

Ultrasound – Scrotal Evaluation

PURPOSE:

To evaluate the testes, epididymis, and scrotum for abnormalities.

SCOPE:

Applies to all ultrasound scrotal studies performed in Imaging Services / Radiology

INDICATIONS:

- Signs (examples: mass, swelling) or symptoms (example: pain) associated with the scrotum
- Male infertility
- Localization of undescended testes
- Evaluate for testicular malignancy in the setting of risk factors or metastatic disease
- Abnormal scrotal findings on other imaging studies
- Evaluate for recurrent disease in the setting of known testicular cancer, lymphoma, leukemia
- Evaluate infertility, or risk factors for azoospermia such as absence of vas deferens

CONTRAINDICATIONS:

- No absolute contraindications

EQUIPMENT:

Linear array transducer with a frequency range of 7-18 MHz. Linear, sector, or curvilinear transducer with a lower frequency range may be required for appropriate penetration and resolution if the scrotum is enlarged.

PATIENT PREPARATION:

- None

EXAMINATION:

GENERAL GUIDELINES:

A complete examination includes evaluation of the scrotal wall, entirety of both testes, and epididymides, and other scrotal contents.

EXAM INITIATION:

- Introduce yourself to the patient and family
- Verify patient identity using patient name and DOB
- Explain test
- Obtain patient history including symptoms. Enter and store data page
- Place patient in supine position

TECHNICAL CONSIDERATIONS:

- Review any prior imaging, making note of abnormalities or other findings requiring further evaluation.
- Size, echogenicity, and vascularity of each testes and epididymis should be compared to the contralateral side, preferably in the same image (side-by-side transverse view).

- Spectral Doppler of the testes is required if testicular torsion is the indication for the exam or if asymmetry of testicular color Doppler flow is seen. Document arterial and venous waveforms within each testis.
- Epididymis is best evaluated from posterior oblique approach. Thickness of the epididymis is measured perpendicular to its long axis.
- Scrotal skin thickness should be measured and compared to the contralateral side. Scrotal wall should be measured from skin surface to inner echogenic layer (tunica vaginalis). No significant probe pressure should be applied, and a thick layer of gel should be used.
- If a palpable abnormality is the indication for the exam, this area should be directly imaged and annotated as area of concern.
- Additional techniques such as Valsalva maneuver (for hernia or varicocele detection) or upright imaging may be used, as indicated.
- Varicocele should be documented in grayscale and color Doppler, without and with Valsalva.
 - If patient is unable to produce sufficient Valsalva, or reports that abnormality only felt with standing, then images should be repeated with patient standing.
 - Varicocele is measured on grayscale (B-mode) image only (NOT Doppler image), inner wall-to-inner wall.
- Focal abnormalities should be documented without and with size measurements and color Doppler.
- Cine sweeps of each testis and any focal abnormalities should be provided.
 - Cine loops should be slow enough to minimize blur. Good transducer contact must be maintained, and other artifacts minimized.
 - Cine loops are not a substitute for high-quality still images
- If indications include infertility, azoospermia, cystic fibrosis, Kartagener's syndrome/situs inversus, localization/identification of the vas deferens is needed.
 - This includes imaging of the inguinal canal/spermatic cord, without and with compression and color Doppler, to confirm presence of vas deferens (see Appendix).
 - An attempt should also be made to identify the insertion of the ejaculatory duct into the base of the prostate, anterior and medial to the seminal vesicles, at the base of prostate (see Appendix).
 - Thorough evaluation of the epididymides should be included.

DOCUMENTATION:

- Testes
 - Grayscale:
 - Measurements:
 - Longitudinal measurement in LONG orientation at mid-testis;
 - Transverse measurements in TRV at mid-testis, first along mediastinum testis, second perpendicular to first;
 - 2-on-1 dual screen images preferred.
 - Longitudinal images (annotated M->L):
 - Medial
 - Midline
 - Lateral
 - Transverse images (annotated S->I):
 - Superior pole
 - Mid superior

