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Diagnosis and Treatment of Infertility in Men: AUA/ASRM Guideline PART II

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Abbreviations and Acronyms

AIs = Aromatase Inhibitors
ART = Assisted Reproductive Technologies
ASRM = American Society for Reproductive Medicine
AUA = American Urological Association
CBAVD = Congenital Bilateral Absence of the Vas Deferens
ECRI = Emergency Care Research Institute
EDO = Ejaculatory Duct Obstruction
FSH = Follicle-Stimulating Hormone
hCG = Human Chorionic Gonadotropin
HH = Hypogonadotropic Hypogonadism
ICSI = Intracytoplasmic Sperm Injection
IUI = Intrauterine Insemination
IVF = In Vitro Fertilization
LH = Luteinizing Hormone
micro-TESE = Microdissection-Testicular Sperm Extraction
NOA = Non-Obstructive Azoospermia
PGC = Practice Guidelines Committee
RE = Retrograde Ejaculation
RPLND = Retroperitoneal Lymph Node Dissection
SA = Semen Analysis
SERMs = Selective Estrogen Receptor Modulators
TESE = Testicular Sperm Extraction
TURED = Transurethral Resection of Ejaculatory Ducts

Purpose: The summary presented herein represents Part II of the two-part series dedicated to the Diagnosis and Treatment of Infertility in Men: AUA/ASRM Guideline. Part II outlines the appropriate management of the male in an infertile couple. Medical therapies, surgical techniques, as well as use of intrauterine insemination (IUI)/in vitro fertilization (IVF)/intracytoplasmic sperm injection (ICSI) are covered to allow for optimal patient management. Please refer to Part I for discussion on evaluation of the infertile male and discussion of relevant health conditions that are associated with male infertility.

Materials/Methods: The Emergency Care Research Institute Evidence-based Practice Center team searched PubMed®, Embase®, and Medline from January 2000 through May 2019. When sufficient evidence existed, the body of evidence was assigned a strength rating of A (high), B (moderate), or C (low) for support of Strong, Moderate, or Conditional Recommendations. In the absence of sufficient evidence, additional information is provided as Clinical Principles and Expert Opinions (table). This summary is being simultaneously published in Fertility and Sterility and The Journal of Urology.

Results: This Guideline provides updated, evidence-based recommendations regarding management of male infertility. Such recommendations are summarized in the associated algorithm (figure).

Conclusion: Male contributions to infertility are prevalent, and specific treatment as well as assisted reproductive techniques are effective at managing male infertility. This document will undergo additional literature reviews and updating as the knowledge regarding current treatments and future treatment options continues to expand.

Key Words: male infertility; evaluation; chemotherapy; surgery; health

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BACKGROUND

Failure to conceive within 12 months of attempted conception is due in whole or in part to the male in approximately one-half of all infertile couples. Although many couples can achieve a pregnancy with assisted reproductive technologies (ART), evaluation of the male is important to identify conditions that may be medically important, counsel men regarding future health considerations and to most appropriately direct therapy. Most male factor conditions are specifically treatable with medical or surgical therapy, while others may only be managed with donor sperm or adoption.

In this guideline, the term "male" or "men" is used to refer to biological or genetic men.

Treatment

Varicocele Repair/Varicocelectomy.

