Management and health of the bull’s genital tract
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Plain City, Ohio
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Pathway of sperm through the male genital system
To accurately evaluate a bull, it is important to know the anatomy of the efferent sperm pathway

Evaluating problems of the male genital system

1. External genitalia: Scrotum, testicles, and epididymides
   Examination of the scrotum, testicles, and epididymides is done by manual palpation.
   An ultrasound examination of the scrotum may be conducted.
   The scrotal circumference is measured regularly.

Scrotum, testicles, and epididymides
Problems are with:
- Volume of the testicles,
- Asymmetry of testicles,
- Health of testicle, and
- Impediments of sperm passage through the epididymis.

Problems are with:
- Softness of testicles.
- Hardness or swelling along the path of the epididymis.
- Infrequently pus in semen.
- Rarely blood in semen.

Scrotum, testicles, and epididymides
Palpation enables the veterinarian to assess the general health of the testicular tissue and related structures.

Ultrasound evaluation provides a detailed view of the mediastinum testis and testicular parenchyma.
Scrotal circumference, for yearling dairy bulls

From literature or textbook sources

<table>
<thead>
<tr>
<th>Age (m)</th>
<th>Mean (cm)</th>
<th>Age (m)</th>
<th>Mean (cm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>30.0 ± 3.3 cm</td>
<td>7</td>
<td>33.4 ± 3.4 cm</td>
</tr>
<tr>
<td>10</td>
<td>42.4 ± 3.7 cm</td>
<td>11</td>
<td>45.4 ± 3.8 cm</td>
</tr>
</tbody>
</table>

From Select Sires data, 1988

<table>
<thead>
<tr>
<th>Age (m)</th>
<th>Mean (cm)</th>
<th>SD (cm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.0-5.9</td>
<td>18.9</td>
<td>1.6</td>
</tr>
<tr>
<td>6.0-6.9</td>
<td>21.9</td>
<td>2.5</td>
</tr>
<tr>
<td>7.0-7.9</td>
<td>24.3</td>
<td>2.4</td>
</tr>
<tr>
<td>8.0-8.9</td>
<td>26.6</td>
<td>2.4</td>
</tr>
<tr>
<td>9.0-9.9</td>
<td>28.6</td>
<td>2.3</td>
</tr>
<tr>
<td>10.0-10.9</td>
<td>30.5</td>
<td>2.1</td>
</tr>
<tr>
<td>11.0-11.9</td>
<td>31.7</td>
<td>2.2</td>
</tr>
<tr>
<td>12.0-12.9</td>
<td>32.7</td>
<td>2.0</td>
</tr>
</tbody>
</table>

JAVMA, Vol 192, 1988, pp. 766-768

Growth of testicles (measured by SC) reflects cellular development

Rapid growth of the testicles from 5-10 months of age reflects pre-pubertal, cellular development in the seminiferous tubules.

When can collection of semen commence?

Calves that remain < 2 sd have testicular hypoplasia.

Management issue in yearling bulls: Low sperm cell production

- Evaluate SC history
  - Is SC stable, or showing late growth trend?
- Evaluate SC relative to expected size, by age
  - If SC > 2 sd below average for age, consider it as testicular hypoplasia, cull bull.
  - If SC is 1 to 2 sd below av for age, evaluate sperm production, but bull is a probable cull.

Management issue in yearling bulls: Low sperm cell production

Calves that remain < 2 sd have testicular hypoplasia.
Management issue in yearling bulls: Low sperm cell production

• If SC is normal, or above average, evaluate the size of the cauda epididymides.  
  • Epididymides may grow more slowly than testicles.

Evaluating the size or presence of the cauda epididymis

From a population of 13,460 yearling bulls residing at Select Sires over a 36-year interval...

391 bulls (2.9%) had marked hypoplasia of the cauda epididymis when ≤ 10m. But, most of these 391 dairy bull calves were late maturing such that only 32 (0.24%) were culled for low sperm production associated with a markedly hypoplastic cauda epididymis at 16 to 18 months of age.

Evaluating the size or presence of the cauda epididymis

Normal size

Aplastic

36 bulls (0.12%) had unilateral aplasia of the cauda epididymis. Eight cases affected the Left cauda and 8 cases affected the Right. Because the aplasia is unilateral, sperm can be collected from an affected bull, albeit in lower than normal numbers. But do you want to buy or recommend purchase of “half a bull?”

Incomplete testicular descent into the scrotum

Of the 13,460 yearling bulls evaluated at Select Sires over a 36 year interval, 25 bulls (0.19%) had unilateral incomplete testicular descent.

