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Fertility evaluation of infertile women: a committee opinion

Practice Committee of the American Society for Reproductive Medicine

American Society for Reproductive Medicine, Birmingham, Alabama

Diagnostic evaluation for infertility in women should be conducted in a systematic, expeditious, and cost-effective manner to identify all the relevant factors with an initial emphasis on the least invasive methods for detecting the most common causes of infertility. The purpose of this committee opinion is to provide a critical review of the current methods and procedures for the evaluation of in fertile women, and it replaces the document of the same name, last published in 2015 (Fertil Steril 2015;103:e44–50). This guidance is intended for any provider evaluating women for infertility. (Fertil Steril® 2021;116:1255-65. ©2021 by American Society for Reproductive Medicine.)

El resumen está disponible en Español al final del artículo.

Key Words: Infertility, ovulation, ovarian reserve, pregnancy, evaluation

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Infertility is a disease historically defined as the failure to achieve a successful pregnancy after ≥12 months of regular, unprotected sexual intercourse or because of impairment of the capacity to reproduce either as an individual or with a partner. In the absence of exigent history or physical findings, evaluation should and treatment may be initiated at 12 months in women <35 years of age and at 6 months in women aged ≥35 years. In women >40 years of age, more immediate evaluation and treatment may be warranted (1). However, diagnostic testing for infertility should be initiated without delay on presentation with a condition known to cause infertility. Such conditions include, but are not limited to (2–6):

- Irregular menstrual cycles, cycle length <25 days (7), intermenstrual bleeding (8), oligomenorrhea, or amenorrhea
- Known or suspected uterine/tubal/peritoneal disease or endometriosis
- Known or suspected male subfertility
- Sexual dysfunction
- Genetic or acquired conditions that predispose to diminished ovarian reserve (e.g., chemotherapy, radiation exposure, FMR1 premutation)

An evaluation may also be indicated in some women who do not have infertility to optimize assisted reproductive technology treatments for other indications, such as recurrent pregnancy loss or genetic carrier status of an individual or couple where preimplantation genetic testing (for aneuploidy, monogenic disorders, and structural chromosomal rearrangements) is warranted. A fertility evaluation before treatment in these situations is useful.

Women in need of donor sperm to achieve pregnancy also warrant consideration for performing a fertility evaluation. These include single women, women in a same-sex relationship, and women in a heterosexual relationship who may require donor sperm. These women should undergo a directed history and physical examination as well as a laboratory evaluation, similar to any other infertile patient. Assessment of the tubal status or uterine cavity should be tailored based on medical history and risk assessment. Same-sex female couples may also elect to pursue reciprocal in vitro fertilization, where the oocytes are removed from one partner and are used to create embryos, which are subsequently transferred to the other partner who carries the pregnancy. Both women need to be evaluated with specific laboratory analysis, and radiologic studies should be ordered based on whether the women will serve as the oocyte contributor or as the gestational carrier. Similarly, transgender men and nonbinary patients require the same targeted evaluation tailored to the desired treatment if they wish to pursue fertility treatments. Careful consideration should be taken to respect potentially distressing examinations and balance financial costs, while ensuring that thoroughness is not compromised.

When a male partner is contributing to the pregnancy, evaluation of both partners should begin at the same time. When applicable, a male partner's reproductive and medical history and at least one semen analysis is obtained at the onset of an infertility evaluation given the high prevalence

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of a contributing male factor. Methods for the evaluation of the male partner are described in detail in a separate document (5, 6).

HISTORY AND PHYSICAL EXAMINATION

The initial infertility appointment should have sufficient time to obtain a comprehensive medical, reproductive, and family history and to perform an appropriate physical examination (Table 1). This is also an opportune time to counsel patients regarding prepregnancy care and screening for relevant genetic conditions. Further information on prepregnancy care can be found in the joint ACOG and ASRM Committee Opinion (9).

The infertility physical examination should be targeted to detect pathology that specifically impacts fertility or reproductive potential. The infertility evaluation is an opportunity to confirm that routine preventative health care maintenance is up to date, but a complete physical or gynecologic evaluation for every patient presenting for a fertility evaluation is not required (Table 2).