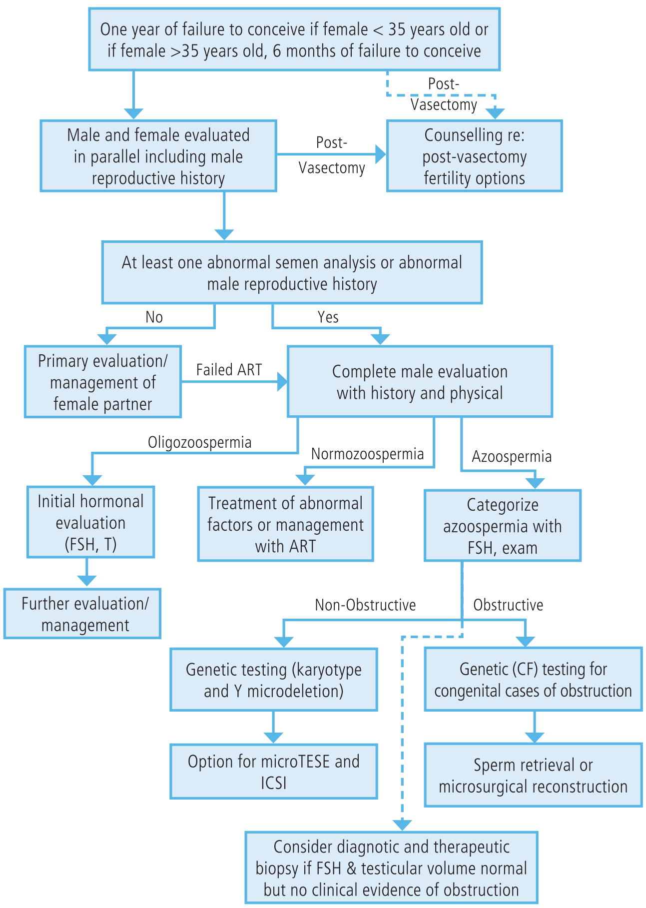
25. Surgical varicocelectomy should be considered in men attempting to conceive, who have palpable varicocele(s), infertility, and abnormal semen parameters, except for azoospermic men. (Moderate Recommendation; Evidence Level: Grade B)
26. Clinicians should not recommend varicocelectomy for men with nonpalpable varicoceles detected solely by imaging. (Strong Recommendation; Evidence Level: Grade C)
27. For men with clinical varicocele and non-obstructive azoospermia (NOA), couples should be informed of the absence of definitive evidence supporting varicocele repair prior to ART. (Expert Opinion)

Varicoceles have long been recognized as a condition that can affect male fertility, where correction of a clinical varicocele can result in substantial improvements in semen parameters and the chance of achieving a pregnancy. The largest most recent meta-analysis by Wang et al. reported significantly higher pregnancy rates for men treated with clinical varicocele repair compared to no treatment.[1] Pregnancy rates without treatment were assumed to be 17%, while rates were calculated to be 42% (95% CI 26% to 61%) with subinguinal microsurgical varicocelectomy, 35% (95% CI 21% to 54%) with inguinal microvaricocelectomy, 37% (95% CI 22% to 58%) with inguinal open (nonmicrosurgical) surgery, and 37% (95% CI 19% to 61%) with laparoscopic surgery.[1] Such findings must be interpreted with caution given that this meta-analysis included studies with nonrandomized designs and selective outcome reporting. A systematic review and meta-analysis of varicocelectomy for subclinical varicocele reported no demonstrable benefit of varicocele repair in pregnancy or bulk seminal parameters with the exception of a possible small numerical effect on progressive sperm motility that is unlikely to be clinically important.[2] These observations support the importance of identifying clinical varicoceles in men with male infertility and evidence of abnormal sperm production or quality.

Case series of men with NOA and clinical varicoceles that have undergone varicocele repair have been reported. Of note, a study of NOA men reported return of adequate motile sperm to the

Table 1. *AUA nomenclature linking statement type to level of certainty, magnitude of benefit or risk/burden, and body of evidence strength*

	Evidence Strength A (High Certainty)	Evidence Strength B (Moderate Certainty)	Evidence Strength C (Low Certainty)
Strong Recommendation	Benefits > Risks/Burdens (or vice versa) Net benefit (or net harm) is substantial	Benefits > Risks/Burdens (or vice versa) Net benefit (or net harm) is substantial	Benefits > Risks/Burdens (or vice versa) Net benefit (or net harm) appears substantial
Net benefit or harm substantial	Applies to most patients in most circumstances and future research is unlikely to change confidence	Applies to most patients in most circumstances but better evidence could change confidence	Applies to most patients in most circumstances but better evidence is likely to change confidence rarely used to support a Strong Recommendation
Moderate Recommendation	Benefits > Risks/Burdens (or vice versa) Net benefit (or net harm) is moderate	Benefits > Risks/Burdens (or vice versa) Net benefit (or net harm) is moderate	Benefits > Risks/Burdens (or vice versa) Net benefit (or net harm) appears moderate
Net benefit or harm moderate	Applies to most patients in most circumstances and future research is unlikely to change confidence	Applies to most patients in most circumstances but better evidence could change confidence	Applies to most patients in most circumstances but better evidence is likely to change confidence
Conditional Recommendation	Benefits = Risks/Burdens	Benefits = Risks/Burdens	Balance between Benefits & Risks/Burdens unclear
	Best action depends on individual patient circumstances	Best action appears to depend on individual patient circumstances	Alternative strategies may be equally reasonable
No apparent net benefit or harm	Future research unlikely to change confidence	Better evidence could change confidence	Better evidence likely to change confidence
Clinical Principle	A statement about a component of clinical care that is widely agreed upon by urologists or other clinicians for which there may or may not be evidence in the medical literature		
Expert Opinion	A statement, achieved by consensus of the Panel, that is based on members clinical training, experience, knowledge, and judgment for which there is no evidence		



