Vasectomy: AUA Guideline

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Abbreviations and Acronyms

CV = conventional vasectomy

FDA = Food and Drug Administration

FI = fascial interposition

MC = mucosal cautery

MIV = minimally invasive vasectomy

NSV = no-scalpel vasectomy

PVSA = post-vasectomy semen analysis

RNMS = rare non-motile sperm

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Purpose: The purpose of this guideline is to provide guidance to clinicians who offer vasectomy services.

Materials and Methods: A systematic review of the literature using the search dates January 1949-August 2011 was conducted to identify peer-reviewed publications relevant to vasectomy. The search identified almost 2,000 titles and abstracts. Application of inclusion/exclusion criteria yielded an evidence base of 275 articles. Evidence-based practices for vasectomy were defined when evidence was available. When evidence was insufficient or absent, expert opinion-based practices were defined by Panel consensus. The Panel sought to define the minimum and necessary concepts for pre-vasectomy counseling; optimum methods for anesthesia, vas isolation, vas occlusion and post-vasectomy follow up; and rates of complications of vasectomy. This guideline was peer reviewed by 55 independent experts during the guideline development process.

Results: Vas isolation should be performed using a minimally-invasive vasectomy technique such as the no-scalpel vasectomy technique. Vas occlusion should be performed by any one of four techniques that are associated with occlusive failure rates consistently below 1%. These are mucosal cautery of both ends of the divided vas without ligation or clips (1) with or (2) without fascial interposition; (3) open testicular end of the divided vas with MC of abdominal end with FI and without ligation or clips; and (4) non-divisional extended electrocautery. Patients may stop using other methods of contraception when one uncentrifuged fresh semen specimen shows azoospermia or $\leq$100,000 non-motile sperm/mL.

Conclusions: Vasectomy should be considered for permanent contraception much more frequently than is the current practice in the U.S. and many other nations. The full text of this guideline is available to the public at http://www.auanet.org/content/media/vasectomy.pdf.

Key Words: vasectomy; sterilization, reproductive; vas deferens, male contraception; guideline

INTRODUCTION

Vasectomy is the most common non-diagnostic operation performed by urologists in the United States. Even though an extensive body of literature on vasectomy exists, evidence-based standards for anesthetic, preoperative, operative and postoperative vasectomy practices have not been defined. This guideline is intended to be a comprehensive evidence-based guideline on vasectomy.

BACKGROUND

The number of vasectomies performed in the U.S. has been calculated to be

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175,000 to over 500,000 annually.[1,2] More than 75% of vasectomies in the U.S. are performed by urologists,[1] and about 90% of urology practices in the U.S. offer vasectomy services.[1]

Vasectomy is the fourth most commonly-used contraceptive method in the U.S. behind condoms, oral contraceptives for women and tubal sterilization.[3] Compared to tubal ligation, which is the other common method of permanent contraception, vasectomy is equally effective in preventing pregnancy, but vasectomy is simpler, faster, safer and less expensive.[4] Vasectomy requires less time off work, requires local rather than general anesthesia and is usually performed in a doctor's office or clinic. The potential surgical complications of vasectomy are less serious than those of tubal ligation.

Despite the clear advantages of vasectomy, prevalence data for 1998–2002 show that tubal ligation was performed about two to three times more often than vasectomy.[2] Among women ages 15 to 44 years in the U.S., in 2002 only 5.7% relied on vasectomy for contraception compared to 16.7% who relied on tubal ligation.[5] Worldwide, the discrepancy between vasectomy and tubal ligation is even more marked than in the U.S. These data and the many advantages of vasectomy compared to tubal ligation establish that vasectomy should be considered for permanent contraception much more frequently than is the current practice in the U.S. and many other nations.

METHODOLOGY

The Panel employed the American Urological Association (AUA) guideline methodology. A systematic review of the literature using the MEDLINE® and POPLINE databases with search dates January 1949-August 2011 was conducted to identify peer-reviewed relevant publications. The search identified almost 2,000 titles and abstracts. Application of inclusion/exclusion criteria yielded an evidence base of 275 articles. Only a small subset of these articles is referenced in this summary. A complete list of references and a full explanation of AUA guideline methodology can be found in the unabridged text of Vasectomy: AUA Guideline (2012), which is available online at http://www.auanet.org/content/media/vasectomy.pdf.

