Vasectomy: The “other” form of sterilization

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Disclosures

• David Turok receives research support from Duramed Pharmaceuticals, Inc. and has served on an advisory board for Bayer Healthcare.
Session Outline

• Part 1: Background on vasectomy
• Part 2: Discussion of NSV and occlusion techniques
• Part 3: Hands-on practice with scrotal model
Objectives

• Discuss acceptability of vasectomy
• Discuss effects of vasectomy on male reproductive anatomy and physiology
• Learn appropriate vasectomy counseling
• Learn appropriate post-vasectomy care and complication management
• Discuss no-scalpel vasectomy (NSV) and occlusion techniques
• Hands-on practice with scrotal model
Low use of vasectomy worldwide

- Female sterilization users exceed vasectomy users by 5 to 1.
- Vasectomy prevalence
  - New Zealand 23%
  - UK 18%
  - US, Netherlands, S. Korea, Australia 11%
- Vasectomy > Tubal Ligation
  - New Zealand, UK, Bhutan, Denmark, Netherlands,
Low use of vasectomy US

• 2006-2008 NSFG
  – Overall 23% rely on sterilization
  – 17% female sterilization; 6% male sterilization
• Homogenous group
  – Non-Hispanic, white
  – Well-educated
  – Married
  – High economic status
  – Access to insurance

Barone, Perspect Sex Reprod Health 2004
Racial disparities in vasectomy use

- White: 15% (BTL), 8% (Vasectomy)
- Latino: 20% (BTL), 2% (Vasectomy)
- Black: 22% (BTL), 1% (Vasectomy)

2006-8 NSFG
Multiple reasons for vasectomy underuse

• Patient
  • Attitudes
  • Lack of knowledge

• Provider
  • Attitudes
  • Lack of knowledge

• Health care system
  • Poor access
Why is vasectomy chosen?

• National, practice-based survey, July 1998-June 1999
• Most important reason for choosing vasectomy
  – Surest way to prevent having more children - 50%
  – Wife/partner disliked other methods - 12%
  – He dislikes other methods – 10%
  – Vasectomy is permanent – 10%
  – Recently had unplanned pregnancy/pregnancy scare 7%
  – Vasectomy does not interfere with sex 5%

Barone, Persp Sex Reprod Health, 2004
Why is vasectomy chosen?

• Most important reason for choosing vasectomy over BTL
  – Vasectomy is simpler and safer – 62%
  – **My turn to take contraceptive responsibility** – 14%
  – Had friend with vasectomy and had no problems – 11%

• Most influential information source
  – **Doctor/nurse** – 31%; Wife/partner – 25%; Friend – 23%

  Barone, Persp Sex Reprod Health, 2004
Review of Anatomy
Anatomy

EngenderHealth 2007
Long-term effects of vasectomy
Long-term effects of vasectomy
Common misconceptions about vasectomy

• Vasectomy is like castration.
• A man cannot have sex or ejaculate after vasectomy.
• Vasectomy makes men weak and less productive.
Myth: Vasectomy changes sexual function and experience

- Men will still have an erection and produce ejaculate
- Sperm only accounts for <2% ejaculate
- Testosterone levels will not be changed

Richards, Urology 1981; McDonald, Clin Anat 1996
Myth: Vasectomy changes sexual function and experience

• No change in interest in sex
• No difference in ability to reach orgasm
• No problems with erection
• No change in sexual pleasure

Smith, J Sex Med 2010; Hofmeyr, J Sex Marital Ther 2002
Myth: Vasectomy causes prostate cancer

• Giovannucci, JAMA 1993
  – Retrospective cohort study of husbands of nurses in 11 US states (n=14,607)
  – Vasectomy associated with increased risk of prostate cancer – age-adjusted RR 1.56 (95% CI: 1.03-2.37)

• Giovannucci, JAMA 1993
  – Prospective study of men in Health Prof follow-up study (n=10,055 with vasectomy; n=37,800 no vasectomy)
  – Age-adjusted RR 1.66 (95% CI: 1.25-2.21)
Myth: Vasectomy causes prostate cancer

• “Vasectomy increases risk of prostate cancer and...the apparent lack of confounding or bias...suggest that the association may be causal.”

Giovannucci E. JAMA 1993
Myth: Vasectomy causes prostate cancer

• Two keys critiques
  - Reliance on self or spousal report for outcome
  - Detection bias
    - Similar frequency of digital rectal exams in vasectomized and non-vasectomized men
Myth: Vasectomy causes prostate cancer

• “No change in current practice of vasectomy nor should vasectomy reversal be done as a prostate cancer prevention measure.”