Male infertility algorithm.

ejaculate sufficient to avoid surgical sperm retrieval only occurred in 9.6% of men after clinical varicocele repair.[3] These data have to be compared to results of re-analysis of sperm in the ejaculate without any intervention beyond repeat semen analysis (SA) using extended sperm search in men who previously were thought to be azoospermic, where up to 35% of men thought to be azoospermic had at least rare sperm detectable with a more detailed search of the centrifuged/concentrated semen pellet. Since the above-mentioned studies did not have a control group, there are no high-quality data to support repair of varicoceles in men with NOA. In addition, varicocele repair defers treatment with ART for at least six months.

Sperm Retrieval.

28. For men with NOA undergoing sperm retrieval, microdissection testicular sperm extraction (TESE) should be performed. (Moderate Recommendation; Evidence Level: Grade C)
29. In men undergoing surgical sperm retrieval, either fresh or cryopreserved sperm may be used for ICSI. (Moderate Recommendation; Evidence Level: Grade C)
30. In men with azoospermia due to obstruction undergoing surgical sperm retrieval, sperm may be extracted from either the testis or the epididymis. (Moderate Recommendation; Evidence Level: Grade C)
31. For men with aspermia, surgical sperm extraction or induced ejaculation, including sympathomimetic, vibratory stimulations, and electroejaculation, may be performed depending on the patient's condition and clinician's experience. (Expert Opinion)
32. Infertility associated with retrograde ejaculation (RE) may be treated with sympathomimetics and alkalinization of urine with or without urethral catheterization, induced ejaculation, or surgical sperm retrieval. (Expert Opinion)

In a meta-analysis of published studies for men with NOA, microdissection-testicular sperm extraction (micro-TESE) was observed to result in successful extraction 1.5 times more often than nonmicrosurgical testis sperm extraction, and testis sperm extraction was 2 times more likely to succeed when compared to testicular aspiration.[4] Less effect on testosterone levels is seen after micro-TESE than with conventional TESE, but testosterone deficiency requiring testosterone replacement remains a risk, even after micro-TESE.[5]

For men with obstructive azoospermia, there are no substantial differences in ICSI success rates when either cryopreserved or fresh sperm are used, so sperm retrieval and cryopreservation may be done prior to ART. For men with NOA, some centers perform simultaneous sperm retrieval with ART because the numbers of sperm obtained may be limited and sperm may not survive cryopreservation. No differences in outcomes were observed between fresh and frozen sperm in most series, as long as there were sperm of adequate number that survived cryopreservation and thawing.[6]

Limited data exist comparing outcomes for the various procedures available to obtain sperm from men with ejaculatory dysfunction. Penile vibratory stimulation, electroejaculation, surgical sperm retrieval, or sympathomimetic agents may be utilized depending on the cause of the ejaculatory dysfunction, the patient's condition, and the surgeon's and IVF laboratory experience.

