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Surgical correction of congenital cranial meningocele in a jersey calf: A case report

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Abstract

A one - day - old, 20 kg weighing female jersey calf was presented to the Department of Veterinary Surgery and Radiology, NTR College of Veterinary Sciences, Gannavaram with a complaint of baseball size swelling on the forehead. On physical examination turgid, fluid filled swelling situated towards the cranium of the head, spreading from the middle third of the forehead to few centimetres above the ear was observed. Aseptic puncture by 18-gauge needle, on its dependent portion, permitted drainage of clear and colourless fluid. The defect was present towards the medial suture line of the frontal bone. The cranial defect was corrected by apposing the meningeal membranes to the cranium using PGA No.2. The protruding extra meningeal membranes were removed. The surgical wound was closed with horizontal mattress pattern using polyamide No.2 and post - operative care was given. Animal had an uneventful recovery.

Keywords: Calf, congenital deformity, cranial meningocele, meningeal membranes, surgical correction

Introduction

Congenital is the descriptive term indicating the condition prevailing from birth [17, 14]. Deformities in structure and function, which are present at birth, are congenital deformities [4, 14]. Cranial meningocele, a congenital deformity, is a sac like protrusion of fluid filled meninges through a defect in skull [7, 20, 22]. In addition to skull, meningocele may also occur in cervical [1, 20], thoracic and lumbar vertebrae [6, 18, 20]. If both brain & meninges are contained in mass, the term meningoencephalocele is used. Environmental factors along with congenital factors are considered to be critical in etiology & development of meningocele and meningoencephalocele [2, 9, 10, 20]. Malnutrition, contact with teratogenic viruses and use of teratogenic drugs are among the significant environmental factors propagating the development of neurological defects [13, 20]. Some environmental factors are shown to provoke the development of various meningocele phenotypes through affecting the degree of gene penetration [18, 20]. Similarly autosomal recessive genes are also reported to be responsible for most cranial defects in animals. The formation of meningocele in calf [3, 5, 11, 14, 20, 21, 23] and lamb [15] has been reported as well. The present case reported successful surgical correction of cranial meningocele in calf.

Case history and Diagnosis

A day - old - 20 kg weighing female jersey calf was presented to the Department of Veterinary Surgery and Radiology, Gannavaram with history of base ball size swelling on forehead since birth [Fig. 1]. The calf was born at full term and did not show any neurological signs. At presentation animal was recumbent. The calf was not able to lift her head and also unable to suckle because of unbearable weight of the swelling. All vital signs were normal. Physical examination revealed a turgid, fluid filled swelling situated towards the cranium of the head, spreading from the middle third of the forehead to few centimetres above the ear, which altered the normal activities of the animal. Radiographic examination of the head revealed homogeneity of hernial sac contents indicating fluid filled sac with no brain tissue [Fig. 2].

Aseptic puncture by 18-gauge needle, on its dependent portion, permitted drainage of clear and colourless fluid similar to cerebrospinal fluid. Deep palpation after drainage revealed an elliptical median opening on the skull, which was also a distinct finding in the radiograph. The condition was tentatively diagnosed as meningocele and surgery was performed under local analgesia to correct the deformity.

Treatment

The swelling and surrounding areas were aseptically prepared and draped for the surgery [Fig. 3]. The calf was premedicated intramuscularly using xylazine at 0.01 mg/kg body weight. The calf was placed in lateral recumbency and local anaesthesia was achieved by infiltrating and injecting 10 ml of 2% lignocaine hydrochloride from cranial to caudal aspect of sac. An elliptical incision was made on base of protruding sac [Fig. 5] & dissected through the interior to reach the meningeal membranes. The sac was found protruding from the cranial defective opening [Fig. 6]. The cranial defect was corrected by apposing with the meningeal membranes to the cranium using PGA No.2 [Fig. 7]. The protruding extra meningeal membranes were removed. The surgical wound was closed with horizontal mattress pattern using Polyamide No.2 [Fig. 8]. The animal was given streptopencillin and meloxicam injections as post - operative care. The post - operative treatment was continued for a week. The sutures were removed on 10th postoperative day. The calf was having an uneventful recovery without any postoperative complications.

Discussion

Meningoceles are herniation of brain or/and meninges substance through defects of skull during embryonic development. The herniation of fluid filled meninges through cranial defects is related to suture lines, almost median [8, 21, 14]. These herniations can occur in frontal [12, 21], parietal [10, 21], or occipital [19, 21] regions of cranium. Frontal herniations are shown to be accompanied with osseous deformities in nasal conchae and ethmoidal bones [16].

The morphogenesis of Meningocele is a problem of ossification of skull with secondary tissue and it depends on primary defect of neural tube from embryonic ectoderm and in consequence, a focal failure of development of skeletal arrangement [8]. In this case, history revealed that 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 a role in the formation of the current defect in calf. Therefore, inspection of mother and inseminating bull for genetic defects will help us to reduce incidence of congenital malformations. The non - recurrence of swelling suggested that defect might have progressively closed during growth of calf.

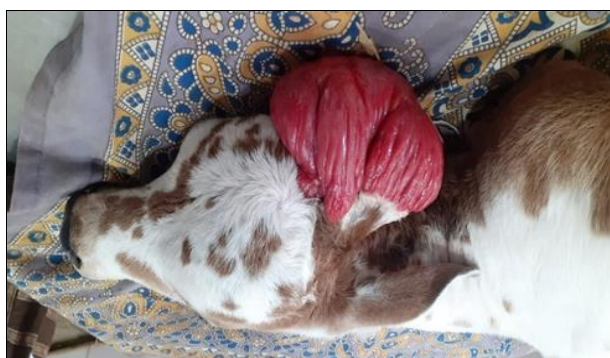


Fig 1: Swelling at cranial region.



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



Fig 3: Draping for surgery.



Fig 4: After drainage of fluid



Fig 5: Incision at the base of protruding sac

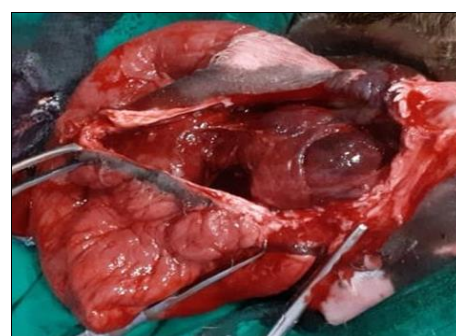


Fig 6: Cranial defect after incision



Fig 7: Correction of cranial defect by apposing with the meningeal membranes to the cranium



Fig 8: Closure of the surgical wound

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 present case was classified as congenital meningocele anatomically. The swelling did not re-occur in due time suggesting that defect might have closed during growth of calf. Congenital defects like meningocele need to be treated as early as possible to increase the chance of survivability of the animals.

Conflict of Interest

Not available.

Financial Support

Not available.

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