

Idiopathic Vestibular Disease in a Beagle Dog: Clinical Findings and Outcome

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Abstract : A 10-year-old, intact female Beagle dog was presented for examination of acute onset of right-sided head tilt and moderate ataxia. Clinical signs were acutely presented 12 days ago and had been progressively alleviated until the admission day. The dog was bright, alert, and responsive. On neurological examinations, mild head tilt to the right and mild ataxia were noted, thus vestibular disorders were suspected. Central vestibular disease was ruled out based on the clinical signs, magnetic resonance imaging (MRI), and cerebrospinal fluid (CSF) analysis. Otoscopic examination showed that the tympanic membranes were intact and normal in appearance. On radiographic and MR examinations, abnormalities were not found in the tympanic bulla and the petrous portion of the temporal bone. Hypothyroidism was ruled out by thyroid-stimulation hormone (TSH) stimulation test. Clinical signs were completely disappeared at 2 weeks after discharge without any therapy. Thus, the dog was definitively diagnosed as idiopathic vestibular disease based on the clinical signs, excluding other causes of vestibular dysfunction, and the alleviation of clinical signs with time.

Key words : idiopathic vestibular disease, head tilt, ataxia, Beagle.

Introduction

The vestibular system maintains the visual image through stabilizing the eyes during head movement and stabilizing the position of the head in space, thus ensuring that the position of the body is stable in relation to gravity and movement (13). Involvement of any of the portions of the vestibular system (semicircular canals, utricle, saccule, vestibular ganglion, vestibular portion of cranial nerve (CN), vestibular nuclei in the brainstem and the flocculonodular lobe of the cerebellum) (10), will result in the following clinical signs: head tilt, falling, rolling, circling, abnormal nystagmus, positional strabismus, and asymmetric ataxia (5).

Vestibular diseases can be classified into three major disease processes: idiopathic vestibular disease, inner ear disease, or central vestibular disease (13). Idiopathic vestibular disease and inner ear disease represent common forms of peripheral vestibular disease which need to be separated from central vestibular disease.

Idiopathic vestibular disease is the most common cause of unilateral peripheral vestibular disease in old dogs (4,6). Generally, dogs are likely to be older and therefore the disease is often referred to as idiopathic geriatric vestibular disease (10). This disorder is characterized by the very sudden onset of unilateral peripheral vestibular signs of dysfunction ranging

from a mild head tilt to severe imbalance and rolling (6,10). The diagnosis is based on the absence of any detectable structural, metabolic or inflammatory disease, as well as lack of evidence of central disease, and on the alleviation of clinical signs with time (6,10,13). The affected animals tend to stabilize in a few days and improvement continues for several weeks (7). The prognosis for recovery is excellent, possibly with an occasional head tilt persisting (6,10,13).

This report describes a case of idiopathic vestibular disease in an old beagle dog diagnosed by the clinical signs and excluding other causes of vestibular dysfunction.

Case

A 10-year-old, intact female beagle dog was presented for examination of acute onset of right-sided head tilt and ataxia, particularly shown in the morning. Clinical signs were acutely presented 12 days ago and had been progressively alleviated until the admission day. There was no known trauma or exposure to a toxic agent before presented. The dog had regularly received all of its vaccinations, heartworm prevention, and no previous medical problems.

On presentation day, the dog was bright, alert, and responsive. Physical examinations revealed that the dog was obese (Body condition score: 4), and had dermatological abnormalities, such as alopecia, seborrhea, and hyperpigmentation. On neurological examinations, mild head tilt to the right (Fig 1) and mild ataxia were noted, thus vestibular disorders were

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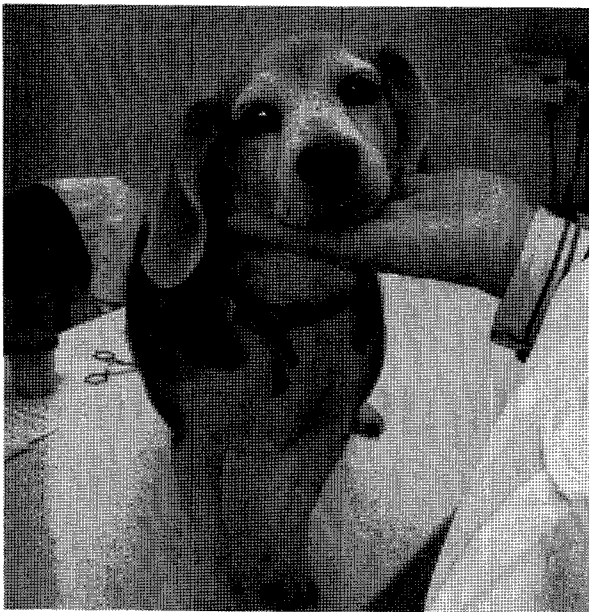


Fig 1. The beagle dog with acute onset of right vestibular dysfunction. On neurological examinations, mild head tilt to the right and mild ataxia were noted. However, nystagmus and CN dysfunction were not shown.

suspected. The differential diagnoses included neoplasia, metabolic disorders (hypothyroidism, cranial nerve polyneuropathy), inflammation (otitis media and interna, infection, foreign body), idiopathic disease (canine geriatric vestibular disease), head trauma, and exposure to toxin (aminoglycosides, lead). Exposure to a toxicant was ruled out based on the dog's history.

