

Department of Pathology,
College of Veterinary Medicine,
Sudan University for Science and Technology.

CONGENITAL DEFORMITIES IN THE SUDAN

4. WRY FACE IN A CROSS-BRED BOVINE CALF

(With 4 Figures)

By
HIND OSMAN E.
(Received at 13/10/2010)

SUMMARY

A description is given to a cross-bred female calf with congenital deformities in the head region. The animal had wry face, microphthalmia, dermoid cysts in both eyes and a characteristic circling movement. A mass of tissue was almost occluding the left nostril. The post-mortem examination of the trunk that was performed immediately after severing revealed petechial haemorrhages in lungs, hypertrophied yellowish liver and greenish yellow discoloration of the body fluids. No apparent internal anatomical deviations were observed. The histopathological examinations revealed multi-focal haemorrhages in the lungs and hyperplastic connective tissues, bile ducts proliferation and slight inflammatory cells infiltration in the liver. The nasal tissue mass was found to be a mass of hyperplastic muscle and connective tissue fibres.

Key words: Wry face, congenital deformities, bovine

INTRODUCTION

Many types of congenital craniofacial deformities in domestic animals had been described in the literature. aprosopia (Dennis and Leipold, 1972), diprosopia (Camon, *et al.*, 1995; Kim, *et al.*, 2000; Bahr *et al.*, 2004; Osman Hind *et al.*, 2004; Osman Hind and Khaleel, 2004; Osman Hind, 2010) dicephalus (Gruys, 1973; Gawlikowski and Misinakewics, 1979; McGirr *et al.*, 1987) Cyclopia (Gawlikowski, 1993; Hirooka and Hamana, 1999; Schulze and Distl, 2006). Agnathia (Dennis and Leipold, 1972) and wry face (LaRue, 1997) which is the least to be reported. In the Sudan there is no satisfactory recording of these deformities and wry face has not been reported before.

This report describes and illustrates craniofacial deformities in a cross-bred, full-termed new borne female calf.

Methods

A. Clinical examination

A thorough examination was done for all organs and for the general behaviour of the deformed calf to investigate any congenital and clinical disturbances.

B. Post-mortem examination

The animal was severed forty eight hours after birth and subjected immediately to post-mortem examination. The body organs were examined for internal congenital deformities and / or pathological changes. Three cross sections at the nasal area were made to investigate the abnormalities of the bones and cavities in that area

C. Histopathology

Tissue sections of about one cubic centimetre was taken from the lung liver and the nasal mass of tissue and preserved in 10% formal saline for forty eight hours. The methods adopted for tissue processing, staining and mounting were that described by Drury and Walungtone (1980). The tissue sections were examined by light microscope.

RESULTS

Case history

A full-termed congenitally deformed cross-bred female calf of a Sudanese Butana cow and a Friesian bull was borne alive in a farm in Khartoum North, Khartoum state, Sudan. The mother did not receive any assistance during parturition and there was no evidence of dystocia or post-parturition disturbances.

The whole body of the deformed calf was well proportioned but there was a slight enlargement in the body size. Clinical examinations of the calf revealed difficulty in breathing and circling movement. He did not suckle although the mouth could be opened.

The calf had many congenital deformities but the most prominent was a wry face; the nasal bone and the upper jaw were crooked and deformed (Fig. 1). The lower jaw was normal with normal dentition. There were microphthalmia and large dermoid cyst in both eyes. In one eye the dermoid cyst extended from the inner canthus and exceeding the middle of the lens which was smaller in size than normal. In the other eye it was covering almost the whole cornea. In the left nostril there was a mass of tissue that almost occluding the nasal cavity.

Post-mortem examination of the trunk was performed immediately after severing. The joints revealed no apparent congenital deformity. The liver was yellowish and hypertrophied. There were foci of petechial haemorrhages in the lungs. Obvious greenish yellow discoloration of the pericardial, abdominal and sinovial fluids was observed.

The cross sections of the nasal area revealed deviation of the nasal septum forming a crooked narrow left nasal passage. That narrowing was increasing caudally. Remnant left malformed turbinate bones and normal right ones were detected (Fig. 2).