PREOPERATIVE PRACTICE

1. A preoperative interactive consultation should be conducted, preferably in person. If an in-person consultation is not possible, then preoperative consultation by telephone or electronic communication is an acceptable alternative. ***Expert Opinion***

Physical examination at the time of in-person preoperative consultation is highly desirable because it may identify genital pathology that might contraindicate vasectomy and may identify rare patients who are not good candidates for local anesthesia because of unusual scrotal sensitivity, marked anxiety or vasa that are difficult to palpate. This examination ideally should be done far enough in advance of the vasectomy to allow the surgeon to plan for oral or other sedation if necessary.

2. The minimum and necessary concepts that should be discussed in a preoperative vasectomy consultation include the following: ***Expert Opinion***

- Vasectomy is intended to be a permanent form of contraception.
- Vasectomy does not produce immediate sterility.
- Following vasectomy, another form of contraception is required until vas occlusion is confirmed by post- vasectomy semen analysis (PVSA).
- Even after vas occlusion is confirmed, vasectomy is not 100% reliable in preventing pregnancy.
- The risk of pregnancy after vasectomy is approximately 1 in 2,000 for men who have post-vasectomy azoospermia or PVSA showing rare non-motile sperm (RNMS).
- Repeat vasectomy is necessary in ≤1% of vasectomies, provided that a technique for vas occlusion known to have a low occlusive failure rate has been used.
- Patients should refrain from ejaculation for approximately one week after vasectomy.
- Options for fertility after vasectomy include vasectomy reversal and sperm retrieval with *in vitro* fertilization. These options are not always successful, and they may be expensive.
- The rates of surgical complications such as symptomatic hematoma and infection are 1–2%. These rates vary with the surgeon's experience and the criteria used to diagnose these conditions.
- Chronic scrotal pain associated with negative impact on quality of life occurs after vasectomy in about 1–2% of men. Few of these men require additional surgery.
- Other permanent and non-permanent alternatives to vasectomy are available.

The reproductive status of the female partner should be considered prior to vasectomy. If the chance for pregnancy in the female partner is poor, the need for vasectomy may be reduced. If a pregnancy exists at the time of the preoperative consultation, the couple may wish to consider delaying the decision about permanent contraception until the postpartum period. A sample form for providing vasectomy information to patients is available as Appendix B at http://www.auanet.org/content/media/vasectomy.pdf.

3. Clinicians do not need to routinely discuss prostate cancer, coronary heart disease, stroke, hypertension, dementia or testicular cancer in pre-vasectomy counseling of patients because vasectomy is not a risk factor for these conditions. *Standard (Evidence Strength: Grade B)*

The Vasectomy Guideline Panel performed a meta-analysis of nine cohort studies on the relationship of vasectomy and prostate cancer.[6–14] This analysis indicated that the risk of prostate cancer is not greater in vasectomized versus non-vasectomized men (Relative risk 1.08; 95% confidence interval 0.88 to 1.32).

Three case-control studies[15–17] and ten observational studies[11,18–26] examined a possible association between history of vasectomy and coronary heart disease. Overall, the body of evidence indicates that there is no association between coronary heart disease and vasectomy.

Several cohort studies evaluated the relationship between vasectomy and stroke.[19,20] There were no significant differences in incidence or fatality rates between vasectomized and non-vasectomized men. One small study with a high risk of bias has reported an association between vasectomy and primary progressive aphasia, a rare type of dementia.[27] A causal relationship between vasectomy and primary progressive aphasia is doubtful based on this single study.

4. Prophylactic antimicrobials are not indicated for routine vasectomy unless the patient presents a high risk of infection. *Recommendation (Evidence Strength: Grade C)*

The AUA Best Practice Policy on Urologic Surgery Antimicrobial Prophylaxis (http://www.auanet.org/content/media/antimicroprop08.pdf) recommends that prophylactic antibiotics for open and laparoscopic surgery (including genital surgery) performed without entering the urinary tract are indicated only if infection risk factors are present. The surgeon's clinical judgement should be used with regard to antimicrobial prophylaxis.

