

VASECTOMY UPDATE 2010

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Conflict of Interest: None

1. Pre-operative counseling:

Vasectomy is a safe and effective method of birth control. Although vasectomy is a relatively simple procedure, it is associated with potential minor and major complications. As such, detailed preoperative counseling is required. Failure to provide and document adequate preoperative information and counseling may lead to litigation. Men must be told of the potential for early complications such as wound infection, scrotal hematoma and primary surgical failure, and, late complications including painful vas granulomas, chronic epididymal pain and delayed vasectomy failure. Such information should be given both verbally and in writing. Surgeons should report their own complication rates, whenever possible. The association between vasectomy and prostate disease (cancer) may be discussed if patients voice a concern. The potential reversibility of the procedure should also be discussed.

Most men are potentially fertile shortly after vasectomy. Moreover, in cases of early re-canalization or technical failure (e.g. missed vas deferens), men will remain fertile. Therefore, couples must be instructed to use other contraceptive measures until post-vasectomy semen testing has confirmed absence of motile sperm.

2. Vasectomy technique (approach and occlusion)

Conventional vs. no scalpel vasectomy (NSV): Grade A-B (Level 1-2 evidence):

The two most common surgical techniques for accessing the vas during vasectomy are the traditional incisional method and the no-scalpel vasectomy (NSV) technique. The conventional incisional technique involves the use of a scalpel to make one or two incisions and the NSV technique uses a sharp, forceps-like instrument to puncture the skin, the latter approach aimed to reduce adverse events (e.g. bleeding, infection and pain).

A recent Cochrane review (of 2 randomized controlled trials) indicates that the NSV is associated with a significantly lower risk of post-operative hematoma (Odds ratio: 0.20 [0.13, 0.32]), pain during surgery (Odds ratio: 0.75 [0.61, 0.93]), post-operative scrotal pain (Odds ratio: 0.63 [0.50, 0.80]), and wound infection (Odds ratio: 0.21 [0.06, 0.78]), than the standard incision group (Cook et al, 2007a, Christensen 2002, Sokal et al, 1999). Based on the same review, NSV is a faster procedure than the conventional surgery. However, there was no significant difference in the effectiveness (azoospermic or absence of motile sperm) of the two procedures.

Fascial interposition vs. no fascial interposition: Grade B (Level 2 evidence):

In a randomized, controlled trial of over 800 vasectomies, it was shown that the use of fascial interposition during vasectomy is associated with a significantly higher rate of azoospermia at 3 months (Odds ratio: 0.42 [0.26, 0.70]) than no interposition (Cook et al, 2007b, Sokal et al, 2004a, Chen-Mok et al, 2003). However, fascial interposition may increase the complication rate of vasectomy (Labrecque et al, 2002).

Cautery vs. fascial interposition: Grade C (Level 3 evidence):

In a comparative (case-control) study, cautery of the vas was associated with a lower risk of failure (defined as >100,000 sperm in the ejaculate) than fascial interposition (1% vs 4.9%, OR=4.8 [1.6-14.3]) (Sokal 2004b).

Intra-vas device vs. NSV: Grade B (Level 2 evidence):

In a randomized, controlled trial of close to 300 vasectomies, the use of an intra-vas device during vasectomy was associated with a significantly lower rate of achieving azoospermia at 3 months (Odds ratio: 0.14 [0.06, 0.29]) than with the NSV (Cook et al, 2007b, Song et al, 2006). However, patients reported less post-operative pain with the intra-vas device than the NSV.

3. Contraceptive efficacy of vasectomy

The early failure rate of vasectomy (presence of motile sperm in the ejaculate at 3 – 6 months post-vasectomy) is in the range of 0.3% to 9% and has been linked to operator experience and the technique used by the surgeon (Labrecque et al, 2002). Both technical failure (e.g. missed vas deferens) and early re-canalization of the vas deferens have been proposed as plausible explanations.

Late failure has been reported to be in the range of 0.04–0.08% (approximately 1/2000 cases) and is defined as the presence of motile spermatozoa in the ejaculate after documented azoospermia in two post-vasectomy semen analyses (Philp et al, 1984, Haldar et al, 2000). In most cases, late failure is first identified as a pregnancy and later confirmed by semen analysis (documenting presence of motile spermatozoa).

The reappearance of sperm (mostly immotile) after documented azoospermia in two post-vasectomy semen samples may be much higher than 1/2000 according to the reported identification of spermatozoa in nearly 10% of ejaculates from men undergoing semen assessment prior to vasectomy reversal (Lemack et al, 1997). It is unlikely that the reappearance (or persistence) of immotile sperm years after vasectomy is of clinical significance as this has not been associated with documented pregnancies (Davies et al, 1990, De Knijff et al, 1997).