Obstructive Azoospermia, Including Post-Vasectomy Infertility

33. Couples desiring conception after vasectomy should be counseled that surgical reconstruction, surgical sperm retrieval, or both reconstruction and simultaneous sperm retrieval for cryopreservation are viable options. (Moderate Recommendation; Evidence Level: Grade C)
34. Clinicians should counsel men with vasal or epididymal obstructive azoospermia that

microsurgical reconstruction may be successful in returning sperm to the ejaculate. (Expert Opinion)

35. For infertile men with azoospermia and Ejaculatory Duct Obstruction (EDO), the clinician may consider transurethral resection of ejaculatory ducts (TURED) or surgical sperm extraction. (Expert Opinion)

Fertility restoration treatment should be provided according to the needs and characteristics of the couple as well as patient preference as a shared decision-making process for couples desiring fertility post-vasectomy. Both sperm retrieval with ART and microsurgical reconstruction are options for management. For most cases of acquired or congenital obstruction (excluding CBAVD), microsurgical reconstruction of the male reproductive tract may be the preferable alternative to sperm retrieval and ICSI when the female partner has normal fertility potential. EDO is rare in infertile men. If the diagnosis is confirmed or suspected based on transrectal ultrasonography findings, then treatment should be considered with TURED, as this intervention may restore natural fertility.[7–9] Surgical sperm extraction (eg, TESE, TESA, Percutaneous Epididymal Sperm Aspiration) for use with ART are alternative options for men with EDO seeking fertility treatment.

Medical & Nutraceutical Interventions for Fertility

36. Male infertility may be managed with ART. (Expert Opinion)
37. A clinician may advise an infertile couple with a low total motile sperm count on repeated SA that IUI success rates may be reduced, and treatment with ART (IVF/ICSI) may be considered. (Expert Opinion)
38. The patient presenting with hypogonadotropic hypogonadism (HH) should be evaluated to determine the etiology of the disorder and treated based on diagnosis. (Clinical Principle)
39. Clinicians may use aromatase inhibitors (AIs), human chorionic gonadotropin (hCG), selective estrogen receptor modulators (SERMs), or a combination thereof for infertile men with low serum testosterone (Conditional Recommendation; Evidence Level: Grade C)
40. For the male interested in current or future fertility, testosterone monotherapy should not be prescribed. (Clinical Principle)
41. The infertile male with hyperprolactinemia should be evaluated for the etiology and treated accordingly. (Expert Opinion)
42. Clinicians should inform the man with idiopathic infertility that the use of SERMs has limited benefits relative to results of ART. (Expert Opinion)
43. Clinicians should counsel patients that the benefits of supplements (eg, antioxidants, vitamins) are of questionable clinical utility in treating male infertility. Existing data are inadequate to provide recommendation for specific agents to use for this purpose. (Conditional Recommendation; Evidence Level: Grade B)
44. For men with idiopathic infertility, a clinician may consider treatment using an Follicle-Stimulating Hormone (FSH) analogue with the aim of improving sperm concentration, pregnancy rate, and live birth rate. (Conditional Recommendation; Evidence Level: Grade B)
45. Patients with NOA should be informed of the limited data supporting pharmacologic manipulation with SERMs, AIs, and gonadotropins prior to surgical intervention. (Conditional Recommendation; Evidence Level: Grade C)

Although ART does not correct the underlying condition(s) causing male infertility, it allows fertility for couples where natural pregnancy has not previously occurred. Although sperm number and quality affected the results of treatment with IVF, the intervention of ICSI, applied during IVF, appears to abrogate any adverse effects of sperm "quality" as measured by sperm concentration, motility, and morphology as long as adequate viable sperm are present to inject into oocytes. IUI is a fertility treatment that involves processing a semen specimen and placing the low volume washed semen into the uterine cavity at the time of ovulation. Men with low total motile sperm count (<5 million motile sperm after processing) will have limited chances of contributing to a pregnancy rates after IUI.

Patients with HH present with deficient luteinizing hormone (LH) and FSH secretion. In the absence of LH and FSH stimulation, Leydig cells in the testes do not secrete testosterone, and spermatogenesis is disrupted.[10] Referral to an endocrinologist or male reproductive specialist is encouraged in this setting. Spermatogenesis can be initiated and pregnancies achieved in many men with idiopathic HH when they are treated with exogenous gonadotropins or pulsatile GnRH. With gonadotropin treatment for HH, hCG injections are typically initiated with a response of serum testosterone monitored. After normalization of testosterone, FSH or FSH analogues may be added to optimize sperm production.

