

**A case report on surgical correction and management of
congenital meningoencephalocele of a new born calf in
Upazilla Veterinary Hospital, Feni Sadar, Feni**



A clinical report submitted by
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The Author

ABSTRACT

A 3 day old male calf with a history of fluctuant swelling on frontal region of the head was brought to the Upazilla Veterinary Hospital, Feni Sadar, Feni. Duration of illness of the case was 3 days. The calf was always lying on lateral recumbence. On clinical examination the calf exhibited resistance to deep palpation around the swelling and neck flexion. A fluctuant spherical sac like protrusion that was 18x15 cm in size covering with a hairy skin was observed on frontal region of the head. The case was diagnosed as meningoencephalocele by the findings of clinical examination that were matched with previous literature. On our assessment, the likelihood to full recovery of the case by medicinal treatment was grey due to the negative impact on brain tissue by intracranial pressure. Therefore, the case, with the permission of farmer, was corrected surgically under local infiltration anesthesia using 4 ml Jasocaine (2% lidocaine HCl). The frontal region was prepared for aseptic surgery and an elliptical skin incision was made at the base of the sac. After separation of the skin, fluid filled meningeal membranes were noticed protruding out from the cranium through the frontal opening. Then meningeal membranes were resected. The skin was closed by suturing with silk. At post-operative treatment Procaine penicillin(10000-30000IU/kg body weight), Benzyl penicillin(10000-40000IU/kg body weight), Streptomycin(5-10mg/kg body weight), Meloxicam(0.5mg/kg body weight) were given to the calf to prevent any secondary bacterial infection. Recurrence was not noticed in the calf after treatment of 9 days. Congenital defects like meningoencephalocele should be treated surgically as early as possible so as to increase the chance of recovery patients from the problem.

Keywords: Calf, Meningoencephalocele, Surgery.

Introduction

Diseases and disorders of calves are thought to be the important constraints for cattle development in Bangladesh. It has been reported that 15-20% calves die every 3 year from various diseases (Anon, 1993). Congenital disorders in calves have been increasing alarmingly with the increase of crossbred animals.

Cranial meningoencephalocele is a congenital anomaly mostly seen in domestic animals, especially in cattle. The formation of meningoencephalocele has been reported in domestic animals, i.e., calves (Raofi et al 2004), lambs (Back et al 1991), dogs (Sponenberg and Graf-Webster 1986), and foals (Ertürk and Samsar 1978). It is a condition in which an abnormal sac of fluid, brain tissue, and meninges (membranes that cover the brain and spinal cord) extends through a defect in the skull. In cranial meningoencephalocele, fluid filled meninges protrude through a defect in the cranium and defect may be due to defective ossification of the skull. The defects on the skull have been reported mostly on frontal, parietal and occipital regions. Hydrocephalus, abnormalities of the eyeball and tear duct, and other findings have been associated with the condition. The condition is typically congenital (present at birth) but has been reported to develop by chance in older individuals in rare cases. The exact cause of meningoencephalocele is not known. Some studies have suggested that environmental factors could play a role in causing the condition. Exposure during pregnancy to aflatoxins, toxins produced by a mold that grows in nuts, seeds, and legumes, has been proposed to be a possible cause in some cases. It has also been suggested that folate deficiency during pregnancy might play a role, because the condition is so closely related to spina bifida, which can be caused by folate. There might additionally be some underlying genetic factors given evidence of meningoencephalocele identified in individuals with an underlying genetic disorder. Further studies are needed to clarify what may cause the meningoencephalocele. Treatment depends on the size, location and severity of the defect but mainly includes magnetic resonance imaging (MRI) to determine the severity of the defect, followed by surgery to repair it. In this paper an unusual case of congenital meningoencephalocele and its surgical management was discussed.

The main objectives were as follows:

- To study the efficacy of surgery in case of congenital Meningoencephalocele
- To study the postoperative management of meningoencephalocele after surgery
- To study the complications of surgery done for correction of meningoencephalocele

Materials and Methods

History

A 3 day old indigenous male calf was presented to Upazilla Veterinary Hospital, Feni Sadar, Feni with a history of swelling over the frontal region. The calf was unable to lift its head and unable to suckle due to weight of the swelling. Physical examination of the swelling revealed a fluid filled sac situated over the frontal bone close to the nuchal's crest. The extra cranial sac was found to have narrow stalk at its base. Vital signs like temperature, pulse and respiratory rates were well within the physiological range. Further, the calf did not have any nervous signs.

Diagnosis

A preliminary diagnosis was made from the history and by palpation of the sac like protrusion (Fig 1). Rectal temperature of 101.2 °F, respiration of 22 breaths per minute and pulse of 120 beats per minute were recorded. On deep palpation, the rim of the cranial bone defect could be felt around the base of the swelling. On palpation of the rostro-dorsal wall of the swelling, a hard, roughly wedge-shaped structure could be felt. Diagnosis of the case, however, was confirmed by exploratory puncture in the sac and demonstration of straw colour fluid contents.