National Institute of Health
1993
Myth: Sperm buildup will cause testicular rupture

• Sperm continues to be produced
• Sperm is reabsorbed
• Can cause sperm granuloma
  – Inflammatory reaction from leaked sperm
  – Typically 2-3 weeks post-vasectomy
  – Up to 60% men; symptomatic in 3-5%
  – Conservative treatment - NSAIDs

Schwingl, Fertil Steril 2000
Truth: Increased presence of antisperm antibodies in vasectomized men

- Present in 50-70% men post-vasectomy vs. 8-20% men in general population
- No increase autoimmune disorders or other diseases
- Potential decrease in fertility after vasectomy reversal

Coulson J Clin Epidemiol 1993; Hattikudur, Andrologia 1982
Counseling Steps

• Preparation
• Discussing family planning options
• Assessing client’s decision
• Describing the procedure
Counseling: Preparation

- Private setting
- Make sure patient is comfortable
- Encourage discussion
- Get background information
  - # kids
  - Past medical history
- Visual aids
Counseling: Other family planning options

- Discuss permanent versus temporary options
- Comparison to female sterilization

<table>
<thead>
<tr>
<th></th>
<th>Vasectomy</th>
<th>Tubal Ligation</th>
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<tbody>
<tr>
<td>Complications</td>
<td>▼</td>
<td>▲</td>
</tr>
<tr>
<td>Failure rate</td>
<td>0.15% in first year</td>
<td>0.5% in first year</td>
</tr>
<tr>
<td>Reversibility</td>
<td>=</td>
<td>=</td>
</tr>
<tr>
<td>Time to efficacy</td>
<td>3 months (or confirmed PVSA)</td>
<td>Immediate</td>
</tr>
<tr>
<td>Cost</td>
<td>$</td>
<td>$$$</td>
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Reversibility

• Successful reversal measured by return of sperm to ejaculate 70-90%
• Successful reversal measured by pregnancy 30-60%
• Expensive

Fox, Br J Urol 1994; Cos, Urol 1983; Lee, J Urol 1986
Counseling: Assessing client’s decision

• This is a permanent procedure! Ask some probing questions….
  – When did you decide to get a vasectomy?
  – Why do you want to get a vasectomy?
  – What does your partner think?
  – How would you feel if your situation changed after the vasectomy? (divorce, death of a child or partner, etc.)
Counseling: Assessing client’s decision

• Warning signs
  – Young
  – Feels pressure
  – Unstable marriage
  – Unsupportive partner
  – Temporary stress (e.g. financial stress, recent difficult pregnancy)
  – Excessive interest in reversal
Counseling: Describing the procedure

• Use simple language
• Use visual aids
Counseling: Describing the Procedure

- Vasectomy is permanent
- Vasectomy is NOT immediate
- Vasectomy does NOT protect you from STDs
- Sexual function and libido will stay the same
Pre-Op Evaluation

• Medical history
  – Bleeding disorders
  – Scrotal surgery/trauma
  – Current or h/o GU infections
  – Sexual impairment
  – Medications – esp. coumadin
  – Allergies
Pre-Op Evaluation

• Palpate testis and epididymis

• Palpate spermatic cord and vas deferens
Case

• A 40y man comes for his pre-operative evaluation. You do a physical exam and notice a small enlargement on his left testicle. How do you proceed?
Discuss

• What could the enlargement be?
• What are your management options?
• What are the WHO MEC criteria regarding vasectomy?
Differential Diagnosis

- Hydrocele
- Varicoele
- Epididymitis
- Testicular cancer
Hydrocele

- Collection of peritoneal fluid between parietal and visceral layers of the testicle
- Usually painless
- Confirm by transillumination or US
- If very large or increasing in size, may require surgery so consider deferring vasectomy.

Uptodate 2010
Varicocele

- Dilation of pampiniform plexus
- “Bag of worms”
- If very large, may require surgery so consider deferring vasectomy.
Testicular Cancer

- Painless
- Transilluminate to differentiate from hydrocele
- US if lesion is suspect
- Defer vasectomy
Epididymitis

- Painful
- Usually chlamydia or gonorrhea
- Treat with antibiotics
- Delay vasectomy until infection cleared
## WHO Eligibility Criteria

