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Guidelines, Policies and Statements

Guidelines for Penile Colour Duplex Ultrasound Examination

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Table of Contents

1.	Introduction	3
	1.1. Purpose	3
	1.2. Scope/Applicability	3
2.	The Examination	3
	2.1. Pre-Injection	3
	2.2. The Injection	3
	2.3. Post-Injection	4
3.	Diagnostic Criteria	4
4.	Post Examination	5
5.	Related and Supporting Documents	5
6.	References	6

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1. Introduction

The Australasian Society for Ultrasound in Medicine (ASUM) is a multidisciplinary society whose mission is to advance the clinical practice of diagnostic medical ultrasound for the highest standards of patient care. A primary aim of ASUM is to promote, educate and disseminate standards of ultrasound practice in this continually developing specialty.

1.1. Purpose

The penile colour duplex examination is typically performed for either:

- Assessment of penile morphology for clinical indications such as penile trauma, lumps, infection or when there is suspicion of Peyronie's disease and/or
- Erectile dysfunction; This requires an intracavernosal injection of a pharmacostimulant[1] and is typically indicated after there has been equivocal or abnormal response to oral pharmacological agents (PDE-5 inhibitors).

This policy largely focuses on the use of colour duplex ultrasound indicated by erectile dysfunction.

1.2. Scope/Applicability

These guidelines are applicable to all ultrasound practitioners.

2. The Examination

2.1. Pre–Injection

- The examination should be performed in a quiet and relaxed environment, free of interruption.[2] The examination should be explained in detail and verbal consent must be obtained. The low risk of priapism should be clearly stated.[1]
- A high-frequency linear transducer is used to perform a B-mode/colour Doppler examination of the penis. There are variable techniques to scanning this region, however, using a gown or towel to fix the penis with the dorsal aspect accessible can be very useful. The corpus cavernosa, corpus spongiosum and glans are evaluated. The dividing penile septum is a valuable echogenic landmark. Prior to injection, the cavernosal arteries will be seen as fine echogenic parallel lines. Variations in vascular anatomy are common and are rarely of clinical significance.

2.2. The Injection

- Careful consideration should be given to the dose and recommended injection protocol of the pharmacostimulant. Follow the dosage recommendations on the product guidelines. A lesser dose can be given to a patient who is highly suspected of having psychogenic impotence, as this will decrease the risk of priapism. The higher dose will be more suitable

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for those who are suspected of having either arterial or venous sources of impotence. Too low of a dose, however, can create a confusing/non-diagnostic result.

- A single injection into the base of one of the cavernosa is generally sufficient as the agent will disperse into both sides of the penis. A second injection may be considered if there has been an inadequate response to the first injection. Patient anxiety may reduce the initial response. The risk of priapism should be kept in mind.

2.3. Post-Injection

- The response of the agent will be almost immediate. Spectral Doppler waveforms should be performed at 0 minutes, 2 minutes, 5 minutes, 10 minutes, 15 minutes, 20 minutes and 25 minutes, in the proximal 1/3 of each cavernosal artery.
- The peak systolic velocity (PSV) and end-diastolic velocity (EDV) should be recorded using a Doppler angle of 60º. If 60º is not possible, as near to 60° should be obtained.
- Late erectile responses at 30 to 40 minutes have been reported. A response can be assisted by getting the patient to sit up and mobilise*.
- A local protocol should be established to determine whether visual or manual stimulation should be used to augment the response. Typically, it is not required, and most reported criteria have not used this technique.
- The examination can be curtailed if normal arterial and venous responses are obtained prior to 30 minutes.
- The engorged penis provides another opportunity for B-mode and colour Doppler? evaluation of the plaques, fibrosis and anatomical/structural change. Particular attention for fibrous plaques along the tissue plane, immediately deep to Buck's fascia. This should be performed across the examination period.

3. Diagnostic Criteria

a) The sonographer/sonologist conducting the examination should be aware of the typical waveforms seen in a normal and abnormal setting.

b) B-mode; Anatomical asymmetry, septum, tunica albuginea, plaques/calcification at/deep to Bucks fascia, masses, vascular malformation should be evaluated in detail and any abnormalities should be documented and described.

c) Arterial evaluation; Immediately post injection, there will be increases in the size of the cavernosal arteries and the blood flow. Variable thresholds are reported in the literature for establishing sufficient arterial supply to the penis. Cavernosal arterial PSV >35cm/s is widely recognised as being normal.[3] Less than 25cm/s is generally accepted as inadequate arterial supply.[4] PSV's around these thresholds should be interpreted with caution. Other locally validated criteria may be applied.

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d) Venous evaluation; With increasing intracavernosal pressure, there should be diminishing flow in diastole.[1] This indicates an appropriate venous response. Persistent significant end diastolic flow is typical when there is venous leakage. Sustained EDV greater than 5-7cm/s[5,6] is evidence of venous incompetence. Other locally validated criteria may be applied.

e) It is important to recognise that venous response is dependent on arterial supply. Inadequate arterial supply will limit the amount of venogenic response, and this decreases the sensitivity and specificity of using EDV to assess venogenic incompetence.

f) Diagnostic criteria are provided as guidelines and should be locally validated whenever possible.

g) The degree of erectile response and patient satisfaction with the response should reported.

4. Post Examination

Adequate and representative images should be recorded.

The patient should be given clear warning about the need to follow up a persisting erection in the event of priapism. This should include a pathway for getting further care; advise as needed.

5. Related and Supporting documents

The following documents are required to give effect to this guideline:

1. ASUM Guidelines for Reprocessing Ultrasound Transducers.

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6. References

The following documents inform this guideline:

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