

The role of HyCoSy- a clinicians perspective

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Content

- ▶ Infertility- definition, referral, causes
- ▶ Investigations- what do we need to know
- ▶ Tubal pathology and assessment methods:
- ▶ Diagnostic laparoscopy and tubal hydrotubation
- ▶ HSG
- ▶ HyCoSy

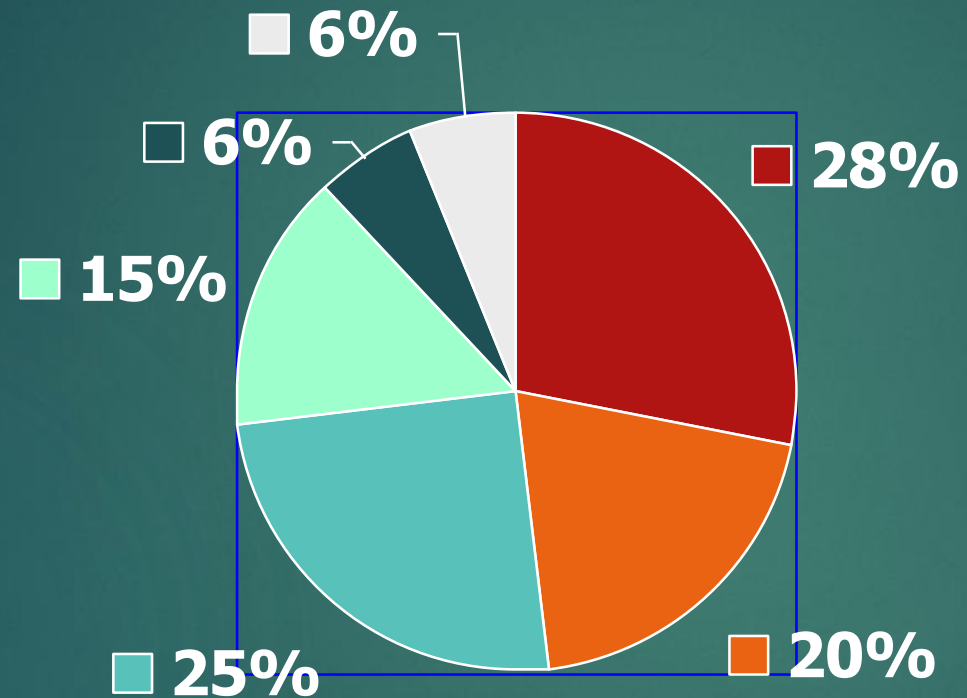
Definition

- ▶ Inability to conceive after one year's unprotected intercourse
- ▶ **Primary:** Never conceived or fathered a pregnancy
- ▶ **Secondary:** Previously been pregnant or fathered a pregnancy

Incidence and Referral

- ▶ Based on global data 1990-2021 WHO estimate approximately 1 in 6 adults experience infertility at least once in their lifetime.
- ▶ Challenges to obtaining representative data include that infertility prevalence varies based on the definition used and study variables included, such as time/period, geographic region, and patient demographic factors.
- ▶ 8 out of 10 couples conceive within 1 year
- ▶ 9 out of 10 couples conceive within 2 years
- ▶ Refer after 1 year (NICE, local ICB)
- ▶ IVF/ICSI after 2 years

Causes of Infertility



- Male
- Ovulatory
- Unexplained
- Tubal
- Endometriosis
- others

Three Conception Questions

- ▶ Sperm:
 - Semen quality
 - Intercourse, correct and frequent
- ▶ Oocyte (egg):
 - Production monthly
- ▶ Fallopian tubes:
 - Sperm and egg meet

