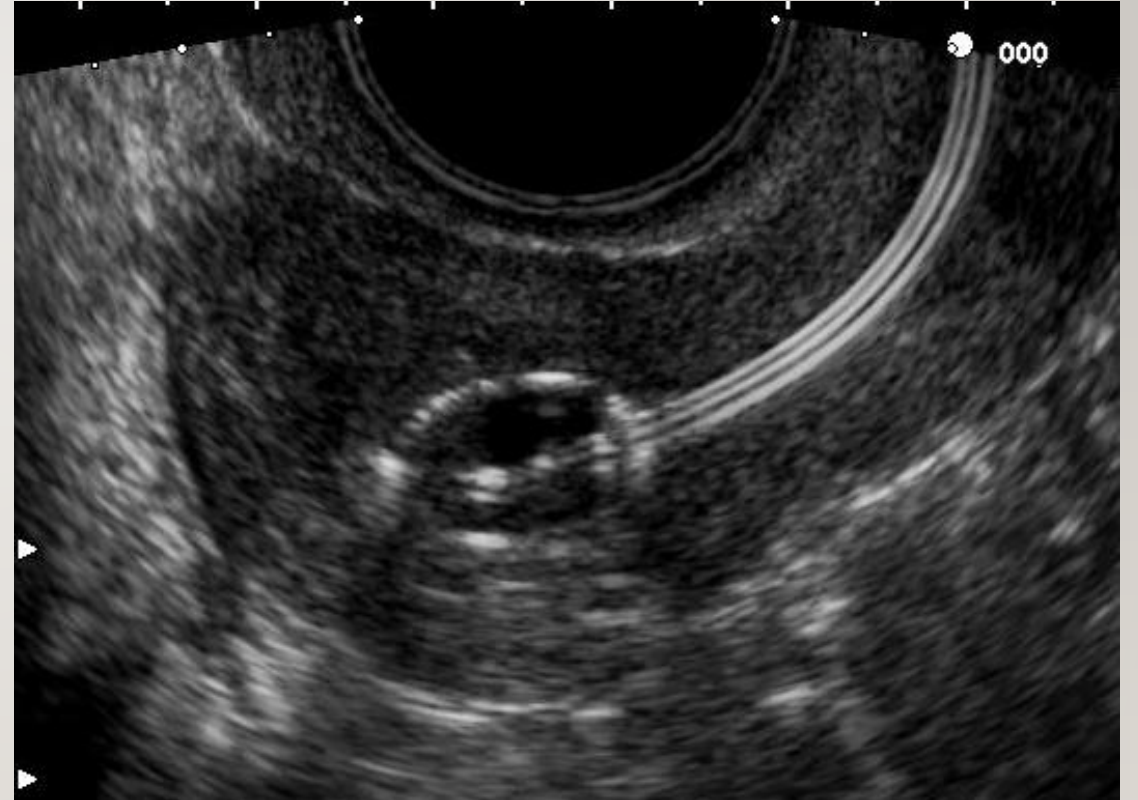
- Remove air from catheter
- 'Prime' contrast