DIAGNOSTIC EVALUATION

Subsequent diagnostic evaluation should be conducted in a systematic, expeditious, and cost-effective manner to identify all relevant factors, with an initial emphasis on the least invasive methods for the detection of the most common causes of infertility. The pace and extent of evaluation should take into account the couple's preferences, patient age, the duration of infertility, and the unique features of the medical history and physical examination.

OVULATORY FUNCTION

Ovulatory dysfunction is identified in approximately 15% of all infertile couples and accounts for up to 40% of infertility in women (18). It commonly results in obvious menstrual disturbances (oligomenorrhea/amenorrhea), but may be more subtle, present in women with apparent eumenorrhea. Once pregnancy has been excluded, other underlying causes for ovulatory dysfunction should be sought because specific treatment may be indicated. Some conditions that cause ovulatory dysfunction may have other health implications that need to be addressed. The most common causes of ovulatory dysfunction include polycystic ovary syndrome (PCOS), obesity, perimenopause, weight gain or loss, strenuous or excessive exercise, thyroid dysfunction, and hyperprolactinemia. Methods for evaluating ovulatory function may include any of the following:

Menstrual History

A thorough menstrual history may be all that is required. In most ovulatory women, menstrual cycles are regular and predictable, generally occur at intervals of 21–35 days, exhibit consistent flow characteristics, and may be accompanied by a consistent pattern of moliminal symptoms (19). Some degree of variation is entirely normal. In a study of more than 1,000 cycles, variations in intermenstrual interval >5 days were observed in 56% of patients within 6 months and in 75% of those observed for 1 year (20). However, sporadic anovulatory cycles in regularly menstruating women are relatively rare at 1%–14% (21, 22). Sporadic anovulation causes minimal variation in fecundity in regularly menstruating women (23). The prevalence of ovulatory cycles based on a normal menstrual history in nonhirsute women is as high as 99.5% (24). Alternatively, the prevalence of regular ovulation in eumenorrheic women with hirsutism decreases to 60%. (25). In these women, luteal progesterone levels should be considered to confirm ovulation.

A history of oligomenorrhea or amenorrhea is clinically sufficient to establish anovulation and warrants further investigation to identify the underlying etiology, without the need for further testing of ovulatory status. The additional tests discussed below are not required to confirm ovulation but may be used to augment fertility evaluation when the menstrual history is indeterminant.

Luteal Progesterone

Serum progesterone determinations provide a reliable and objective measure of ovulation if they are obtained at the appropriate time in the cycle. Given the range of normal variation in ovulatory cycles, a serum progesterone measurement should generally be obtained approximately 1 week before the expected onset of the next menses, rather than on any one specific cycle day (e.g., day 21). A progesterone concentration >3 ng/mL provides presumptive and sufficient evidence of recent ovulation (26). Because luteal serum progesterone levels can fluctuate sevenfold over a few hours, a single progesterone value may be used to confirm ovulation, but not to assess the quality of the luteal phase (26).

Ovulation Predictor Kits

Urinary luteinizing hormone (LH) determinations using various commercial ''ovulation predictor kits'' can identify the midcycle LH surge that precedes ovulation within 1–2 days. Urinary LH detection provides indirect evidence of ovulation (27). Results generally correlate well with the peak in serum LH, particularly when the test is performed on midday or evening urine specimens (20). Patients with PCOS may have a tonic elevation in basal LH levels, leading to false-positive results with urinary LH levels. However, accuracy, ease of use, and reliability vary among products, and testing may yield false-positive and false-negative results (28).

Transvaginal Ultrasonography

Transvaginal ultrasonography is a useful tool to assess ovarian reserve and adnexal and uterine pathology. Transvaginal ultrasonography may reveal the size and number of antral and developing follicles and provide presumptive evidence of ovulation and luteinization when obtained in the putative luteal phase.

