

# Canine Renal Nephroblastoma with Multiple Organ Metastasis – A Case Report

Chaitanya S.<sup>1\*</sup>, Sukirti Sharma<sup>1</sup>, P. M. Sonkusale<sup>1</sup>

*Ind J Vet Sci and Biotech* (2024): 10.48165/ijvsbt.20.2.27

**N**ephroblastoma is also known as Wilm's tumour / embryonal nephroma / embryonal adenocarcinoma. It is a rare neoplasm that results from a poor differentiation of metanephric blastema and represents defective nephrogenesis (Meuten and Meuten, 2017). The tumour origin is believed from genetic predisposition, primarily mutations in the WT1 gene (*i.e.*, tumour suppressor) (Brown and Malik, 2001). It is mostly reported in less than 2 year old dogs (Bryan *et al.*, 2006). Higher incidence is seen in large breed dogs such as German Shepherd and Golden retrievers (Summers *et al.*, 1988). In dogs, metastasis is expected to be >50% (Chen *et al.*, 2018). Nephroblastoma is generally seen as a primary renal tumour or as a tumour within the thoracolumbar portion of spinal cord in dogs (Sale *et al.*, 2004). This case report documents canine renal nephroblastoma with multiple organ metastasis in a dog.

## CASE HISTORY AND OBSERVATIONS

A 2-year-old dead male German Shepherd dog from dog squad, Police Department, Wardha District of Maharashtra used for narcotic and explosive detection was brought to the Department of Veterinary Pathology, Nagpur Veterinary College, Nagpur (India) for detailed post-mortem examination, with the history of under treatment since 3 months and the clinical symptom of anorexia, depression, progressive weight loss. Blood picture had indicated leucocytosis, neutrophilia, lymphopenia and anaemia. Urine analysis indicated proteinuria (1+) and microscopic haematuria. Also, there was history of pelvic limb paresis, ataxia followed by recumbency since last 15-20 days. Anuria was exhibited before death.

On external examination, the carcass was cachectic and dehydrated (Fig. 1). Pale conjunctival mucous membrane, decubitus ulcer of 3 cm diameter in right pelvic region, 2.5 cm diameter in left pelvic region, 1.5 cm diameter in left scapular region, haemorrhagic ulcers in upper oral mucosa and foul odour from oral cavity were noticed.

## POST-MORTEM FINDINGS AND DISCUSSION

The carcass was cut opened and detailed necropsy examination was done. Lesions included white to tan tiny nodules diffusely present on the left kidney parenchyma,

<sup>1</sup>Department of Veterinary Pathology, Nagpur Veterinary College, MAFSU, Nagpur-440006, Maharashtra, India

**Corresponding Author:** Chaitanya S., Department of Veterinary Pathology, Nagpur Veterinary College, MAFSU, Nagpur-440006, Maharashtra, India. e-mail: chaitanyasgowda@gmail.com

**How to cite this article:** Chaitanya, S., Sharma, S., & Sonkusale, P. M. (2024). Canine Renal Nephroblastoma with Multiple Organ Metastasis – A Case Report. *Ind J Vet Sci and Biotech*. 20(2), 121-123.

**Source of support:** Nil

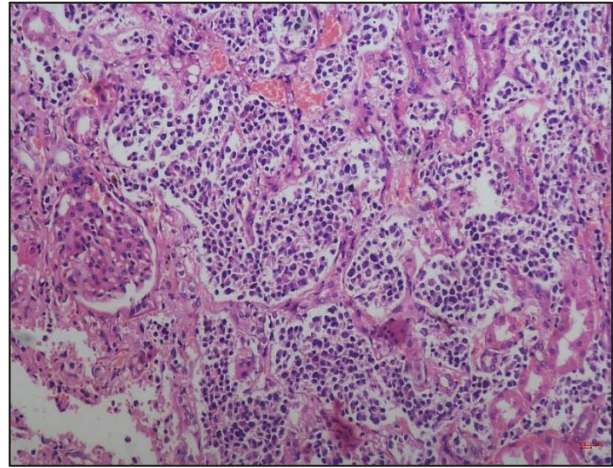
**Conflict of interest:** None.