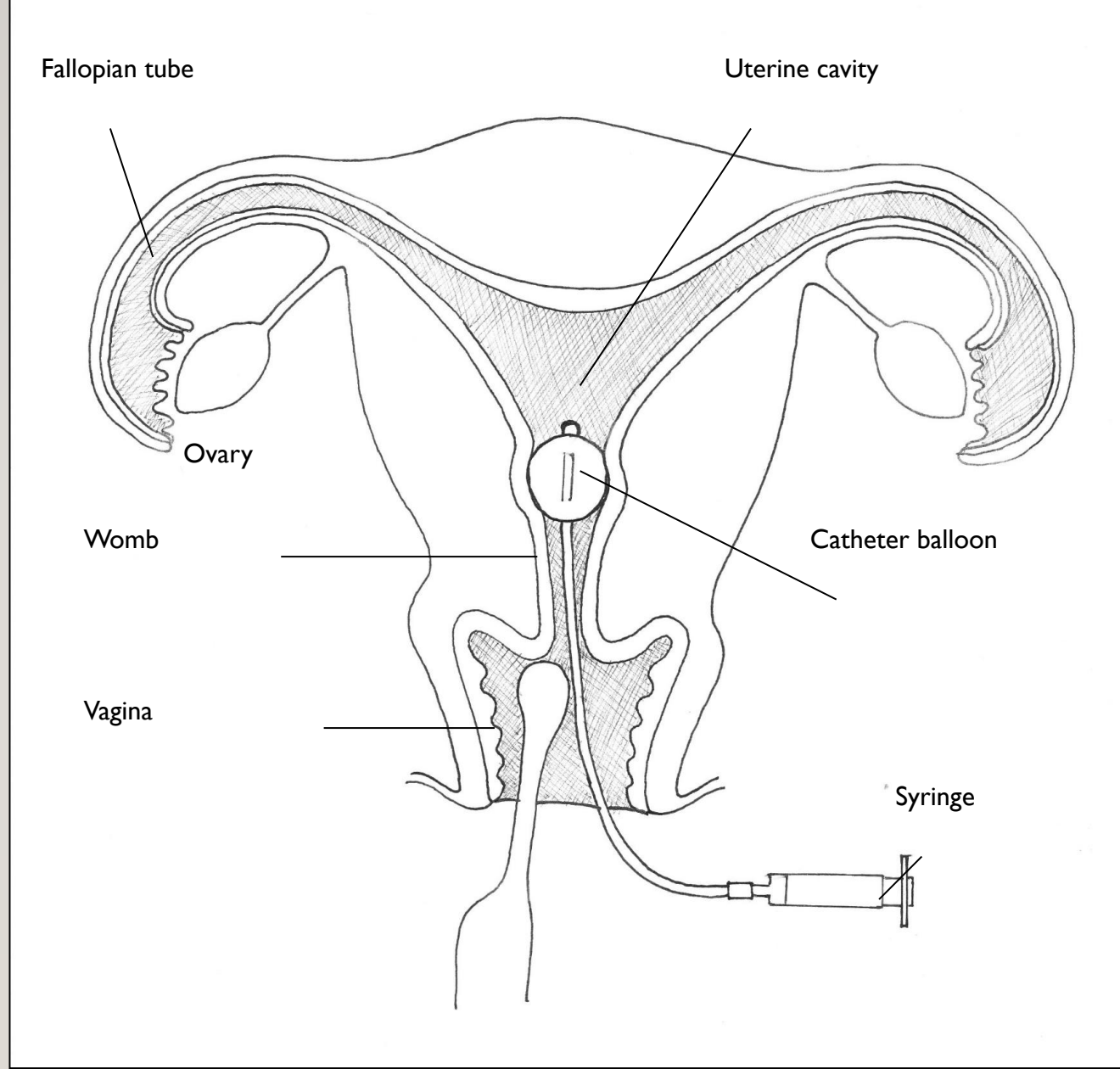
- Speculum inserted and catheter passed into the uterine cavity

STAGE 2 – UTERINE CATHETERIZATION

- The balloon is inflated with 0.5-1 ml of saline (normally 0.8ml or 1-1.5ml if in cervix)
- Speculum removed and TV probe reinserted. If catheter is unstable, can scan with speculum in place



