CLINICAL MANAGEMENT OF DYSTOCIA DUE TO FREEMARTIN TWINS IN A CROSSBRED JERSEY COW

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ABSTRACT

Freemartinism is a distinct form of intersexuality that arises as a result of a vascular anastomosis of the adjacent chorioallantoic sacs of heterozygous fetuses in multiple pregnancies (Lillie, 1916). A full term crossbred jersey cow at its fifth parity was presented to the Madras Veterinary College Teaching Hospital with the history of serosanguinous discharge from the vulva. Owner reported that the animal was straining and anorectic since two days. On general clinical examination, all the clinical parameters were in normal range. Vaginal examination revealed the presence of fetal forelimbs in the vaginal passage with head deviated laterally and the fetus in right dorso-ilio position. After correcting the position and postural abnormality a male dead fetus was relieved by simple traction. Further examination of birth passage of the dam revealed the presence of second fetus in anterior presentation and dorso-sacral position with fore limbs extended and a female dead fetus was relieved by simple traction. On careful examination, the external genitalia of female fetus revealed prominent clitoris and the vagina were found to be a blind pouch. The present case was diagnosed as a dystocia due to twins and further, the condition of the female fetus was found to be to be freemartinism on clinical and karyotypic analysis. The present case will be discussed in detail.

Keywords: Dystocia, freemartin, twins and karyotyping

Introduction

The mechanisms involved in the fertility of a mammalian species relate to a series of events i.e. follicular development and maturation, oestrus, coitus, ovulation, fertilization, implantation, and the development and delivery of the foetus and its membranes. Inadequacy in these events due to diseases, poor nutrition, inadequate herd management, hereditary and congenital factors, hormonal disturbances or environmental changes causes infertility in mammalian species (Osmanu, 1979). Despite of variability and complexity of the causes of infertility (Arthur, 1982), congenital causes (especially chromosomal abnormalities) were often inherited which included developmental abnormalities of the ovaries, oviducts, uterus, cervix, vagina and vulva altering morphological and functional significance. According to Lagerlof (1963) common morphological conditions include ovarian (gonadal) hypoplasia and aplasia, anomalies of the tubular genitalia, hermaphroditism, freemartinism, arrested development of the Mullerian ducts. Recent techniques for the chromosome study in mammals had facilitated the analysis of chromosomal abnormalities to a great extent which had brought us an increased knowledge in mammalian cytogenetics. Freemartinism is one such form of congenital chromosomal abnormality resulting in a distinct form of intersexuality which due to the vascular anastomosis of the adjacent chorioallantoic sacs of heterozygous fetuses in multiple pregnancies (Lillie, 1916). The present paper discusses a case of freemartin that occurred in a heterosexual bovine twin.
Materials and methods

A full term crossbred jersey cow at its fifth parity was presented to the Madras Veterinary College Teaching Hospital with the history of serosanguineous discharge from the vulva. Owner reported that the animal was straining and anorectic since two days. On general clinical examination, all the clinical parameters were in normal range. Vaginal examination revealed the presence of fetal forelimbs in the vaginal passage with head deviated laterally and the fetus in right dorso-iliac position. After correcting the position and postural abnormalities a male dead fetus was relieved by simple traction. Further examination of birth passage of the dam revealed the presence of second fetus in anterior presentation and dorso-sacral position with fore limbs extended and a female dead fetus was relieved by simple traction. On careful examination, the external genitalia of female fetus revealed prominent clitoris and the vagina were found to be a blind pouch (about 4 cm) and the blood samples were collected for the karyotypic analysis for chromosomal abnormalities.

Results and discussion

From the above said descriptions the condition of the female fetus was found to be freemartinism. The karyotypic analysis of the fetal blood leukocyte culture showed the presence of blood cell chimerism. Prevalence of the freemartin syndrome in cattle population is directly dependent of the prevalence of twinning within the population and its incidence had been found to present different among breeds (Esteves et al., 2012) and explained that genital tract defects with varying severity could be observed in freemartin animals, which often present suppression and disorganization of the ovary, originating a rudimentary or a testis like gonad depleted of germ cells. The uterine horns may be hypoplastic or instead may be reduced to a cord like structure suspended in the broad ligament. Absence of anatomical continuity between the vagina and the uterus, hypoplastic or absent uterus, and hypoplastic or streak gonads, co-existing with vesicular glands, are common findings in freemartin heifers (Schlafer and Miller, 2007). Furthermore, according to Padula (2005) some freemartin animals had been identified that were born as singleton due to the death of its co-twin in utero.

For freemartinism to occur, 3 main events had to co-exist: i) a dizygotic twin pregnancy, ii) with fetuses of different sex and iii) the occurrence of placental anastomosis. Further, placental anastomoses have to occur early in pregnancy, as it has to be established before gonadal differentiation, between 2 weeks and 30 days of pregnancy. It is generally assumed that 92% of heifers which are born as co-twins to bulls are sterile freemartins (Biggers and McFeely, 1966).

The gonads, in animals that have undergone a significant degree of masculinisation, resemble testes with their parenchyma containing recognisable tubules and interstitial tissue. Development of the mesonephric (Wolfian) ducts is related to the degree of masculinisation of the gonad. In extreme cases, there are well-developed epididymides, vasa deferentia and vesicular glands (Short et al., 1969). Conversely, in the least affected cases, the female genital tract may be small, with a persistent hymen and hypoplastic ovaries (Wijeratne et al., 1977). Vascular anastomosis occurs as early as 30 days of gestation; thus if there is death of the male twin of a heterozygous pair after this time with the other being carried to term, it is possible for a single born freemartin to occur. The newborn freemartin can sometimes be recognised by its prominent clitoris with an obvious tuft of hair at the inferior commissure of the vulva, although these signs are not always reliable.

 Freemartinism could be diagnosed by physical examination, karyotyping, blood typing, polymerase chain reaction (PCR) or fluorescence identification of Y-chromosome directed probes (FISH), but none ideal in terms of speed, sensitivity, or specificity (Sohn et al., 2007). Freelartins can be identified on the basis of the length of the vagina and the absence of the cervix. A small blind-ending vagina where the cervical relieve is
not possible to palpate or to visualize by vaginoscopy is a strong indicator for freemartinism. The cytogenetic tests are probably the most accurate laboratorial methods for freemartin testing, and yet its efficiency fairly reaches 90% (Padula, 2005)
and they are particular indicated for animals clinically normal. PCR technique allows male-specific DNA amplification, thus presenting several advantages in comparison to karyotyping, as it allows the use of small amounts of sample, is relatively fast and precise, is a more sensitive assay than the karyotype (Ennis, et al., 1999).

Although not a heritable effect, freemartinism is a congenital syndrome that in association with twinning may prevail or even increase in cattle farms. Thus, the frequency of freemartinism in cattle population is directly associated with the prevalence of twinning births in the population. Hence, it is concluded that the diagnosis of freemartinism should be based on the cytogenetic analysis and amplification of DNA from the samples by PCR.

References