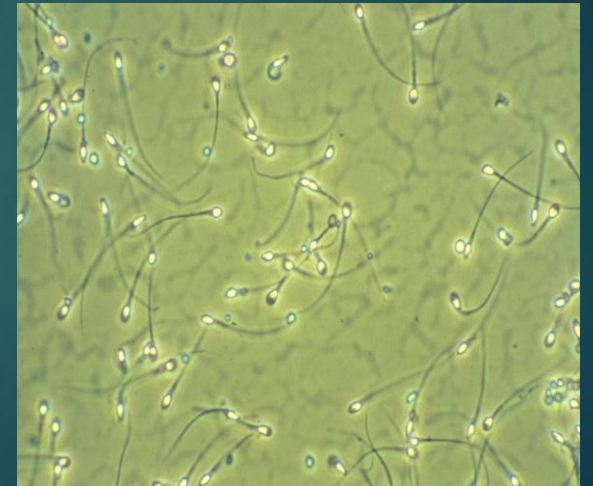


Basic Investigations

- ▶ 1 (or 2) semen analysis
- ▶ Luteal phase Progesterone
- ▶ Tubal assessment
- ▶ Many patients will require IVF/ICSI
- ▶ Ovarian egg reserves (AMH blood test, AFC on uss)
- ▶ Ovaries accessible

Sperm

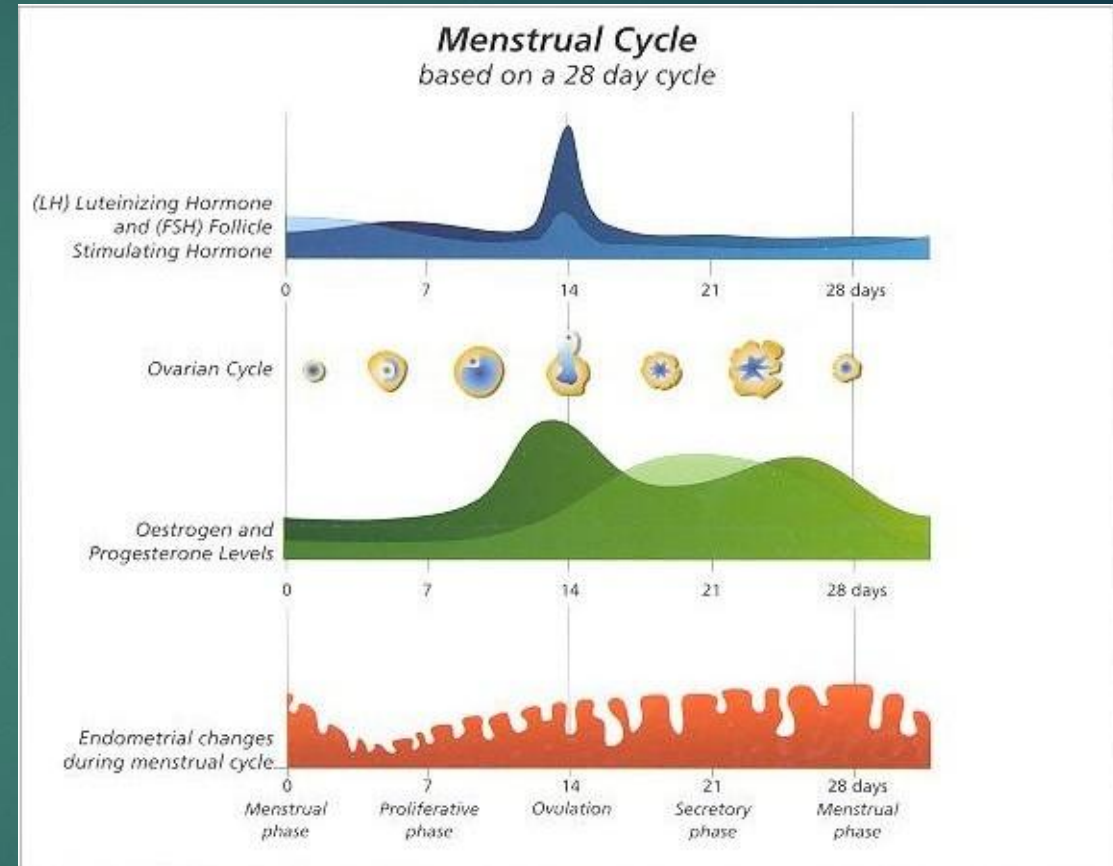
- ▶ WHO reference ranges
- ▶ 2 tests- if first abnormal
- ▶ Allow 3 months in between tests if abnormal



