Displaced Abomasum

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Outline: Displaced Abomasum

- History and Signalment
- Pathophysiology
- Diagnosis
  - Clinical signs, clin path, R/O’s
- Treatment
  - Non-surgical
  - Surgical (4 approaches)
  - Ancillary care (Fluids, Abx, ...)
- Risk Factors for LDA
Displaced Abomasums

- DA’s, LDA’s, RDA’s, RTA’s
- Adult lactating dairy
- Production problem
- Herd problem [related to nutrition]
- Majority of DA’s have concurrent diseases
**History and Signalment of DA**

- **Age:** older lactating dairy cattle
- **Timing:** 80% occur during first month after parturition
- **Nutrition:**
  - Dry cow rations: +DCAD / inadeq efv fiber
  - Fresh cow: excess NSC’s / inadeq efv fiber
- **Concurrent disease:**
  40% of DA’s have retained placenta, mastitis, or metritis
Normal location of abomasum
Left view bovine stomach
Why does the abomasum displace?

(1) Abomasal atony
(2) Increased abomasal gas production

(1) + (2) => abomasum moves (LDA, RDA)

Normal position of abomasum

Left displacement
Displacing Abomasum In Action
LDA
Why does abomasal atony occur?

- **Hypocalcaemia** due to:
  - +DCAD, ↓ [Ca]_{blood}, mastitis, - E balance
  - 7 times more likely to develop DA’s

- **Inadequate effective fiber**
  - VFA’s reach abomasum ⇒ abomasal hypomotility ⇒ HCl refluxes back into rumen ⇒ systemic metabolic alkalosis

- **Endotoxemia**
  - Released during Gm – sepsis (mastitis/metritis)
### Why increased gas productn?

- **NSC**: effective fiber ratio

<table>
<thead>
<tr>
<th>Diet Type</th>
<th>Gas volume (methane, O\textsubscript{2}, N\textsubscript{2})</th>
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<tbody>
<tr>
<td>Hay</td>
<td>800 ml/hr</td>
</tr>
<tr>
<td>Concentrate 3 lb</td>
<td>1100 ml/hr</td>
</tr>
<tr>
<td>Concentrate 15 lb</td>
<td>2200 ml/hr</td>
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Clinical Pathology

- Normal CBC
- Metabolic alkalosis (slight)
- Hypo
  - Ca
  - K
  - Cl
- Ketosis (mild)
- Dehydration
- Hypoglycemia (maybe)
- Hyperbilirubinemia
Clinical Signs of DA’s

- Normal TPR (most cases)
- Partial anorexia (“off feed”)
- Hypogalactia (“down in milk” ~ 5-10 lb/day)
- Depression (ADR)
- Secondary ketosis
  - mild to moderate
- Scant stool
  - firm/loose
  - undigested particles
Clinical Signs (continued)

- Paralumbar fossa:
  - “slab-sided” abdomen
  - Visualize / Palpate PLF
- Rectal palpation (can’t)
- Mild colic
- Mild hypocalcemia
  - Hypotonic rumen
  - Cold ears, widely dilated pupils
Clinical Signs (continued)

- LDA: Ping & Splash
- Ascult and percuss
- Ping high pitched
- Ballottment for splash of fluid
- All pings are not created equal – rumen ping

Note: ~15% of LDA’s DO NOT PING or ping sporatically
Differential Diagnosis

- LDA R/O's
  - 1° ketosis (non-pinging LDA)
  - Rumen ping

- RDA R/O's
  - 1° ketosis (non-pinging RDA)
  - Other Right-sided pings:
    - Uterus, cecum, peritoneum, colon, rectum
    - “off feed” ping
Right-Sided Gas-Filled Viscus (Pings)

- RDA: Right-Displaced Abomasum
- RTA: Right-Torsed Abomasum (Abomasal Volvulus)

Gas in Rectum & Colon
Cecal volvulus

Pneumoperitoneum
Gas in spiral colon

Off Feed
Treatment of Displaced Abomasum
Therapeutic Goals

- Return Abomasum to proper position
- Create a permanent attachment
- Correct electrolyte, acid-base, & hydration deficits
- Treat other concurrent diseases
Therapeutic Choices

- Upper 25% of herd: “cut ‘em”
- Middle 50%: “tack ‘em”
- Lower 25%: “cull ‘em”
How to Fix?

