MYELOGRAPHIC DIAGNOSIS OF SPINAL CORD INJURY USING IOHEXOL CONTRAST MEDIA IN A CAT

R.B. Kushwaha[1], D.K. Dwivedi[2], Ankur Sharma[2] and Pankaj Gupta[2]
[1]Assistant Professor, Division of TVCC; [2] Assistant Professor, Div. of Veterinary Surgery & Radiology;Faculty of Veterinary Sciences & Animal Husbandry; Sher-e-Kashmir University of Agricultural Sciences & Technology-Jammu, R S Pura-Jammu 181 102
[Received: 16.2.2019; Accepted: 24.9.2019]
{DOI 10.29005/IJCP.2019.11.2.186-188}

An adult cat weighing four kilogram was brought to the clinics with the history of fall from the height two days back and signs of paraplegia, urinary and faecal incontinences and abnormal upward curvature of vertebral column at the thoraco-lumbar region. The plain radiograph revealed the presence of fracture of body of second lumbar vertebra (L_2). Myelography of cat was done via cisterna magna using iohexol @ 0.50 ml/kg body weight under thiopental sodium anaesthesia. Myelogram at 60 minutes intervals revealed complete transection of spinal card at the fractured site.

Key words: Cat, Iohexol, Myelography, Spinal cord injury.

Myelography is a contrast study of spinal cord, in which positive contrast agent is injected into subarachnoid space either through cisterna magna or lumbar site, to diagnose the spinal cord diseases (Widmer and Thrall, 2009; Harris and Dhupa, 2008). The procedure, myelography, is mostly performed to diagnose the spinal cord diseases in dogs and cats where plain radiograph fails to reveal conclusive diagnosis. In India, myelographic procedure is routinely done in dogs but rarely done in cats. The present paper reports the cisternal myelography by using iohexol (350 mg I/ml) contrast media in a cat having L_2 vertebral fracture. Aim of this report is to assess the degree of compression of spinal cord in known spinal cord injury so that judgement can be made whether the condition is treatable or not.

Case History and Observations

An adult cat weighing four kilogram was brought to the clinics with the history of fall from the height two days back leading to trauma at vertebral column. The cat presented the signs of paraplegia, urinary and faecal incontinences, and abnormal upward curvature of vertebral column in the thoraco-lumbar region. There was loss of sensation in the hind limbs and perineal area. The physiological parameters were within the normal range. The plain radiograph revealed fracture of body of second lumbar vertebra (L_2).

Materials and Methods

Myelographic procedure

The atlanto-occipital area was clipped, shaved, scrubbed and swabbed with sprit for aseptic cisternal myelography. The cat was pre-medicated with diazepam @ 0.5 mg/kg i.v. and anaesthetised with 2.5% thiopental sodium @ 15 mg/kg body weight i.v. to effect. The cat's neck was bent downward up to 90^0. A 21 gauze spinal needle was inserted vertically from a middle point of triangle formed by the wings of atlas bone and protuberance of the occipital bone. The needle was advanced slowly through the foramen magnum till cerebrospinal fluid (CSF) started dribbling from the hub of needle. Two millilitres of iohexol (OMNIPAQUE^{TM}, 350 mg I/ml) @ 0.50 ml/kg wt., after removal of equal amount of CSF, was injected slowly into the subarachnoid space. The cat's hind quarter slopped down by approximately 45^0 immediately after administration of contrast agent till the completion of procedure, except at the time of x-rays exposure at different intervals.

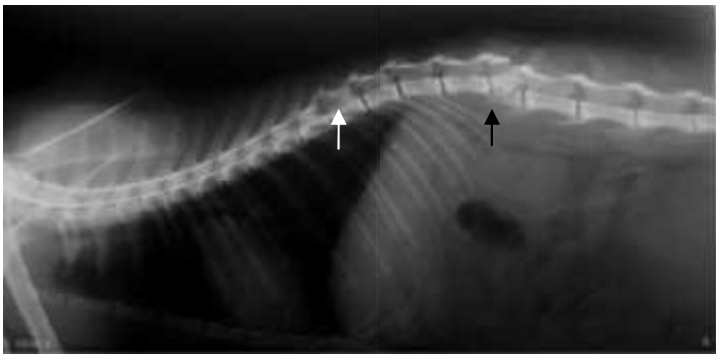

Fig. 1: Lateral myelogram of cat at 5 minute interval showing flow of contrast material up to T_{11} with good contrast effect (white arrow). Note the fracture of second lumbar vertebral body (L_2; black arrow).