CATHETER IN SITU



STAGE 3 - CAVITY ASSESSMENT

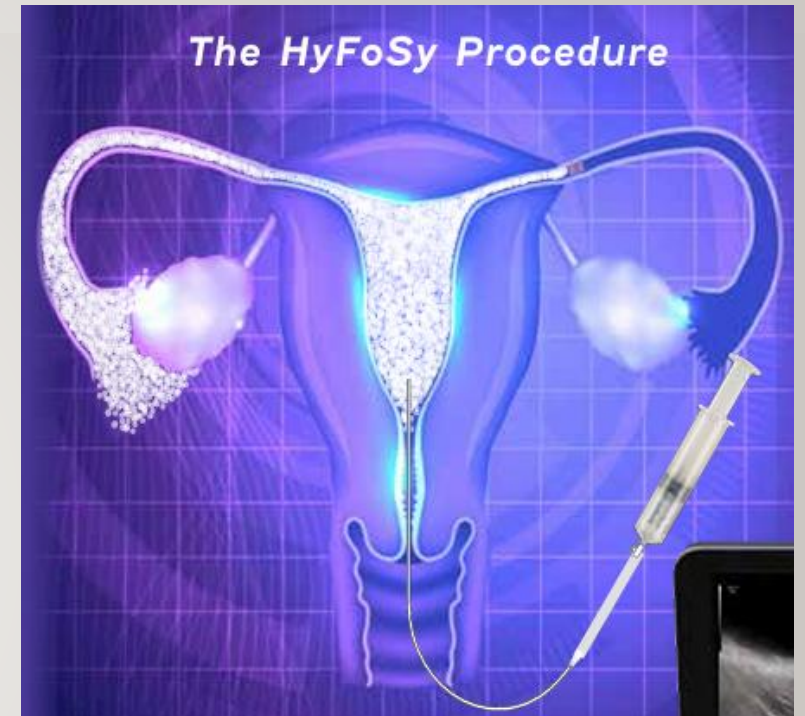
- Balloon position checked
- Saline slowly injected into the cavity
- Real-time assessment of cavity filling in both LS and TS planes