Egg



- ▶ Luteal Phase Progesterone
- ▶ 7 days prior to menstruation
- ▶ Luteal phase is 14 days whilst follicular phase is variable



Tubal Assessment

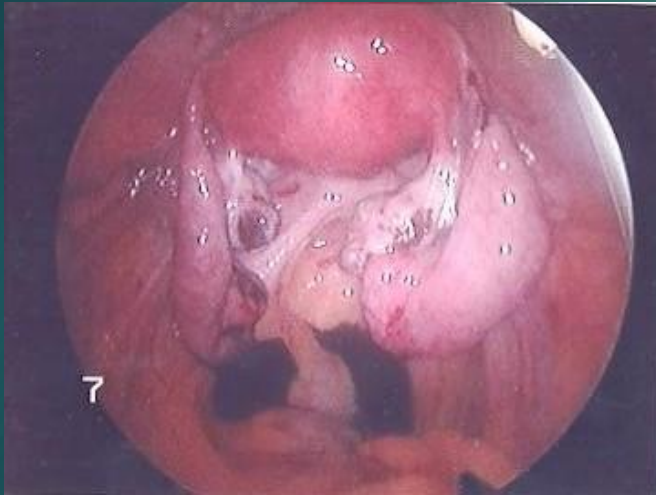
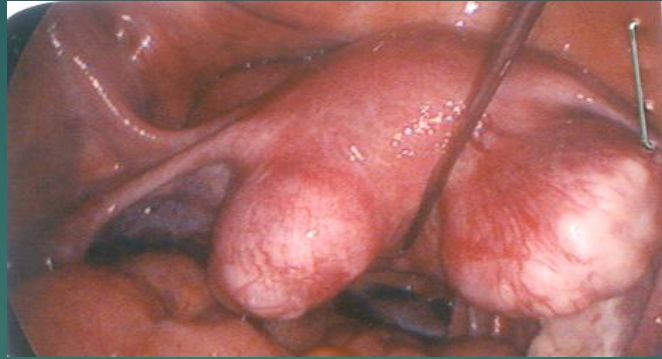
- ▶ Laparoscopy and dye hydrotubation = Gold Standard
- ▶ HSG
- ▶ HyCoSy
- ▶ Selective salpingography
- ▶ Falloposcopy

Tubal Pathology

- ▶ Infection : STI Chlamydia, post-partum sepsis, instrumentation of uterus eg coil insertion, hysteroscopy*
- ▶ Endometriosis
- ▶ Fibroids
- ▶ Appendicitis
- ▶ Previous pelvic surgery

*All patients given 5/7 doxycycline 100mg BD post tubal assessment

Tubal Assessment

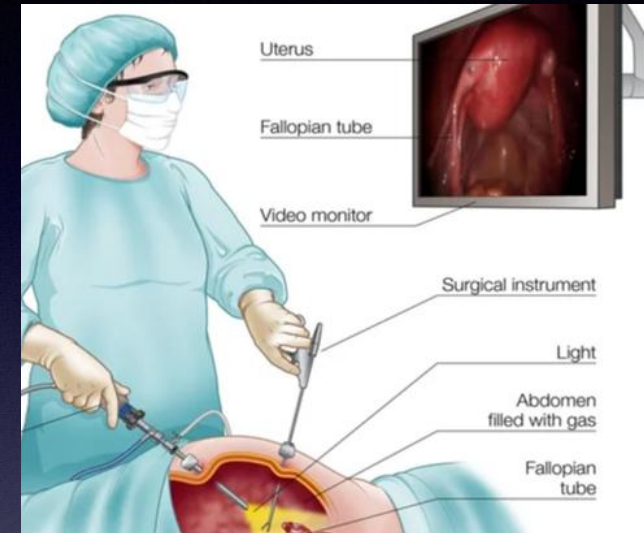


Laparoscopy and dye hydrotubation

- ▶ Diagnostic 'Gold Standard'
- ▶ Therapeutic options-
 - Adhesions
 - Endometriosis *

