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Surgical Correction of Congenital Cranial Meningocele in Buffalo Calf

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ABSTRACT: In present study, a day old male buffalo calf showing the fluctuant swelling on frontal region of the head, weakness and poor suckle reflex was presented to the Veterinary Clinical Complex, College of Veterinary Science, ANDUAT, Kumarganj, Ayodhya. Fluctuant mass was approximate 20×18 cm in size covering with hairy skin. On the clinical examination, calf exhibited resistance to deep palpation. The case was diagnosed as congenital cranial meningocele on basis of clinical and radiographic results. Since there was intracranial pressure on brain tissue, therefore, the case was corrected surgically under local infiltration anesthesia with the permission of owner After 10 days of treatment, the calf showed uneventful recovery.

Keyword: Buffalo calf, Congenital, Cranial Meningocele, Meningoencephalocele.

I. INTRODUCTION

Cranial meningocele, congenital defect, is a fluid-filled meninges protrude through cranial defect [14]. Umbilical hernia, is considered as most common congenital defect in animals followed by atresia-ani and cranial meningocele [12]. Meningocele also occur in thoracic and, lumbar vertebrae [6, 18] and cervical [1] in addition to skull. If both brain and meninges are contained in the mass, the term meningoencephalocele is used. The formation of meningocele in calf [3, 5, 13, 22] and lamb [16] are reported as well. The condition is typically congenital (present at birth) but has been reported to develop by chance in older animals in rare cases. The exact aetiology of meningocele is not known. Congenital factors during development of foetus along with environmental factors are considered as critical in aetiology and occurrence of meningocele and meningo-encephalocele [2, 10, 11]. Meningocoele is the dislocation of the meninges through congenital bone deficiency in skull. Inadequate nutrition, teratogenic viruses and use of teratogenic drugs are the significant factors contributing to the development ofalmost allneurological defects [15]. The surgical correction of cranial meningocele defect has been reported in 5 calves so far in veterinary literature [4, 10, 20]. Similarly, an unoperated anomaly reported in a buffalo calf [3]. The present case reported a successful surgical correction of cranial meningocoele in a buffalo calf presented on VCC of college.

Case History and Diagnosis. A day old buffalo male calf was presented to Veterinary Clinical Complex, College of Veterinary Science, ANDUAT, Kumarganj, Ayodhya having swelling over frontal region of head. The calf was not able to lift his head and also unable to suckle because of unbearable weight of the swelling. Approximate size of swelling was 20 ×18 cm which was covered with thick hair. Uponpalpation, it appears as fluid filled and turgid in consistency. It was situated on cranial midline of head, extending from middle third of the forehead to 3 cm above muzzle.

Vitals including respiratory rates, pulse and temperature, were normal. Nervous sign was not recorded. A preliminary/tentative diagnosis was made using anamnesis and by palpation. (Fig. 1). Radiographic examination of the head revealed homogeneity of hernial sac content indicating fluid-filled sac with no brain tissue (Fig. 2). Puncture by sixteen-gauge needle on dependent part of sac, permitting drainage of about three liters of clear and colourless fluid similar to cerebrospinal fluid. An elliptical median hole on the skull, diameter of 2.5cm, revealed on deep palpation, which was also distinct findings in radiograph. The condition was tentatively considered as meningocele and surgery was performed under local analgesia (2% lignocaine hydrochloride).

Fig. 1. Cranial Meningocele of 20 × 18cm size in calf.

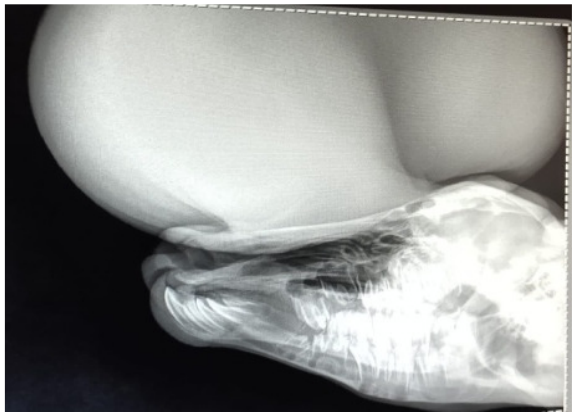

Fig. 2. Radiograph of head region showing the homogenous content of hernial sac and cranial defect.

Fig. 3. After drainage of fluid.

Fig. 4. Surgical correction and introduction of a shunt for proper drainage of fluid.

