Male Infertility
Case Study

Medical Student Case-Based Learning

American Urological Association
Education & Research, Inc.

AUA National Medical Student Curriculum

Learning objectives

- Describe the hypothalamus-pituitary-gonadal (HPG) axis
- Describe the workup for male infertility including the importance of the physical exam
- Restate the limitations of the semen analysis
- List some common reversible causes of infertility and their treatments
- Recognize when to refer a patient for ART

Mr. Ely

Mr. Ely is a 38 years old male with a past medical history of obesity and type 1 diabetes. He and his 28 year old spouse have been trying unsuccessfully to conceive for the last 1.5 years.

What would you like to do next?

Recommended Evaluation

- History
- Physical Exam
- Semen Analysis x 2
- Labs – FSH, LH, T
- Optional / pending results
  - prolactin, E2
  - Pituitary MRI, TRUS
  - Post-ejaculatory U/A
  - Genetic testing

History

Mr. Ely reports that he has never fathered a child and his wife has never been pregnant. They have routine vaginal intercourse using an ovulation predictor kit to determine when she is most fertile. Neither he nor his wife have any family history of infertility. No history of childhood illnesses or trauma. He takes insulin for his diabetes. He works as a college math professor.

Physical Exam

- No acute destress, obese
- Normal secondary sex characteristics
- Testicles: normal size (average 20 mL), no masses bilaterally
- Epididymis: present and normal
- Vas: palpable bilaterally
- Varicocele: grade 2 on left
- Penis: circumcised, orthotopic meatus, no plaques

Semen Analysis

Initial testing

- Semen analysis x 2
- Separated by ≥1 month (preferred)
- 2-3 day abstinence

Vol: 3.8 ml
Concentration: 7.2 million/ml
pH: 8.0
Motility: 24%
Morphology: 3%

Labs

LH: 4.6 (normal)
FSH: 3.5 (normal)
Testosterone: 287 (low)

Any other tests needed?

Imaging

Imaging is NOT routinely needed to diagnose a varicocele. It can be useful in indeterminate cases or in men who have a difficult physical exam

Grading Varicoceles

- Subclinical
  - Not palpable or visible at rest or during Valsalva maneuver but seen on scrotal ultrasound (>3 mm)
- Grade I (small)
  - palpable only during the Valsalva maneuver
- Grade II (moderate)
  - palpated without Valsalva
- Grade III (large)
  - visible through the scrotal skin and classically described as feeling like a “bag of worms”

What treatment would you offer?

Varicocelectomy

Indications for Treatment

American Society for Reproductive Medicine, 2014

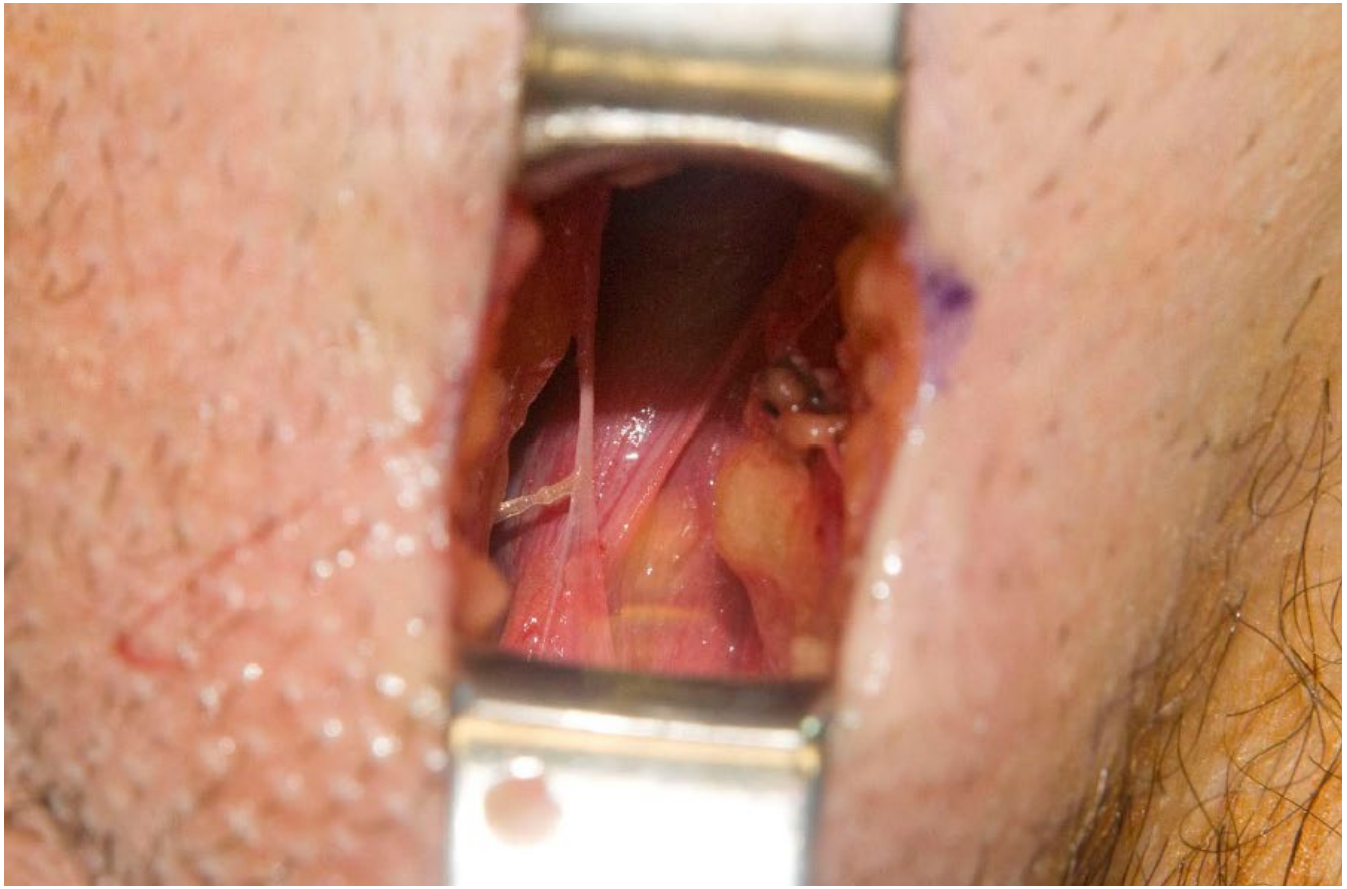
1. palpable on physical examination
2. the couple has known infertility or the male desires future fertility
3. the female partner has normal fertility or a potentially treatable cause of infertility, and time to conception is not a concern
4. abnormal semen parameters