Additional Points for Preoperative Practice

Preoperative laboratory tests are not required routinely for vasectomy patients. In unusual cases, laboratory tests, such as coagulation studies, are necessary to assess the patient's suitability for a surgical procedure. Patients may be reassured that psychosocial, sexual and endocrine problems are rarely encountered following vasectomy. Prior to vasectomy, spousal consent is advisable but not legally required in the U.S.

There are very rare case reports of Fournier's gangrene after vasectomy. In Europe, one such patient died due to this complication.

ANESTHESIA FOR VASECTOMY

5. Vasectomy should be performed with local anesthesia with or without oral sedation. If the patient declines local anesthesia or if the surgeon believes that local anesthesia with or without oral sedation will not be adequate for a particular patient, then vasectomy may be performed with intravenous sedation or general anesthesia. *Expert Opinion*

The smallest available needle should be used for the injection of local anesthesia because small gauge needles typically produce less pain than larger gauge needles. The optimal range of needle sizes is 25 to 32 gauge. It is not clear that intra-operative pain is less when a pneumatic injector (jet or no-needle device) is used than when a small gauge needle is used. Patients who are needle-phobic may prefer a no-needle procedure.

VAS ISOLATION

6. Isolation of the vas should be performed using a minimally-invasive vasectomy (MIV) technique such as the no-scalpel vasectomy (NSV) technique or other MIV technique. *Standard (Evidence Strength: Grade B)*

The risks of intraoperative and early postoperative pain, bleeding and infection are related mainly to the method of vas isolation rather than to the method of vas occlusion. Methods of vas isolation include Conventional Vasectomy and MIV. Any isolation technique, including NSV, that uses the following two key surgical principles should be classified as an MIV technique:

1. Small (≤10 mm) openings in the scrotal skin, either as a single midline opening or as bilateral openings that do not need skin sutures.
2. Minimal dissection of the vas and perivasal tissues, which is facilitated by using a vas ring clamp and vas dissector or other similar special instruments (fig. 1)

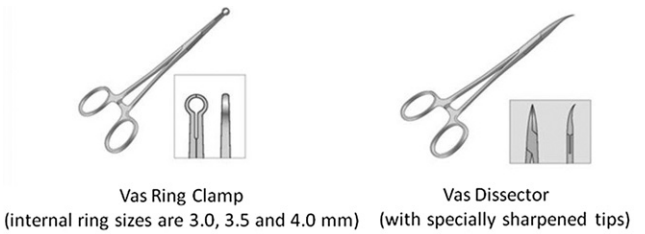

Figure 1. Instruments used for no-scalpel vasectomy and other methods of minimally invasive vasectomy.

The available evidence indicates that a minimally-invasive vas isolation procedure results in less discomfort during the procedure and in fewer surgical complications. One large randomized controlled trial,[28] one comparative study,[29] one observational study[30] and two systematic reviews[31,32] concluded that the NSV technique of vas isolation has fewer early postoperative complications than CV.

CV technique was the most common technique until the late 1980s when MIV techniques and special vasectomy instruments were introduced. No special instruments are used during CV, and the vas usually is grasped with a towel clip or an Allis forceps. During CV, the scrotal incisions and the area of scrotal dissection usually are larger than when MIV techniques are used.

The NSV isolation technique[30] was the first minimally-invasive technique for vasectomy. The term NSV is a misnomer because the no-scalpel technique is only a technique of vas isolation. NSV does not describe a technique for vas occlusion. Thus, the proper term for NSV should be no-scalpel vas isolation technique. An excellent description of no-scalpel vas isolation technique can be found in training materials prepared by EngenderHealth (www.engenderhealth.org/files/pubs/family-planning/no-scalpel.pdf).