TABLE 1

Infertility history assessment (5, 6, 10–16)

	Routine assessment	Additional considerations
Fertility history	**Current conception attempts** • Length of time of unprotected intercourse • Coital frequency • Use of ovulation monitoring • Partner status and are they contributing sperm or oocytes to the patient's reproductive efforts • Presence of sexual dysfunction, including: - Decreased libido - Erectile dysfunction - Ejaculatory dysfunction - Dyspareunia - Vaginismus **Prior fertility history** • History of previous conception attempts • Prior periods of intercourse without contraception or with low efficacy contraception • Any prior fertility evaluation or treatment	• Patient may incorrectly identify attempts at pregnancy as only conscientious efforts for conception, rather than periods of active sexual activity without contraception. • Coital frequency may change over time. • If using urine LH kits, assess whether patient has been successful in detecting ovulatory surges. • If using a fertility tracking app, discuss its limitations in accurately predicting the fertile window (10).
Gynecologic history	**Menstrual history** • Age at menarche • Cycle length (range), duration, and amount of bleeding • Presence of intermenstrual bleeding • Presence of dysmenorrhea • Presence of molimina **General gynecologic history** • Cervical screening history including related treatments • Contraceptive use including type and duration • Sexually transmitted infections and/or pelvic inflammatory disease • Dyspareunia or chronic pelvic pain • History of abnormal cervical screening (pap smear ± human papillomavirus testing)	• If menses onset <8 years of age or >14 years of age, was evaluation performed and were menses ever achieved spontaneously? (11, 12) • If menstrual interval is <21 days or >35 days or there is a significant variation in range, perform a review of systems including: - Thyroid symptoms - Hirsutism - Visual field defects - Galactorrhea - Stressors - Dietary and exercise habits - Vasomotor symptoms • If abnormal menstrual bleeding, were any investigations performed and was a diagnosis made? • Have any surgical cervical excision procedures been performed?
Obstetrical history	• Total number of pregnancies and outcomes, including: (13) - Biochemical miscarriage - Clinical miscarriage - Pregnancy of unknown location - Terminations - Ectopic pregnancy - Stillbirth - Live birth • Conceived with current vs. prior partner(s) • Details of any fertility treatment required • Obstetrical complications, including: - Gestational diabetes - Hypertensive disorders - Preterm delivery - Placental disease - Intrauterine growth restriction • Congenital disease or birth defects in offspring	• If outcome other than live birth, inquire about related evaluations.
Medical history	**Past medical and surgical history** • Medical disorders with particular attention to endocrine, autoimmune, genetic, psychiatric, or malignant disorders (14–15) • Endocrine history should include evaluation of the thyroid, and the presence of galactorrhea and hirsutism • Prior hospitalizations • Surgical procedures **Medications and allergies** • Use of gonadotoxic medications or radiotherapy • Current medications including any supplements • Known drug allergies and type of reaction	• If diagnosed with an endocrine disease, what is the status of the disease, including medications and last hormonal testing?

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TABLE 1

Continued.

	Routine assessment	Additional considerations
Family history	• Any family members with known history of: - Inherited disorders - Endocrinopathies - Birth defects - Developmental delay - Infertility - Early menopause (<40 years of age) - Multiple spontaneous abortions - Heritable cancer syndromes	• If known or suspected history of inherited disorder, construct family pedigree and assess whether patient had carrier testing. Consider referral to a genetic counselor. • If family history of developmental delay, assess whether the individual was evaluated for Fragile X syndrome. • If family history of infertility, assess whether there was a known associated diagnosis. • If family history of early menopause, assess whether there was a known autoimmune or genetic cause.
Social history	• Occupation and potential exposure to toxic agents • Use of tobacco, alcohol, or recreational drugs • History of psychological, physical, and/or sexual trauma • Gender identity • Race and ethnicity • Diet and exercise habits	
Male history - if applicable	• Fertility history (5, 6) • Urologic history • Medical and surgical history (including endocrine history) • Current medications including any supplements • Exogenous steroid use • Sexual dysfunction (16) • Social history • Family history	

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Basal Body Temperature

Serial, daily basal body temperature (BBT) testing is an inexpensive, although often unreliable, method of predicting ovarian function. Ovulatory cycles are generally associated with biphasic BBT recordings, and anovulatory cycles typically result in monophasic patterns. However, some ovulatory women cannot document clearly biphasic BBT patterns (29). Grossly short luteal phases (<10 days of temperature elevation) may identify women with more subtle ovulatory dysfunction. Theoretically, the period of highest fertility spans the 7 days before the midcycle rise in BBT. Given the tedious nature of the testing and its lack of accuracy, this test is not routinely recommended today, especially when the menstrual history is consistent with ovulatory cycles.