Fig. 5. Antiseptic dressing.

Fig. 6. After removing of sutures on 10th Post-operative day.

Treatment. Aseptic surgery preparation of swelling and surrounding areas was done. The operation site was clipped, shaved and prepared aseptically for surgery. For sedation, xylazine hydrochloride (Xylazine®) was administered at @ 0.1mg/kg body weight through intra-muscular route. Later, by infiltrating and injecting 5 ml of 2% lidocaine hydrochloride (Xylocaine®, Zydus Healthcare Ltd., Ahmedabad, India) from cranial to caudal aspect of sac, local anaesthesia was achieved. The calf was placed in sternal recumbence; an elliptical rostro-caudal incision was made over swelling part. Internal hernial-sac was separated by blunt dissection

and resected leaving enough tissues to permit simple apposition and to cover defective hole. The inner surface of sac appeared smooth embedded with connective tissue. The hernial-ring was seen on median suture line of frontal bones at its middle third. The defect measured 4.5 cm rostro-caudally on frontal suture line with a width of 2.5 centimeters through which brain tissue was visible. Introduce shunt for proper drainage for a week. The edges of tissues overlying defect were opposed with continuous suture-pattern with vicryl no. 1-0. The skin was trimmed to size and the edges were apposed by cross mattress suture with silk No. 2. The suture line was covered with a rolled piece of sterile gauze, fixed in place with 4 simple interrupted sutures. Post-operatively, parenteral medication was carried out with Inj. Enrofloxacin (5mg/kg body weight) for 7 days, inj. Meloxicam (0.5mg/kg body weight) and Inj. Mannitol 20% for 3 days and skin sutures were removed on 10^{th} post-operative day. The calf was having an uneventful recovery without any post-operative complications.

II. DISCUSSION

Meningocoele usually occur in frontal regions, but some are occipital, located below the occipital crest. The herniation of fluid filled meninges through cranial defects are related to suture lines, almost median and usually in the frontal regions covered by skin. The herniations are related to suture lines and are almost always median [9]. Meningoceles are herniation of brain or/and meninges substance through defects of skull during embryonic development. These herniations can occur in frontal [10], parietal [11] or occipital [19] regions of cranium. Frontal herniations are shown to be accompanied with osseous deformities in nasal conchae and ethmoidal bones [17]. In the operated case, meningocoele was related to frontal suture line and covered by a normal skin. The morphogenesis of Meningiocoele is problem of ossification of skull with secondary herniation of preformed intracranial tissue and it depends on primary defect of neural tube from embryonic ectoderm and in consequence, a focal failure of development of skeletal arrangement [9]. In our case, history revealed that buffalo calf had not been exposed to any kind of toxicants, received any kind of medicines or suffered from high fevered disease and gave normal birth without any assistance. Therefore, genetic factors are considered to have played role in formation of current defect in calf [8, 1]. Therefore, inspection of mother andinseminating bull for genetic defects will help us to reduce incidence of congenital malformations. Two calves reported earlier were recumbent at time of presentation [20, 3]. The surgical procedure and intra-operative findings were similar to those reported by [12]. Radiographic and ultrasonographic examination of a meningocoele atthe anterior fontanelle has already been shown in a two-and-a-half-month old calf with suggestion of cranioplasty, where the cranial defect was considerably large [4, 7]. Frontal meningocele and cervical spinal meningocele in calves were surgically corrected. The non-recurrence of swelling suggested that defect might had progressively closed during growth of calf.

CONCLUSION

It may be concluded from our study that factors causing congenital anomalies cannot be diagnosed easily as they are high in number such as malnutrition, exposed diseases, applied medicines and growing conditions. The presented case classified as congenital meningocele as anatomically. The swelling did not re-occur in due time suggesting that defect might have closed during growth of calf. Congenital defects like meningocele, if treated early may save the life of animal as in our case.

REFERENCES

[1]. Alkan, I., Bak1r, B., Dilek, F. H. and Belge, A. (1995). Two Akkaraman lambs with meningocephalocele. *YYÜ Sag Bil. Derg, 1*, 71-75.

[2]. Aslanbey, D., Öcal, M.K., Kutsal, O. and Ünsald, E. (1989). Meningocele and meningoencephalocel in two lambs. *AÜ Vet Fak Derg, 36*, 379-89.

[3]. Ayyappan, S., Balasubramanian, S., Subramanian, A. and Dhanapalan, P. (1996). Congenital Meningocoele in a buffalo calf - A Case report. *Cheiron, 25*: 162-163.