Examination of the brain revealed flat lobulation. Distinct cord like lobulation and cavitation with the meninges forming stretched membrane over them were also seen in the lateral aspect of the anterior part of the right hemisphere. Asymmetry of the cervical vertebrae was detected.

Histopathological examination of the nasal mass of tissue, lung and liver samples revealed hyperplastic muscle fibers and slight infiltration of inflammatory cells in the nasal mass of tissue (Fig. 3); alveolar emphysema, focal atelectasis and multi-focal haemorrhages in the lungs; and proliferation of connective tissue and epithelial hyperplasia of the bile ducts in the liver (Fig. 4).



Fig. 1. Wry face in a female cross-bred bovine calf

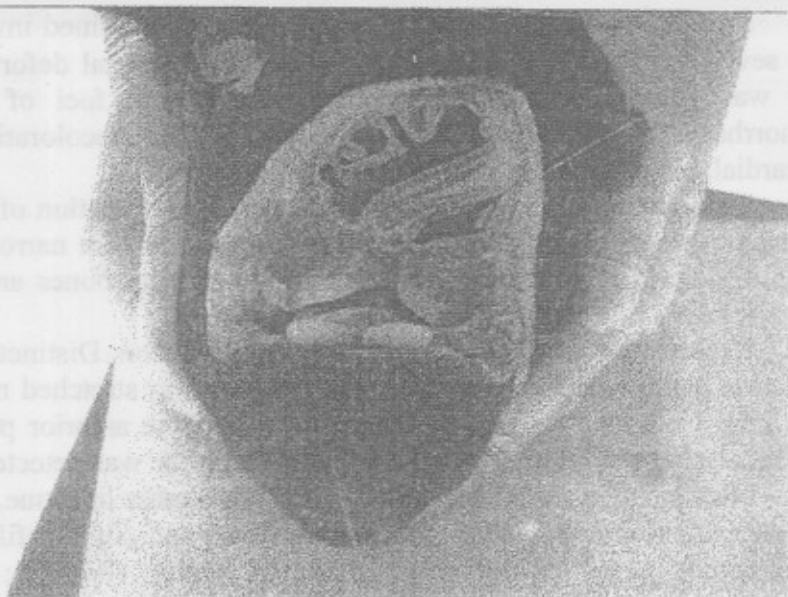


Fig. 2: Crooked narrow left nasal cavity and deformed turbinate bones in a female cross-bred bovine calf

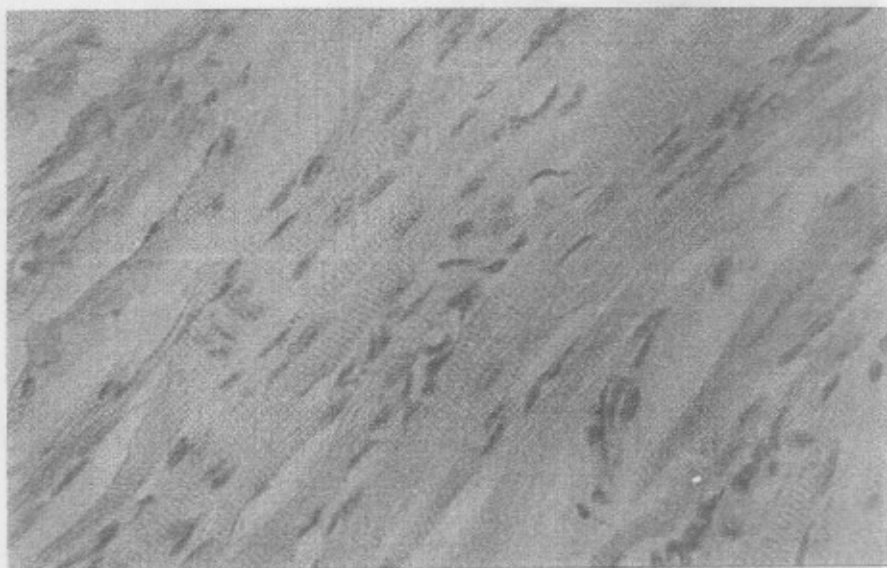


Fig. 3: Hyperplasia of muscle fibres in a nasal mass of tissue in a female cross-bred bovine calf (H&E, x 100)