Endometrial Biopsy

Endometrial biopsy was historically used to histologically evaluate for the presence of secretory endometrial development in the luteal phase, thus implying prior ovulation (30). However, careful studies have since demonstrated that histologic endometrial dating is not a valid diagnostic method for ovulatory function because it lacks both accuracy and precision (31) and cannot distinguish fertile from infertile women (32). Thus, an endometrial biopsy is no longer recommended for routine infertility evaluation (Table 3).

Hormonal Testing

If the provider has confirmed that a woman has oligomenorrhea or anovulation, it is imperative to search for an underlying cause. Serum thyroid-stimulating hormone can identify thyroid disorders, which may require further investigation and impair fertility when untreated. Prolactin is not recommended as part of the routine infertility evaluation, but is indicated in the setting of galactorrhea, oligomenorrhea, or amenorrhea. In women with amenorrhea, serum follicle-stimulating hormone (FSH) and estradiol measurements can distinguish women with ovarian insufficiency (high FSH, low estradiol) who may be candidates for oocyte donation from those with hypothalamic amenorrhea (low or normal FSH, low estradiol) who require exogenous gonadotropin stimulation for ovulation induction. Serum antimüllerian hormone can also be used to assess amenorrhea, although it may not provide additional clinically relevant information compared to FSH and estradiol (34). In those women with normal FSH and estradiol levels in the setting of oligomenorrhea or anovulation, evaluation for PCOS is warranted, and in those with clinical signs of androgen excess, additional screening for 21-hydroxylase deficient nonclassic adrenal hyperplasia should be performed (35).

OVARIAN RESERVE

The concept of ''ovarian reserve'' describes reproductive potential as a function of the number of oocytes (36). Decreased or diminished ovarian reserve describes women of reproductive age having regular menses whose response to ovarian stimulation is reduced relative to those in women of comparable age. Female age is the single most important predictor of fecundity. Ovarian reserve tests should augment and not replace patient counseling based on age and diagnosis. The goal of using ovarian reserve testing is to identify women who may be poor responders to gonadotropin stimulation in

TABLE 2

Infertility physical examination (17). The infertility physical examination can be a targeted evaluation to identify specific factors associated with fertility and reproductive outcomes. This table provides examples of situations where specific physical examinations may be indicated.

Examination	When to consider	Evaluate for	Additional considerations
Skin examination	• Polymenorrhea • Oligomenorrhea • Amenorrhea • Signs or symptoms of androgen excess (e.g., hirsutism, acne, scalp hair loss)	• Hirsutism • Acne • Androgenic alopecia • Acanthosis nigricans	• Evaluate for evidence of biochemical androgen excess (hyperandrogenemia); and similar/mimicking disorders including thyroid dysfunction, hyperprolactinemia, and 21-hydroxylase deficient nonclassic adrenal hyperplasia.
Thyroid examination	• Abnormal thyroid function tests • Goiter	• Thyroid texture and size and the presence of nodularity, tenderness, or cervical adenopathy	• Refer for a thyroid ultrasound if the patient reports rapid growth of the thyroid or if the examination identifies nodularity, asymmetry, or tenderness. • Referral to a specialist. • Fine-needle aspiration may also be indicated based on examination and ultrasound findings.
Breast examination	• Breast pain • Breast mass • Nipple discharge	• Palpable tenderness • Masses • Skin changes • Expressed or spontaneous nipple discharge • Nearly all breast abnormalities without a known cause should be imaged	• Refer for breast ultrasound. Ultrasonography is the preferred initial modality in women <30 years of age and diagnostic mammography is preferred in women ≥30 years of age (17).
Speculum examination	• Dyspareunia • Postcoital spotting	• Vaginal and cervical abnormalities • Lesions • Cervical polyps	
Bimanual pelvic examination	• Not routinely indicated for the evaluation of infertility	• Tenderness • Rectovaginal masses or nodularity • Uterine masses • Ovarian masses	• A bimanual pelvic examination will rarely add clinical information to the infertility evaluation that cannot be assessed with pelvic ultrasound. Perform as an adjunct to ultrasound when a tactile examination may add additional useful information to the evaluation. The consideration of a bimanual examination may be influenced by the availability of resources for affordable ultrasonography.

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efforts to tailor treatment and discuss realistic expectations of response to treatment (36, 37). Poor ovarian reserve testing does not necessarily imply an inability to conceive or subfertility.