A few common pathologic conditions of the external genitalia

Incomplete testicular descent into the scrotum

Epididymitis

Of the 13,460 yearling bulls, there were 11 cases (0.08%) of chronic fibrotic cauda epididymitis.
Scrotal hematoma, subsequent to traumatic injury

1. Affected side of scrotum initially distended with blood

2. After several months the clot is resorbed and the affected testicle degenerates

Genitalia located in the pelvic canal of the bull

Examination is by manual palpation via the rectum with a gloved/sleeved arm.
- Problems are associated with abnormal swelling of the vesicles and firm or hard tissues.
- May observe pus in semen.
- May occasionally observe old blood (tan or brown) in semen.

Seminal vesicles, normal

Vesiculitis

Of the 13,460 yearling bulls evaluated, 60 bulls (0.45%) were culled for vesiculitis.

Etiology of vesiculitis

- Infection
  - Ascending
  - Descending
  - Hematogenous

- Inflammatory
  - Congenital malformation
    - Understand anatomy of the colliculus seminalis

Colliculus seminalis

Normal orifices

Congenitally abnormal orifices
3. Examination of the penis

Examination is usually by the collector. Secondly by a DVM.

Problems may be:
- Irritated epithelium (skin)
  - Skin reddened; spotty
  - If blood in semen, it's fresh, or red
- Injury to penis
  - Cut or laceration.
- Wart (yearling bulls)
- Persistent penile frenulum
- Irritated urethra
  - Very rare

Exam of the penis by the collector and collecting semen

- It is important to position the AV near the glans penis and at the same angle as the penis.

Persistent penile frenulum

Prior to correction

After ligation and cutting the frenulum

Epithelial avulsion of the penis, at the fornix

Penile tissue 'separated' at fornix

Separated epithelium sutured

Penile fibropapilloma

Diagnostic testing considerations for *Tritrichomonas fetus* and *Campylobacter fetus* subsp. *venerealis*
Trichomonas fetus and Campylobacter fetus subsp. venerealis

Diagnostic testing schedule for bulls entering a CSS-approved AI Center

<table>
<thead>
<tr>
<th>Pre-entry</th>
<th>Admittance</th>
<th>Resident herd</th>
</tr>
</thead>
<tbody>
<tr>
<td>No tests conducted pre-entry</td>
<td>If bull &lt; 6 m old, 1 test</td>
<td>Retest all animals every 6 months</td>
</tr>
<tr>
<td>If 6 to 12 m old, 3 tests, weekly</td>
<td>If ≥ 12 m old, 6 tests, weekly</td>
<td></td>
</tr>
</tbody>
</table>

Trichomonas testing method

A sterile collection pipette with attached 0.5 oz rubber bulb is passed up the prepuce to the fornik.

Trichomonas testing method

- The length of the pipette used to procure a preputial specimen is dependent on:
  - The size and breed of the bull
  - How close to the bull and its preputial orifice the veterinarian wants to be when taking the specimen.

- Pipette lengths available:
  - 28” (71 cm). Available from Continental Plastics, #88-5831
  - 25” (63 cm). Sold for equine therio work
  - 22” (56 cm). Sold for equine therio work
  - 21” (53 cm). Standard infusion pipette
  - 18” (45 cm). Standard infusion pipette

Trichomonads prefer a microaerophilic environment, and the fornik of the prepuce provides that microenvironment.

Preputial lengths in bulls

<table>
<thead>
<tr>
<th>Breed</th>
<th>Age (m)</th>
<th>Mean length (inches)</th>
<th>Mean length (cm)</th>
<th>s.d.</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Holstein</td>
<td>6 to 8.9</td>
<td>13.5</td>
<td>34.3</td>
<td>3.9</td>
<td>45</td>
</tr>
<tr>
<td>Holstein</td>
<td>9 to 11.9</td>
<td>15.2</td>
<td>38.5</td>
<td>4.1</td>
<td>25</td>
</tr>
<tr>
<td>Holstein</td>
<td>12 to 23.9</td>
<td>17.6</td>
<td>44.7</td>
<td>2.9</td>
<td>51</td>
</tr>
<tr>
<td>Holstein</td>
<td>24 to 59.9</td>
<td>20.5</td>
<td>52.0</td>
<td>3.2</td>
<td>24</td>
</tr>
<tr>
<td>Angus</td>
<td>≥ 24</td>
<td>18.5</td>
<td>46.9</td>
<td>4.7</td>
<td>31</td>
</tr>
<tr>
<td>Hereford</td>
<td>&gt; 24</td>
<td>23.0</td>
<td>58.8</td>
<td>1.7</td>
<td>4</td>
</tr>
<tr>
<td>Simmental</td>
<td>≥ 24</td>
<td>20.6</td>
<td>52.4</td>
<td>2.9</td>
<td>5</td>
</tr>
</tbody>
</table>

The preputial epithelium is scraped with the pipette. The sample is placed in a sterile vial before inoculating the transport medias.