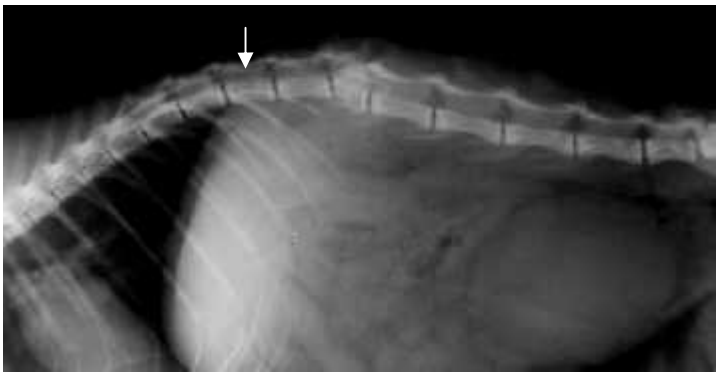

Fig. 2a: Lateral myelogram at 30 minute interval showing flow of contrast material up to fractured lumbar vertebral bone.

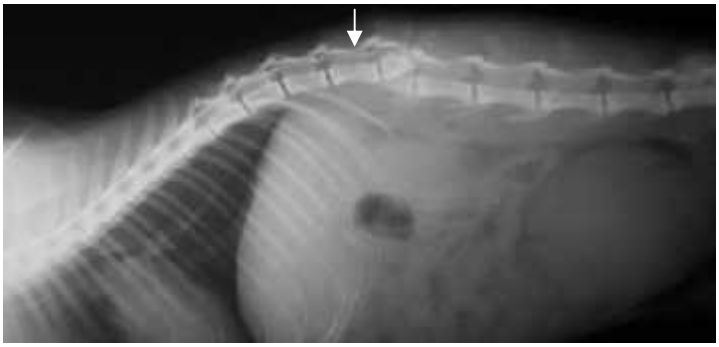

Fig. 3a: Lateral myelogram at 60 minute interval showing flow of contrast material still up to fractured vertebra but with better visualization than 30 minute intervals.

Fig. 2b: V/D myelogram at 30 minute interval. Note the poorly visualized spinal cord (black arrow).

Fig. 3b: V/D myelogram at 60 minute interval showing poor contrast of spinal cord.

Discussion

Thiopental sodium anaesthesia, in combination with diazepam, was found satisfactory in this case. Several other researchers have also used thiopental sodium for myelography in dogs (Kumar *et al.,* 2003; Riyaz *et al.,* 2006; Widmer and Thrall, 2009) and cats (Wheeler and Davis, 1985). The plain radiograph in two orthogonal views revealed fracture of L_2 vertebral body. However, the degree of compression over spinal cord could not be assessed.

The myelograms taken at five minutes interval showed flow of contrast material up to 11^{th} thoracic vertebra with a good contrast effect (Fig. 1) which could be because of contrast material not reached to the fracture site in five minutes and no diffusion of contrast from the subarachnoid space. At 15 minutes, myelogram revealed flow of contrast material up to fractured site but with decreased contrast effect. The myelogram at 30 minute interval still showed flow of contrast material up to fractured site (Fig. 2 a &b) and did not cross it even at the 60 minutes interval (Fig. 3a &b). Radiopacity of lateral myelograms were better than ventrodorsal myelograms. The summation of myelograms taken at different interval suggested that fracture of L_2 probably caused complete severance of spinal cord which in turn responsible for paraplegia, loss of sensation in hind limbs, faecal and urinary incontinence. On plain radiography the degree of compression of spinal cord could not be assessed, albeit clearly the fracture of lumbar vertebra (L_2) and compression of spinal cord were evident. Thus myelography was done, which revealed complete compression/severance of spinal cord as contrast material did not cross the fractured site even at 60 minutes.

Conclusions

From the present case study it can be concluded that myelography must be done to assess the degree of compression of spinal cord for prognosis of the case and to judge whether the case is fit for surgical treatment or fit for euthanasia in the cases of vertebral fracture.

References

Harris, J.E. and Dhupa, S. (2008). Lumbosacral intervertebral disk disease in six cats. *J. Am. Anim. Hosp. Assoc.,* **44**: 109-115.

Kumar, P., Rangananth, L., Rangananth, B.N., Vasanth, M.S. and Jayadevappa, S.M. (2003). Myelographic studies in dogs using iohexol and iopamidol. *Indian J. Vet. Surg.,* **25**: 72-74.

Riyaz, D.B., Vasanth, M.S., Ranganath, L. and Ranganath, B.N. (2006). Myelography for evaluation of spinal lesions in dogs. *Indian J. Vet. Surg.*, **27**: 127.

Wheeler, S.J. and Davies, J.V.(1985). Iohexol myelography in dog and cat: A series of one hundred cases and a comparison with metrizamide and iopamidol. *J. Small Anim. Pract.*, **26**: 247-256.

Widmer, W.R. and Thrall, D.E. (2009). Canine and Feline Intervertebral Disc Disease, Myelography, and Spinal Cord Disease. In: Textbook of Veterinary Diagnostic Radiology, eds by Donald E. Thrall, 5^{th} edn., Philadelphia, USA. Pp.194-219.