[4]. Back, W., van den Belt, A. J., Lagerweij, E., van Overbeeke, J. J. and van der Velden, M. A. (1991). Surgical repair of a cranial meningocele in a calf. *The Veterinary Record, 24*, 569-571.

[5]. Buck, B. C., Ulrich, R., Wohlke, A., Kuiper, H., Hewicker-Trautwein, M. and Distl, O. (2009). Two rare brain malformations in black and white German Holstein calves. *Dtsch Tierarztl Wochenschr, 116*, 192-99.

[6]. Ertürk, E. and Samsar, E. (1978). Congenital spina bifida and meningocele in a lamb. *AÜ Vet Fak Derg, 28*, 261-66.

[7]. Gangwar, A. K., Devi, K. S., Singh, A. K., Katiyar, N., Patel, G. and Srivastava, S. (2014). Congenital anomalies and their surgical correction in ruminants. Adv. Anim. *Vet. Sci., 2*(7), 369 – 376

[8]. Hoogmoed, L. V., Yarbrough, T. B., Lecouteur, R. A. and Hornof, W. J. (1999). Surgical repair of a thoracic meningocele in a foal. *Vet Surg., 28,* 496-00.

[9]. Jubb, K. V. F. and Huxtable, C. R. (1993) Crania bifida and related refects, In: Pathology of Domestic Animals, Jubb, K. V. F., Kennedy P.C. and Palmer N.(editors), Vol. 1, 4th Edn., Academic Press, San Diego, pp: 273-274.

[10]. Köm, M. E., Han, C. M. and Çeriba, A. O. (2009). Surgical treatment of patients with congenital meningocele. *KafkasUniv Vet Fak Derg, 15*, 979-82.

[11]. Kaya, M., Okumu, Z., Doan, E., Çetin, E. M. and Yanmaz, L .E. (2011). Congenital anomalies in calves – Incidence and Survival rates. *FÜ Sa Bil Vet Derg, 25*, 83-93.

[12]. Kohli, R. N. (1998). Congenital meningocele with a rare skull defect in a lamb. *Aust Vet J., 76*, 252.

[13]. Kumar, R. V. S. and Ramakrishna, O. (1996). An unusualcase of meningocele in a day-old calf. *Indian Vet J., 73*, 1078-79.
[14]. Leipold, H. W. and Davis, S. M. (1993). Congenital defects in cattle and sheep. In: Current Veterinary Therapy, Vol 3, Food Animal Practice. Howard JL (Edn.), Philadelphia, WB Saunders; p 89.
[15]. Lopez, M. J. and Wilson, D. G. (2000). Crania bifida with meningocoele in a Holstein calf. *Large anim. pract., 21*, 16-19.
[16]. Özaydn, Okumus, Z., Baran, V. and Kilic, E. (1996). Meningocele and carcinoplasty in a lamb. *Kafkas Univ VetFak Derg, 1*, 103-09.
[17]. Ohba, Y., Fau-Iguchi, T., Iguchi, T., Fau-Hirose, Y. and Hirose Y. (2008). Computer tomography diagnosis of meningoencephalocele in a calf. *J Vet Med l Sci., 70*(8), 829-831.
[18]. Rivas, L.J., Hinchcliff, K. W. and Robertson, J. T. (1996). Cervical meningomyelocele associated with spina bifida in a hydrocephalic miniature colt. *J. Am. Vet. Assoc., 209*, 950-53.
[19]. Raoofi, A., Dehghan, M. M. and Mardjanmehr, S. H. (2004). Cranium bifidum with meningocelein a lamb. *Small Ruminant Research, 55*(1), 253-256.
[20]. Sarma. B., K. N. Deka, D. K. Lahonand and S. C. Pathak, (1993). Congenital meningiocoele in a bovine calf - A case report. *Indian Vet J*, *70*, 367.
[21]. Saunders, W. B., M. G. Maxie and S. Youssef (2007). Malformations of the Central Nervous System. In: Pathology of Domestic Animals, 5th ed, Vol 1, Maxie, MG (Ed.), Elsevier, Saunders, pp: 301-302.
[22]. William, Justin, Simon Shiju, Ayyappan, B. M., Ramani, S. Velavan, C. and Suresh Kumar, R. (2011). Surgical Management of Cranial Meningocoele in a calf. *Tamilnadu J. Vet. Anim. Sci., 7*, 164-66.