B-5007
[1-4]

CASE REPORT Indian Journal of Animal Research

# Dropsy of Fetal Membranes Combined with Hydrocephalus in a Jersey Crossbred Heifer

Raja Sengodan, Prabaharan Vaiyapuri, Senthilkumar Shanmugam[1], Rajkumar Ramasamy, Palanisamy Mahakrishnan

10.18805/IJAR.B-5007

## ABSTRACT

**Background:** A Jersey Cross bred heifer (3 years) was presented to Large Animal Obstetrical Unit of Veterinary College and Research Institute, Orathanadu with a bilaterally distended abdomen suffering from dystocia. The present work was aimed to study the diagnosis and effect of therapeutic intervention for dropsy of fetal membranes and fetus.

**Methods:** The animal was observed for general examination and subjected to clinical investigation. Vaginal examination revealed patent vaginal passage with dilated cervix. Fetal head could be palpable on further deep vaginal examination. In addition, a uterine tear was also palpable on the lateral side of the birth canal at 5' O" clock position.

**Result:** Based on the clinical observations, the case was diagnosed as dystocia due to dropsy of fetal membranes with uterine tear. The animal was restrained and stabilized with 3 L of Inj. Normal saline intravenously. Under paravertebral nerve block cesarean section was performed and a dead male fetus with hydrocephalus was removed. Approximately about 280 L of mixed fetal fluids were drained. Postoperatively the animal was treated for seven days and the animal had uneventful recovery after 2 weeks of suture removal.

**Key words:** Dystocia, Fetal Membranes Dropsy, Fetal hydrocephalus, Jersey Crossbred Heifer.

## INTRODUCTION

Dropsy of fetal membranes occurs sporadically, being most common in cows (Peek, 1997). Incidence of hydrallantois is more common (88%), while hydramnios is seldom (5%) and in the rest of the cases (7%) both forms occur together (Vandeplassche *et al.,* 1965). Hydrallantois associated with a diseased uterus in which most of the caruncles in one horn are not functional and rest of the placentomes are greatly enlarged and possibly diseased (Roberts, 1986). Hydramnios is a congenital defect due to recessive gene (Leipold and Dennis 1980) and often associated with certain cranial abnormalities of the fetus especially cleft palate which led to impaired swallowing, causing amniotic fluid to accumulate with progressing gestational age (Jackson, 1995). Hydrocephalus is a dropsical condition of the fetus, with accumulation of fluid which may be in ventricular system or between the brain and duramater which causes the swelling of cranium. Infections, nutritional and hereditary as a predisposing cause leading to hydrocephalus (Venkataramana *et al.,* 2017). The present case records a report on dropsy of fetal membranes combined with communicating hydrocephalus in a crossbred Jersey heifer.

## MATERIALS AND METHODS

A 3 year old Jersey crossbred heifer was presented to the Department of Veterinary Gynaecology and Obstetrics Teaching Hospital of the Tamil Nadu Veterinary and Animal Sciences University for dystocia (Fig 1) during the period of May 2020. The clinical parameters like rectal temperature, heart rate and respiratory rate were within the normal limits. According to the anamnesis the animal had completed the gestation lenght; inappetence and not voided dung for past 24 h.

Clinical observation disclosed that the animal was found to be dull, bilaterally distended abdomen with oedematous vulva and pink conjunctival mucous membrane. Vaginal examination revealed patent vaginal passage with dilated cervix. Fetal head could be palpable on further deep vaginal examination; with signs of prolonged first stage labour. In addition, a uterine tear could also be palpable on the lateral side of birth canal at 5' O" clock position. Rectal examination explored a gravid uterus with feeble fremitus. Based on the clinical observations, the case was diagnosed as dystocia due to dropsy of fetal membranes with uterine tear. Blood samples were collected from the jugular vein and subjected

Department of Veterinary Gynaecology and Obstetrics, Veterinary College and Research Institute, Tamil Nadu Veterinary and Animal Sciences University, Orathanadu, Thanjavur-614 625, Tamil Nadu, India. [1]Veterinary Clinical Complex, Veterinary College and Research Institute, Tamil Nadu Veterinary and Animal Sciences University, Orathanadu, Thanjavur-614 625, Tamil Nadu, India.

**Corresponding Author:** Raja Sengodan, Department of Veterinary Gynaecology and Obstetrics, Veterinary College and Research Institute, Tamil Nadu Veterinary and Animal Sciences University, Orathanadu, Thanjavur-614 625, Tamil Nadu, India. Email: argoraja@gmail.com

**How to cite this article:** Sengodan, R., Vaiyapuri, P., Shanmugam, S., Ramasamy, R. and Mahakrishnan, P. (2022). Dropsy of Fetal Membranes Combined with Hydrocephalus in a Jersey Crossbred Heifer. Indian Journal of Animal Research. DOI: 10.18805/IJAR.B-5007.

