



Bio Vet Innovator Magazine

(Fueling The Future of Science...)

Volume 3 (Issue 7) JULY 2026



World Zoonosis Day – 06th July 2026

Popular Article

Atresia Ani in Calves: Etiology, Clinical Diagnosis, Surgical Management and Prevention

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DOI: <https://doi.org/10.5281/zenodo.21739115>

Received: July 28, 2026

Published: July 31, 2026

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Abstract:

Atresia ani is one of the most frequently encountered congenital anorectal malformations in neonatal calves. The condition is characterized by the absence of a functional anal opening due to failure of embryonic development of the terminal gastrointestinal tract. Affected calves are unable to pass meconium or feces, resulting in progressive abdominal distension, tenesmus, anorexia, and eventual toxemia if untreated. Clinical diagnosis is generally straightforward; however, advanced imaging techniques such as ultrasonography and radiography aid in differentiating simple atresia ani from more complex forms such as atresia ani et recti. Surgical reconstruction remains the only effective treatment. Prognosis is excellent in uncomplicated cases treated early but becomes guarded when associated congenital anomalies are present. This review summarizes the embryology, etiology, classification, clinical manifestations, diagnosis, surgical management, prognosis, and preventive measures for atresia ani in calves.

Keywords: Atresia ani, congenital anomaly, calf, anorectal malformation, anoplasty, intestinal obstruction.

Introduction:

Congenital anomalies significantly affect neonatal calf survival and reduce the economic returns of dairy and beef farms. Among congenital gastrointestinal defects, atresia ani (imperforate anus) is one of the most common surgical conditions encountered in bovine neonates. The anomaly results from incomplete embryonic development of the terminal digestive tract, leading to the absence of a patent anal opening. Clinical signs usually become evident within 24–72 hours after birth when the calf fails to pass meconium and develops abdominal distension.

Although the incidence is relatively low, prompt diagnosis and surgical correction are essential because untreated calves generally die due to intestinal obstruction, perforation, septicemia, or toxemia. Recent studies have shown that timely surgical intervention provides excellent long-term survival in uncomplicated cases.

Embryology and Pathogenesis:

During embryonic development, the cloaca is divided by the urorectal septum into the rectum and the urogenital sinus. Normally, degeneration of the anal membrane establishes communication between the rectum and the exterior.

Failure of this developmental process results in:

- Imperforate anus (Atresia ani)
- Blind-ending rectum (Atresia recti)
- Combined atresia ani et recti
- Rectovaginal fistula
- Rectourethral fistula

Depending on the location and extent of the developmental defect, clinical severity varies considerably.

Etiology:

The precise etiology remains uncertain; however, several factors have been implicated:

- Hereditary or genetic abnormalities
- Autosomal recessive inheritance in certain bloodlines
- Embryonic developmental disturbances
- Teratogenic drugs and toxins
- Viral infections during gestation
- Nutritional deficiencies affecting fetal development
- Sporadic developmental errors

Recent genetic studies indicate that inherited predisposition contributes to several forms of intestinal atresia in cattle, emphasizing the importance of selective breeding.

Classification:

- **Type I – Atresia Ani:** Absence of anal opening while the rectum terminates immediately beneath the skin.
- **Type II – Atresia Ani et Recti:** The rectum ends blindly several centimeters cranial to the perineum.
- **Type III:** Segmental atresia involving part of the rectum or colon.
- **Type IV:** Multiple intestinal atresias involving different intestinal segments.

Simple Type I lesions have the most favorable prognosis.

Clinical Signs:

Clinical signs generally appear within the first two to three days after birth.

Typical manifestations include:

- Absence of anal opening
- Failure to pass meconium
- Progressive abdominal distension
- Repeated straining (tenesmus)
- Tail elevation
- Restlessness
- Colic
- Reduced suckling
- Depression
- Dehydration

Delayed cases may develop:

- Intestinal rupture
- Septic peritonitis
- Shock
- Death

Diagnosis:

Diagnosis is primarily based on physical examination.

Clinical Examination:

- Visual inspection of the perineum
- Absence of anal opening
- Perineal bulging
- Abdominal distension
- Failure to defecate

Radiography:

Lateral radiographs help determine the distance between the blind rectum and the perineum.

Ultrasonography:

Useful for identifying associated intestinal or urogenital abnormalities.

Surgical Management:

Surgery is the only definitive treatment.

Anaesthesia:

- Caudal epidural anaesthesia
- Local infiltration
- Mild sedation if necessary

Surgical Procedure:

1. Prepare the perineal region aseptically.
2. Make a circular or cruciate skin incision.

3. Identify the blind rectal pouch.
4. Exteriorize the rectum.
5. Incise the rectal wall.
6. Evacuate accumulated meconium.
7. Suture rectal mucosa to skin using interrupted non-absorbable sutures.
8. Ensure adequate anal diameter.
9. Lavage thoroughly.

Post-operative Care:

Recommended management includes:

- Broad-spectrum antibiotics
- NSAIDs for analgesia
- Gentle anal dilation for several days to prevent stenosis
- Milk feeding followed by gradual introduction of calf starter
- Daily antiseptic dressing
- Stool softeners if required

Regular follow-up is essential until complete healing.

Complications:

Possible complications include:

- Anal stenosis
- Fecal incontinence
- Wound infection
- Dehiscence
- Rectal prolapse
- Peritonitis
- Recurrence due to scar formation

Prognosis:

Prognosis depends upon:

- Type of anomaly
- Age at presentation
- Presence of associated congenital defects
- Surgical expertise
- Post-operative management

Prevention:

Although complete prevention is difficult, the following measures are recommended:

- Avoid breeding affected animals.
- Maintain breeding records for congenital defects.
- Provide balanced nutrition during pregnancy.
- Avoid unnecessary drug administration during gestation.
- Prevent exposure to teratogenic chemicals.
- Perform thorough neonatal examination within the first few hours after birth.

Conclusion:

Atresia ani remains one of the most important congenital surgical conditions encountered in neonatal calves. Early recognition, prompt referral, and appropriate surgical intervention are critical for successful outcomes. Advances in diagnostic techniques, including radiography and needle aspiration, have improved surgical decision-making, while careful postoperative management minimizes complications such as anal stenosis. Genetic selection, responsible breeding practices, and routine neonatal examination remain the most effective long-term strategies for reducing the incidence of this congenital defect.

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