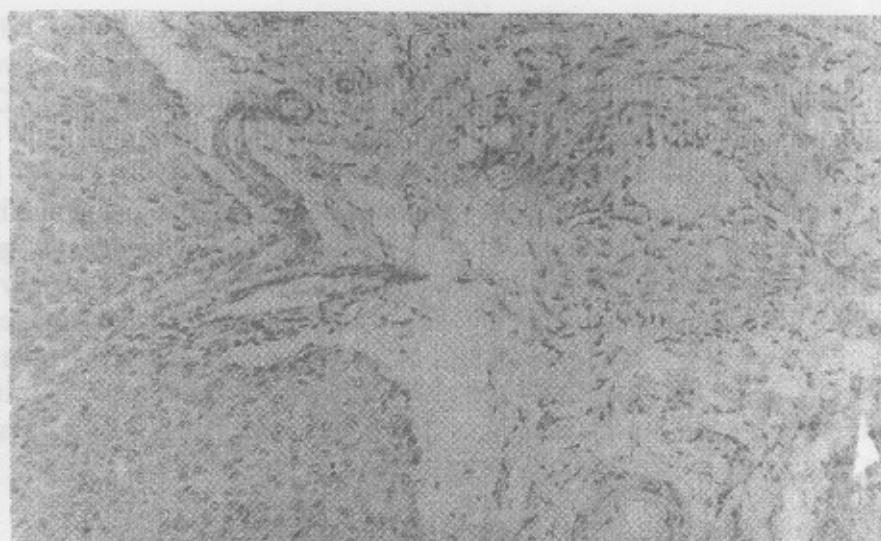


Fig. 4: Proliferation of connective tissue in the liver of a female cross-bred bovine calf (H&E, x 20)

DISCUSSION

The facial structures are considered to be neural crest-derivatives. These derivatives of the neural crest are expected to be deformed when there is deformed neural crest. (Chlmers and Rocken, 1990; Carles *et al.*, 1995). The cause of craniofacial malformations are very complicated (Feng and Fang, 2007) but high percentage of craniofacial abnormalities is ascribed to abnormalities in the neural crest (Johnston and Bronsky, 1995; Tallquist and Soriano, 2003) and ganglionic placodes (Boshart *et al.*, 2000).

Corneal dermoid has been reported in various animal species and in human. It is believed to be congenital although it is non hereditary (Lee *et al.*, 2005). No dermoid cyst was reported in the previous case of wry face in the lama calf (LaRue, 1997). In this case the dermoid impaired the normal vision but the circling movement is more probably due to the deformities of the brain.

The laboured breathing may be due to the crooked narrow left nasal cavity and the mass of tissue in the nostril since there is no evidence of defects in the trachea and the diaphragm.

In the Sudan craniofacial abnormalities in bovine calves were reported before. The deformed nasal bones in this case was different from that of the previous three deformed calves in which there were duplication

of the nasal bones (Osman Hind *et al.*, 2004; Osman Hind and Khaleel, 2004; Osman Hind, 2010). In another case there was circling movement associated with congenital hydrocephalus and perforated skull (Osman Hind, unpublished work).

Congenital deformities have many etiological factors (Kim *et al.*, 2000). The pathological changes in liver, lung and sinovial fluid in this deformed calf raise the probability of involvement of teratogenic agent. It is always difficult to get and trust complete and accurate case history of an animal from an illiterate owner. This makes it more difficult to suggest any causative or influencing factor for such congenital defects which were sporadic cases till now. Still the recording of the congenital deformities in ruminants should be continued, as it was observed by the author that they are increasing in number in Khartoum state in this decade.