MIV isolation techniques utilize either an open access approach or a closed access approach. In the open access approach, the skin opening(s) is (are) made before the vas ring clamp or similar instrument is applied to the vas. In the closed access approach, the vas ring clamp or similar instrument is applied around the vas, perivasal tissue and overlying skin before the skin opening(s) is (are) made.

CV or MIV methods are performed by making either one midline incision or bilateral scrotal incisions using a scalpel. One large observational study (N=1,800) compared single incision to double incision procedures. Fewer adverse events were reported with a single incision, and the procedure time was reduced, but no statistical testing was performed.[33] The Panel opinion is that there is no clear advantage to making one or two skin openings. The choice of one or two incisions should be based on the surgeon's preference.

For a midline approach, the scrotal skin opening should be made just below the penoscrotal junction or midway between the penoscrotal junction and the top of the testes. For a lateral approach, many experts recommend that the scrotal skin opening should be made at the level of the penoscrotal junction or higher. Scrotal skin openings for vasectomy should be positioned to provide access to the straight portion of the vas. Occlusion of the vas is more easily performed in the straight portion than in the convoluted portion. Compared to occlusion in the convoluted portion, occlusion in the straight portion may facilitate anastomosis during subsequent vasovasostomy.

For a single-incision vasectomy, the surgeon should ensure that the same vas is not isolated mistakenly and occluded in two locations, leaving the other vas unoccluded. A gentle tug on each vas during isolation will cause the ipsilateral testis to move.[34]

VAS OCCLUSION

The Panel considered the majority of the studies in the vas occlusion literature to be Grade C evidence because most suffer from methodological flaws that reduce certainty regarding the relative efficacy of various occlusion techniques. Examples of these flaws are failure to identify consecutive versus selected patients, failure to obtain at least one PVSA, lack of information about follow-up protocols, unclear criteria for vasectomy failure and wide variations and/or inadequate periods of follow-up duration for evaluation of contraceptive failure.

The Panel defined the acceptable rate of vas occlusion failure to be ≤1% across multiple studies conducted by different surgeons with large numbers of patients. Failure of vas occlusion includes failure to achieve azoospermia and failure to achieve RNMS. The literature review produced evidence about occlusion failure in 89 study arms reporting on 126,821 patients. The Panel found four techniques that satisfy the criterion of ≤1% failure rate and, therefore, recommends these four techniques for vas occlusion. These four techniques are detailed below in Guideline Statement 7 and illustrated in **Figure 2**.

7. The ends of the vas should be occluded by one of three divisional methods:

1. **Mucosal cautery (MC) with fascial interposition (FI) and without ligatures or clips applied on the vas;**
2. **MC without FI and without ligatures or clips applied on the vas;**
3. **Open ended vasectomy leaving the testicular end of the vas unoccluded, using MC on the abdominal end and FI;**

OR by the non-divisional method of extended electrocautery. ***Recommendation (Evidence Strength: Grade C)***

MC with FI

Thirteen study arms evaluated this technique in approximately 18,456 patients. Failure rates for this technique ranged from 0.0% to 0.55%, with most study arms reporting rates of 0.0% failure. Although the majority of these data were from non-randomized observational designs, one study arm was from a high-