**Submitted:** 27-08-2022 **Accepted:** 10-12-2022 **Online:** 13-12-2022

to hematological study as a pre-surgical assessment. The blood parameters were in the normal range. The animal was restrained and stabilized with 3 L of Inj. Normal saline intravenously. Under paravertebral nerve block cesarean section was performed (Kumar and Purohit 2022) and a dead male fetus was removed. Approximately about 280 L of mixed fetal fluids were drained. Postoperatively the animal was treated for seven days and the animal had uneventful recovery after 2 weeks of suture removal. Placental tissue was collected and fixed in 10% neutral buffered formalin for histo-pathological studies. Placental tissue was paraffin embedded sectioned at 4 µm, processed as per standard staining procedures for Masson's Trichrome and Haematoxylin eosin.

## RESULTS AND DISCUSSION

The fetal fluids were amber in color (Fig 2); on careful examination, the calf was found to be defective (Fig 3) with external hydrocephalus and cleft palate (Fig 7). Wrinkled skin with mild degree of arthrogryposis were also observed. The fetal membrane weighed 8.5 Kg and it had only 28 numbers of cotyledons which could be noticed only in the gravid uterine horn and were larger (19×12 cm) than usual (Fig 4). The rest of the fetal membranes were adventitious in nature. Thinning of cranium with dome shape was observed upon radiographic examination the fetal head. On dissection of skin, failure in fusion of cranial bones were noticed (Fig 5, 6) with absence of cerebral atrophy.

Leipold and Dennis (1980) reported recessive gene expression could be the factor of hydramnios and it's congenital in nature gene. Jackson (1995) stated that hydramnios was often associated with cranial malformation such as cleft palate which might result in improper swallowing, which led to accumulation of amniotic fluid. Shupe *et al.* (1968) reported that Lupine (Indian beet) and hereditary as the factors responsible for cleft palate leading to hydramnios. Congenital hydrocephalus caused by a lethal autosomal recessive gene with incomplete penetration had been reported in cattle which are termed as neuropathic (Jubb and Kennedy, 1970). Katiyar *et al.* (2020) reported that hydramnion coupled with fetal anasarca in a doe due to placental origin.

Microscopically the placental tissue showed more of connective tissue covered with trophoblast. The connective tissue contained numerous blood vessels. The tunica media of blood vessels were thickened (medial hypertrophy) (Fig 8 and 9). Cotyledonary area was made up of mesenchymal tissue covered with a single layer of