Abnormalities on the complete blood count (CBC) and urine analysis were not detected. The serum biochemical profile revealed an elevated alanine aminotransferase (ALT, 144 U/L; reference range, 17 to 78 U/L) and elevated alkaline phosphatase (ALP, 1019 U/L; reference range, 47 to 254 U/L). Canine distemper virus was not detected on the reverse transcription polymerase chain reaction (RT-PCR).

Otoscopic examination showed that the tympanic membranes were intact and normal in appearance. The radiographic examinations of the tympanic bulla were performed in dorso-lateral, lateral-oblique, and rostrocaudal (with mouth open) projections. Any abnormal changes, such as increased or decreased bone density and diminution of foraminal detail or fluid density within the bulla tympanum, were not found. To evaluate the osseous structures of the inner ear and brain, magnetic resonance (MR) scan of the skull was obtained using a 0.2 Tesla magnet (E-Scan[®], ESAOTE, Italy) in transverse, sagittal, and dorsal T1-weighted images acquired before and immediately after injection of gadolinium-diethylenetriamine pentaacetic acid (Omniscan; Nycomed Amersham, Princeton, NJ) (0.01 mmol/kg body weight, intravenously [IV]) and T2-weighted images. However, there were no detectable lesions. In addition, no remarkable findings were found on cerebrospi-

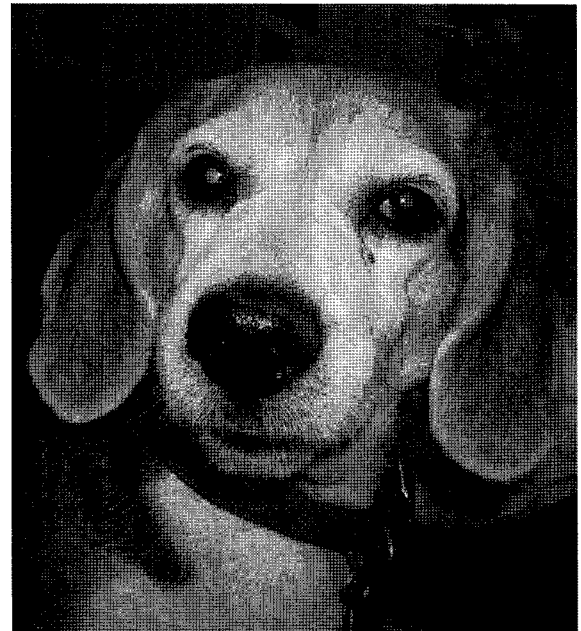


Fig 2. Appearance of the head after 2 weeks. Right sided head tilt and ataxia were completely improved.

nal fluid (CSF) analysis. Since the tympanic bullae and membrane were normal and there was no indication of Horner's syndrome, inflammation was ruled out. Central vestibular disease, trauma, and neoplasia were excluded based on neurological signs, CSF analysis, radiographic and MR examinations.

Since the dog had dermatological abnormalities, weight gain, and vestibular signs, thyroid-stimulation hormone (TSH) stimulation test was done to rule out hypothyroidism. A blood sample is obtained immediately before and 6 hours after administration of TSH (Thyrotropic hormone; Sigma-aldrich, St. Louis, USA) (0.1 unit/kg body weight, IV). Pre-TSH serum T4 concentration was 1.2 µg/dL (reference range, 1.1 to 4.0 µg/dL) and post-TSH serum T4 concentration was 4.4 µg/dL (reference range, 1.5 to 4.5 µg/dL). Thus hypothyroidism was ruled out.

Based on excluding of other causes, the dog was tentatively diagnosed as idiopathic vestibular disease. Because clinical signs were not severe and specific treatment for the disease did not exist, the dog was not treated. After discharge, clinical signs were slowly improved, and then completely disappeared after 2 weeks (Fig 2). Thus idiopathic vestibular disease was definitively diagnosed.

Discussion

Peripheral vestibular diseases are pathologic processes that affect the inner ear, vestibular ganglion, or vestibular portion of CN (2). Idiopathic vestibular disease is a common cause of peripheral vestibular disease in the dog. A previous report (11) showed that 39% of the dogs with peripheral vestibular disease were diagnosed as having idiopathic vestibular disease.