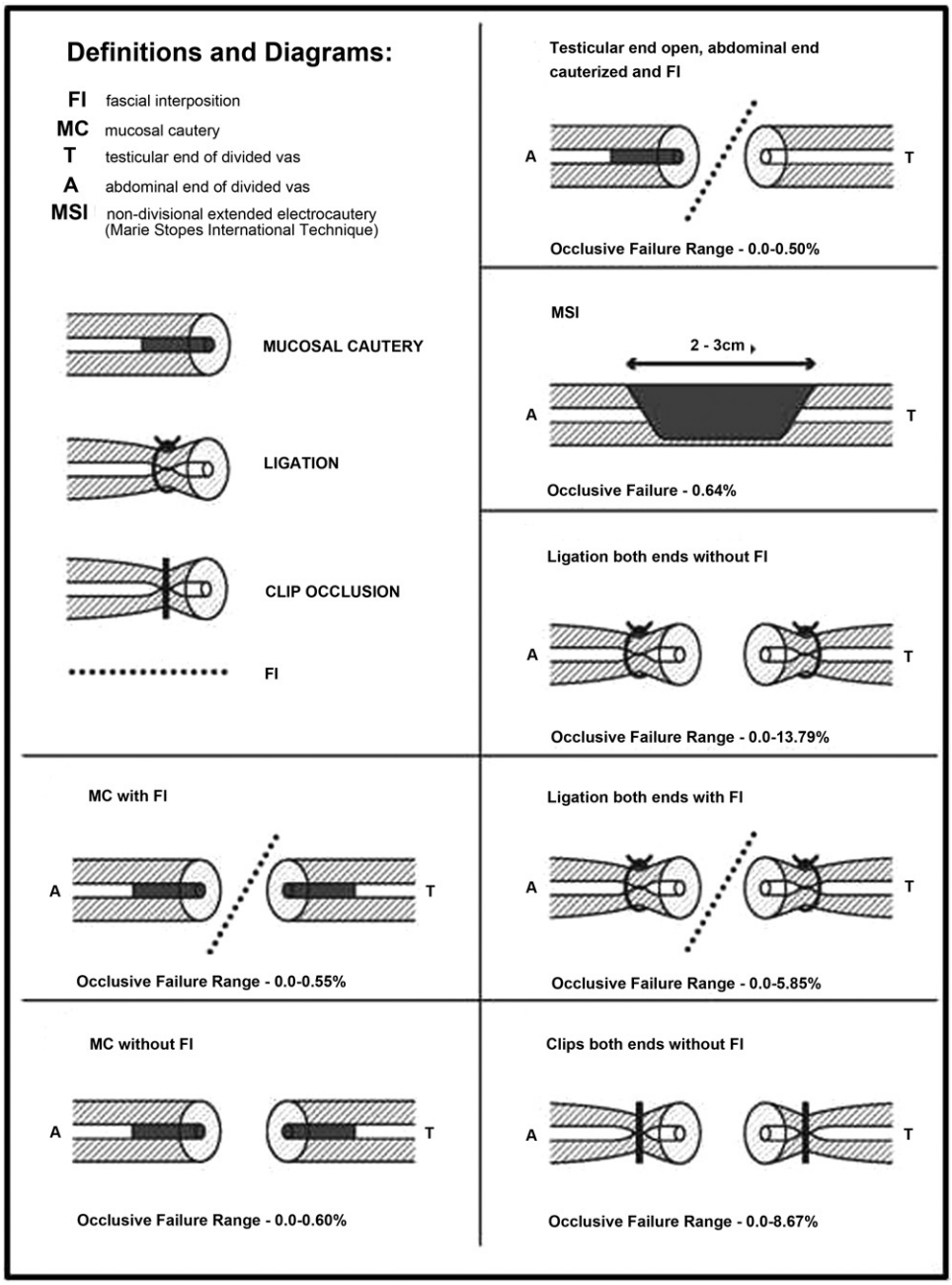

Figure 2. Most commonly used vas occlusion techniques and their occlusive failure rates

quality observational study[35] that reported an occlusive failure rate of 0.0% with a secondary analysis of PVSA data reporting 0% recanalizations.[36]

MC without FI

Six study arms evaluated this technique in approximately 13,851 patients; failure rates ranged from 0.0% to approximately 1.0%. Four of the six study arms were from non-randomized observational designs, but two arms were from a high-quality observational study; these two arms reported an overall failure rate of 1.0%.[35]

Open Ended Method Leaving the Testicular end Unoccluded with MC of the Abdominal end and FI

Four study arms evaluated approximately 4,600 men with this technique. Failure rates ranged from 0.0% to 0.50%. One study arm was from a high-quality observational study and reported a failure rate of 0.0%.[35]

With regard to the same technique of open ended vasectomy with MC but without FI, only two study arms were found. Both study arms were from the same study,[37] evaluated a total of 171 patients and