All ovarian reserve tests should be interpreted in the context of the entire clinical picture, taking into consideration age, risk factors, and prior treatment and response of the individual patient. Ovarian reserve testing does not have proven benefits in fertile women or as a random biomarker of ovarian function (36). Ovarian reserve tests indicating diminished ovarian reserve in women without infertility does not predict future short-term fecundity (38, 39)

Ovarian reserve tests include both biochemical analysis and ultrasound imaging of the ovary. Biochemical tests which aim to depict the biology of the ovary include basal FSH and estradiol measurements and antimüllerian hormone concentrations. Basal FSH and estradiol should be measured together in the early follicular phase between menstrual cycle days 2–4. Antimüllerian hormone can be measured at any point in the menstrual cycle. Transvaginal ultrasound can be used to assess the follicular phase antral follicle count and ovarian volume (14, 36). Inhibin B and the clomiphene challenge test are not helpful tools to assess ovarian reserve and are not recommended.

TABLE 3

Infertility tests that should not be routinely ordered, unless specifically indicated (33).

- Laparoscopy for unexplained infertility
- Advance sperm function testing (e.g., DNA fragmentation testing)
- Postcoital testing
- Thrombophilia testing
- Immunologic testing
- Karyotype
- Endometrial biopsy
- Prolactin
- Progesterone
- Estradiol
- Follicle-stimulating hormone
- Luteinizing hormone

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CERVICAL FACTORS

Examination of the cervix may reveal cervical pathology, such as stenosis or evidence of chronic cervicitis that merits further evaluation. Clinical history of previous cervical surgical procedures or abnormal discharge should be addressed and treated. Abnormalities of cervical mucus production or sperm-mucous interactions are rarely the sole or principal cause of infertility. The postcoital test, in which a specimen of cervical mucus obtained shortly before expected ovulation is examined microscopically for the presence of motile sperm within hours after intercourse, was the traditional method for diagnosing cervical-factor infertility. The postcoital test is no longer recommended for the evaluation of infertile women (Table 1) because it is subjective, has poor reproducibility, is inconvenient to the patient, rarely changes clinical management, and does not predict inability to conceive (40, 41).

UTERINE ABNORMALITIES

Uterine abnormalities occur in 16.2% of women presenting for infertility evaluation, most commonly polyps (13%), submucous fibroids (2.8%), and adhesions (0.3%) (42). In women with abnormal uterine bleeding, the prevalence of uterine abnormalities increases to 39.6%. Uterine imaging may be warranted in infertile women given the significant prevalence of abnormalities.

Ultrasonography is the best imaging modality available to assess uterine anatomy since one can assess the uterine myometrium, endometrial cavity, and the surrounding adnexa simultaneously. Transvaginal ultrasound allows for visualization of most uterine pathologies, such as leiomyomas, endometrial polyps, and adenomyosis, which may play a role in infertility. Other imaging modalities such as three-dimensional ultrasound and pelvic magnetic resonance imaging may be used to further evaluate the uterus, most often to further characterize findings of an initial study such as a pelvic ultrasound or hysterosalpingography (HSG). These radiologic studies have the advantage of assessing for intramural fibroids and adnexal pathology that are undetectable on hysterosalpingogram or hysteroscopy.

Hysterosalpingography defines the size and shape of the uterine cavity and can reveal potential developmental anomalies (unicornuate, septate, bicornuate uteri) or other acquired abnormalities (endometrial polyps, submucous myomas, synechiae) that may impact reproduction. However, HSG has relatively a low sensitivity (50%) and positive predictive value (PPV) (30%) for the diagnosis of endometrial polyps and submucous myomas in asymptomatic infertile women (43). Because HSG cannot reliably differentiate a septate from a bicornuate uterus, further evaluation with pelvic magnetic resonance imaging or three-dimensional-ultrasonography may be necessary.

Sonohysterography (SHG), involving transvaginal ultrasonography after the introduction of saline into the uterine cavity, better defines the size and shape of the uterine cavity and has a high (>90%) PPV and negative predictive value for the detection of intrauterine pathologies (endometrial polyps, submucous myomas, synechiae) (43–45).