Surgical Technique

- Blind
  - Toggle
  - Closed suture

- Open
  - Standing
    - Left flank abomasopexy
  - Dorsal recumbency
    - Right flank omentopexy
    - Right paramedian abomasopexy
Non-Surgical Technique: Rolling

- Cast cow with ropes into right lateral recumbency
- Roll onto back & extend the rear legs
- Roll in a 90-degree arc for 3 minutes, ending in left lateral recumbency
- Bring the cow to sternal position & allow to stand
- Auscult the left thorax to ensure LDA is relieved
Rolling Technique

- Advantages
  - Quick & easy technique
  - No invasive surgery

- DISADVANTAGES
  - >50% redisplace
  - If RDA or RTA are present, can exacerbate problems
**Surgical Techniques**

**Roll & Toggle**

- +/- Tranquilization or Sedation
- Cast cow onto right side & roll onto back
- Clip & scrub operational site:
  - Area of loudest "ping"
  - 4-7 inches behind Xiphoid
Roll & Toggle

- Assistant places pressure on lower abdominal quadrant
- Trocharize the abdomen 4-7 inches behind xiphoid & 3 inches right of midline
- Remove handle & push rod from trochar
Roll & Toggle

- Place toggle suture and push through cannula, then remove trochar
- Trocharize 2nd site 2-3 inches proximally
- Tie two toggle suture ends together, leaving space between skin & the knots
Roll & Toggle

■ Advantages:
  ■ Simple, quick, inexpensive
  ■ Minimally invasive
  ■ High success rate (60-80%)

■ Disadvantages:
  ■ Blind technique - cannot see abomasum
  ■ Dorsal recumbent position
Surgical Techniques:

Right Flank Omentopexy

- Paravertebral/Inverted L/Line Block
- 20 cm vertical incision in right paralumbar fossa
- Left arm moves over top of rumen to left side of abdomen, locates abomasum
Right Flank Omentopexy

- Feel abomasum for adhesions
- Deflate gas
- Bring arm under rumen, grab top of abomasum & scoop back to ventral position
Right Flank Omentopexy

- Pull out omentum through incision until pylorus can be seen.
- Mattress sutures through peritoneum, omentum, & muscle.
- Continuous sutures on inner layers of muscle incorporating omentum.
Right Flank Omentopexy

- **Advantages:**
  - High success rate in experienced surgeons
  - Standing procedure
  - Can perform exploratory

- **Disadvantages:**
  - Omentum can tear & redisplacement
  - Cannot see abomasum to evaluate
  - Need long arms to reach across abdomen!
Surgical Techniques: Left Flank Abomasopexy

- Anesthetize Left Flank
- 20 cm incision of left paralumbar fossa
- Locate abomasum
- Place sutures in greater curvature—simple continuous or interlocking & tab
- Deflate abomasum
Left Flank Abomasopexy

- Attach a cutting needle to sutures & bring to ventral surface of abdominal wall.
- Stab needle through abdominal wall & reposition abomasum by traction on suture.
- Anchor sutures in skin.
Left Flank Abomasopexy

- **Advantages**
  - Direct fixation of abomasum to body wall
  - Standing surgery
  - Can see abomasum

- **Disadvantages**
  - Not as secure of anchorage as ventral paramedian approach
Surgical Techniques:
Ventral Paramedian Abomasopexy

- Sedated & blocked cow in dorsal recumbancy
- Incision between midline & milk vein 8 cm behind Xiphoid
Ventral Paramedian Abomasopexy

- Bring abomasum back to normal position directly below incision
- Trochar to remove gas
- Suture lateral aspect of greater curvature to peritoneum & internal rectus sheath
- Close
Ventral Paramedian Abomasopexy

- **Advantages**
  - Very secure fixation with good adhesion
  - Can visualize abomasum
  - Casting usually repositions abomasum

- **Disadvantages**
  - Stressful to cast the cow, danger of regurgitation in dorsal recumbency
  - Rest of abdomen cannot be explored
Replacement Fluids

- Isotonic Saline, Lactated Ringer’s IV to replace deficit
- K, Ca salts as needed to correct electrolyte imbalances
- Free-choice oral fluids with NaCl, KCl
Antibiotics???

- **The Three T's:**
  - **Time** - how long was the procedure?
  - **Trash** - how clean was the surgical site?
  - **Trauma** - are tissues damaged?

- Also evaluate for other concurrent problems, cost, withdrawal times, route, and ability of agent to reach the tissue.
Risk Factors for LDA

- High-production Dairy Cows
- High concentrate, low roughage diet
- Large body size
- Limited exercise
- Post-partum
- Abomasal Atony
Questions???
References

Dr. Kent Ames

Web references:

- http://www.ldatogglesuture.com/
- http://www.iann.unl.edu/pubs/dairy/g1201.htm
- http://muextension.missouri.edu/xplor/agguides/pests/g07701.htm

Books:

- Oehme, Frederick W. Textbook of Large Animal Surgery, 2nd ed.
- Smith, Bradford P. Large Animal Internal Medicine
- Turner, McIlwraith. Techniques in Large Animal Surgery, 2nd ed.