Characteristics of vas occlusion studies

Occlusion Technique*	No. Study Arms	No. Pts	Range of Occlusive Failure Rates
Recommended techniques			
Mucosal cautery of both ends and fascial interposition	13	18456	0.0%–0.55%
MC of both ends	6	13851	0.0%–1.0%
Open testicular end, MC of abdominal end, FI	4	4600	0.0%–0.50%
Non-divisional extended electrocautery (Marie Stopes technique)†	1	41814	0.64%
Optional techniques for surgeons with training and/or experience that may produce acceptable failure rates			
Ligation of both ends	31	24797	0.0%–13.79%
Ligation of both ends and FI	9	2782	0.0%–5.85%
Clips on both ends	7	4337	0.0%–8.67%
Other techniques with insufficient evidence			
Open testicular end, MC of abdominal end	2	171	4.35%–4.73%
Open testicular end, ligation of abdominal end, FI	1	2150	0.00%
MC and ligation of both ends and FI	1	1379	0.36%
MC and ligation of abdominal end, testicular end left open, FI	1	61	3.28%
Clips on both ends, FI	1	1073	0.0%
MC and ligation of both ends	3	1220	2.0%–4.75%
MC and clips on both ends	1	324	0.62%
Open testicular end, ligation of abdominal end	2	758	1.11%–2.5%
Ligation and cautery (non-mucosal) of both ends	1	500	0.40%
Ligation and cautery (non-mucosal) of both ends and FI	1	3867	0.08%
Open testicular end, ligation and cautery (non-mucosal) of abdominal end, FI	1	4330	0.02%
Open testicular end, abdominal end clipped	1	262	0.38%
Clips only, no excision/division	2	89	0.0%–2.56%
Totals	**89**	**126,821**	

A complete list of references associated with this table can be found at www.auanet.org/content/media/vasectomy.pdf.
* Unless otherwise noted, FI was not performed.
† Non-divisional technique.

reported failure rates of 4.73% and 4.35% in the two arms of the study. Therefore, the panel does not advocate the omission of FI in performing open ended vasectomy with MC.

Non-Divisional Vasectomy with Extended Electrocautery (Marie Stopes International Electrocautery Technique)

One paper reports the findings from a 10-year period by Marie Stopes clinics during which 45,123 vasectomies were performed at more than 20 centers by up to 30 clinicians in the United Kingdom. PVSAs were obtained on 41,814 patients and revealed 267 early failures (a failure rate of 0.64%) defined as patients whose PVSAs continued to show the presence of sperm and required reoperation.[38]

8. The divided vas may be occluded by ligatures or clips applied to the ends of the vas, with or without FI, and with or without excision of a short segment of the vas, by surgeons whose personal training and/or experience enable them to consistently obtain satisfactory results with such methods. *Option (Evidence Strength: Grade C)*

The Panel is aware that many surgeons occlude the vas using ligatures or clips and may add other adjunctive techniques of vas occlusion (fig. 2). The literature on these techniques is characterized by great variability in failure rates (see table), making the balance between benefits and risks/burdens for these techniques uncertain. Individual surgeons who consistently obtain rates of occlusion failure of ≤1% are justified in using these techniques.

9. Routine histologic examination of the excised vas segments is not required. *Expert Opinion*

Although there is no evidence for or against routine histologic examination of excised vas segments, the AUA recommended in 1998 and reaffirmed in 2003 and 2007 that histologic confirmation of the vas is not necessary because PVSA, rather than pathologic identification of vas segments, is the determinant of vasectomy success.

Additional Points of Surgical Practice

Insufficient evidence was found to determine if folding back of the vas, irrigation of the abdominal end or FI over the abdominal compared to the testicular end is associated with lower occlusive failure rates.

There was insufficient evidence to determine the optimum length of vas that should be excised, if any, after division of the vas. The Panel believes that it is not necessary to remove any length of vas. The decision to excise a vas segment should be left to the

surgeon's judgment. Although failure is very rare if a long vas segment is excised, removal of a long segment requires more extensive dissection and may be associated with a higher risk of complications and more difficulty to perform a later vasectomy reversal. If the surgeon prefers to excise a vas segment, the Panel believes that 1 cm is adequate.

