Veterinary Research 1 (3): 61-64, 2007
ISSN: 1993-5412

A Case of Diprosopia in Anomalus Cross-Bred Bovine Calf

E. Hind Osman, M.N. Badawi, M.B. Musa, M. Hala Ali and M. Rabab Ahmed
College of Veterinary Medicine and Animal Production,
University for Science and Technology, Sudan

Abstract: A case of diprosopia is described in a cross-bred bovine calf. The animal was tetraophthalmus, tetraoteus and distomus. There were two heads, two brains, single spinal cord, single vertebral column and single trunk. The congenitally deformed animal had two heterogenic reproductive organs. The condition was associated with dystocia.

Key words: Diprosopia, croos bred bovine calf, heterogenic, vertebral column, brains

INTRODUCTION

Congenital deformities seem to be frequent in domestic animal. Many of the reported cases were craniofacial including: aprosopia (Dennis and Leipold, 1972), diprosopia (Cammon *et al*., 1990; Peter, 1998; Kim *et al*., 2000; Camon *et al*., 1995; Bahar *et al*., 2004), dicephalus (Gawlikowski and Misinakewicz, 1979; Mcgirr *et al*., 1987; Gruys, 1973; Wakuri *et al*., 1990) Cyclopia (Gawlikowski, 1993; Hirooka and Hamana, 1999; Schulze and Distl, 2006; Ozcan *et al*., 2006), agnathia (Dennis and Liepold, 1972) and Wry face (Larue, 1997). Diprosopia (partial duplication of the head and face) has been reported before in cats (Cammon *et al*., 1990; Peter, 1998), goats (Ramadan, 1996; Mukaratirwa and Sayi, 2006) and bovine calves (Kim *et al*., 2000; Hind and Khaleel 2004). It is more common in animals than in man.This report describes and illustrates a case of diprosopia in a cross-bred bovine calf.

CASE REPORT

A case of bovine dystocia was investigated in the clinic of Sudan University for Science and Technology, Khartoum North, Khartoum state, Sudan. There was no previous record of reproductive problem with the cow. The animal gave three normal births before and presented to the clinic in full term, with ruptured sac. The fetal fluids were almost absent. After examination the two fore feet were found to be present in the pelvic cavity with the head located downward in-between them. The feotus was dead. The dystocia was due to abnormal downwards position and large size of the head.

Manual manipulation was failed due to the exhaustion and decumbency of the cow that was straining for about 19 h. Caesarian section was performed. Offensive odor and change in the color of the placenta were detected. The cow was given 2500 mL of glucose and 20 mL of Petamox (amoxicillin, Norbrook Laboratories ltd.) and died 10 h later.

Fig. 1: Diprosopia in a cross-bred bovine calf

A still-born congenitally deformed calf was delivered. Diprosopia of the head was obvious (Fig. 1). The animal was tetraophthalmus tetraoteus and distomus with well proportionate body and male and female external genitalia.

Post-mortem examination of the body was done immediately and revealed male and female well developed internal genital organs. Multiple abscesses and congestion were observed in the liver. Post-mortem changes were seen in different body tissues.

Corresponding Author: E. Hind Osman, College of Veterinary Medicine and Animal Production,
University for Science and Technology, Sudan

Fig. 2: Asymmetry of the face of a congenitally deformed cross-bred bovine calf

Fig. 3: Asymmetry of the cerebral part of the brain in a congenitally deformed cross-bred bovine calf

The two heads were dissected after preservation in 10% formalin. They were attached posterio-laterally in the mandibular area with no shared or adhesion in craniofacial bony structure. The two heads were of different size. The smaller left head was bilaterally asymmetrical (Fig. 2) with well developed teeth. The right half of the face was smaller than the left one the right orbicularis oculi muscle was absent. The asymmetry was also seen in the cerebral part of the brain in which the right cerebral hemisphere was larger than the left one (Fig. 3). There was a spinal cord entering the spinal canal of the atlas that attached to the skull of that head. The cervical vertebrae were deviated to the left forming acute angle with the left ear. The right head was bilaterally symmetrical with softer bones and no teeth but only one loose tooth in the mandible. The cerebral part of the brain in the right head

was bilaterally symmetrical and larger than that of the left head. A distorted cerebellum like structure was extending through the foramen magnum. No spinal cord was emerging from that skull. At the attachment side of the two heads, there was obvious overlapping of the two mandibles. The two oral cavities were opening together in one pharynx. There is no duplication in the esophagus and trachea.

RESULTS AND DISCUSSION

Congenital anomalies are among the known causes of dystocia in animals (Staffenberg *et al*., 2002) and may be associated with traumatic injuries and functional disturbances of the female genital tract. The probability of these conditions increases in the case of duplication of the head region. Congenital abnormalities in animals are not infrequent in the Sudan. However, proper documentation of these cases seems to be lacking. Many of them pass unnoticed and many others are not reported.