**Submitted** 10/08/2023 **Accepted** 21/12/2023 **Published** 10/03/2024

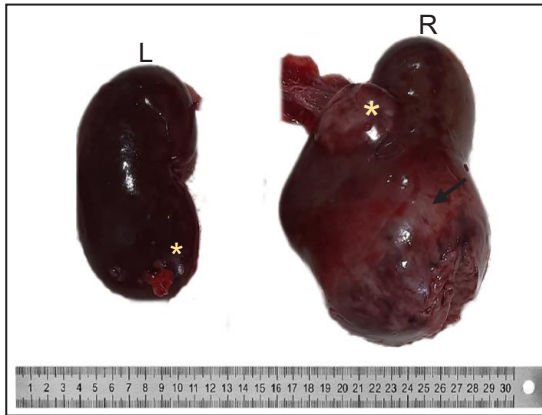
enlarged right kidney with encapsulated solid tumorous growth (3 x 3.5 inch) at caudal part and firm pale raised tumour mass about 2.5 cm diameter in cranial part (Fig. 2). Apical lobe of right lung showed large encapsulated firm tumour growth with nodular projections (7x4.5 inch) (Fig. 3). Other findings included haemothorax, congested lung, frothy trachea, thickened urinary bladder and severe congestion in liver and spleen. Tissue samples of kidney, lungs, liver and spleen were collected in 10% neutral buffered formalin and processed for routine histopathological examination using haematoxylin and eosin stain (Luna, 1968). Microscopically, kidney revealed nests of small round to oval hyperchromatic nuclei, scant cytoplasm and undifferentiated diffuse sheets of blastemal cells. The mesenchymal component consisted of streams of spindle cells. Classical lesion of triphasic mixture of embryonic epithelium consisting glomerular buds, tubules, undifferentiated blastema and mesenchymal components in varying amounts were observed (Fig. 4). These findings of triphasic mixture of cells are in agreement with Chen *et al.*, (2018). Mitotic figures were noticed at higher magnification. Lungs showed tumour cells arranged in islands and surrounded by delicate stromal tissue (Fig. 5). Higher magnification showed tumour composed of pleomorphic cells with hyperchromic nuclei, high N:C ratio and mitotic figure. Liver showed metastatic foci of tumour consisted of nest of blastemal cells along with necrosis. Spleen revealed emboli of blastemal cells in arteries.



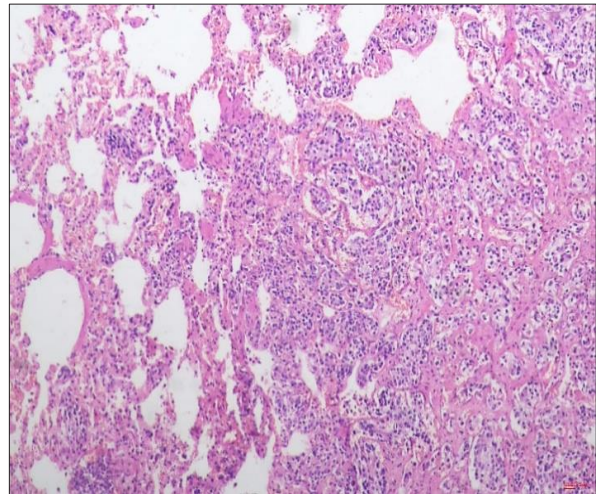
**Fig. 1:** German Shepherd dog with decubitus ulcers on right pelvic region (arrow)



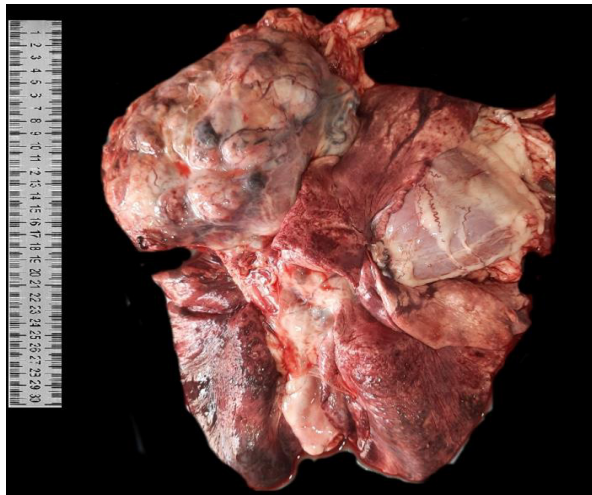
**Fig. 4:** Kidneys showing triphasic tumor composed of blastema (B), epithelial elements (tubules) (T), and stroma (S) (H&E, 200 x)