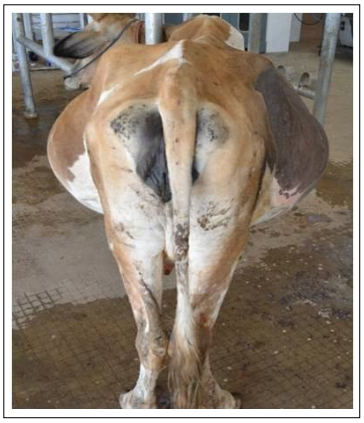

**Fig 1:** Cow with bilaterally distended abdomen.

**Fig 3:** Dead fetus.

**Fig 2:** Amber coloured fetal fluids (mixture of amniotic and allantoic fluids).

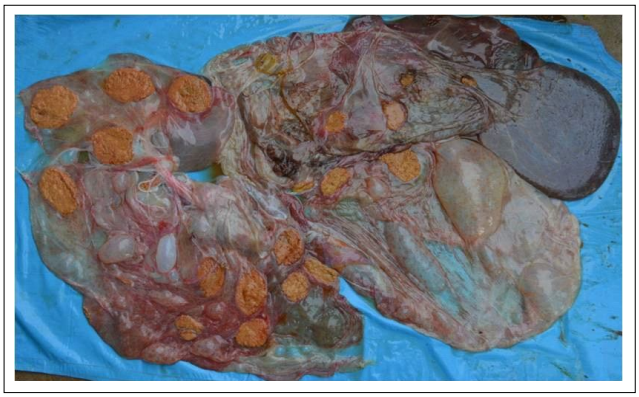

**Fig 4:** Placenta with 28 nos of cotyledons andrest is adventitious in nature.

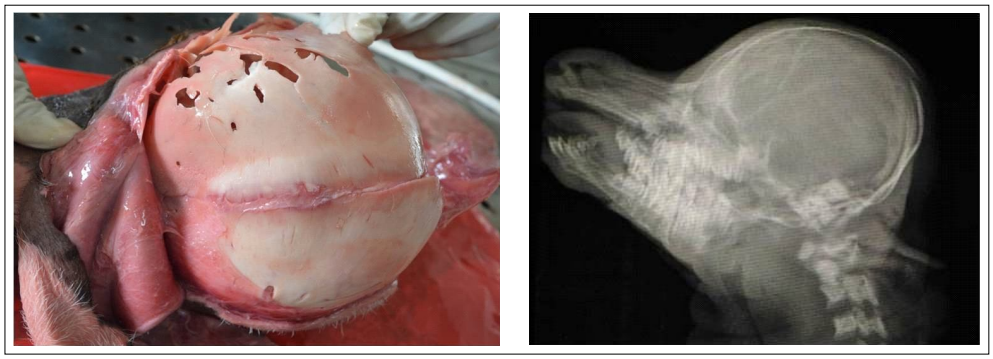

**Fig 5 and 6:** Thinning of cranium in hydrocephalus skull with dome shape.

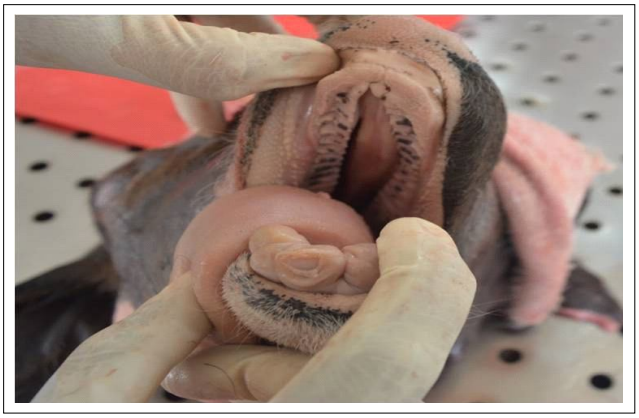

**Fig 7:** Cleft palate.

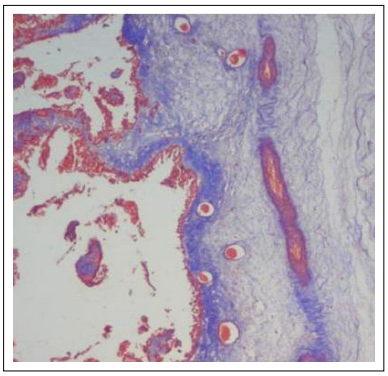

**Fig 8:** Photomicrograph of the adventitious portion of placenta showing the increased amount of connective tissue. (MT X100).

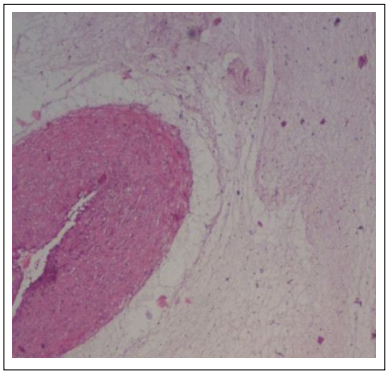

**Fig 9:** Photomicrograph of normal placenta at the cotyledonary area. (H and E X 100).

trophoblast. Average thickness of artery in adventitious portion was 10.37 µ and in normal it was 1.87 µ.

Etiology of hydrallantois was frequently associated with diseased uterus and in which major portion of caruncles were atrophied. In such circumstances the presence of few caruncles may become enlarged as a compensatory mechanism and rest of the portion become adventitious. Similar results were reported by Drost (2007). Cooke *et al.* (2013) reported that development of uterine glands (adenogenesis) started immediately after birth and lasted for few weeks; prenatal progestins inhibited the uterine epithelial proliferation by influencing the gene expression (Hox, Wnt *etc* and resulted in congenital disorders of the endometrial organization which could lead to hydrallantois.

Fride (1975) stated that disturbances in normal circulation of cerebrospinal fluid due to distorted production might lead to hydrocephalus. In internal hydrocephalus the fluid was in the ventricular system; while in external hydrocephalus the fluid was in the arachnoid space and in communicating hydrocephalus the fluid was in boththe locations. Jubb and Kennedy (1970) reported that external hydrocephalus was often congenital and could also occur due to hypovitaminosis A. Leipold and Dennis (1980) reported that in cattle, expression pattern of simple autosomal recessive gene and autosomal gene with incomplete penetrance had been associated with hydrocephalus. Possibility of external hydrocephalus was either due to excess production of fluid nor obstruction in drainage of fluid (Shastry, 1971). Leptin receptors in placenta could regulate metabolism and sustain the fetal nutritive demand by influencing the hematopoiesis angiogenesis mechanism Priyadarshini *et al.* (2015).