REFERENCES

- Bahr, C.; Beineke, A.; Drogemuller, C. and Distl, O. (2004): Diprosopus in calves of different breeds. *Dtsch Tierarztl Wochenschr.* 111(4): 154-8.
- Boshart, L.; Volt, E.A. and Vermeij-Keers, C. (2000): Epitheliomesenchymal transformation in the embryonic face: implications for craniofacial malformation. *European Journal of Plastic Surgery*. 23, 4: 217-223.
- Camon, J.; Lopez-Bejar, M.; Verdue, J.; Rutllant, J.; Sabate, D.; Degollada, E. and Lopez-plana, C. (1995): Persistent truncus arteriosus in a diprosopic newborn calf. *Zentralbl Veterinarmed A.* 42(1): 41-9.
- Carles, D.; Wiechhold, W.; Alberti, E.; Leger, F.; Pigeau, F. and Horovitz, J. (1995): Diprosopia revisited in light of the recognized role of neural crest cells in facial development 15: 2, 90-97.
- Chlmers, A.G. and Rocken, L. (1990): A congenital defect resembling Hereford syndrome I in Alberta. *Can Vet. J.* 31: 31-33.
- Dennis, S.M. and Leipold, H.W. (1972): Aprosopia (facelessness) in lambs. *Veterinary Records.* 90(13): 365-7.
- Dennis, S.M. and Liepold, H.W. (1972): Agnathia in sheep: external observations. *Am. J. Vet. Res.* 33: 339-347.
- Drury, R.A. and Walungtone, E.A. (1980): "Carlton's Histological Technique" 5th ed. New York: Oxford University Press.
- Feng, Y.M. and Fang, B. (2007): Current gene study in etiological analysis of congenital craniofacial abnormalities. *Shanghi Kou Qiang Yi Xue.* 16, 2; 215-218.

- Gawlikowski, J. (1993): Cyclopia in a case report. *Zeszyty Naukowe Akademia Rolniczej. W. Szczencinie Zootechnika*. 29: 63-9.
- Gawlikowski, J. and Misinakewicz, A. (1979): Studies on congenital deformities in cattle. XXVIII. A dicephalic calf (dicephalus bicollis). *Zeszyty Naukowe Akademia Rolniczej. W. Szczencinie Zootechnika*. 15: 101-109.
- 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 Veterinary Medizin*. 20A(10): 789-800.
- Osman Hind, E.; Badawi, M.N.; Musa, M.B.; Ali Hala, M. and Ahmed Rabab, M. (2007): A Case of Diprosopia in Anomalous Cross-Bred Bovine Calf. *Veterinary Research*. 1 (3) 61-64.
- Osman Hind, E. and Khaleel, O. (2004): A case of diprosopia in a bovine calf, Sudan J. Vet. Sc. Anim. Husb. 43(1-2): 239-243.
- Osman Hind, E. (2010): Congenital dewformities in the Sudan: 3. A case of diprosopia in a Friesian bovine calf. *Journal of Science and Technology*. (accepted for publication)
- Hirooka, M. and Hamana, K. (1999): Three cases of cyclopia. *Japan Veterinary Medical Association*. 52(10): 644-647.
- Johnston, M.C. and Bronsky, P.T. (1995): Prenatal craniofacial development: new insights on normal and abnormal mechanisms. *Crit Rev Oral Biol Med*. 6, 4: 368-422.
- Kim, C.S.; Cho, G.H.; Lee, Kwak, S.D.; Cho, M.C. and Soo, D.W. (2000): A case of diprosopia in a Holstein calf. *Korean Journal of Veterinary Research*. 40(1): 27-34.
- LaRue, W. (1997): Wry face in camelides. *Alpaca Registry Journal*. 2: 27-31.
- Lee, I.; Kim, J.; Kim, H.; Kim, B. and Kim, C. (2005): Surgical correction of corneal dermoid in a dog. *J. of Vet. Sci.* (6) 4: 369-370.
- Mcgirr, W.; Partlow, G. and Fisher, K. (1987): Two headed two necked twin calf with partial duplication of thoracoabdominal structures role of blastocyst hatching. *Anat. Rec*. 217(2): 196-202.
- Schulze, U. and Distl, O. (2006): Case report: arthinia and cyclopia in a German Fleckvieh calf. *Dtsch Tierarztl Wochenscher*. 133(6): 236-9.
- Tallquist, M.D. and Soriano, P. (2003): Cell autonomous requirement for PDGFRalpha in population of cranial and cardiac neural crest. *Development*. 130, 3: 507-518.