Reproductive Ultrasonography in Stallions and Geldings

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Ultrasonographic evaluation of the internal and external reproductive tract of stallions is considered an adjunct to the traditional breeding soundness exam. Knowledge and familiarity with the ultrasonographic appearance of a normal stallion or gelding’s reproductive tract can be used as an important tool that allows the veterinarian to detect pathology and intervene in an appropriate and timely manner, as well as provide assessment of a healthy stallions potential book size or sperm production. The use of a linear 7.5 MHz or high-frequency transducer and a knowledge of the stallion’s anatomy allows for excellent visualization of structures and should permit evaluation for all that is described below. Often a 7.5-10 MHz curvilinear transducer is chosen to assess the internal reproductive tract of stallions with narrow pelvic inlets, but there is no difference in measurements when these two methods are compared. Most geldings and stallions permit rectal palpation and ultrasonography as well as transcutaneous ultrasound of the inguinal, perineal and penile regions, but sedation should be used if there is any concern that the examination process is unsafe.

**STALLION**

<table>
<thead>
<tr>
<th><strong>Dorsal View Of The Internal Reproductive Tract Of Stallions and Geldings</strong></th>
<th><strong>Lateral View Of Stallion Scrotal Contents</strong></th>
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<tbody>
<tr>
<td><strong>Anatomy</strong></td>
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<tr>
<td>BLADDER</td>
<td>URETER</td>
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<tr>
<td>AMPULLA</td>
<td>SEMINAL VESICLE</td>
</tr>
<tr>
<td>PROSTATE</td>
<td>BULBOURETHRAL GLAND</td>
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<tr>
<td>Scrotum</td>
<td>Spermatogenic Cord</td>
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<tr>
<td>Head of the Epididymis</td>
<td>Head of the Epididymis</td>
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<tr>
<td>Vaginal Tunic</td>
<td>Tail of the Epididymis</td>
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<tr>
<td>Testis</td>
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External Evaluation

Scrotal Contents:

1) Testes:

   a. Testicular measurements (length, width, height) can be used to estimate a stallion's predicted daily sperm output (DSO), predicted book size, and spermatogenic efficiency.

   Formula for calculating DSO:

   1. Testicular volume of each testicle is calculated by using the measurements taken in centimeters of the testicle length, width, and height. Using ultrasound only the testicular parenchyma is included in this measurement.

   \[
   \text{0.523} \times \text{Length} \times \text{Width} \times \text{Height} = \text{testicle volume}
   \]

   2. The volume of each testis is added to yield the estimated total testicular volume (TTV).

   3. The TTV is used in the following formula: the number of billion sperm that a stallion would be expected to produce on a daily basis after approximately 10 days of daily semen collection\(^1\).

   \[
   \text{DSO (in billion)} = 0.024 \times \text{TTV} - 0.76
   \]

   Using this estimated volume it has been suggested that one can predict the book size and covers/day a stallion would be able to fulfill and to render efficiently pregnant\(^2\).

<table>
<thead>
<tr>
<th>Testicular Volume (ml)</th>
<th>Range in Predicted DSO</th>
<th>Number of Covers/Day</th>
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<tbody>
<tr>
<td>200</td>
<td>3.54-4.04</td>
<td>2.26-2.69 (2 and occasionally 3)</td>
</tr>
<tr>
<td>250</td>
<td>4.74-5.24</td>
<td>3.16-3.69 (3)</td>
</tr>
<tr>
<td>300</td>
<td>5.97-6.44</td>
<td>3.96-4.29 (4)</td>
</tr>
<tr>
<td>350</td>
<td>7.14-7.64</td>
<td>4.76-5.09 (5)</td>
</tr>
</tbody>
</table>

   This assumption is based on a presumed requirement of 1.5 billion total sperm per cover. If a lesser number is required per cover, correspondingly more covers would be available per day.


   b. Parenchyma and associated structures should be evaluated for changes in echogenicity outside of the normal range which may indicate trauma, degeneration, edema, neoplasia, abnormal blood flow (torsion), or an abscess.

2) Spermatic cord:

   a. The spermatic cord can be evaluated and compared to the contralateral cord for changes in blood flow, varicosities, trauma, edema, torsion, entrapped bowel or neoplasia.
3) **Epididymides:**
   a. The orientation of the testes is evaluated by palpation and can be confirmed using transcutaneous ultrasound. The lumen is larger in the tail of the epididymus and becomes smaller in the body and head of the epididymus. Cysts, abscesses, and abnormal dilations may be significant in stallions with subfertility.

**Penis:**

Ultrasonography of the penis is performed to aid in identifying affected regions of trauma, blood flow, the presence of foreign bodies, extent of neoplasia (squamous cell carcinoma), and may help give a more accurate prognosis and more appropriate treatment plan given the findings.

**Internal Evaluation**

The internal reproductive tract, pelvic urethra, and bladder of most stallions and geldings are located within 16 inches of the anus, requiring less invasive palpation as is often the case in the mare.

**Inguinal rings:** These are often identified first by palpation and feel like small slits, similar to the feeling of slipping your hand into a shirt pocket, at the ventral inguinal region lateral to the bladder. By identifying the ampullae and following them cranially and then ventrally, the inguinal ring can also be located. Palpation and ultrasound can be used to assess the size of the inguinal rings, the normal and abnormal structures which pass through, determine the location of cryptorchid testes, and identify enlarged lymph nodes which may alter prognosis in cases of neoplasia (squamous cell carcinoma).

**Aorta:** The terminal aorta can be a site of thrombosis and abnormal ejaculatory sequence in some stallions, and can be evaluated easily by turning the probe dorsally against the ventral aspect of the spine and sacrum over the area of palpable heartbeat. Thrombosis, vascular anomalies, hematomas, abscesses can be identified this way.

**Urinary:** The bladder, ureters and pelvic urethra are easily examined in the pelvic inlet once the location of them is understood and the normal ultrasonographic appearance is recognized. This may help in identifying cystoliths, sabulous cystitis, ureteroliths, abnormalities of the pelvic urethra (edema, rents, fibrosis), and neoplasia.

**Accessory sex glands:** Normal ultrasonographic measurements of the accessory sex glands of stallions and geldings have been reported.

1) Bulbourethral glands
2) Prostate
3) Seminal vesicles/Vesicular glands
4) Ampullae
5) Urethral glands

**Seminal colliculus:** Cysts, occlusion, air
GELDINGS

The reproductive tract is rarely requested to be evaluated unless there is an issue. Ultrasound is helpful in identifying regions of abnormalities.

REFERENCE

1) McKinnonn pg 2785 Reproductive Efficiency Nath, LC.