Undeviating alteration of caruncular structures of the endometrium lead to adventitious placenta and prognosis was guarded (Drost, 2007). Role of heparin binding angiogenic factors in differentiation of placental endothelium resulted in establishment of circulatory network between dam and fetus (Reynolds and Redmer, 1995). Raja *et al.,* (2017) stated that the stimulating factor for activation of

adventitious placental circulation is yet to be explored. Inspite of increased mesenchymal connective tissue, there were more number of blood vessels present in the connective tissue, which might be helped in the diffusion of nutrients to fetus from the endometrium.

## CONCLUSION

In the present case, we conclude that the congenital endometrial disorder could have caused formation of adventitious placenta that resulted in hydrallantois along and the cleft palate aided in occurrence of hydramnios. In addition to these defective cerebral system resulted in hydrocephalus. To the best of our knowledge this is the first report citing three dropsical conditions in a single case

## ACKNOWLEDGEMENT

The authors thank the Dean, Veterinary College and Research Institute, Orathanadu and the Director of Clinics, Tamil Nadu Veterinary and Animal Sciences University, Chennai for providing administrative support in conducting the study.

**Conflict of interest:** None.

## REFERENCES

Cooke, P.S., Spencer, T.E., Bartol, F.F., Hayashi, K. (2013). Uterine glands: Development, function and experimental model systems. Molecular Human Reproduction. 19: 547-558.

Drost, M. (2007). Complications during gestation in the cow. Theriogenology. 68: 487-491.

Fride, R.R. (1975). Developmental Neuropathology. Springer Verlag, New York, USA.

Jackson, P.G.G. (1995). Handbook of Veterinary Obstetrics, 2nd ed. W.B. Saunders Company Philadelphia, USA. pp. 123-127.

Jubb, K.V.F. and Kennedy, P.C. (1970). Pathology of Domestic Animals, 2nd ed. Academic Press, NYC.

Katiyar, R., Kharayat, N., Rautela, R., kumar, A., Gautam, D., Ghosh, S.K. and Prasad, J.K. (2020). A rare case of dystocia due to hydroamnion coupled with fetal anasarca in a doe. Agricultural Science Digest. 40(3): 328-329.

Kumar, D. and Purohit, G.N. (2022). Cesarean section in cattle: A review. Agricultural Reviews. 43(2): 154-161. DOI: 10.18805/ag.R-1933.

Leipold, H.W., Dennis, S.M. (1980). Congenital defects affecting bovine reproduction In: Current Therapy in Theriogenology: Diagnosis, Treatment and Prevention of Reproductive Diseases in Animals. Morrow, D.A. 2nd ed., WB Saunders, Company, Philadelphia, USA. pp. 432.

Peek, S.F. (1997). Dropsical Conditions Affecting Pregnancy. In: Current Therapy in Large Animal Theriogenology, 1997, Younquist, R.S. WB Saunders Company. Philadelphia. pp. 400.

Priyadarshini, L., Yadav, A.K., Singh, H.S., Mishra, A., Jain, A.K., Ahirwar, M.K. (2015). Role of leptin in physiology of animal reproduction-A review. Agricultural Reviews. 36(3): 235-240

Raja, S., Vijayarajan, A., Prabaharan, V., Jayaganthan, P., Sivakumar, A., Kumar, S.S., (2017). Abortion due to adventitious placentation in a jersey Crossbred cattle: Indian Journal of Animal Reproduction. 38(1): 2017: 66-67.

Reynolds, L.P. and Redmer, D.A. (1995). Utero-placental vascular development and placental function. Journal of Animal Science. 73: 1839-1851.

Roberts, S.J. (1986). Veterinary Obstetrics and Genital Diseases 2nd ed. CBS Publishers and Distributors, New Delhi. pp. 223.

Shastry, G.A. and Rao, R. (1971). Veterinary Pathology, The Nervous System. 3rd ed. CBS Publishers and Distributors, New Delhi, India. pp. 345.Tirupati. pp.345.

Shupe, J.L., Binns, W., James, L.F., Keeler, R. (1968). A congenital deformity in calves induced by the maternal consumption of lupin. Australian Journal of Agricultural Research. 19: 335-340.

Vandeplassche, M., Oyaert, W., Bouters, R., Vandenhende, C., Spincemaille, Hermann, J., (1965). Uber die Eihautwassersucht beim Rind. Wiener Tiearztliche Monatsschrift. 52: 461.

Venkataramana, K., Rathod, S., Kumar, D.A. (2017). The chances of dystocia in cows due to hydrocephalus Fetus: Pharma. Innovation Journal. 6(3): 162-163.