Congenital atresi ani with double vagina in a one day old cattle calf: A case report

Sadawy, M. (1) and Abdelhakiem, M.A.H. (2)

(1) B.V.Sc, M.V.Sc and Ph.D. Department of theriogenology, Fac. Vet. Med. Assiut University, 71526, Egypt.
(2) B.V.Sc, M.V.Sc and Ph.D. Department of Surgery, Anesthesiology and Radiology, Fac. Vet. Med. Assiut University, 71526, Egypt.
Abstract

A case of 1-day-old female calf was admitted to animal surgery clinic at the veterinary teaching hospital (Faculty of Veterinary medicine, Assiut University) with two congenital defects, including Atresia ani and double vagina. The atresia ani was successfully corrected surgically. To the best of author's knowledge this report is the first to describe the combined two malformations in one case.

Congenital anomalies are defects of structure or function that appear at birth. Many different congenital defects, either of genetic, environmental, or unknown cause, or due to environmental-genetic interaction have been reported in animals (Blowey and Weaver, 2011). The environmental factors may include nutritional deficiencies, endocrine disturbances, extremes of temperature during pregnancy, radiation, drugs, chemicals, toxic plants and infectious diseases (Roberts, 1971). Congenital defects are reported in all breeds of cattle with variations in the frequency of occurrence (Roberts, 1971).

The incidence of the ano-rectal anomalies in neonatal farm animals increased in the last years (Abdel-hakiem and Aref, 2012). Atresia ani is one such developmental anomaly due to autosomal recessive gene (Bademkiran et al., 2009) characterized by absence of anus and may be associated with other defects such as atresia recti, recto-vaginal fistula, rectocystic fistula, vagino urethral agenesis, taillessness, hypospadias (Singh et al., 1993, Abdel-hakiem and Aref, 2012) and diphallus (Loynachan et al., 2006). Anal atresia is considered one of the most frequently encountered anomalies in calves (Das and Hashim, 1996, Abdel-hakiem and Aref, 2012). The causes of this congenital defects
may be genetical or environmental of both, but in many cases the cause is unknown (Bademkiran et al., 2009).

The paramesonephric (müllerian) ducts develop to form the female tubular reproductive tract. The nonfused cranial portion of the paired paramesonephric ducts differentiate into the oviducts and uterine horns, while the caudal portions of the paramesonephric ducts fuse and develop into the uterine body, cervix and cranial vagina. The caudal vagina or the vaginal vestibule develops from the urogenital sinus. Failure of complete fusion of the müllerian ducts during reproductive tract development results in a range of abnormalities, including duplication of the uterine body, cervix and vagina but mostly affecting the cervix. The most common anomaly of the genital tract is the double external cervical os. Moreover a vertical band of tissue caudal to the cervix may develop which has little effect on reproduction (Immegart, 2006). However, the most severe anomaly that may affect the fertility of the animal is the uterine didelphys. This anomaly include separation of the uterine horns and a complete double cervix, with a band of tissue extending to the vaginal vestibular junction that result from failure of fusion of the paramesonephric (müllerian) ducts (Fathalla, 2000).

**Case history and clinical examination:**
A female cattle calf of 1-day-old was admitted to animal surgery clinic at the Veterinary teaching hospital (Faculty of Veterinary medicine, Assiut University). The owner complain was the absence of the anal opening since birth. The clinical examination of the perineal region revealed the absence of the anal opening and duplication of the vaginal canal (Fig. 1).
Surgical treatment
The vaginal septum left without treatment according to the owner decision, while the atresia ani was corrected surgically according to (Abdel-hakiem and Aref, 2012). The pre-operative preparation of the proposed site of the operation was performed by the scrubbing using pieces of gauze and tincture of iodine (3.5%). 3 ml of 1% Lidocaine Hcl was injected subcutaneously at the seat of operation. A circular fold of the skin (about 2 cm in diameter) was excised at the seat of bulging. Careful blunt dissection was carried out inwardly using mayo scissors. The blind end of the anal canal (ampula recti) was detected and opened. After intestinal evacuation, the cut edges of the anal canal were sutured circumferentially to the skin by simple interrupted pattern using braided silk # 1.

Congenital malformations of the rectum and anus are commonly reported in all species of animals especially the ruminants (O’Connor, 1998, Abdel-hakiem and Aref, 2012). Some deformities are amenable to surgical intervention and some are incorrigible in nature (Shakoor et al., 2011). The aim of the surgical correction of such anomalies especially the ano-rectal defects is to increase the survival period of the animals as was stated by Abdel-hakiem and Aref (2012).

By taking the case history, it was noticed that the dam of this calf was pluriparous and the owner noticed this condition for the first time, which overweigh that the external factors such as the cumulative effect of ingested toxic plants or radiation may have teratogenic effect and may reduce the probability of the genetic factors.
The external factors as were mentioned above may lead to failure of the anal membrane to perforate, failure of the bowel to canalize, failure of the proctodeum to invaginate, and interruption of the blood supply to the anus during embryonic development which may contribute to cause the atresia ani (Newman et al., 1999; Johnson et al., 1980; Prieur and Dargatz 1984).

Remnants of the Müllerian ducts often persist in the anterior vagina of cattle. They generally have the form of one or more bands passing from the roof to the floor just caudal to the cervix and are usually broken during parturition (Noakes et al., 2001). Sometimes they are laterally situated, and the fetus passes to one side of them. The presence of double vagina due to a vertical fibrous division within the vagina in the present case might be ascribed to incomplete fusion of the two Müllerian ducts. Similar to the finding in the present case Noakes et al. (2001) reported that occasionally, the remnant of Mullerian ducts is of such size and strength that it forms an effective barrier to the birth of the fetus. The forelimbs may pass on either side of it.

It is worthwhile to mention that despite of the external examination of the animal was done, it was not enough to ascertain whether the calf suffered any abnormalities in other parts of the reproductive tract such as double cervix or uterus didelphis or not. So, the authors tried to guess the reproductive fate of this animal. The effect of double vagina on fertility is similar to the condition of duplication of the lumen of the cervix. Affected animals may conceive normally, but may show dystocia due to fetal limbs entering each vaginal canal. The expulsion of the fetal membranes may also be impeded by these structural aberrations.
Some authors reported that the vertical vaginal band can be easily divided with a fetotomy knife (Noakes et al., 2001). But, in the present case the thickness of the vertical vaginal band is about 1.45 cm, moreover it extended inwardly to about 5 cm. Also, the approach and technique may be difficult because of the anatomic location of the vaginal vault. These factors may impair the surgical correction due to the expected haemorrhage which may not be tolerated from 1 day old calf. As well as, the owner preferred to postpone this operation, but unfortunately he did not return back to the hospital.

It could be concluded from this short report that the surgical correction of the atresia ani will increase the survival period of the animal. The double vagina is considered one of the anomalies which may hinder or impair the eutokia in the mature animal. So this animal should not be used in breeding.

References


Fig 1: The photo shows the atresi ani after surgical correction with the feces going out from the anus and the double vagina left without surgical interference (the septum (red line) is about 1.45 cm).