The cause of diprosopia is unknown (Kutsi *et al*., 2003). Many factors may have a role in such anomalies include environmental factors (Turpin *et al*., 1981; Staffenberg *et al*., 2002), genetic mutations and biological factors (Moritomo *et al*., 1999). It is difficult to know the cause since it is a sporadic case but the presence of abscesses in the liver may suggest the biological factors to be the cause of the congenital deformities in this calf. As suggested before (Carles *et al*., 1995) the duplicated facial structures were considered to be neural crest derivatives. These derivatives of the neural crest are supposed to be partially or totally duplicated when there is an initial duplication of the notochord leads to two neural plates and subsequently duplicated neural crests.

To the best of our knowledge, it is very rare to have two different- male and female- genital organs in a diprosopus animal. The possible relationship between the duplication in the craniofacial and genital structures in this case is not fully understood.

REFERENCES

Aziz, D. and M. Sultan, 1998. Lambs congenital anomalies causing dystocia in Awassi ewes. Iraqi J. Vet. Sci., 11: 45-49.

Bahr, C., A. Beineke, C. Drogemuller and O. Distl, 2004. Diprosopus in calves of different breeds. Dtsch Tierarztl Wochenschr, 111: 154-158.

Cammon, J.R., J. Ruberte and G. Ordoneez, 1990. Diprospia in a cat. J. Vet. Med., 37: 278-284.

Camon, J., M. Lopez-Bejar, J. Verdue, J Rutllant, D. Sabate, E. Degollada and C. Lopez-plana, 1995. Persistant truncus arteriosus in a diprosopic newborn calf. Zentralbl Veterinarmed A., 42: 41-49.

Carles, D., W. Wiechhold, E. Alberti, F. Leger, F. Pigeau and J. Horovitz, 1995. Diprosopia revisited in light of the recognized role of neural crest cells in facial Development, 15: 90-97.

Dennis, S. and H. Liepold, 1972. Agnathia in sheep: External observations. Am. J. Vet. Res., 33: 339-347.

Dennis, S.M. and H.W. Leipold, 1972. Aprosopia (facelessness) in lambs. Vet. Rec., 90: 365-7.

Gawlikowski, J. and A. Misinakewicz, 1979. Studies on congenital deformities in cattle. XXVIII. A dicephalic calf (dicephalus bicollis). Zeszyty Naukowe Akademia Rolniczej. W. Szczencinie Zootechnika. 15: 101-109.

Gawlikowski, J., 1993. Cyclopia in a case report. Zeszyty Naukowe Akademia Rolniczej. W. Szczencinie Zootechnika, 29: 63-69.

Gruys, E., 1973. Dicephalus, Spina bifida, Arnold-Chiari malformation and duplication of thoracic organs in a calf. Discription of the case and critical discussion of the pathogenesis of Arnold-Chiari malformation. Zentralblatt fur Vet. Medizin, 20A: 789-800.

Hind Osman, E. and O. Khaleel 2004. A case of diprosopia in a bovine calf, Sudan J. Vet. Sci. Anim. Husb., 43: 239-243.

Hirooka, M. and K. Hamana, 1999. Three cases of cyclopia. Japan Vet. Med. Assoc., 52: 644-647.

Kim, C.S., G.H. Cho, S.D. Lee Kwak, M.C. Cho and D.W. Soo, 2000. A case of diprosopia in a Holstein calf. Korean J. Vet. Res., 40: 27-34.

Kutsi, K., G. Cantay, D. Yelda and K.N. Can, 2003. CT and MR imaging findings of a rare craniofacial malformation: diprosopus A. J. R., 180: 863-864.

LaRue, W., 1997. Wry face in camelides. Alpaca Registry J., 2: 27-31.

Mcgirr, W., G. Partlow and K. Fisher, 1987. Two headed two necked twin calf with partial duplication of thoracoabdominal structures role of blastocyst hatching. Anat. Rec., 217: 196-202.

Moritomo, Y., T. Tsuda and H. Miyamoto, 1999. Craniofacial skeletal abnormalities in anomalus calf with clefts of the face. J. Vet. Med. Sci., 61: 1147-1152.

Moritomo, Y., T. Tsuda and H. Miyamoto, 1999. Craniofacial skeletal abnormalities in anomalus calves with clefts of the face. J. Vet.Med. Sci., 61:1147-1152.

Mukaratirwa, S. and S.T. Sayi, 2006. Partial facial duplication(diprosopus) in a goat kid. J. S. Afr. Vet. Assoc., 77: 42-44.

Ozcan, K., K. Gurbulak, I. Takci, H. Ozen and C. Kacar, 2006. Atypical cyclopia in a new Swiss cross calf: A case report. Anat. Histol. Embryol., 35:152-154.

Peter, M., 1998. Diprosopia with tri-ophthalmia in a new kitten. Klintierpraxis, 43: 609-615.

Ramadan, R.O., 1996. A dicephalic goat with other defects. Zentralbl Veterinarmed A., 43: 337-343.

Schulze, U. and O. Distl, 2006. Case report: Arthinia and cyclopia in a German Fleckvieh calf. Dtsch Tierarztl Wochenscher, 133: 236-239.

Staffenberg, W., J. Mulliken and E. Shanske, 2002. Diprosopia: A unique cases and review of literature. Teratology., 66: 282-287.

Wakuri, M., T. Mori and K. Mutoh, 1990. Arnold-chiari malformation and associated anomalies in a dicephalic newborn calf. Okajimas Flia Anat. Jpn., 67: 339-350.