**Fig. 2:** Kidney, **Lt:** White to tan tiny nodules on the parenchyma (asterisk), **Rt:** Enlarged kidney with encapsulated tan to haemorrhagic solid tumorous growth (3 x 3.5 inch) (arrow) and firm pale raised tumour mass about 2.5 cm diameter (asterisk)



**Fig. 5:** Lungs showing tumour cells arranged in islands surrounded by delicate stromal tissue (H&E, 100 x)



**Fig. 3:** Lungs showing large encapsulated firm tumour growth with nodular projections(7x4.5 inch) attached to the apical lobe of right lung (asterisk)

Based on the history of clinical signs, gross and microscopic lesions, the case was diagnosed as blastema dominant canine renal nephroblastoma with multiple metastasis in vital organs. Based on the staging system (I-V) for nephroblastoma in humans, developed by the National Wilms Tumour Study Group (NWTSG), the case was designated as Stage V with unfavorable prognosis since both the kidneys were involved with multiple organ metastasis. It's a third most common renal tumour in dogs followed by renal cell carcinoma and sarcoma (Meuten and Meuten, 2017). Ectopic nephroblastoma of spinal cord has been reported in dogs which was located at the region of 10<sup>th</sup> thoracic to 2<sup>nd</sup> lumbar vertebrae (Sale *et al.*, 2004) having characteristic glomeruli like structures and tubules microscopically (Summers *et al.*, 1988). No ectopic nephroblastoma to spinal cord was found in our case; however, metastasis was mainly seen in lungs, liver and spleen. Nephroblastoma remains a rarely diagnosed tumour in dogs (Martin *et al.*, 2014) therefore early detection and treatment is difficult to perform.

## ACKNOWLEDGEMENT

The authors thank both teaching and non-teaching staff of Department of Veterinary Pathology, Nagpur Veterinary College for the support provided.

## REFERENCES

- Brown, K.W., & Malik, K.T.A. (2001). The molecular biology of Wilms' tumour. *Expert Reviews in Molecular Medicine*, 3(13), 1-16.
- Bryan, J.N., Henry, C.J., Turnquist, S.E., Tyler, J.W., Liptak, J.M., Rizzo, S.A., & Jackson, T. (2006). Primary renal neoplasia of dogs. *Journal of Veterinary Internal Medicine*, 20(5), 1155-1160.
- Chen, B., Li, W.T., & Wang, F.I. (2018). A blastema-predominant canine renal nephroblastoma with gingival metastasis: case report and literature review. *Journal of Veterinary Diagnostic Investigation*, 30(3), 430-437.
- Luna, A.G. (1968). *Histological Staining Methods of the Armed Forces Institute of Pathology*. McGraw Hill book Co., London, 3<sup>rd</sup> edn., pp. 124-125.
- Martin, K.D., Sarangom, S.B., Krishna, B.N.D., Nair, N.D., Pillai, U.N., Philip, S.B., & Kankonkar, A.P. (2014). Renal nephroblastoma in an adult dog. *Veterinarski Arhiv*, 84(1), 85-96.
- Meuten, D.J., & Meuten, T.L.K. (2017). *Tumours in Domestic Animals*. 5<sup>th</sup> edn., Ames, IA, Wiley, pp. 646-650.
- Sale, C.S., Skerritt, G.C., & Smith, K.C. (2004). Spinal nephroblastoma in a crossbreed dog. *Journal of Small Animal Practice*, 45, 267-271.
- Summers, B.A., DeLahunta, A., McEntee, M., & Kuhajda, F.P. (1988). A novel intradural extramedullary spinal cord tumour in young dogs. *Acta Neuropathologica*, 75, 402-410.