For those patients with functioning pituitary glands but low testosterone, AIs, hCG, and SERMs act by different mechanisms to increase endogenous testosterone production. Each agent may be used separately or in combination in an effort to increase serum testosterone concentrations and improve spermatogenesis. Exogenous testosterone administration provides negative feedback to the hypothalamus and pituitary gland that can result in inhibition of gonadotropin secretion. Depending on the degree of testosterone-induced suppression, spermatogenesis may decrease or cease altogether, resulting in azoospermia.[11]

Men with decreased libido and/or impotence and/or testosterone deficiency accompanied by a low/low-normal LH level warrant measurement of serum prolactin to investigate for hyperprolactinemia. For persistently elevated prolactin levels above the normal value without an exogenous etiology, MRI is indicated.[12–14] Treatment depends on the etiology of the hyperprolactinemia.[15]

Although not currently FDA-approved for use in men, SERMs such as clomiphene or tamoxifen are often prescribed in infertile men who have normal serum testosterone levels with the therapeutic aim of improving semen parameters and fertility outcomes. The benefits of SERM administration, particularly in the patient population with idiopathic infertility, are small and, therefore, outweighed by the distinct advantages offered by other forms of medically-assisted reproduction (eg, IVF), which include higher pregnancy rates and efficiencies with respect to the earlier timeframe of conception. While exogenous FSH may be used as an adjunct for treatment of HH in order to initiate and maintain spermatogenesis with good results, use of exogenous FSH in idiopathic infertile men without HH (ie, baseline FSH in or slightly above the normal range) has measurable but limited fertility benefits. Clinicians should be aware that FSH is not FDA-approved for this use in men at this time. Additionally, the cost-to-benefit ratio of this treatment is questionable, as men are typically treated for 3 months or more to effect spermatogenesis, and the incremental increase in pregnancy rates using exogenous FSH injection therapy for this subset of men with idiopathic infertility is small.

There are no clear, reliable data to support use of the variety of supplements (vitamins, antioxidants, nutritional supplement formulations) that have been offered to men attempting conception. Current data suggest that they are likely not harmful, but they are of questionable value in improving fertility outcomes.

For any patient with NOA, it would be ideal to optimize spermatogenesis and hence the chances of sperm recovery at the time of attempted surgical sperm retrieval. SERMs, AIs, and hCG have been used off-label to try to manipulate male reproductive hormones with the goal of inducing recovery of sperm to the ejaculate or improving surgical sperm retrieval rates. Case series have suggested that these treatments may be associated with return of sperm to the ejaculate or good sperm retrieval rates. Unfortunately, these studies have typically been uncontrolled, with a question as to whether the medical intervention, more careful examination of the centrifuged semen specimen or simply repeat attempts at sperm retrieval may have been responsible for a favorable treatment outcome. For men with NOA, such medical interventions have limited, low quality data available to support any treatment benefit.

Gonadotoxic Therapies and Fertility Preservation

46. Clinicians should discuss the effects of gonadotoxic therapies and other cancer treatments on sperm production with patients prior to commencement of therapy. (Moderate Recommendation: Evidence Level: Grade C)
47. Clinicians should inform patients undergoing chemotherapy and/or radiation therapy to avoid pregnancy for a period of at least 12 months after completion of treatment. (Expert Opinion)
48. Clinicians should encourage men to bank sperm, preferably multiple specimens when possible, prior to commencement of gonadotoxic therapy or other cancer treatment that may affect fertility in men. (Expert Opinion)
49. Clinicians should consider informing patients that a SA performed after gonadotoxic therapies should be done at least 12 months (and preferably 24 months) after treatment completion. (Conditional Recommendation; Evidence Level: Grade C)
50. Clinicians should inform patients undergoing a retroperitoneal lymph node dissection (RPLND) of the risk of aspermia. (Clinical Principle)
51. Clinicians should obtain a post-orgasmic urinalysis for men with aspermia after RPLND who are interested in fertility. (Clinical Principle)
52. Clinicians should inform men seeking paternity who are persistently azoospermic after gonadotoxic therapies that TESE is a treatment option. (Strong Recommendation; Evidence Level: Grade B)