SALINE INFUSION SCAN OF CAVITY



STAGE 4 - ULTRASOUND ASSESSMENT OF CONTRAST INSTALLATION

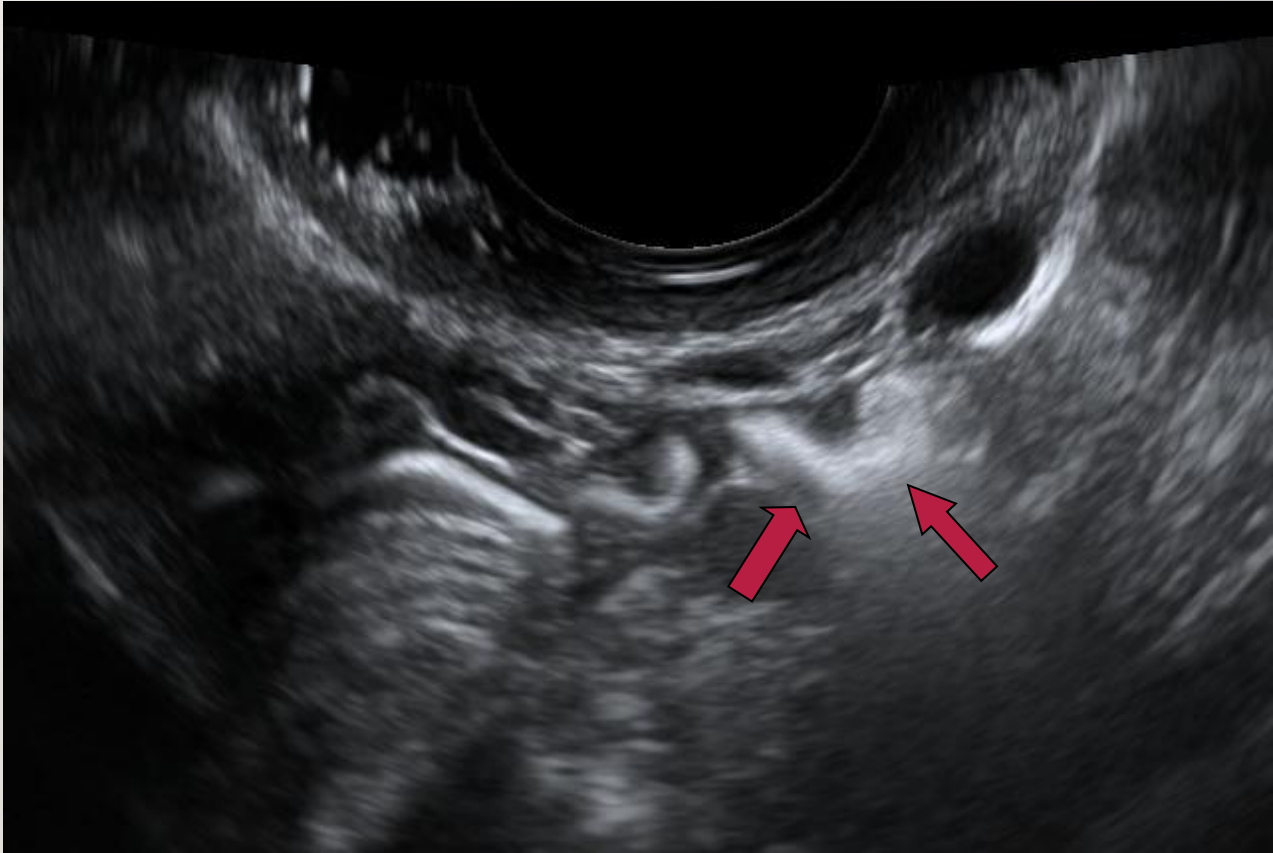
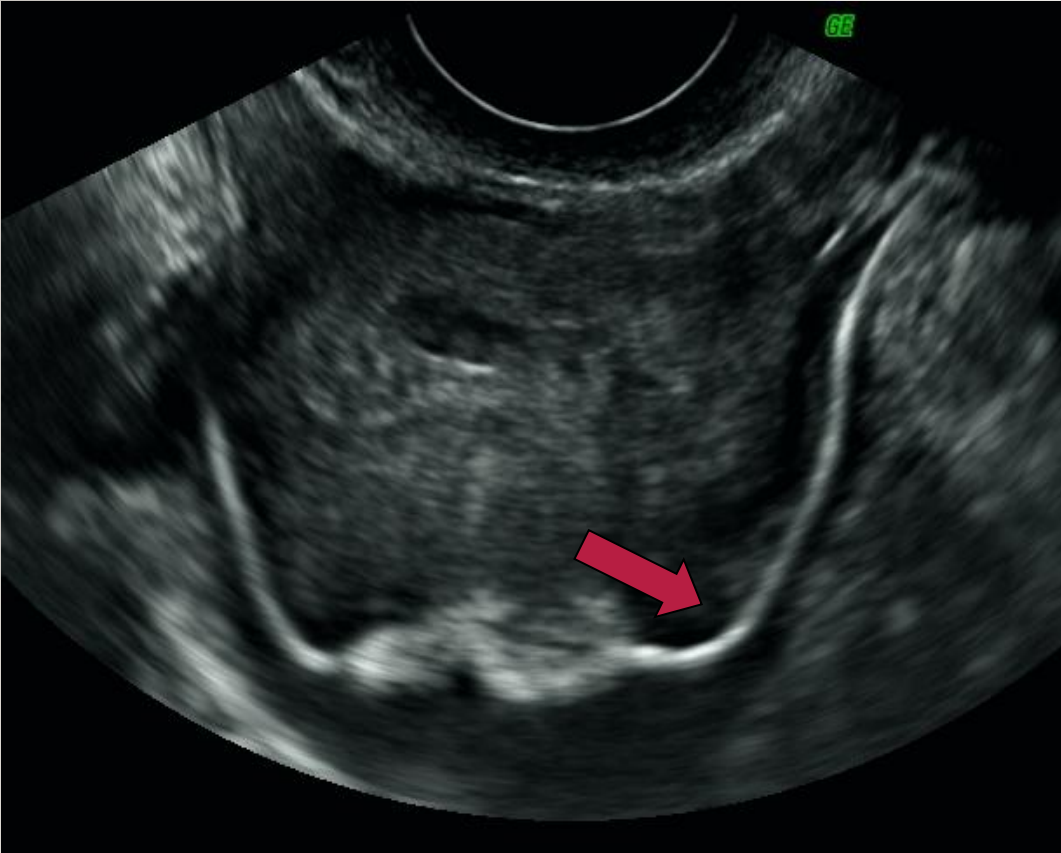
- Locate both ovaries
- Obtain a TS section & show both cornua
- Slowly inject contrast
- Confirm contrast exit via the cornua
- Look briefly for tubal fill
- Go swiftly to fimbrial region to look for free spill
- Once visualised go immediately to the other side to confirm bilateral spill