Figure 1: Physical examination of the calf

Preparation of the patient

The animal was placed on the operation table in dorsal recumbency and was restrained physically by the assistants. The operation site was clipped, shaved and draped using sterile surgical towel. The site was finally painted with tincture of iodine.

Anaesthesia

Xylazine hydrochloride (Xylazine[®]) was administered at a dose rate of 0.1mg/kg body weight through intramuscular route to calm down the calf. Later, by infiltrating and injecting of 4 ml of 2% lidocaine hydrochloride (Jasocaine[®], Jayson Pharmaceuticals Ltd., Dhaka, Bangladesh) from cranial to caudal aspect of sac like protrusion local anaesthesia was achieved.

Operative procedure

The calf was controlled in sternal recumbency and operated under local anesthesia. The frontal region was prepared for aseptic surgery and an elliptical skin incision was made at the base of the sac. After separation of the skin, fluid filled meningeal membranes were noticed protruding out from the cranium through the frontal opening. These meningeal membranes were ligated close to the defect in the frontal bone and then resected. The skin was closed as per standard procedures using silk.

Postoperative management

This consisted of a course of antibiotic for 5 days. At post-operative treatment Procaine penicillin(10000-30000IU/kg body weight), Benzyl penicillin(10000-40000IU/kg body weight), Streptomycin(5-10mg/kg body weight), Meloxicam(0.5mg/kg body weight) were given to the calf to prevent any secondary bacterial infection. The animals were kept under supervision for 20 days to observe any complication if there was any. Respiratory rate, heart rate and rectal temperature were recorded prior to surgery and thereafter daily until the 7th post-operative day.

Results

Figure 2 portrays the sequential steps followed in the surgery (a) Anaesthesia using 2% Lidocaine HCl (b) Making the incision; (c) Removal of fluid-filled sac; (d) Closing the operation site by silk suturing (e) Cleaning and disinfecting the sutured-site and (f) Sealing the site with aseptic bandaging. Recurrence was not noticed in the calf after treatment of 9 days. The skin stitches were removed within 12 days after operation.



a. Anaesthesia



b. Incision



c. Removal of fluid filled sac



d. Suturing



e. Sutured site after surgery



f. Aseptic sealing of the sutured site.

Figure 2: Sequential steps followed in the Surgery.

The surgical procedure followed in the present case was similar to that of Justin et al(2011), who treated a cranial meningocele by surgical correction after draining the fluid in the sac, but in the present case, the meningocele was corrected surgically without draining fluid from it. The non-recurrence of meningoencephalocele in calf might be due to progressive closing of the defect during its growth. The owner of the calf was advised to avoid natural service in further lactations so as to prevent the hereditary form of meningo encephalocele.

Discussion

Meningo encephalocele goes synonymous with spina bifida and cranial meningocele etc. The condition is a rare form of neural tube defect (NTD) which is observed at the time of birth, in which, the neural tube is unable to close completely. The neural tube is a hollow, embryonic structure that gradually develops into the central nervous system, comprising of the brain and spinal cord. This in turn creates a gap or hole through which cerebrospinal fluid, brain tissue, and the membrane covering the brain (Meninges) protrude into a sac-like formation (McComb and Chen 1996). Herniation of fluid filled meninges is due to defects in the cranium especially on frontal bone at its medial side. This was also attributed to defective union of related suture lines. In the present case, the herniation was also noticed on the frontal bone nearer to nuchal's crest.

This condition is usually named after its location. Congenital giant occipital Meningo encephalocele was reported in a Holstein calf fetus by Ayhan et al.(2013). Diagnosis of this condition is done by signalment itself but the nature and degree of involvement of meninges and the magnitude of defect in the cranial vault have to be assessed by diagnostic imaging like radiography as in the present case.

The prognosis for each individual with congenital meningoencephalocele depends on the size & location whether brain tissue is present in the sac, and if other brain abnormalities are also present. Survival is generally better when brain tissue is not involved in the sac. Individuals with encephaloceles located in the face (at the frontal and nasal bones tend to have better survival and development than those located at the back of the head (at the occipital and parietal bones. Several studies have found that approximately two-thirds (66%) of individuals with meningoencephalocele in the back of the head survive; of those survivors, approximately half have normal intelligence. Infections, such as meningitis, may develop and could also affect the outcome.

Conclusion

Determination of the factors causing the congenital anomalies becomes impossible since they are numerous such as malnutrition, exposed diseases, applied medicines, and growing conditions. The present case classified as congenital meningoencephalocele both pathologically and anatomically and I think that current report will illuminate on the further similar studies on the congenital anomalies. Anatomopathological findings confirmed the diagnosis as cranial meningoencephalocele at the frontal region of the skull . The presence of a bony structure embedded to the wall of meningeal sac was rather unusual and could not be sufficiently explained. It was however thought to, most likely, represent a part of interparietal bone that failed to get incorporated into squamous part of occipital bone as a result of the defect. Congenital defects like meningoencephalocele, if treated as early as possible can save the life of the animal as in the present case.

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