Radiotherapy and chemotherapy used for treatment of cancer and other medical conditions can often lead to temporary or even long-term gonadal injury in men. Patients should be informed of the short and long-term implications of these therapies on future fertility potential prior to initiation of treatment. Patients should be made aware that estimates are available on the risk of azoospermia associated with gonadotoxic therapy and that the treatment regimen may change, especially with the need for additional or more toxic interventions during the course of therapy.[16] Men with testicular cancer who undergo orchiectomy and chemotherapy have a 1% to 42% risk of long-term azoospermia.[17–24] For azoospermic men with an intratesticular lesion, cryopreservation of testicular tissue should be considered during orchiectomy or excisional biopsy of the testicular lesion (Onco-TESE approach).[25]

One of the major concerns regarding the effects of gonadotoxic therapies in men wishing to father children is the induction of mutations in developing testicular germ cells.[26] Based on the known mutagenic effects of gonadotoxic therapies it is recommended to use contraception for a period of at least 12 months after completion of therapy. Studies on the health and genetic integrity of children fathered by men exposed to chemotherapy and/or radiotherapy more than a year prior to conception have generally been reassuring.

It is important to encourage young men to bank sperm prior to initiating gonadotoxic therapies. In keeping with this guideline, several societies (American Society of Clinical Oncology, American Society of Reproductive Medicine (ASRM)) recommend that fertility preservation be an essential component in the management of cancer patients.[27,28] Studies have shown that 20 to 50% of men will bank sperm prior to chemotherapy.[29–31] The low sperm banking rates have been attributed to inadequate fertility counseling before gonadotoxic therapy and lack of desire to father children.[30] Depending on sperm number and motility, a banked sperm sample can be used for either IUI or ART. Rates of azoospermia are highest within the first 12 months after completion of therapy and nadir between 2 to 6 years after chemotherapy, with most recovering sperm in the ejaculate 2 to 3 years following treatment completion. These data strongly suggest limited value of performing a SA within the first 12 months after treatment completion and, where possible, SA to assess recovery of sperm production is most valuable at a time point 2 to 3 years after treatment ends.

RPLND is a cornerstone in the management of some patients with testis cancer. After nerve sparing RPLND by an experienced testis cancer surgeon, it is rare to have permanent sympathetic nerve damage and long-term failure to ejaculate (RE or failure of emission). However, in the post-chemo RPLND patient the likelihood of ejaculatory dysfunction higher. If aspermia persists 24 months after RPLND, then this condition is likely to be permanent. Differentiating between RE and failure of emission requires analysis of a urine specimen obtained after orgasm.

Micro-TESE has become a mainstay in the management of the man with NOA, regardless of the etiology of azoospermia. While the experience is extensive in the noncancer population, there is significantly less experience using TESE in men previously exposed to gonadotoxic therapies. Sperm retrieval is typically deferred until at least two years after chemotherapy. Meta-analysis of published studies reported a sperm retrieval rate of 42% (95% CI 34% to 49%) per patient, with no significant differences between conventional (overall sperm retrieval rate 45%, 95% CI 34% to 58%) and micro-TESE (overall sperm retrieval rate 40%, 95% CI 32% to 49%). However, the advantage of micro-TESE over conventional TESE in other forms of NOA suggests that this surgical intervention is also the preferred approach for men azoospermic after chemotherapy.

SUMMARY

Evaluation and management of men in a couple with infertility involves a step-wise process of evaluation and consultation regarding treatment options. Specific interventions such as varicocele repair, correction of identifiable hormonal abnormalities, microsurgical reconstruction of obstructive conditions, and surgical relief of ejaculatory duct obstruction are effective at increasing fertility for men. This recognition supports thorough evaluation of a man for correctable conditions that may affect his fertility. Use of ART is an effective intervention for fertility and a critical component for treatment of some couples, such as men with CBAVD or NOA who also require surgical sperm retrieval. Evaluation should proceed in parallel for both male and female members of a couple to optimize treatment success.