4. Post-operative counseling:

After the vasectomy has been performed, men should be instructed about proper wound and scrotal care and short-term physical limitations. Men should be told how to collect

the semen sample (completeness, type of container) and reminded of the importance of submitting the sample to the laboratory in a timely fashion (within 30 to 60 minutes after producing the sample). They should also be told that semen samples should be collected after an abstinence period of two or more days and no more than seven days, and maintained at body temperature before delivery to the laboratory. A list of local laboratories that perform proper post-vasectomy semen analysis should be given to the patient. The men must be reminded to use other contraceptive measures until post-vasectomy semen testing has confirmed absence of motile sperm.

5. Post-vasectomy semen testing

The post-vasectomy semen analysis should be performed on the whole (unprocessed) semen and on the centrifuged semen to confirm the absence of low numbers of motile sperm. The laboratory should give an estimation of sperm concentration or numbers of spermatozoa observed per high power field ($\times 400$ magnification).

It is important to recognize that compliance with post-vasectomy semen testing is a significant issue with up to 30% of men failing to submit a single sample (Chawla et al, 2004, Bodiwala et al, 2007).

One (1) vs. two (2) post-vasectomy samples: Grade C (Level 3 evidence)

Surveys have shown significant variability in the post-vasectomy testing protocols (Haws et al, 1997). Most agree that a single azoospermic semen sample is sufficient to deem the vasectomy effective (Badrakumar et al, 2000, Griffin et al, 2005). However, because spermatozoa are detected in 10-40% of the 3-month post-vasectomy samples (the % depends on the vasectomy technique and the accuracy of the semen analysis) it may be necessary for up to 40% of the men to submit a 2nd semen sample (Labrecque et al, 2002, Barone et al, 2003). As such, requesting 2 semen samples at the onset may be more efficient as this may reduce the number of post-vasectomy counseling sessions (e.g. phone calls or office visits) but this may also reduce the overall compliance (Bodiwala et al, 2007).

Timing of post-vasectomy testing: Grade C (level 3 evidence)

Although most studies suggest that post-vasectomy testing be conducted at 3 months after vasectomy, the issue remains debatable with some studies suggesting earlier examinations (with determination of failure based on the presence of motile sperm) and others proposing later examinations (Edwards et al, 1993, Labrecque et al, 2005, Bodiwala 2007). The difficulty in establishing a set time point for semen testing, stems largely from the variable success of the vasectomy occlusion techniques (Labrecque et al, 2002). Azoospermia is achieved much later with the ligation (and excision) compared to the cautery or fascial interposition techniques (Labrecque et al, 2002, Barone et al, 2003, Edwards 1993). The argument in favor of waiting at least 3 months is that this will reduce the number of false positive samples and minimize the need for repeat laboratory assessment and counseling (Labrecque et al, 2005).

6. Interpreting and communicating results

Azoospermia or rare immotile sperm (<100,000 per ejaculate) as an indication of successful vasectomy: Grade C (Level 3 evidence)

Contraceptive measures may be abandoned after the men have produced one azoospermic or two ejaculates with rare (<100,000) immotile spermatozoa. It is the physician's responsibility (not the laboratory's) to communicate these results to the patient and measures should be taken to ensure that patients not be lost to follow-up (e.g. follow-up phone calls to remind patients). Physicians must also remind couples about the risk of late failure (~1/2000) despite azoospermia or rare immotile sperm on initial testing.

It is estimated that approximately 20 to 40% of samples have rare non-motile sperm at 3 months post-vasectomy, with a lower percentage having non-motile sperm at 6 months (Barone et al, 2003, Chawla et al, 2004). When there is doubt regarding the analysis, physicians may want to contact the laboratory and confirm that there was no reporting error (i.e. that the sample was incorrectly labeled as "non-motile"). The literature has suggested that the risk of pregnancy occurring from these non-motile sperm is small, perhaps no more than the risk of late pregnancy after two azoospermic semen samples, as a result of spontaneous re-canalization (Davies et al, 1990, De Knijff et al, 1997). Similarly, rare non-motile sperm can appear in the ejaculate one or more years after vasectomy with no increased risk of failure (pregnancy or motile sperm). Therefore, repeat semen testing in men with rare non-motile sperm is unnecessary because pregnancy is very unlikely to occur in this setting.