*(fertility improves by 13% over 9 months with Tx for endometriosis)

- Requires GA + recovery
- Risk of damage to internal structures (1 in 500-1000)
- No assessment of uterine cavity



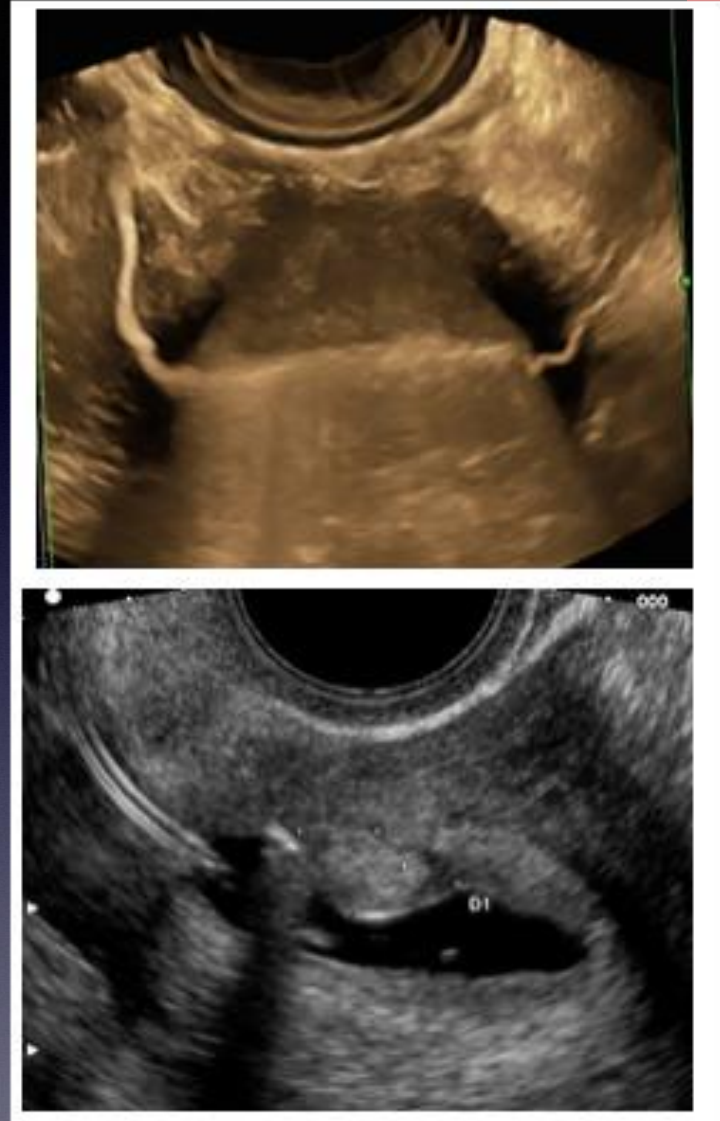
Hysterosalpingogram

- ▶ Simple and convenient
- ▶ Well tolerated
- ▶ Good detail of endosalpinx
- ▶ Locate site of blockage
- ▶ May be therapeutic/corrective
- Limited information on cavity lesions and abnormalities
- Ionizing radiation



HyCoSy

- ▶ Simple and convenient
 - ▶ Well tolerated
 - ▶ Uterine assessment
 - ▶ Ovarian assessment
 - ▶ May be therapeutic
- Limited detail of endosalpinx