FUTURE DIRECTIONS

The causes of male infertility, including their genetic basis, have only been superficially explained at this time. There is a strong suggestion that most cases of apparently idiopathic severe male infertility, including NOA, have a genetic basis that may underlie the impaired sperm production seen for these men. A greater understanding of the basis for impaired sperm production could also lead to treatments to enhance sperm production and fertility. The interactions of infertility with other health conditions requires a deeper understanding as well. Fortunately, progress continues to be made on each of these fronts.

DISCLAIMER

This document was written by the Male Infertility Guideline Panel of the American Urological Association Education and Research, Inc., which was created in 2017. The Practice Guidelines Committee (PGC) of the AUA selected the committee chair. Panel members were selected by the chair. Membership of the Panel included specialists in urology and primary care with specific expertise on this disorder. The mission of the panel was to develop recommendations that are analysis based or consensus-based, depending on panel processes and available data, for optimal clinical practices in the treatment of early stage testicular cancer. Funding of the panel was provided by the AUA. Panel members received no remuneration for their work. Each member of the panel provides an ongoing conflict of interest disclosure to the AUA, and the Panel Chair, with the support of AUA Guidelines staff and the PGC, reviews all disclosures and addresses any potential conflicts per AUA's Principles, Policies and Procedures for Managing Conflicts of Interest. While these guidelines do not necessarily establish the standard of care, AUA seeks to recommend and to encourage compliance by practitioners with current best practices related to the condition being treated. As medical knowledge expands and technology advances, the guidelines will change. Today these evidence-based guidelines statements represent not absolute mandates but provisional proposals for treatment under the specific conditions described in each document. For all these reasons, the guidelines do not pre-empt physician judgment in individual cases. Treating physicians must take into account variations in resources, and patient tolerances, needs, and preferences. Conformance with any clinical guideline does not guarantee a successful outcome. The guideline text may include information or recommendations about certain drug uses ('off label') that are not approved by the Food and Drug Administration (FDA), or about medications or substances not subject to the FDA approval process. AUA urges strict compliance with all government regulations and protocols for prescription and use of these substances. The physician is encouraged to carefully follow all available prescribing information about indications, contraindications, precautions and warnings. These guidelines and best practice statements are not intended to provide legal advice about use and misuse of these substances. Although guidelines are intended to encourage best practices and potentially encompass available technologies with sufficient data as of close of the literature review, they are necessarily time-limited. Guidelines cannot include evaluation of all data on emerging technologies or management, including those that are FDA-approved, which may immediately come to represent accepted clinical practices. For this reason, the AUA does not regard technologies or management which are too new to be addressed by this guideline as necessarily experimental or investigational.

DISCLOSURES

All panel members completed COI disclosures. Disclosures listed include both topic— and nontopic-related relationships. **Consultant/Advisor:** Barbara Collura: WHO, COMMIT, EMD Serono, ACOG; Christopher De Jonge, PhD: WHO; Michael L. Eisenberg, MD: Sandstone Diagnostics, Roman, Dadi, Gilead, Underdog, Illumesense; Dolores J. Lamb, PhD: Celmatix; John P. Mulhall, MD: Vault; Craig S. Niederberger, MD: COMMIT; Peter N. Schlegel, MD: Theralogix, Inc, Roman Health. **Scientific Study or Trial:** Delores J. Lamb, PhD: NIH, American Board of Bioanalysts; Craig S. Niederberger, MD: Ferring Pharmaceuticals; Cigdem Tanrikut, MD: Ferring Pharmaceuticals. **Leadership Position:** Delores J. Lamb, PhD: American Board of Bioanalysts; John P. Mulhall, MD: Association of Peyronie's Disease Advocates (APDA), Sexual Medicine Society of North America, Journal of Sexual Medicine; Craig S. Niederberger, MD: ASRM, NexHand; Peter N. Schlegel, MD: ASRM. **Investment Interest:** Armand S. Zini, MD: YAD-Tech. **Health Publishing:** Cigdem Tanrikut, MD: Fertility Research and Practice, F&S Reviews. **Other:** Barbara Collura: RESOLVE: The National Infertility Association; Delores J. Lamb, PhD: WHO; Peter N. Schlegel, MD: RESOLVE; Cigdem Tanrikut, MD: New England Cryogenic Center, Swimmers.

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