- Mid
 - Mid inferior
 - Inferior pole
 - Doppler:
 - Transverse side-by-side image of both testes with grayscale and color Doppler
 - Representative longitudinal color Doppler of each testis
 - Arterial spectral Doppler waveform of each testis
 - Venous spectral Doppler waveform of each testis
 - Cine sweep of each testis, longitudinal and transverse.
- Epididymides
 - Grayscale:
 - Longitudinal images:
 - Head without and with thickness measurement
 - Body
 - Tail
 - Representative color Doppler images
 - Cine sweep of any subtle or equivocal abnormality.
- Scrotal Wall
 - Scrotal wall without and with bilateral thickness measurements (side-by-side transverse view)
- Other Scrotal Contents
 - If hydrocele is seen:
 - Representative grayscale images, longitudinal and transverse
 - Stationary cine images of mobile debris, if present
 - If varicocele is suspected:
 - Grayscale Color Doppler images without and with Valsalva and/or standing
 - Dual-screen format preferred
 - Transverse vessel measurements on B-mode image, inner wall-to-inner wall, without and with Valsalva and/or standing
 - Dual-screen format preferred
 - For focal abnormalities, images without and with measurements and color Doppler, and cine sweeps should be provided.
- Cine sweep through any abnormality
- Vas Deferens (if indication includes infertility, azoospermia, cystic fibrosis, etc).
 - Trans and Long images of each inguinal canal, focused on the spermatic cord
 - At the pre-pubic, suprascrotal, and intrascrotal segments (see Appendix)
 - Without and with color Doppler
 - Without and with compression
 - Transverse trans-abdominal image through bladder of prostate base
 - Identify seminal vesicles
 - Identify vas deferens (inserting medial and anterior to seminal vesicles at prostate base; see Appendix)

- Data page(s)

PROCESSING:

- Review examination images and data
- Export all images to PACS
- UTSW: Confirm data in Imorgon
- Document relevant history and any study limitations

REFERENCES:

ACR-AIUM-SRU Practice Guideline (Revised 2010)

REVISION HISTORY:

SUBMITTED BY:	David T. Fetzer, MD	Title	Medical Director
APPROVED BY:	David T. Fetzer, MD	Title	Medical Director
APPROVAL DATE:	11-09-2015		
REVIEW DATE(S):	09-24-2018		Jeffrey Pruitt, MD
REVISION DATE(S):	01-24-2016	Brief Summary	
REVISION DATE(S):	12-10-2017	Brief Summary	Clarified use of cine sweeps through each testis, and through focal abnormalities
	09-24-2018; Pruitt		No changes
	01/28/2019	D Fetzer	Included additional details on evaluating scrotal varicocele
	07/14/2020	D Fetzer	Minimized number of image needed in LONG of each testis
	09/16/2020	D Fetzer	Clarified orientations for the 3 orthogonal measurements of testes
	06-21-2022		Added information regarding imaging vas deferens, when indicated

Evaluation of vas deferens by ultrasound

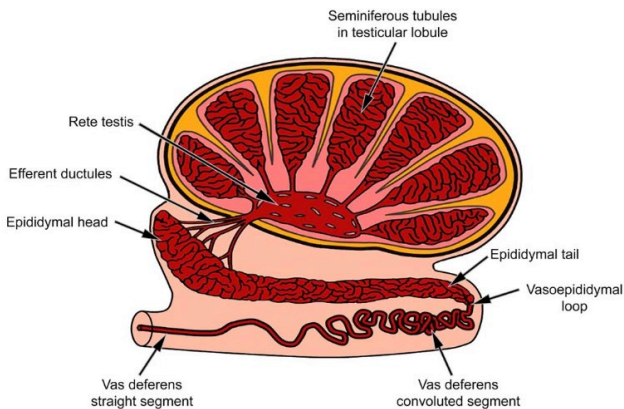


FIGURE 1. Diagram showing anatomy of the vas deferens, epididymis, and testis.

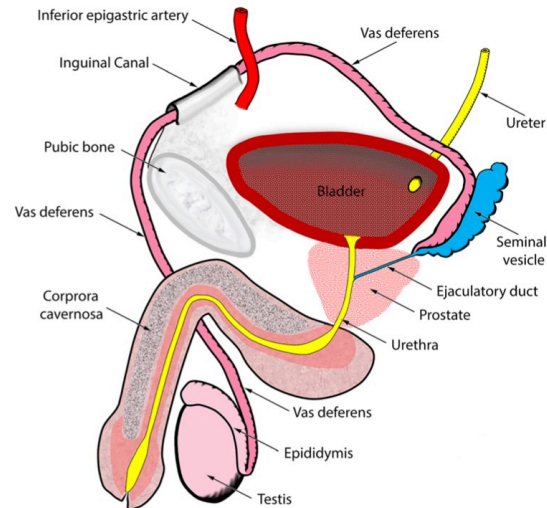
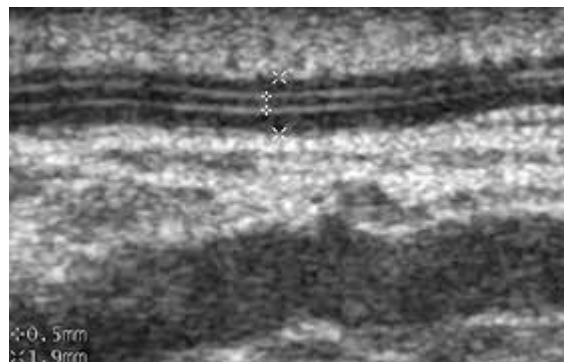