Hysteroscopy is the definitive method for the diagnosis and treatment of intrauterine pathologies. Depending on the operative setup, it may also be a more costly and invasive method for evaluating the uterus when compared with less invasive methods such as HSG and SHG (46). Use of small caliber office hysteroscopes may be a reasonable approach for evaluating the uterine cavity with minimal discomfort, lower cost, and sometimes the ability to surgically remove a lesion.

TUBAL PATENCY

Tubal disease is an important cause of infertility and should be specifically excluded. Accurate diagnosis and effective treatment of tubal obstruction often require more than one of the following techniques (47):

An HSG can document proximal or distal tubal occlusion, demonstrate salpingitis isthmica nodosa, reveal tubal architectural detail of potential prognostic value, and may suggest the presence of fimbrial phimosis or peritubal adhesions when the escape of contrast is delayed or becomes loculated, respectively. Findings suggesting bilateral proximal tubal obstruction require further evaluation to exclude the possibility of an artifact affecting the results because of transient tubal/myometrial contractions or relating to catheter position.

Sonohysterography can also be used to demonstrate tubal patency. Although tubal patency can be observed by the appearance of fluid in the cul-de-sac with the saline infusion, the test does not differentiate between unilateral or bilateral patency. Hysterosalpingo-contrast sonography, an adjunct to SHG, determines tubal patency with the use of contrast through a transcervical catheter. The technique often uses a contrast agent with air bubbles to aid in the identification of the medium as it passes through the tubes. The accuracy of hysterosalpingo-contrast sonography may be more dependent on operator experience than the standard HSG. The sensitivity of hysterosalpingo-contrast sonography for the determination of tubal patency ranges from 76%–96%, although the specificity ranges from 67%–100% (9, 48, 49). Hysteroscopic assessment of tubal patency is an emerging approach that is performed through the direct observation

TABLE 4

Infertility evaluation

	Potential routine tests	Tests not routinely recommended	Other considerations
Ovulation	• Menstrual historyIf indeterminant, consider: • Luteal progesterone • Ovulation predictor kits • Transvaginal ultrasound	• Basal body temperature • Endometrial biopsy	• A menstrual history is adequate to establish an ovulatory menstrual pattern. Additional ovulation testing is not required when the history is clearly abnormal or normal. If the menstrual history is clearly abnormal, additional testing to determine the cause is indicated.
Ovarian reserve	• Antimüllerian hormone • Antral follicle count • Basal follicle-stimulating hormone and estradiol	• Inhibin B • Clomiphene citrate challenge test	• Ovarian reserve is a poor predictor of fertility but can be used to guide fertility treatments.
Other endocrine systems	• Thyroid-stimulating hormone	• Prolactin • Androgen measures	• Prolactin is indicated in women with galactorrhea, or oligomenorrhea. • If the thyroid-stimulating hormone is abnormal, assessment of free T4 and thyroid autoantibodies is warranted. • If signs of androgen excess or oligomenorrhea, check serum total and free testosterone, and 17 hydroxyprogesterone. • If testosterone is >200 ng/ml, ultrasound of the ovaries and computed tomography of the adrenal glands to exclude androgen-secreting neoplasm. • If 17 hydroxyprogesterone is >200 ng/dl, perform an acute adrenocorticotropic hormone stimulation test to exclude 21-hydroxylase deficient nonclassic adrenal hyperplasia.
Uterus	• Transvaginal ultrasonography • Saline infusion ultrasonography • Hysterosalpingography • Hysteroscopy	• Magnetic resonance imaging	• Magnetic resonance imaging may be indicated as follow-up to further evaluate abnormalities found by other imaging modalities.
Fallopian tube patency	• Hysterosalpingogram • Hysterosalpingo-contrast sonography • Chlamydia antibody test	• Laparoscopy with chromopertubation	• Laparoscopy with chromopertubation is appropriate if the surgery is already being performed for a separate indication. • A positive chlamydia antibody test may require further evaluation to confirm that the tubes are non-patent.

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of fluid or air bubble flow into the tubal ostia. A meta-analysis of six published trials demonstrated that the utilization of hysteroscopy to predict tubal patency had a sensitivity of 88% and specificity of 85%.