FOLLOWING CONTRAST

First exiting cornua.....

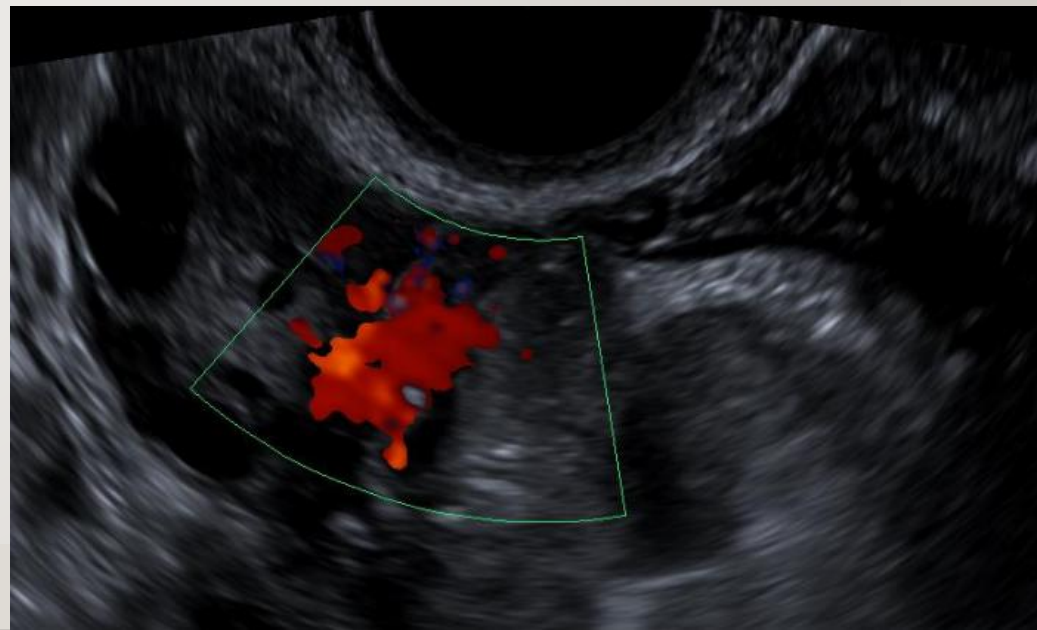
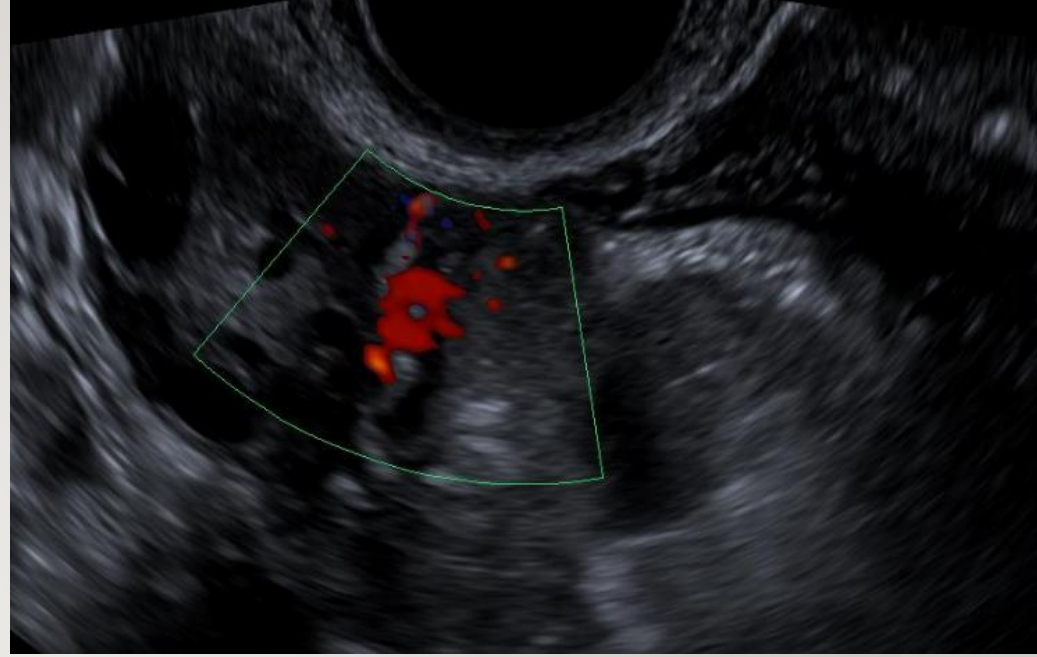
Then go straight to fimbrial end to observe start of spill





