

CLINICAL, IMAGISTIC AND THERAPEUTICAL ASPECTS OF ASTROCYTOMA IN A DOG

ASPECTE CLINICE, IMAGISTICE ȘI TERAPEUTICE LA UN CÂINE CU ASTROCITOM

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ABSTRACT | REZUMAT

Intracranial neoplasms are common conditions in geriatric dogs, 10% of primary tumors with CNS localization being astrocytoma.

The patient, a dog ten years old, male, West Highland White Terrier, came in for a neurological examination due to changes in posture in motion and behavioral changes. In the neurological examination, using the VITAMIND acronym, there were suspicions of vascular disorders (V), inflammatory / infectious (I) conditions or neoplastic (N) process. Because the hematological and biochemical blood tests, thoracic Rx and abdominal ultrasound examination were normal, a MRI and cytological examination of the cerebrospinal fluid were recommended. By interpretation of the MRI results, the diagnosis was compatible with an intraneuraxial, infiltrative tumor located at pontine level, having the appearance of a grade II infiltrative astrocytoma; reserved prognosis.

The treatment was determined by following the established protocol for palliative therapy with corticosteroids, antioxidants and supplements, noticing a significant improvement of the clinical condition of the patient.

Keywords: dog, astrocytoma, MRI, palliative treatment

Neoplaziile intracraniene sunt afecțiuni frecvent întâlnite la câinii geriatrici, astrocitomul deținând un procent de 10% dintre tumorile primare cu localizare la nivelul SNC.

Pacientul, un câine în vârstă de 10 ani, rasa West Highland White Terrier, mascul, a fost prezentat la consultație neurologică datorită modificărilor de postură avute în timpul deplasării și a modificării de comportament. La examinarea neurologică, folosind acronimul VITAMIND, s-au suspiciat afecțiuni la nivel vascular (V), afecțiune inflamatorie / infecțioasă (I) sau proces neoplazic (N). Deoarece examenele sangvine hematologice, biochimice, radiografiile toracale și examinarea ecografică abdominală au fost fără modificări s-a recomandat efectuarea MRI și examinarea citologică a lichidului cefalorahidian. În urma interpretării informațiilor obținute în urma examenului MRI diagnosticul a fost compatibil cu o formațiune tumorală intraneuraxială, infiltrativă, localizată la nivel pontin, având aspectul unui astrocitom infiltrativ de gradul II, prognostic rezervat. Tratamentul instituit a fost stabilit prin urmărirea protocolului de terapie paliativă cu administrare de corticosteroizi, antioxidanți și suplimente, observându-se îmbunătățirea semnificativă a stării clinice a pacientului.

Cuvinte cheie: câine, astrocitom, MRI, tratament paliativ

The neoplasms of the Central Nervous System (CNS) are common in animals, especially in geriatric animals, brachycephalic breeds are predisposed.

Intracranial neoplasms have neuroectodermal or mesodermal origin, the highest frequency being glial cell tumors and meningiomas (9, 11, 13, 15).

In domestic animals, especially in dogs, astrocy-

toma is the most common CNS malignant tumor (4). Astrocytomas, oligodendrogliomas and oligo-astrocytoma (mixed gliomas) have intra-axial localization, are unique, with slightly differentiated, oval or amorphous margins, infiltrated into the parenchyma (11).

Astrocytomas and oligodendrogliomas - each represents 10% of primary tumors with CNS localization, astrocytomas are located mainly in cerebral hemispheres, predominantly in the temporal-pyramidal and diencephalic region but can have almost any localization in the CNS (7,13, 14).