Laparoscopy is not recommended as a routine method for assessing tubal patency. However, if laparoscopy is already being performed, then chromopertubation with a dilute solution of methylene blue or indigo carmine introduced via the cervix may demonstrate tubal patency or document proximal or distal tubal obstruction. The procedure can also identify and be used to correct tubal factors such as fimbrial phimosis or peritubal adhesions, which may not be identified with less invasive methods like HSG or SHG. Fluoroscopic/hysteroscopic selective tubal cannulation will confirm or exclude any proximal tubal occlusion suggested by HSG or laparoscopy with chromopertubation and provides the means for

possible correction via recanalization using specialized catheter systems (50).

Although not commonly used in the United States, some clinicians use the chlamydia antibody test (CAT) as a first-line assessment of tubal patency. The detection of antibodies to *Chlamydia trachomatis* has been associated with tubal pathology but lacks the clinical utility to predict tubal patency. Compared with laparoscopy, CAT has a more modest sensitivity (40%–50%) and PPV (60%), but a higher negative predictive value (80%–90%) for detecting distal tubal disease (49, 51). Therefore, a negative CAT may suggest the absence of tubal disease; however, a positive CAT requires further evaluation to determine tubal patency.

PERITONEAL FACTORS

Peritoneal factors, such as endometriosis and pelvic or adnexal adhesions, may cause or contribute to infertility. History and/or physical examination findings may raise suspicion but are rarely sufficient for diagnosis. Peritoneal factors should also be considered in women with otherwise unexplained infertility.

Transvaginal ultrasonography may reveal otherwise unrecognized pelvic pathology that may have reproductive implications, such as an endometrioma (52). Laparoscopy with a direct visual examination of the pelvic reproductive anatomy is the only method available for the specific diagnosis of peritoneal factors that may impair fertility. However, the impact of minimal and mild endometriosis on fertility is relatively small (53, 54), and most women with significant adnexal adhesions have historical risk factors (pelvic pain, moderate or severe endometriosis, previous pelvic infection, or surgery) or an abnormal HSG. Consequently, laparoscopy is not recommended for the routine evaluation of an infertile woman without a suspected pelvic pathology or another specific indication (i.e., severe dysmenorrhea) that requires surgical evaluation (Table 4).

SUMMARY

- Female fertility declines with increasing age, and female age is the single most important predictor of fecundity.
- A comprehensive medical, reproductive, and family history combined with a physical examination, as medically indicated, can reveal anatomic and physiologic causes of infertility.

CONCLUSION

- Infertility evaluation should be initiated immediately if there is a known medical history that is associated with infertility.
- Infertility evaluation, and indicated treatment, should be initiated at 12 months in women <35 years of age and at 6 months in women aged ≥ 35 years. In women >40 years, a more immediate evaluation and treatment may be warranted.
- The infertility evaluation should include an evaluation of ovulatory status, the structure and patency of the female reproductive tract, and semen evaluation of the male partner.
- When applicable, parallel fertility evaluation of the male partner should occur.
- HSG or SHG are recommended tests to evaluate for tubal patency.
- In women with regular menstrual cycles between 21–35 days, additional testing to confirm ovulation is not required, unless patients demonstrate hirsutism.
- Ovarian reserve testing should not be used as a screening test for women who do not meet the criteria of infertility, but should serve as an adjunct to the evaluation of infertile women.
- The tests used in the fertility evaluation may be warranted in women presenting for donor sperm treatments, recurrent pregnancy loss, and otherwise fertile women utilizing preimplantation genetic testing.
- Couples with known genetic carrier status or the need for preimplantation genetic testing may warrant a fertility evaluation before treatment.
- Laparoscopy, advanced sperm function testing, postcoital testing, thrombophilia testing, immunologic testing, karyotype, endometrial biopsy, and serum prolactin are not recommended as part of the routine infertility evaluation without other clinical indications.

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Evaluación de la fertilidad en mujeres infértiles: Opinión de comité.

La evaluación diagnóstica para infertilidad en mujeres debe ser realizada de una manera sistemática, expeditiva y costo efectiva para identificar todos los factores relevantes con un énfasis inicial en los métodos menos invasivos para detectar las causas más comunes de infertilidad. El propósito de esta opinión de comité es proveer una revisión crítica de los métodos y procedimientos actuales para la evaluación de la mujer infértil. Esta guía está destinada a aquellos que evalúen a mujeres por infertilidad.