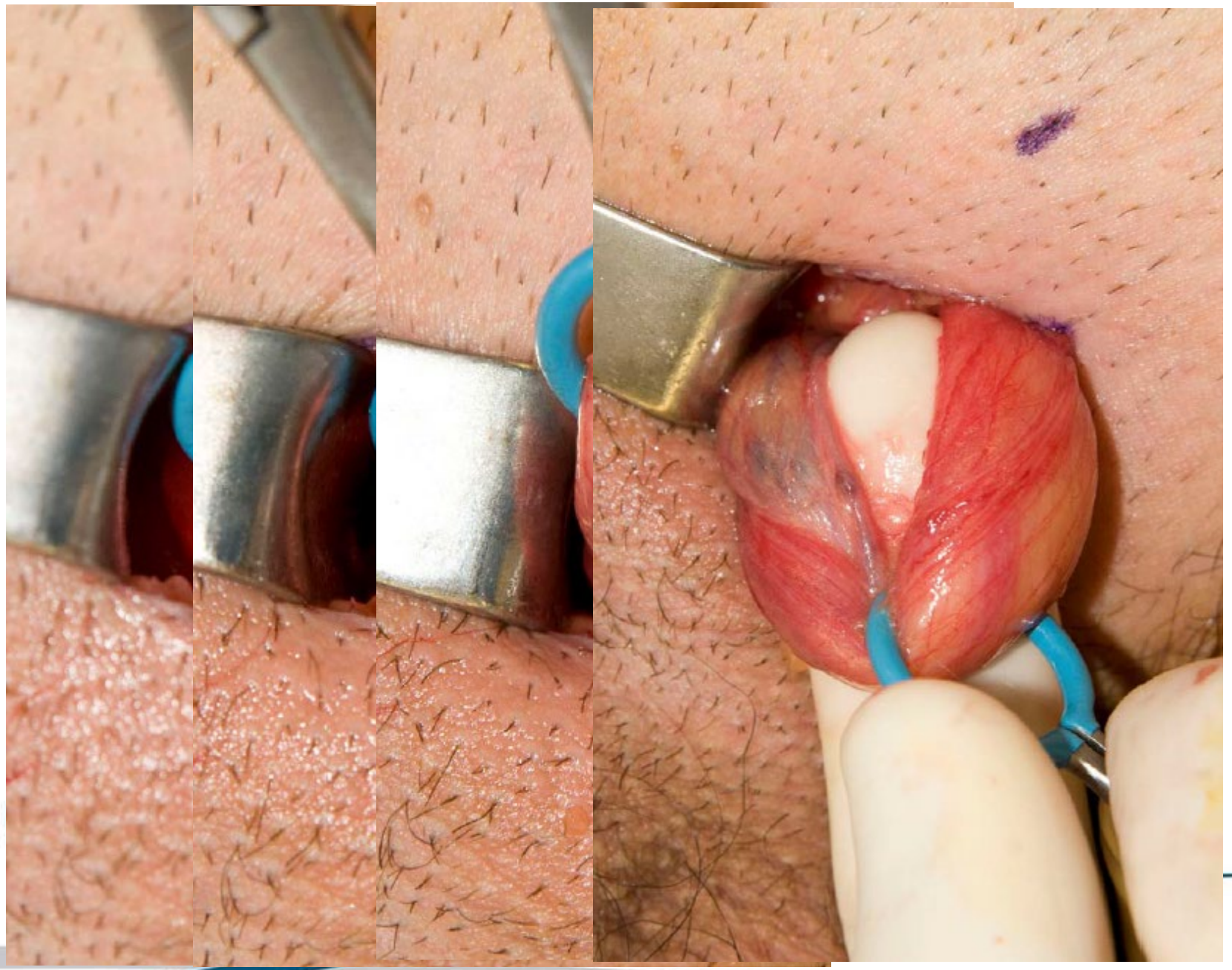
Which technique?