<table>
<thead>
<tr>
<th>Condition</th>
<th>Score</th>
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<tbody>
<tr>
<td>HIV Positive</td>
<td>A</td>
</tr>
<tr>
<td>Diabetes</td>
<td>C</td>
</tr>
<tr>
<td>Local infections (e.g. active STI, epididymitis)</td>
<td>D</td>
</tr>
<tr>
<td>Large varicocele or large hydrocele</td>
<td>C</td>
</tr>
<tr>
<td>Intrascrotal Mass</td>
<td>D</td>
</tr>
</tbody>
</table>

WHO MEC 2009
Pre-Op Evaluation

• Avoid aspirin, NSAIDS for 7d prior
• Rx anxiolytic (diazepam 5mg PO; disp #2)
  Take one tablet 1 hr prior to procedure
Post-Op Care

• Rest for 24h, light work in 2-3d. No heavy lifting x 1 week.
• Scrotal support, ice pack intermittently x 48 h
• Tylenol for pain
• Mild pain, swelling, bruising, blood in ejaculate is common. Clears in 3-4 days.
• No sex for 3 days.
Post-vasectomy semen analysis (PVSA)

- ALL patients need PVSA at 12 weeks
- Semen analyses at 3 months (or 20 ejaculations) \( \rightarrow \) goal is azoospermia
- Noncompliance is a problem – only 42% men provide post-vasectomy semen sample
- Median time to azoospermia – 10 wks

Griffin, J Urol 2005; Cortes, Contraception 1997; Haldar, Lancet 2000
Complications

- Hematoma formation - <2% with NSV
- Infection - <1% with NSV
- Sperm granulomas - 3-5%

Schwingl, Fertil Steril 2000
Who performs vasectomy?

- Overall
  - 79% Urology
  - 13% Family Medicine
  - 8% General Surgery

- Western US
  - 71% Urology
  - 27% Family Medicine
  - 2% General Surgery

- ACGME requirements – Dec 2008

Barone, Journal of Urology 2006
Who performs vasectomy?
No Scalpel Vasectomy Workshop

Part 2: Technique

Reproductive Health 2010
Preconference workshop
September 22, 2010
David Turok
Objectives: To Understand Evidence Based Principals to...

- Approach the vas deferens using the no-scalpel vasectomy technique
  - 2 crucial instruments
  - 3 finger technique
- Occlude the vas deferens
- Assess success (Post Vasectomy Semen Analysis - PVSA)
Pre-Procedure Visit

• Explain procedure, risks, and failure rate
• Perform focused history and physical exam
• Have patient sign consent form
• Review of pre- and post-operative instructions
• Billing: code as Contraceptive Counseling
• Offer Rxs:
  – Ativan 1 mg po #2
  – Hydrocodone 5 mg #10
Erection and ejaculation continue as before, but the semen contains no sperm.

The seminal vesicles and prostate secrete the same amount of fluids as before.

The vas deferens are cut, preventing sperm from moving to the penis.

The testes still produce sperm and hormones.
Vasal Anatomy

- Skin
- Dartos
- External spermatic fascia
- Cremasteric fascia
- Cremaster muscle
- Internal spermatic fascia
- Veins
- Artery
- Vas
- Vas lumen
Informed Consent—Risks

• Bleeding (hematoma)
• Infection (wound, epididymitis, prostatitis)
• Pain
• Swelling
• Sperm granuloma
• Adhesions
• Hydrocele
• Pregnancy
• Regret
Precautions

• Active local or systemic infection
• Prior scrotal injury
• Coagulation disorders
• Diabetes
• Inability to palpate and elevate both vas
• Desire for possible future reversal
• Hydrocele, varicocele, hernia, cryptorchidism or mass
• Inappropriate reasons for wanting vasectomy (stress, sexual dysfunction, marital problems)

This is a **Permanent** and **Non-Reversible** Procedure

- Number of children
- Current relationship situation
- Current method of contraception
- Desire for more children if life situation changed (divorce, remarriage, death of a child or partner)
History

- Social history
  - Marital status, number of children, life situation, motives
- PMH
  - Bleeding disorders, chronic disease
  - Genital surgery, trauma, pain, STDs
- Medications
  - NSAIDs, aspirin, coumadin
- Allergies
  - Anesthetic agents, analgesics
Physical exam

- Vitals
- Cardiovascular
- Pulmonary
- Abdomen
- GU
  - Testicular size, masses, location
  - Vas deferens bilaterally
  - Hernia, varicocele, hydrocele, STDs
Pre-operative instructions

• Wash and shave scrotal area morning of procedure
• NPO two hours prior
• Ativan 1 mg PO 20 minutes prior prn anxiety
  – Consent must be signed prior to taking ativan!
• Someone else to drive patient to and from clinic
• Bring athletic supporter or jockey shorts, wear sweat pants for comfort
• No aspirin for 7 days prior
Pre-procedural preparation

