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Wasting of calf muscle and spastic foot drop caused by falcine meningioma in 22 -year adult male: revisit of uncommon but important localizing sign

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Wasting of calf muscle and spastic foot drop caused by falcine meningioma in 22 -year adult male: revisit of uncommon but important localizing sign

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Abstract: Wasting of muscle is usually a feature of lower motor neuron pathology, astonishingly parasagittal intracranial lesion affecting parietal lobe of cerebral hemisphere may be associated with Wasting of contralateral calf muscle. It can be associated with spastic foot drop. Foot drop is a common neurological state presenting with weakness involving anterior tibialis muscle causing inability of foot extension. Foot drop is commonly caused lower motor neuron disease pathology and a common cause includes L4-L5 radiculopathy or peroneal peripheral neuropathy. However, extremely rarely can be caused by intracranial pathology e.g. falcine meningioma and represents an important localization sign. Authors report an interesting case of calf muscle wasting caused by falcine meningioma, which may escape detection to remind rare but extremely important neurological localizing sign and ask for thorough and further neurological evaluation prior to concluding a final neurological diagnosis.

Key words: foot drop, parasagittal meningioma, spasticity, upper motor neuron

Introduction

Foot drop is a neurological condition characterized by weakness of anterior tibialis muscle causing inability to carry out foot extension leading to difficulty in walking and

climbing stair with repeated injury to foot and ulceration. Foot drop, is commonly associated with weakness of extensor digitorum longus and extensor hallucis longus muscles. Common causes of are lower motor neuron

pathology includes herniation of nucleus pulposus or stenosis of neural foramina causing L4-L5 radiculopathy or peroneal peripheral neuropathy [1], [2], [3]. However, pathology in the central nervous system can very rarely cause foot drop. Foot drop has been reported to occur in 52% to 67% of patients with spinal upper motor neuron pathology along the UMN tracts: interhemispheric motor cortex homunculus - mass lesion, anterior cerebral artery stroke, corona radiata, internal capsule, cerebral peduncle, medulla, and spinal cord pyramidal tract (myelopathy). Physician evaluating a case of foot drop generally consider the peripheral nerve lesions. Although this is true in most cases, it would be sometime very erroneous as delay in the diagnosis and may have worse or extreme rarely fatal neurological outcome. Foot drop may be rarely caused due to intracranial pathology involving parietal lobe. Lesion in the parasagittal region near the motor strip for the leg area may produce foot drop. This type has been called spastic foot drop [4] [5].

Case Illustration

A 22-year- male admitted with complains of headache associated with left foot drop along with wasting of calf muscle for last three months. Neurological examination revealed, steppage of gait with left foot drop, wasting of left calf muscle (diameter of left calf-27cm, right-36cm). (Figure 1)

Fundi showed papilloedema and weakness of left tibialis anterior and dorsiflexor of left foot. Left ankle jerk was brisk

with plantar extensor response. Straight leg raising test was negative and rest of neurological examination were within normal limit. There were no sign of occult spinal dysraphism, cutaneous markers including sinus, tufts of hairs or dimple along spine and occipital region.

Cranial MRI showed extra-axial mass lesion with epicenter over falx based measuring 6.1x4.7x3.7cm (Figure 2) located in the high frontal region (Figure 3) in midline compressing adjacent high frontal parenchyma on both sides. (Figure 4) It was showing homogenous enhancement on contrast enhanced MRI imaging (Figure 5). MR Veinography revealed a mass lesion, which is causing completely encasement and attenuating superior sagittal sinus in the mid 1/3 suggestive of invasion over a length of 3.2 cm and associated few collateral are seen along anterior part of sinus and draining into superficial middle cerebral vein and further into sphenoparietal sinus. (Figure 6) A presumptive diagnosis of meningioma was considered.

He underwent bifrontal scalp flap and biparietotemporal craniotomy with Simpson grade two excision of bifalcine meningioma with excision of invaded middle 1/3 sagittal sinus. During postoperative period no fresh neurological deficit was observed. He was discharged on fourth post-operative day. Histopathology was suggestive of transitional meningioma. At last follow-up after nine months following surgery there was no improvement in foot drop was observed.