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MATERIALS AND METHODS

The patient, a 10-year-old West Highland White Terrier named Whiskey was brought to the clinic because of posture changes during walking for almost 2 months. After the anamnesis, it was found that the displacement problems occurred for several months, but these were correlated with the age of the animal and ignored. There were no changes in the clinical examination. The neurological examination was performed in stages because the patient was not tolerant to sit on the exam table. It found that their status was more depressed, when examine posture head was slightly tilted to the left the resort and went. It was found that the status was much depressed, when examining the posture the head was slightly inclined to the left in standing or moving, atasia in standing, in walking there was hypermetry on all limbs but far exaggerated on the anterior anterior limb, imbalance in walking and sometimes sliding to the left and small circles on the left. Proprioception was observed to be unchanged, but the climb on the exam table was done with the exaggerated lifting of the anterior limbs, spinal reflexes being normal on all four limbs. When examining the cranial nerves, it was found that there was no reaction of attention (menace), does not watch the pieces of cotton (cotton ball), the both eyes had physiological nystagmus, did not have pathologic nystagmus, panniculus is normal, bilateral and normal perianal reflexes. Behavior has changed over the past few months: no longer interacting with the other dog in the house; it had moments when it was going a long way or sleeping a lot, eating disorderly, sometimes "pecking up". Following the clinical and neurological examinations neuroanatomic localization was central left and cerebellar vestibular syndrome. We used the acronym "VITAMIND" for etiological differentiation and we concluded that the changes were on: V-vascular, I-inflammatory / infectious and N-neoplastic. Blood chemistry and haematological blood tests were recommended and they were in normal range. There were no age-related changes in the abdominal and cardiac ultrasound examinations, the result of the radiological examination was unmodified, on the ophthalmologic examination the diagnostic was crystalline nuclear sclerosis in both eyes, tapetum lucidum hyperreflectivity and low caliber secondary retinal vessels towards on the periphery of tapetum lucidum in both eyes. The owners were informed and agreed to the CNS magnetic resonance imaging (MRI) examination for the most accurate diagnosis.

RESULTS AND DISCUSSIONS

Following MRI anesthesia, cerebrospinal fluid was also collected for cytopathological examination and the result was acellular smear with rare NaCl crystals (normal presence). The patient was examined by magnetic resonance imaging with a VET MR GRADE device from ESAOTE with 0.3 Tesla power. The protocols used to obtain images were composed of T1 Spin Eco (SE) sequences (Fig.1) and T2 Fast Spin Eco (FSE) (Fig.2) in three planes (sagittal, transverse and dorsal) and postcontrast images obtained in sequences T1 after administration of the Multihance intravenous contrast substance. The patient underwent an inhaled anesthesia to obtain superior image quality and motionless artifacts.

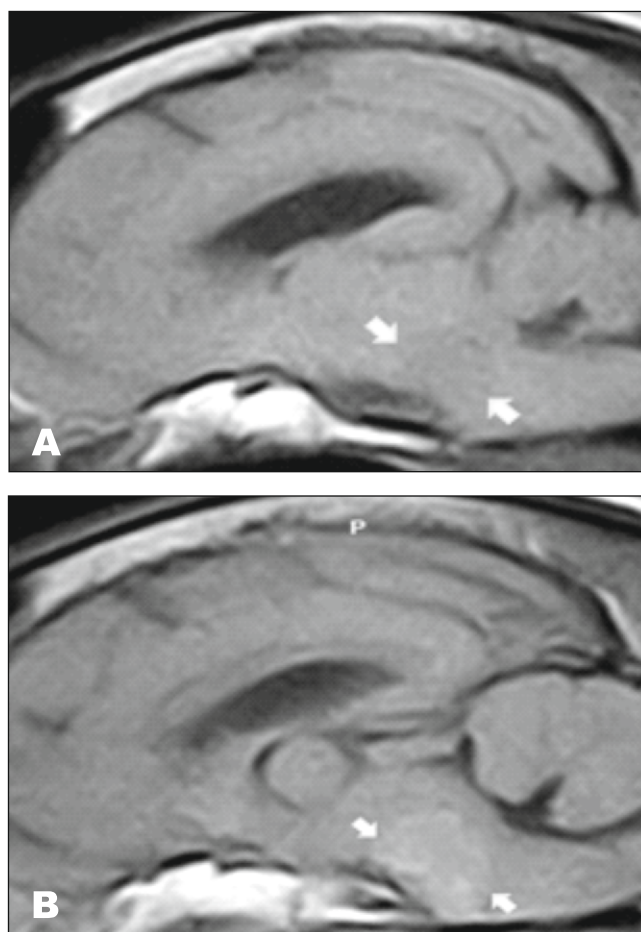


Fig. 1. Sagittal T1 (A) and sagittal T1 with contrast images (B). In Figure A, a slight hypo-intense (arrows) is observed, in figure B, post-contrast, it appears to be a heterogeneous, well-contoured, moderate hyper-intense (arrow)

By interpretation of the MRI results, the diagnosis was compatible with an intra-nevral, infiltrative tu-

mor located at pontine level, having the appearance of a grade II infiltrative astrocytoma (glial tumor).