• Encourage patient to bring music
  – iPods are your friend!
• **Warm all solutions** (betadine, saline)
• Place warm pack on scrotum while patient lying supine to relax cremaster muscles
• Fasten penis out of the field (rubber band and safety pin technique)
History of No-Scalpel Vasectomy

• Developed by Dr. Li Shunqiang in Sichuan Province in 1974
• 1985 EngenderHealth’s team travels to China
• International training of high-volume vasectomists
• 1987 Thailand King’s Birthday Vasectomy Festival

NSV at the King's Birthday Vasectomy Festival

<table>
<thead>
<tr>
<th></th>
<th>NSV (n=680)</th>
<th>Incisional Vas (n=523)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infection (%)</td>
<td>0.2</td>
<td>1.3</td>
</tr>
<tr>
<td>Hematoma (%)</td>
<td>0.3</td>
<td>1.7</td>
</tr>
<tr>
<td>Complications (%)</td>
<td>0.4</td>
<td>3.1</td>
</tr>
<tr>
<td>Procedures performed/day</td>
<td>57</td>
<td>33</td>
</tr>
</tbody>
</table>

Lancet. 1990 Apr 14;335(8694):894-5.
## NSV vs. Incisional

<table>
<thead>
<tr>
<th></th>
<th>Sokal, 1999 (n=1429)</th>
<th>Christensen, 2002 (n=100)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Design</strong></td>
<td>RCT, single-blinded</td>
<td>RCT, unblinded</td>
</tr>
<tr>
<td><strong>Bleeding</strong></td>
<td>OR 0.49 (0.27-0.89)</td>
<td>No difference</td>
</tr>
<tr>
<td><strong>Hematoma</strong></td>
<td>OR 0.23 (0.15-0.36)</td>
<td>Decreased</td>
</tr>
<tr>
<td><strong>Pain</strong></td>
<td>OR 0.75 (0.61-0.93)</td>
<td>No difference</td>
</tr>
<tr>
<td><strong>Infection</strong></td>
<td>OR 0.21 (0.06-0.78)</td>
<td>No difference</td>
</tr>
</tbody>
</table>

NSV: 2 Crucial Instruments
Ringed Clamp & Dissecting Forceps

Inside dimensions of clamp:
3.0 mm, 3.5 mm, or 4.0 mm

Ahh, Anesthesia

• Vasal Block
• 10 cc syringe 5-8 cc of 1% lidocaine without epi
• 0.5 cc at median raphe
• 2-3 cc in external spermatic sheath 2-3 cm proximal to the vasectomy site
• Regional block with minimal edema

Vasal Block:
Skin Wheal  0.5 cc 1% lido
Vasal Block
Deep Injection: 2-3 cc Each Vas
Isolating the Left Vas
Alternative Anesthetic Techniques

• 1) EMLA cream - no pain reduction
• 2) No-needle jet technique -
  – ↓ pain of administration but not procedure
  – ↓ volume, ↓ trauma, more rapid onset
• 3) Buffered anesthetic - decreases pain of infiltration and procedure
• 4) The Mini-needle technique
  – 1” 30g needle 2cc of 2% lidocaine

3 Finger Technique

The ideal entry site for no-scalpel vasectomy is found midway between the top of the testes and the base of the penis.
Applying the NSV Ringed Clamp

a) Applying the ringed clamp at a 90-degree angle, perpendicular to the vas.

Correct

b) If the ringed clamp does not grasp the vas at a 90-degree angle, the surgeon may grasp the vas incompletely.

Incorrect
1) Spread the scrotal skin
2) Palm up
3) Clamp perpendicular to the vas
Switch Hands, Lower the Clamp, Elevate the Vas

Switch clamp to left hand

Palpate the vas beyond the clamp
Quick Pierce of Scrotum
Blunt Dissection Down to Vas
Use the Lateral Blade to Pierce the Vas
Pierce the Vas & Rotate
Elevate the Vas and Release Clamp

NOTE: Clamp is opening.
Grasp Partial Thickness of Vas
Puncture the Vas Sheath Just Below the Vas
Bluntly Dissect Vas Sheath in Longitudinal Motion

- Expose at least 1 cm of the vas
- Clamp or cauterize bleeders
Vasal Occlusion

• Ligation & excision with
• Intimal cautery and/or
• Fascial interposition
Occlusion Techniques