Motile sperm or large numbers of immotile sperm as a measure of failure: Grade C (Level 3 evidence)

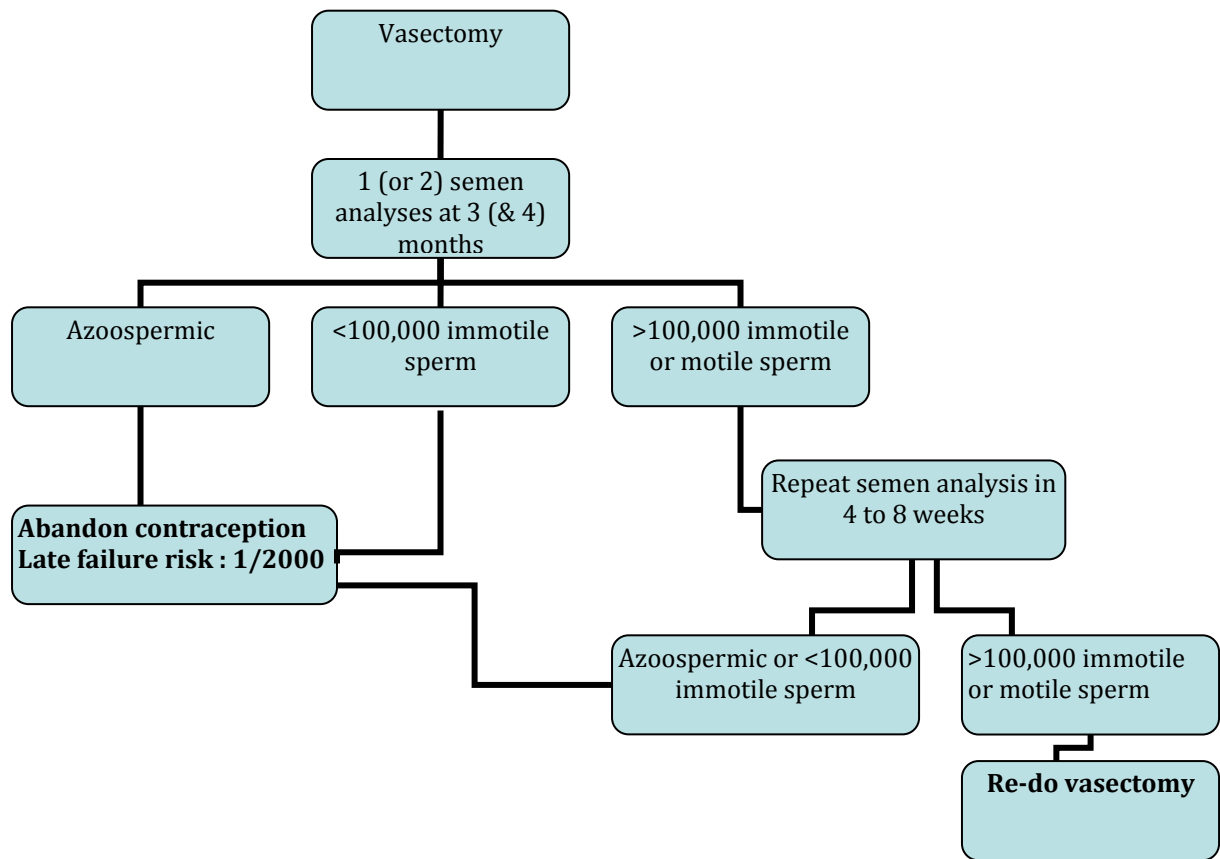
If any motile sperm or substantial numbers of immotile spermatozoa (> 100,000) are detected, the physician must inform the patient to continue the use of other contraceptive measures and request that a repeat semen analysis be performed. A repeat vasectomy is indicated when there is persistence of motile sperm or large numbers of non-motile sperm in the ejaculate. However, no long-term studies have evaluated the risk of pregnancy in this setting.

Summary

Vasectomy is a safe and effective method of birth control. The NSV technique is associated with a lower risk of early post-operative complications and the use of cautery or fascial interposition will reduce the risk of contraceptive failure. Post vasectomy testing should consist of examination of 1 or 2 semen samples at approximately 3 (and 4 months) after vasectomy. The laboratory should examine a freshly produced seminal fluid specimen by direct microscopy and if no sperm are seen, the centrifuged sample should be examined for the presence of motile and non-motile spermatozoa. Other contraceptive measures may be abandoned after the production of one azoospermic

ejaculate or two consecutive ejaculates with fewer than 100,000 immotile spermatozoa. Couples must be counseled (both pre- and post-operatively) about the risks of early and late failure.

Proposed algorithm for post-vasectomy testing protocol



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