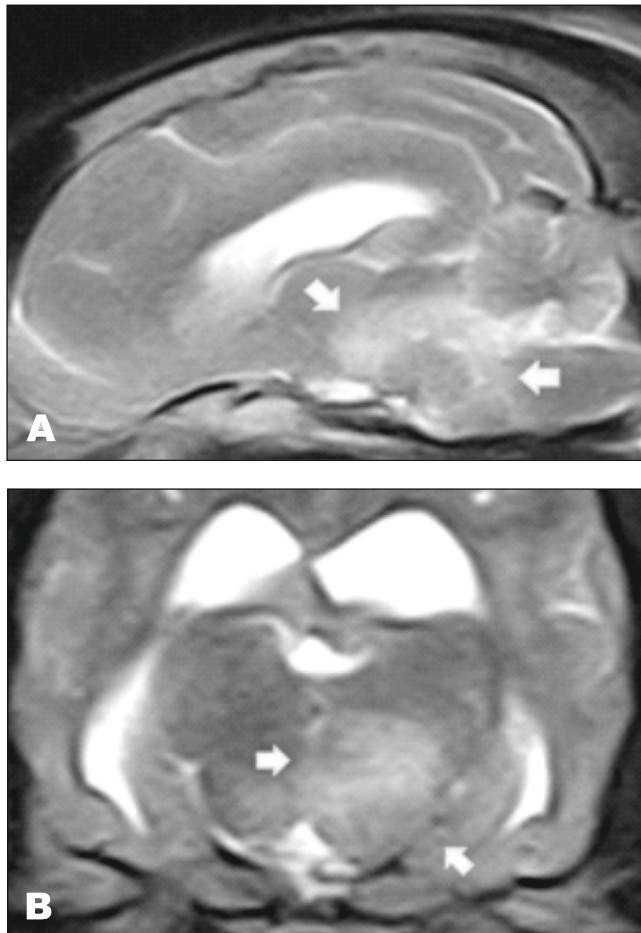


Fig. 2. Sagittal T2 (A) and transverse images T2 (B), a heterogeneous, hyper-intense infiltrative mass on the left side (arrows)

MRI is an investigation used in human medicine to establish the diagnosis of cerebral glioma (10), often applied in veterinary medicine to dogs (12), also chosen for establishing the topography of the formation (2). Astrocytoma is a primary tumor that occurs frequently in middle-aged and geriatric dogs but can also occur at younger ages. A case of astrocytoma was observed in a dog aged three months after being exposed to radiation during the perinatal period (1).

Another case of astrocytoma localized in the CNS, spontaneously appeared, was studied in a dog nearly 6 months old (6). Established treatment consisted of: prednisolone, antioxidants, *Agaricus*; Onco-Oil (*Daucus carota* oil, *Echinacea purpurea* oil, *Silybum marianum* oil) and has been established in accordance with the literature and the owner's agreement. Palliative therapy in veterinary medicine involves the administration of corticosteroids to reduce vascular permea-

bility that has cytotoxic effects on tumors, inhibits tumor growth and decreases CRL production (8). In the case of chemotherapy it was observed that the best result was the administration of lomustine (methyl chloroethyl nitrous urea) (15). Specialty literature recommends surgical excision as the first intention, followed by radiotherapy and / or chemotherapy, but the optimal protocol for intra-nevrxial tumors has not yet been established (5). The patient progressed well under the treatment. After 30 days, it did not have walk in a circle on left side, nor the head leaning on the left. It walks better, and hypermetry has considerably reduced. At the next medical control, 60 days after the start of the treatment, the patient eats and drinks normally, shows hypermetry just on the right anterior limb, does not get unbalanced in walking, is more present and interacts with the other dog.

