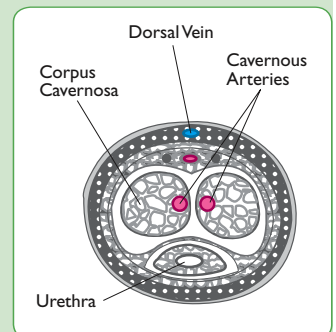
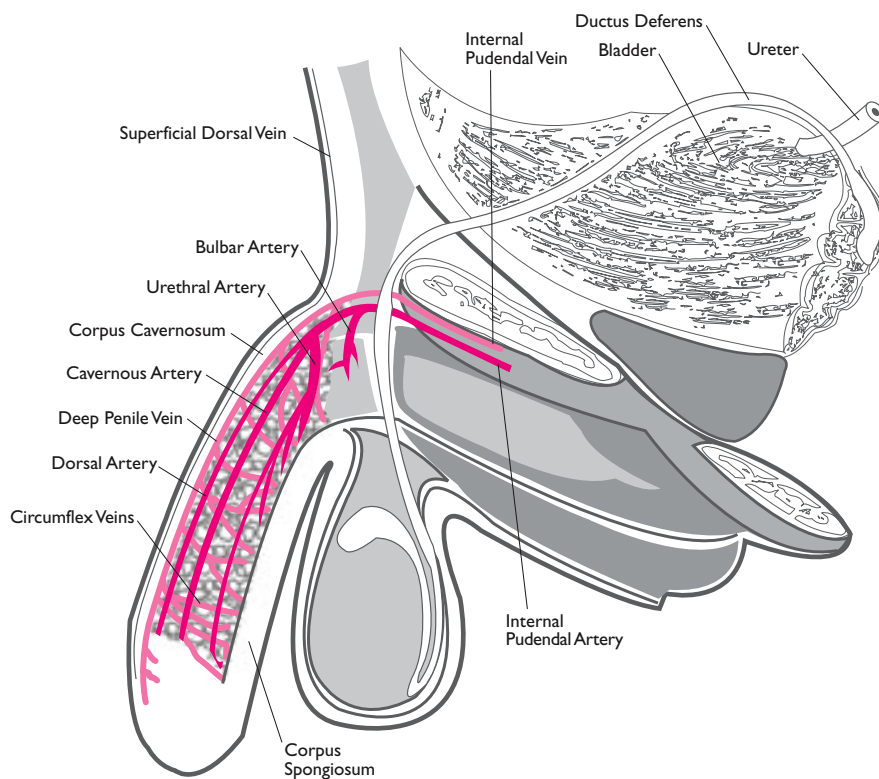


Techniques and Criteria for the Diagnosis of Vasculogenic Impotence

Anatomy

The corpora cavernosa forms the main part of the body of the penis. These structures are located dorso-laterally and divided by a fibrous tissue, the medium septum. Arterial supply to the penis flows from the internal iliac artery through the internal pudendal artery. After branching, the internal pudendal artery becomes the penile artery. This artery is a short segment that divides into four terminal branches:

- Dorsal artery (feeding the skin and glans)
- Urethral artery (supplying the corpus spongiosum and urethral tissue)
- Bulbar artery (feeding the urethral bulb and bulbourethral gland)
- Cavernous artery (cavernosal, supplying the erectile tissue of the corpus cavernosum)



Drainage from the corpora cavernosa is provided by the emissary or circumflex veins that empty into the deep dorsal vein. The proximal portions of the corpora cavernosa are drained by deep penile veins that join with urethral veins draining the corpus spongiosum and eventually draining into the internal pudendal vein. The superficial dorsal vein drains the skin and subcutaneous tissue.

The hemodynamic changes that occur in a normal physiologic erection result from a relaxation of the smooth muscle of the cavernous arterioles and sinusoids resulting in dilation and an increase in blood flow. The distension of the sinusoids creates a mechanical compression of the draining venules restricting venous outflow.

Penile Ultrasound to Rule Out Vasculogenic Impotence

Indications

- Impotence
- Decreased erectile duration

Patient Preparation

The patient is supine with the penis placed dorsally on the pubic area. Rolled washcloths on either side of the penis may be helpful at times for stabilization.

Technique

- To examine the penile arteries, begin with the appropriate equipment setup parameters. These include:
 - low wall filter
 - low color PRF
 - color map that displays slow flow
 - appropriate small parts or slow flow setups
- Begin at the base of the penis, with the penis in a flaccid state. Images should be obtained both in transverse and sagittal views.
- During the scan, the echogenicity of the corpora cavernosa should appear homogeneous throughout. Any increased echogenicity may indicate an area of fibrosis.
- While in the flaccid state, measure the diameter of each of the cavernous arteries. *Note: These arteries vary considerably and there are no absolute normal or abnormal values currently being used.*
- Obtain intimal diameter measurements in grayscale and record a pulsed Doppler signal.
- At this time, a vasoactive agent, such as Prostaglandin E-1 or Papavarine, is injected into the corpora cavernosa. The clinical response is graded as to firmness, rigidity and the ability to penetrate.
- Patient is then rescanned to assess dilatation of the cavernosal arteries in response to the drug.

Clinical Assessment

A normal artery should demonstrate a 75 - 100 percent increase in diameter. The spectral waveform can also offer qualitative information in evaluating arterial disease.

A normal waveform should show a peak systolic increase of 75 - 100 percent post injection. A quick acceleration phase shows a higher percentage of change in vessel diameter and a good clinical response.

Measurements taken post injection should always denote the time lapse since the drug was administered. Taking serial measurements will ensure proper documentation while the drug is demonstrating its maximum effect. During this peak period, researchers believe that if an end diastolic component is present, and if the end diastolic component is $>.05$ cm/s, there is sufficient venous leakage resulting in either an inadequate erection or a diminished erection duration.

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