SUPPLEMENT OF COLOUR DOPPLER

- Position the colour box over the region of the fimbria
- Inject a bolus of contrast/saline and look for Doppler jet
- If no jet is seen reposition the box over fimbrial region and inject further bolus
- Repeat until 3 jets are identified



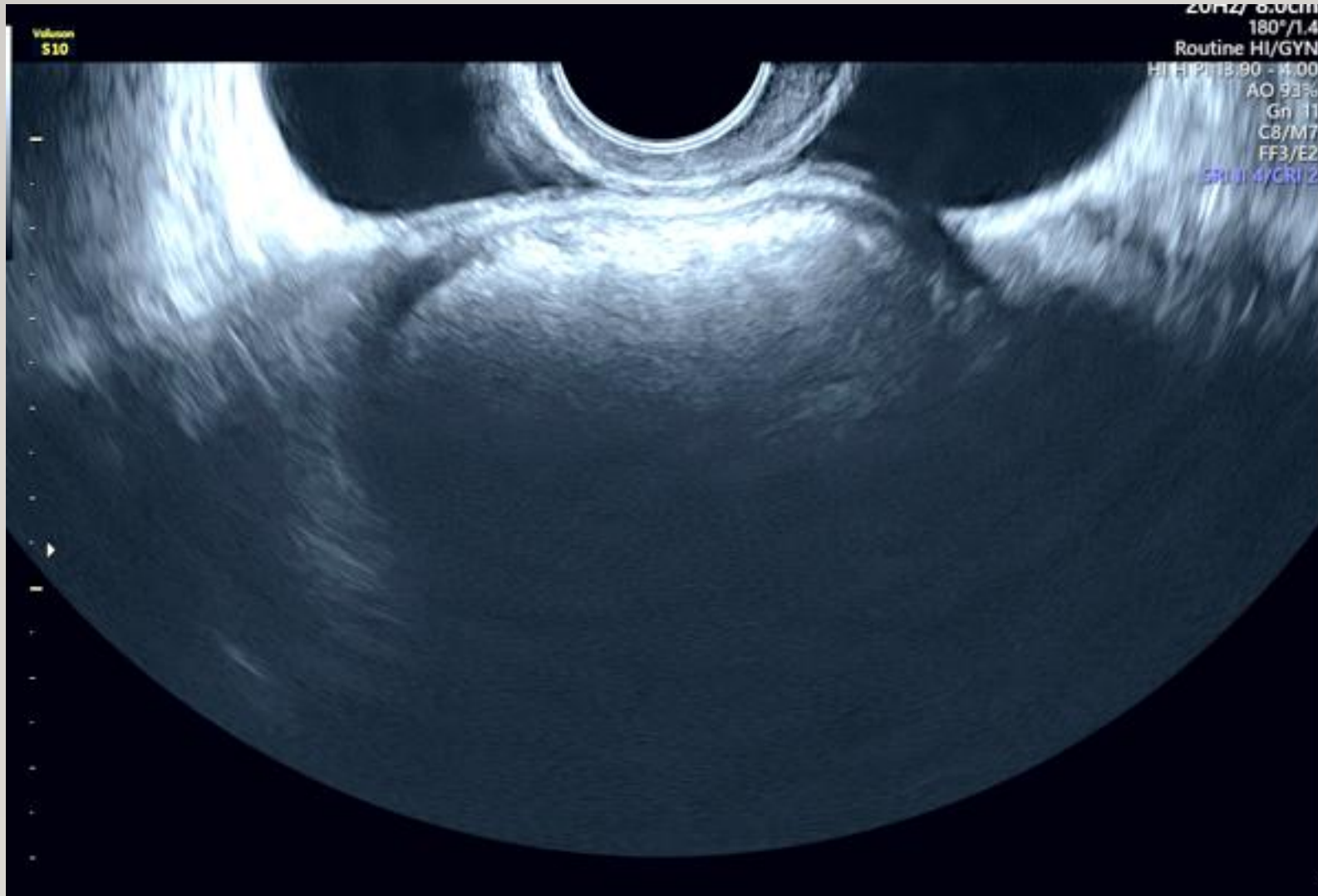
COLOUR DOPPLER BOLUS



POSITION OF UTERUS AND OVARIES



BOWEL GAS



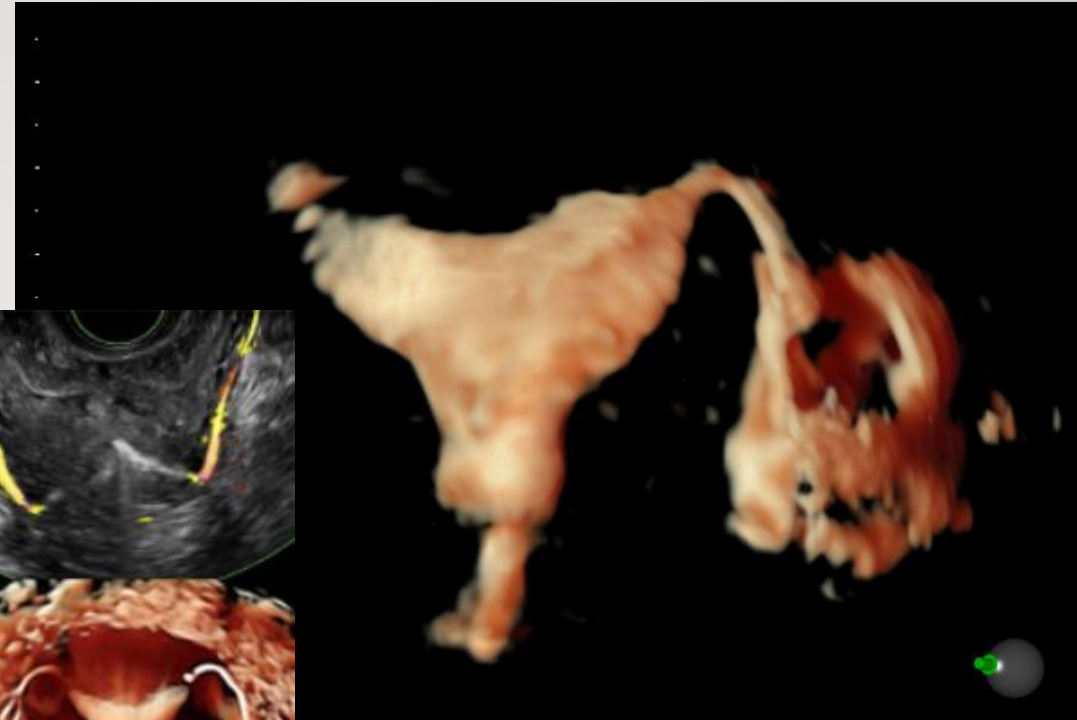
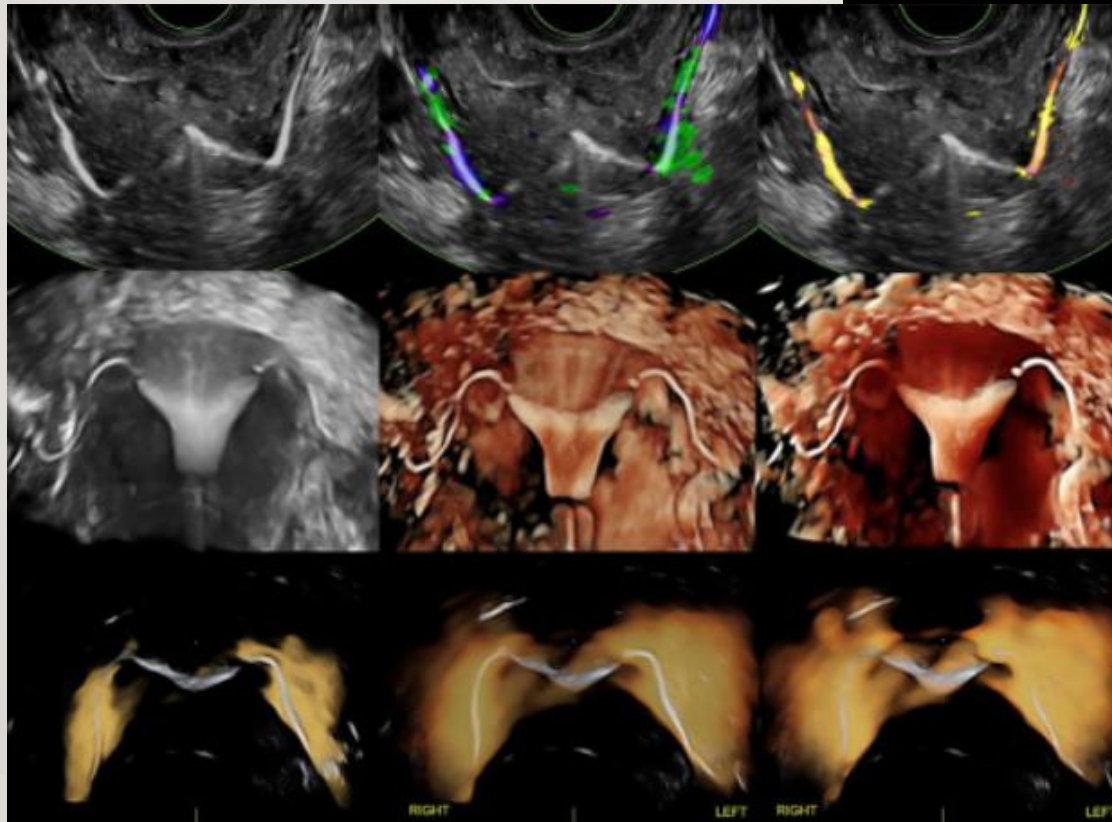
MANAGING A VASOVAGAL RESPONSE



- Avoidance!
- Have a bed elsewhere that can be used for recovery
- Ask all patients to wait a short time before leaving

FURTHER DEVELOPMENT OF HYCOSY

- HyFoSy
- 3D + 4D application
- Use of Doppler to confirm contrast flow: makes diagnosis easier to interpret for less experienced users



THANK YOU FOR
LISTENING

ANY QUESTIONS?



REFERENCES

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- [ExEm_US_87_v1_HCP Intro One-sheet](#) [Accessed 11.03.25]