Figure 1 - Clinical photograph showing foot drop associated with wasting of calf muscle of left lower limb

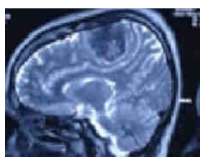


Figure 2 - MRI brain, T2W image, sagittal section, showing falcine meningioma



Figure 3 - MRI brain T2WI, axial section showing falcine meningioma causing mass effect

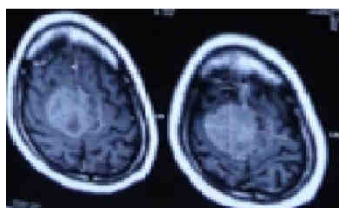


Figure 4 - Gadolinium contrast enhanced MRI brain axial section, showing heterogeneously enhancing falcine meningioma

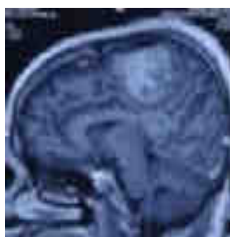


Figure 5 - Gadolinium contrast enhanced MRI brain sagittal section, showing heterogeneously enhancing meningioma

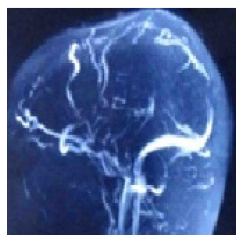


Figure 6 - MR Venography of brain showing complete attenuation of middle third of superior sagittal sinus. Falcine meningioma

Discussion

Foot drop is usually considered as lower motor neuron or peripheral nerve lesion by physician [6], [7]. Although this situation may stand true in most cases, however upper motor neuron causes also needs consideration [4] [8]. Brain localization studies of motor cortex have precisely determined the somatotopic localization of ankle and toe in the parasagittal region [2]. However, there remains a group of foot drop patients with central pathology. These patients have a clinical presentation resembling peripheral causes of foot drop but an upper motor neuron lesion may be differentiated if the Babinski sign or hyperactive ankle jerk is present [7]. The classical presentation of lumbar disk herniation is with clinical findings such as leg pain, sensory deficits, atrophy, impaired motor function, positive straight leg raising test, and hyporeflexia. Motor evoked potential and tibial somatosensory evoked potential recordings are abnormal with cranial lesions while electromyography (EMG) and neuropsychological tests give normal results [6]. These electrophysiological study can be utilized to differentiate central lesions from peripheral causes of foot drop. In our case, the spastic foot drop was caused by parasagittal meningioma.

This case reminds us about importance of the foot drop caused by intracranial cerebral lesions; the clinicians may lack such experience. Accordingly, to the best of our opinion, lack of publication of such cases in the literature is another factor leading to

inappropriate clinical decisions. This case emphasizes foot drop may also occur with brain lesions, especially located in the parasagittal region, near the motor strip area representing for the leg area in the human homnocus [5], [9], [10]. A cerebral lesion should be suspected in patients, who have either a Babinski sign or brisk deep tendon reflexes. Headache is another important clue of a central cause, if also associated with projectile vomiting occurring in the early morning and being relieved by vomiting correctly suggestive of raised intracranial pressure [1], [4], [11], [12]. In conclusion, clinicians should always also keep in mind about possibility of existence of central cause while evaluating the case of foot drop. Failure to consider this possibility may result in unnecessary investigations, cost and precious time loss and delay in diagnosis and initiating early treatment with consequent worsening of the neurological morbidity [6], [7], [13].

Summary

The muscle wasting is usual presentation of lower motor neuron pathology, but occasionally intracranial lesion situated in the parasagittal region in the parietal lobe may also cause wasting of contralateral calf muscle and spastic foot drop. These findings can be especially helpful in the establishment of proper diagnosis and avoiding unnecessary investigation and sparing valuable time and early initiation of therapeutic intervention. The evaluating clinicians should always also keep in mind about possibility of existence of

central cause while evaluating the each and every case of foot drop to avoid last minute surprise.

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