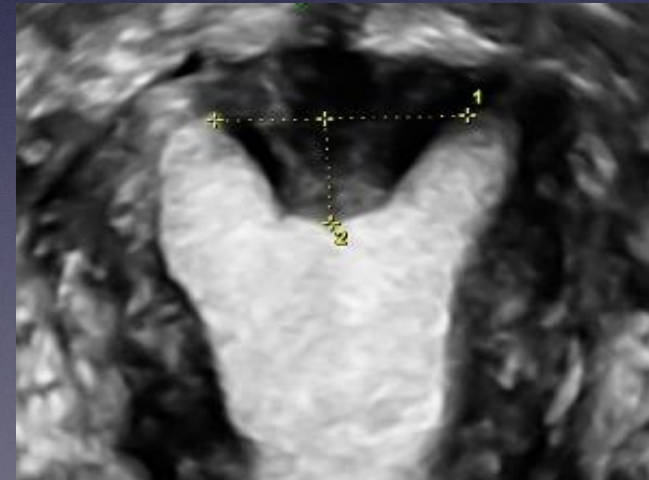
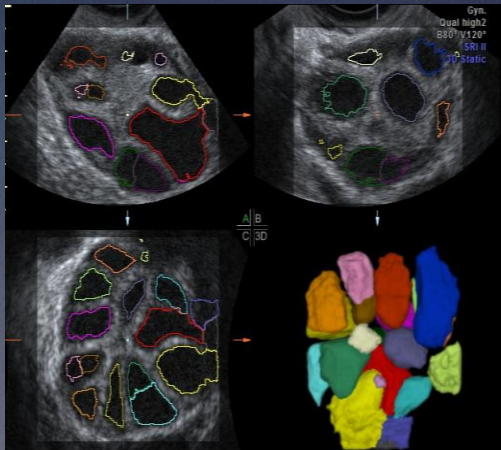
Additional benefits of HyCoSy

Ovarian assessment – AFC, incidental cysts

Ovarian mobility/accessibility

Cavity assessment

3D assessment of uterine malformation



+ (2) = 10mm

Advantages and disadvantages

TABLE 4

Advantages and disadvantages of hysterosalpingogram (HSG), hysterosalpingo-contrast sonography (HyCoSy), and laparoscopy with chromopertubation (LSC).

Study	Advantages	Disadvantages
HSG	Potential visualization of entire length of fallopian tube Ability to diagnose various tubal pathologies (i.e., SIN, hydrosalpinx) Therapeutic lavage with documented improvement in pregnancy rates (10)	Exposure to radiation Potential severe adverse contrast reaction (1, 2, 8, 9) Requires trained staff with appropriate equipment & facilities Visualization of pelvic adhesions and ovaries not possible
HyCoSy	Visualization of ovaries, uterus, and fallopian tubes in a single study	Requires trained staff with appropriate equipment & facilities Therapeutic lavage or improved pregnancy rates not proven (60)
LSC	Visualization of pelvic pathology (i.e., adhesions, endometriosis) Possible concomitant therapeutic surgical correction or removal of pelvic pathology	Invasive procedure with increased morbidity and mortality (62, 63) Requires general anesthesia Longer post-procedure pain and recovery Higher medical costs

Note: SIN = salpingitis isthmical nodosa.

Saunders. Tubal patency assessment. Fertil Steril 2011.

NICE (CG 256) 31st March 2026

Fertility problems: assessment and treatment

▶ 1.3.8 Investigation of suspected tubal and uterine abnormalities

▶ 1.3.8.1

- ▶ Offer women, trans men and non-binary people with female reproductive organs who are not known to have comorbidities (such as pelvic inflammatory disease, previous ectopic pregnancy or endometriosis) should be offered hysterosalpingography (HSG) to screen for tubal occlusion because this is a reliable test for ruling out tubal occlusion, and it is less invasive and makes more efficient use of resources than laparoscopy. **[2004 and 2026]**

▶ 1.3.8.2

- ▶ Where appropriate expertise is available, screening for tubal occlusion using hysterosalpingo-contrast-ultrasonography should be considered because it is an effective alternative to HSG for those who are not known to have comorbidities. **[2004 and 2026]**

▶ 1.3.8.3

- ▶ For those who are thought to have comorbidities offer laparoscopy and dye so that tubal and other pelvic pathology can be assessed at the same time. **[2004 and 2026]**

HyCoSy compared with

HyCoSy studies compared with reference study for the detection of tubal occlusion by study design.