A  Cautery and Excision

B  Cautery and Fascial Int

C  Ligation and Fascial Int

D  Cautery and Fascial Int

E  Ligation & Excision

Testicular end

Open test end
Occlusion Retrospective Review

1 surgeon
2,040 men had clip and excision
vs. 1,721 thermal cautery, FI and open end

NSV approach
Semen Analysis 2-3 months after procedure- variable

Occlusion Retrospective Review

<table>
<thead>
<tr>
<th></th>
<th>Clip</th>
<th>Cautery &amp; FI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Had ≥ 1 SA</td>
<td>1453 (71%)</td>
<td>1,165 (68%)</td>
</tr>
<tr>
<td>Failures</td>
<td>126 (8.7%)</td>
<td>3 (0.3%)</td>
</tr>
<tr>
<td>Hematoma/infection</td>
<td>10 (0.5%)</td>
<td>28 (1.6%)</td>
</tr>
<tr>
<td>Pain</td>
<td>72 (3.5%)</td>
<td>71 (4.2%)</td>
</tr>
</tbody>
</table>

Occlusion RCT

Vs.

Ligation & Excision

Ligation and Fascial Int

7 sites
NSV approach
Randomized to ligation and excision +/- FI
Semen Analysis 2 weeks after, then Q 4 weeks up to 34 weeks
Primary outcome = time to azoospermia

Sokal et al. Vasectomy by ligation and excision, with or without fascial interposition: a randomized controlled trial  BMC Med 2004.31;2:6
Occlusion RCT

<table>
<thead>
<tr>
<th></th>
<th>L &amp; E</th>
<th>L&amp;E + FI</th>
</tr>
</thead>
<tbody>
<tr>
<td>n</td>
<td>416</td>
<td>410</td>
</tr>
<tr>
<td>Failure @ 34 wks</td>
<td>53 (12.7%)</td>
<td>24 (5.9%)*</td>
</tr>
<tr>
<td>Surgical time</td>
<td>11.7 min</td>
<td>14.3 min*</td>
</tr>
<tr>
<td>Adverse events</td>
<td>62 (14.7%)</td>
<td>74 (17.7%)</td>
</tr>
<tr>
<td>Pregnancies</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

RCT of L&E +/- FI

Time to Azoospermia

Time to severe oligospermia (<100,000 sperm/ml)

L&E had a longer time to azoospermia (HR 1.35, p<0.0001)
- mean time 14 vs. 10 weeks

L&E had a longer time to severe oligospermia (HR 1.32, p<0.0001) - mean time 6 vs. 4 weeks
Occlusion Techniques

• No accepted standard
  – Most common – combination of ligation and cautery - 41% of cases
  – 46% physicians regularly use fascial interposition
  – Preferred method varies by specialty
    • Ligation and cautery – Uro 40%; FM 49%; GS 43%
    • Cautery & clips – Uro 19%; FM 16%; GS 10%
    • **Ligation only** – Uro 15%; FM 9%; GS 37%
    • Cautery only – Uro 13%; FM 18%; GS 6%

Barone, Engender Health, 2002
Occlusion Technique Summary

- Simple ligation and excision is associated with an unacceptably high risk for failure.
- Adding FI to ligation and excision significantly reduces the risk for failure (level A).
- Adding cautery lowers risk of failure (level B).
- Adding FI to cautery has the lowest failure.
- Future Indian Council of Medical Research trial planned to compare:
  - L&E + FI
  - Cautery & Excision
  - Cautery, Excision & FI

Fascial Interposition
FI: Pull Prostatic End Up
FI: Ligate Fascia Below Vas Stump
Cautery of the Lumen
Tips for Beginners and Difficult Cases

• Reload the syringe of lidocaine with 5-10cc extra in case the block needs help.
• Obese patients or thick scrotal skin
  – Use 2 ringed clamps or
  – Make incision before attempting to grasp vas
How Little is Enough?
The Evidence for Post Vas Testing

- Systematic review of 56 studies
- 80% will achieve azoospermia after 3 months and 20 ejaculations
- 1.4% demonstrate persistent nonmotile sperm
- Conclusion: 1 PVSA after 3 mths + 20 ejaculations. If + then periodic testing until azoospermia
- If persistent non-motile sperm in low numbers then cautious reassurance.

PVSA Protocol

Resources for Clinicians

• FHI.org
• ARHP.org
• www.EngenderHealth.org
• http://www.cornellurology.com/infertility/no_scalpel.shtml
• YouTube.com
Conclusions

• NSV is the technique of choice to approach the vas
• To occlude the vas use multiple methods
  – With cautery is better than without cautery
  – With FI is better than without
• PVSA 3 mths and 20 ejaculations after procedure