FIGURE 2. Diagram showing the entire course of the vas deferens. After the vas deferens exits from the inguinal canal it travels lateral to the inferior epigastric artery and medial to the ureter. It ultimately runs medial to the seminal vesicle and drains into the ejaculatory duct.

1. Find vas deferens as a non-vascular, non-compressible tube in spermatic cord
2. Best seen in the pre-pubic region (usually within lateral spermatic cord).



3. Trace inferiorly into the supra-scrotal segment to best visualize inner lumen.



Transverse view (LEFT, with compression) shows collapsed inguinal canal vessels. The vas deferens (arrow) is non-compressible, appearing as a hypoechoic ring or target (hypoechoic muscular wall with central echogenic outline of thin lumen). Longitudinal view (RIGHT) shows the vas deferens appearing as a hypoechoic tube with hypoechoic muscular wall (outer calipers) and central echogenic lines (inner calipers) of the central lumen.

4. Intra-scrotal segment of vas deferens (V), at epididymal tail (E), find vasoepididymal loop (*)

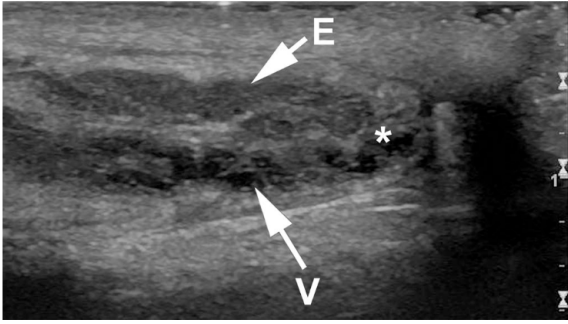
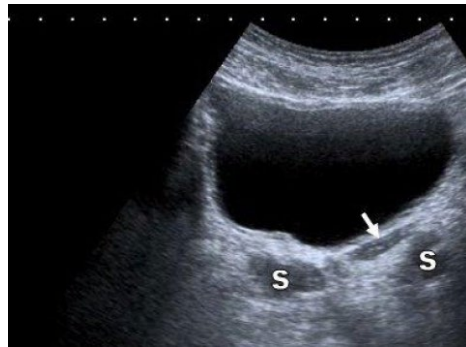


FIGURE 5. Normal scrotal segment of the vas deferens. A, Longitudinal view obtained lateral to the testis shows the epididymis (E) anterior to the vas deferens (V) and the tight vasoepididymal loop (*) formed at their junction. The tortuosity of this segment of the vas deferens leads to its appearance as a series of contiguous circular and curvilinear structures. In this case the lumen is slightly distended and is visible in some areas. B, Video shows the vasoepididymal loop and the relationship between the epididymis and the vas deferens.

5. Vas deferens anterior and medial to seminal vesicles; enters prostate base as combined ejaculatory duct



Transabdominal, bladder as acoustic window, vas deferens (arrow) anterior and medial to seminal vesicles (S) prior to joining as ejaculatory duct, which enters the medial prostate base

Normal thickness: 1.5 to 2.7 mm; lumen diameter 0.2 to 0.7 mm.

Ancillary features of absence of the vas deferens:

- Abnormal appearance of epididymides
 - Segmental atrophy/absence (body and tail)
 - Tubular ectasia (fine meshwork appearance)
 - Cysts/cystic change (honeycombing)

References:

- Kerr DM, Middleton WD, Ultrasound of Normal and Abnormal Vas Deferens, *Ultrasound Quarterly* 2022
- *Ultrasound Quarterly* 2017;33:153-156
- *Journal of Ultrasound in Medicine* 2021;40:1085-1090