TECHNIQUE	ARTERY PRESERVED	HYDROCELE (%)	FAILURE (%)	POTENTIAL FOR SERIOUS MORBIDITY
Retroperitoneal	No	7	15-25	No
Conventional inguinal	No	3-30	5-15	No
Laparoscopic	Yes	12	3-15	Yes
Radiographic	Yes	0	15-25	Yes
Microscopic subinguinal	Yes	<1	1	No

Subinguinal Incision

Exposure of Spermatic Cord





Cord Elevation

Operating Microscope

Semen Parameters after varicocelectomy

Table 3. Preoperative and postoperative semen parameters of the infertility cases

Semen Parameters	Open			Laparoscopic			Microscopic		
	Preop	Postop	*P* Value	Preop	Postop	*P* Value	Preop	Postop	*P* Value
Sperm concentration (million/mL)	22 ± 4	40 ± 6	<0.01	21 ± 5	41 ± 6	<0.01	20 ± 5	42 ± 7	<0.01
Motility (%)	33 ± 4	48 ± 4	<0.05	31 ± 5	50 ± 5	<0.05	34 ± 3	52 ± 6	<0.05
Normal oval forms (%)	34 ± 2	36 ± 2	0.4	33 ± 3	35 ± 3	0.3	31 ± 4	32 ± 5	0.6

Data given as mean ± SD.
Preop = preoperative; postop = postoperative; SD = standard deviation.

Al-Kandari AM, Shabaan H, Ibrahim HM, Elshebiny YH, Shokeir AA. Comparison of outcomes of different varicocelectomy techniques: open inguinal, laparoscopic, and subinguinal microscopic varicocelectomy: a randomized clinical trial. Urology. 2007;69(3):417-420.

Pregnancy Rates

- Microscopic subinguinal varicocelectomy vs no treatment
- 145 patients
- Pregnancy
  - 32.9% (treatment) vs. 13.9% (no treatment) within the first year

Abdel-Meguid TA, Al-Sayyad A, Tayib A, Farsi HM. Does varicocele repair improve male infertility? An evidence-based perspective from a randomized, controlled trial. Eur Urol. 2011;59:455-461.

Varicocele Repair and ART

- Divided the patients into groups based on total motile sperm count
  - ICSI candidates (<1.5 million)
  - IVF candidates (1.5-5 million)
  - IUI candidates (5-20 million)
  - natural birth candidates (>20 million)
- All patients underwent varicocelectomy
- Half of the patients had a >50% increase in their total motile sperm count
  - 31% of couples moved from the ICSI or IVF groups to the IUI and natural birth groups
  - 42% of IUI candidates were upgraded to natural birth candidates

- Per Delivery cost
  - Varicocelectomy $26,268
  - IVF/ICSI $89,091

Cayan S, Erdemir F, Ozbey I, Turek PJ, Kadioğlu A, Tellaloğlu S. Can varicocelectomy significantly change the way couples use assisted reproductive technologies? J Urol. 2002;167:1749-1752.

Schlegel PN. Is assisted reproduction the optimal treatment for varicocele-associated male infertility? A cost-effectiveness analysis. Urology. 1997;49:83-90.

Mr. Ely

- He undergoes a left subinguinal microscopic varicocelectomy
- A repeat semen analysis 6 months after the procedure shows:
  - Vol: 3.5 ml
  - Concentration: 33.7 million/ml
  - pH: 8.0
  - Motility: 56%
  - Morphology: 4%

- 9 months after procedure you get a message from the patient that his wife is 20 weeks pregnant!

Take Home Messages

- Varicoceles are the most common cause of male factor infertility
- Treat *clinical* varicoceles only
- Microscopic ligation minimizes complications
- Improvement in semen parameters in 60% - 80%
- Improvement in pregnancy rates of 20% - 60%
- May avoid or upgrade ART in 30-50%