Tubal patency assessment						Sensitivity	Specificity	PPN	NPV	C
	Study	Study design	Sample size	Study type	Reference standard	(%)	(%)	(%)	(%)	(%)
1	Holz et al. (1997)	MA	1,007	HyCoSy	HSG	—	—	87.2	96.1	83.1
				HyCoSy	LSC	—	—	89.7	92.3	83.3
2	Campbell et al. (1994)	R	600	HyCoSy	HSG	—	—	—	—	84–91
				HyCoSy	LSC	—	—	—	—	80–93
3	Hamilton et al. (1998)	R	185	HyCoSy	LSC	90.4	70.3	91.2	68.2	85.8
4	Strandell et al. (1999)	P, B	103	HyCoSy	HSG	—	—	—	—	72.0
			43	HyCoSy	LSC	27.0	90.0	75.0	88.0	80.0
			43	HSG	LSC	73.0	87.0	47.0	94.0	83.0
5	Chenia et al. (1997)	P, B	50	HyCoSy	HSG	—	—	—	—	85.0
6	Radic et al. (2005)	P, B	68	HyCoSy	LSC	100.0	77.0	70.0	100.0	—
7	Mitri et al. (1991)	P, B	80	HyCoSy	HSG	—	—	—	—	72.0
8	Hamed et al. (2009)	P, B	57	HyCoSy	LSC	76.1	79.4	71.4	83.1	78.1
			57	HSG	LSC	81.8	77.1	69.2	87.1	79.9
9	Kiyokawa et al. (2000) ^b	P, B	25	HyCoSy	HSG	84.4 ^a	100.0 ^a	100.0 ^a	33.0 ^a	84.0
10	Deichert et al. (1989)	P	219	HyCoSy	LSC	83.7	87	63.2	87.0	86.3
			68	HyCoSy	HSG	80.6	85	65.9	92.4	83.8
			23	HSG	LSC	71.4	84.4	—	—	80.4
11	Deichert et al. (1987)	P	76	HyCoSy	HSG	100.0	90	—	—	87.5
				or LSC						
12	Degenhardt et al. (1996)	P	57	HyCoSy	LSC	—	—	—	—	90.9
			20	HyCoSy	HSG	—	—	—	—	89.2
13	Tanawattanacharoen et al. (2000)	P	60	HyCoSy	LSC	—	—	—	—	80.0
14	Reis et al. (1988)	P	44	HyCoSy	LSC	85.2	85.2	71.9	92.9	85.2
			44	HSG	LSC	85.2	83.6	69.7	92.7	84.1
15	Inki et al. (1998)	P	32	HyCoSy	LSC	90.2 ^a	83.3 ^a	94.9 ^a	71.4 ^a	88.7
16	Exacoustos et al. (1996)	P	38	HyCoSy	HSG	80.0	94.0	84.0	92.0	89.6
			15	HyCoSy						
			15	HSG						
17	Volpi et al. (2003)	P	29	HyCoSy						
			10	HyCoSy						
18	Dietrich et al. (1996)	P	20	HyCoSy						

Conclusion(s)

Increasing evidence supports the more recently described hysterosalpingo-contrast sonography procedure as an acceptable screening study for the subfertile patient with the potential advantage that it is a comprehensive evaluation, methodologically simple, cost effective, and time efficient.

Conclusion

Numerous advantages in setting up a HyCoSy service

- ▶ A well-tolerated procedure
- ▶ Can easily characterize uterine cavity, myometrial lesions, malformations
- ▶ Additional assessment of the adnexae and AFC
- ▶ No ionizing radiation
- ▶ Recent studies show a therapeutic effect
- ▶ Extended role for the sonographer
- ▶ Limitations of HyCoSy
 - ▶ Still considered to be not as accurate as HSG ???
 - ▶ Requires a higher degree of technical competence than HSG