POSTOPERATIVE PRACTICE

10. Men or their partners should use other contraceptive methods until vasectomy success is confirmed by PVSA. ***Clinical Principle***

During the first few weeks after vasectomy, sperm that are left in the male reproductive system on the abdominal side of the vasectomy site may retain the ability to fertilize an ovum. Semen analysis after vasectomy is necessary to provide assurance for the patient and his partner that the risk of future pregnancy is very low.

11. To evaluate sperm motility, a fresh uncentrifuged semen sample should be examined within two hours after ejaculation. ***Expert Opinion***

WHO guidelines (2010) recommend that semen analysis to assess motility should be done within 60 minutes of ejaculation when the semen sample is collected in the laboratory facility.[39] Because only the presence or absence of motility rather than precise motion quality is important for a PVSA, the Panel believes that two hours allows time for both delivery of the specimen to the laboratory and subsequent processing of the specimen.

12. Patients may stop using other methods of contraception when examination of one well-mixed, uncentrifuged, fresh post-vasectomy semen specimen shows azoospermia or only rare non-motile sperm (RNMS or ≤ 100,000 non-motile sperm/mL). ***Recommendation (Evidence Strength: Grade C)***

After PVSA demonstrates azoospermia, the risk of fertility is about 1 in 2,000.[40] Other studies suggest that the risk of pregnancy associated with RNMS is very low and similar to the risk when sperm are absent.[41–45] The opinion of the Panel is that after azoospermia or RNMS has been achieved, the patient may rely on his vasectomy for contraception, and further PVSAs are unnecessary.

Laboratory techniques, especially centrifugation, influence the presence or absence of azoospermia observed in a PVSA. Recent data suggest that centrifugation leads to the identification of extremely small, but clinically insignificant, numbers of sperm in some men with uncentrifuged azoospermia, thus possibly leading to some unnecessary repeat vasectomies. Because centrifugation may interfere with sperm motility[39] and clinically relevant numbers of sperm can be identified without centrifugation, routine PVSA should be performed on an uncentrifuged semen specimen.

In the U.S., CDC regulations implementing the 1988 Clinical Laboratory Improvement Act distinguish provider-performed microscopy analysis (Section 493.19) from that in laboratories performing tests of high complexity (Section 493.25). These regulations allow for semen analysis in a doctor's office, i.e., "provider performed microscopy," as long as the reported result is qualitative, i.e., "limited to the presence or absence of sperm and detection of motility." Thus, U.S. surgeons are permitted to conduct PVSA in their offices, but they are not authorized to determine sperm concentration unless their laboratories have "high complexity" testing certification from the Clinical Laboratory Improvement Act.

13. Eight to sixteen weeks after vasectomy is the appropriate time range for the first PVSA. The choice of time to do the first PVSA should be left to the judgment of the surgeon. ***Option (Evidence Strength: Grade C)***

The longer the time period before the first PVSA, the better the chance that the PVSA will reveal sterility but the longer the time that the patient must use another method of contraception. Sperm clearance after vasectomy is time-dependent with both large inter-individual variations as well as variability across published reports. Because of these variations, it is impossible to define a precise time when the first PVSA should be performed. Clearance of motile sperm is much more rapid and consistent than clearance of non-motile sperm. The majority of PVSA studies report that more than 80% of men have no sperm or only RNMS by 12 weeks after vasectomy. The opinion of the Panel is that 8–16 weeks is the most appropriate time range for PVSA testing.

Rates of azoospermia and RNMS related to the number of post-vasectomy ejaculations are inconsistent and dependent on the patient's age and the method of vas occlusion. One study[35] of vas occlusion by MC showed that only 77% of men had azoospermia or RNMS after 20 ejaculations, and another study using ligation and excision showed that only 44% of men were azoospermic after 20 ejaculations.[46] Thus, the number of post-vasectomy ejaculations should not be used as a guide to timing of the first PVSA.