CONCLUSIONS

Neurological and MRI diagnosis should be performed as soon as possible after the onset of clinical signs. Treatment will be instituted throughout life, with the owner's agreement because evolution and prognosis are reserved for brain tumors. In addition to supporting drug therapy, surgical excision, oncological treatment and / or radiotherapy can be recommended.

REFERENCES

1. Benjamin S.A., Lee A. C., Angleton G.M., Saunders W. J., Miller G. K., Williams J. S., Brewster R. D., Long R. I. (1986) Neoplasms in young dogs after perinatal irradiation, Journal of the National Cancer Institute Vol. 77, pg 563-571
2. Bentley R.T. , Burcham G.N. , Heng H.G., Levine J.M., Longshore R.,Carrera-Justiz S., Cameron S., Kopf K., Miller M.A., (2014), A comparison of clinical, magnetic resonance imaging and pathological findings in dogs with gliomatosis cerebri, focusing on cases with minimal magnetic resonance imaging changes, Veterinary and Comparative Oncology, Vol. 14, pg 318-330
3. Fulton L.M., Steinberg H.S., (1990), Preliminary study of lomustine in the treatment of intracranial masses in dogs following localization by imaging techniques. Sem Vet Med Surg (Sm Anim), Vol. 5, pg 241-245.
4. Gavin P.R., Fike J.R., Hoopes J.P., (1995), Central nervous system tumors. Semin Vet Med Surg (Small Anim) Vol. 10(3), pg.180-189.

5. Jeffery N., Brearley M. J., (1993), Brain tumours in the dog: Treatment of 10 cases and review of recent literature, *Journal of Small Animal Practice* Vol. 34, pg. 367-372
6. Keller E. T., Madewell B. R., (1992), Locations and types of neoplasms in immature dogs: 69 cases (1964-1989). *Journal of the American Veterinary Medical Association* Vol. 200, pg.1530-1532
7. Koestner A., Higgins R.J., (2002), Tumors of the nervous system. In: *Tumors in Domestic Animals*, ed. Meuten DJ, 4th ed., pp. 697-738. Iowa State Press, Ames, IA,
8. Kube S.A., Bruyette D.S., Hanson S.M., (2003), *Journal of the American Animal Hospital Association*, Vol. 39, No. 3, pg. 288-293
9. Lenz S.D., Janovitz E.B., Lockridge K., (1991) An anaplastic astrocytoma (glioblastoma) in the cerebellum of a dog. *Vet Pathol*, Vol. 28, pp. 250-252,
10. Ponce P., Alvarez-Santullano M.V., Otermin E., Santana M.A., Garcia Ludena M.V., (1998). Gliomatosis cerebri: findings with computed tomography and magnetic resonance imaging. *Eur J Radiol* Vol. 28, pg.226-229.
11. Platt S., Garosi L., (2012), *Small Animal Neurological Emergencies*, Ed. Manson Publishing Ltd, London, pp 461-471
12. Rodenas S., Pumarola M., Gaitero L., Zamora A., Anor S., (2011) Magnetic resonance imaging findings in 40 dogs with histologically confirmed intracranial tumors, *Vet J* Vol. 187, pg 85-91.
13. Siso S., Lorenzo V., Ferrer I., Villagrassa M., Pumarola M., (2003), An Anaplastic Astrocytoma (Optic Chiasmatic-Hypothalamic Glioma) in a Dog, *Vet Pathol*, Vol. 40, pp. 567-569
14. Stoica G., Kim H.T., Hall D.G., Coates J.R., (2004), Morphology, immunohistochemistry and genetic alterations in dog astrocytomas, *Veterinary Pathology* Vol. 41, pg 10-19.
15. Wong M., Glass E., DeLahunta A., Jackson B., (2011), Intracranial anaplastic astrocytoma in a 19-week-old boxer dog, *Journal of Small Animal Practice*, Vol. 52, pp. 325-328