Generally, older dogs are primarily affected by idiopathic disease. The mean age of onset was 12.5 years, with a range of 2 years to 17 years (11). In this case, the beagle was aged dog and her age was 10 years old. Clinically, there is a sudden onset of moderate ataxia, which can be severe, head tilt, nystagmus, and occasionally vomiting (11,13). In previous report (11), ataxia, head tilt, and vomiting was respectively detected in 97%, 64%, and 42% of dogs with idiopathic vestibular disease. In this case, head tilt and moderate ataxia were acutely appeared. However, vomiting was not shown. Most animals will improve rapidly, although complete recovery may take 2-3 weeks in a typical case (10). In some animals, clinical signs may persist for up to 5 weeks and a mild head tilt will occasionally persist after other clinical signs have resolved (10). In this case, severities of ataxia and head tilt on history were different from physical and neurological examinations. The beagle dog was presented to hospital at 12 days after onset of clinical signs. Thus, these differences might be caused by improving of disease for 12 days. Clinical signs were completely disappeared at 2 weeks after discharge. Thus, total period of improvement was 4 weeks.

For the diagnosis of idiopathic vestibular disease, it is important that other causes of vestibular dysfunction were excluded. Central vestibular disease was ruled out, as clinical signs of central disease, such as CN dysfunction, altered mental status, vertical or positional nystagmus, paresis or proprioceptive deficits, and abnormal lesions on MR imaging (MRI) and CSF analysis were not found. In company with otoscopic examination, MRI was taken on a major role of excluding middle and inner ear disease from causes of peripheral disease. Previously, the most accessible way to evaluate the middle ear was a special set of radiographs called a "bulla series". However, radiographic evaluation of the tympanic bulla is limited. Because of the complex anatomy of the skull, with superimposition of multiple osseous structures, radiography can result in false-negative examinations or underestimation of the disease present (3). The use of computed tomography (CT) to evaluate middle and inner ear disease and lesions of the caudal fossa in dogs has been described (3,8,12). CT is more sensitive for detection of otitis media than is radiography (8), but artifacts induced by the petrous portion of the temporal bone limit examination of the caudal fossa (9). Thus, MRI is preferable to CT scan to evaluate central vestibular disease. There is also no bone artifact which may be problematic with CT scan due to the presence of the petrous temporal bones (5). In this case, MRI was a useful test to diagnosis of idiopathic vestibular disease.

Until recently, the underlying cause of idiopathic disease has been unknown. In few cases, histologic examination did not reveal any lesions within the central nervous system, vestibular nerve, vestibular ganglion, or labyrinthine end-organ (11). According to the previous reports (1,10,11), this disorder may result from neuritis of the vestibular portion of CN, dynamic abnormalities with the endolymphatic fluid of the inner ear structures, a mild intoxication of the vestibular system, or

immune-mediated disease.

There is no specific treatment for the disease. The use of corticosteroid has not resulted in more rapid clinical improvement (10). Occasionally vomiting is severe, H1-histaminergic receptor antagonists, M1-cholinergic receptor antagonists or vestibulosedative drugs are administered to alleviate the emesis associated with motion sickness (6). Since vomiting was not present and clinical signs were mild, the dog was not treated with corticosteroid, sedative, and supportive care.

In conclusion, we diagnosed this case as idiopathic vestibular disease based on the clinical signs, exclusion of other causes of vestibular dysfunction, and the improvement of clinical signs with time. In addition, idiopathic vestibular disease which will occur in geriatric dogs can be managed without aggressive glucocorticoid administration.

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비글 견에서 발생한 특발성 전정계 질병 증례: 임상적 발견과 결과

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요 약 : 10년령의 암컷 비글 견이 우측으로의 사경과 중등도의 보행실조가 급성으로 발병하여 내원하였다. 12일 전에 임상증상이 나타났으며, 이는 내원 일까지 점진적으로 호전되고 있는 상태였다. 환견은 활발하고 의식이 명료하며 외부자극에 잘 반응하였다. 신경 검사 상에서 약간의 우측으로의 사경과 보행실조가 관찰되었고, 따라서 전정계 질환을 의심할 수 있었다. 임상증상, 자기공명영상, 그리고 뇌척수액 검사를 통해서 중추성 전정계 질병을 감별하였다. 검이경 검사를 통해서 고막의 존재와 정상 형태를 확인하였다. 방사선 및 자기공명영상 검사상에서 고실불룩과 측두골의 암석부분에서 이상소견을 발견할 수 없었다. 갑상선 자극 호르몬 자극 시험을 통해서 갑상선 기능 저하증을 감별하였다. 임상증상은 퇴원 2주 후 완전히 사라졌다. 따라서 임상증상, 전정계 기능이상을 유발하는 다른 원인들의 감별, 그리고 시간에 따른 증상의 완화를 통해서 특발성 전정계 질병으로 진단 할 수 있었다.

주요어 : 특발성 전정계 질병, 사경, 보행실조, 비글.