14. Vasectomy should be considered a failure if any motile sperm are seen on PVSA at six months after vasectomy, in which case repeat vasectomy should be considered. ***Expert Opinion***

When the vas is successfully occluded, motile sperm disappear by a few weeks after vasectomy.[36] The presence of motile sperm at 6 to 12 weeks after

vasectomy indicates that recanalization has occurred or that there was a rare technical failure of vas occlusion. If any motile sperm are present six months or more after vasectomy, repeat vasectomy should be considered. There is limited evidence that about half of those men who have recanalization less than six months after vasectomy will later have spontaneous occlusion of the recanalization and achieve sterility.[47]

15. If >100,000 non-motile sperm/mL persist beyond six months after vasectomy, then trends of serial PVSAs and clinical judgment should be used to decide whether the vasectomy is a failure and whether repeat vasectomy should be considered. ***Expert Opinion***

If non-motile sperm are present on the first PVSA in the surgeon's office, one or more repeat PVSAs should be performed in the surgeon's office laboratory to determine if azoospermia develops over time. If the PVSA shows persistent non-motile sperm, then a semen specimen should be examined in a clinical laboratory that is certified for quantitative semen analysis. If the complex lab certifies that there are ≤100,000 non-motile sperm/mL, the patient may rely on his vasectomy for contraception and stop using other methods of contraception. If the PVSA shows >100,000 non-motile sperm/mL or any motile sperm, then further PVSA monitoring or repeat vasectomy should be considered. The decision to consider vasectomy a failure if >100,000 non-motile sperm/mL persist for six months or more after vasectomy should be based on clinical judgment that includes the trend of sperm counts, the patient's preferences and the patient's tolerance for the risk of pregnancy.

Additional Points of Postoperative Practice

A self-PVSA home test has been approved by the FDA and is available for clinical use.[48] This test is sensitive to sperm counts ≥250,000/ml, but the test does not assess for sperm motility. Furthermore, no studies have shown that clearing men at this cut-off without evaluating for motility is reliable enough to recommend discontinuation of contraception, and no studies have followed patients who used the test to assess for the risk of unanticipated pregnancy. This test may have potential value, but there still are insufficient data for the panel to judge its clinical utility.

In the absence of bothersome discomfort, patients may return to non-physical work on the day of or the day after vasectomy. Patients may resume physically demanding work or recreation when pain permits.

DNA testing has proven paternity in couples in whom pregnancy has occurred despite demonstration of post-vasectomy azoospermia around the time of pregnancy initiation.[49] These rare events are probably due to intermittent recanalization.

FUTURE RESEARCH

Gaps in knowledge about vasectomy and research ideas for filling these gaps are available online in the full text of this guideline on the AUA website.

Conflict Of Interest Disclosures

All panel members completed COI disclosures. Relationships that have expired (more than one year old) since the panel's initial meeting, are listed. Those marked with (C) indicate that compensation was received; relationships designated by (U) indicate no compensation was received.

Consultant/Advisor: Ira D. Sharlip, Absorption Pharmaceuticals (C), Pfizer (C), Lilly(C), Bayer (C)(expired), Plethora Solutions (C)(expired); **Stanton C. Honig**, Endo Pharmaceuticals (C), Serono (C), Lilly/ICOS (C), Coloplast (C), AMS (C), menMD (C), Slate Pharmaceuticals (C)(expired); **Michel Labrecque**, Shepherd Medical (expired) (C)**; Joel L. Marmar**, Wellspring Urology (C); **Lawrence S. Ross**, Gerson Lehrman Group (C)

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Disclaimer

This document was written by the Vasectomy Guideline Panel of the American Urological Association Education and Research, Inc., which was created in 2008. The Practice Guidelines Committee of the AUA selected the panel chair and co-chair. Panel members were selected by the chair and co-chair. Membership of the panel included urologists, family medicine physicians, and other clinicians with specific expertise on vasectomy techniques. The mission of the committee was to develop recommendations that are evidence-based or consensus-based, depending on Panel processes and available data, for optimal clinical practices in the surgical technique of vasectomy.

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vides an ongoing conflict of interest disclosure to the AUA.

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 guideline 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. These guidelines are not intended to provide legal advice about vasectomy practices.

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 these guidelines as necessarily experimental or investigational.

The completed evidence report may be requested through AUA.

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