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Питання Європейського іспиту

Зразки питань до Європейського іспиту. Вибірку підготовлено професором В. А. Гриб та асистентом В. С. Ботєвим.
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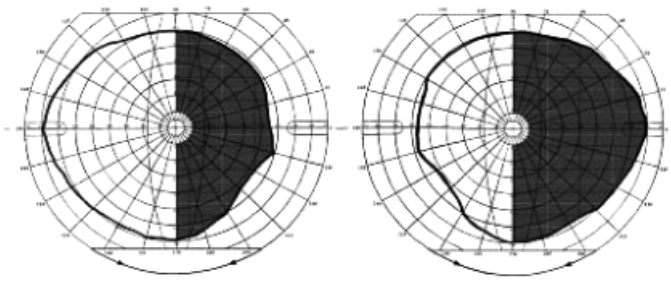
European Board Examination in Neurology
Variants of questions with answers

Closed Book
Questions related to the guidelines

1. *Which of the following is a direct MRI-sign of a sagittal sinus thrombosis?*
   A. Hemorrhagic and non hemorrhagic infarcts
   B. Generalized brain edema
   C. An empty delta sign
   D. Intense contrast enhancement of the tentorium cerebelli
   E. Intense contrast enhancement of the falx cerebri

2. *Which of the following is the commonest sign following an infarction of the lateral medulla oblongata?*
   A. Chewing weakness
   B. Hiccup
   C. Internuclear ophthalmoplegia
   D. Unilateral loss of deep sensation
   E. Vertical gaze paralysis

3. *Which of the following signs is most likely to occur in autosomal dominant spastic paraplegia with a SPG4-mutation?*
   A. Amyotrophy
   B. Diminished pain sensation
   C. Dry skin due to autonomic dysfunction
   D. Reduced vibration sensation

4. 

Which is the most likely occluded artery in a patient showing this visual defect?
   A. Carotid artery
   B. Choroid artery
   C. Medial cerebral artery
   D. Posterior cerebral artery
   E. Thalamic artery

5. *Which of the following statements concerning neuromyotonia (NM) is most valid?*
   A. NM is predominantly an inherited disease
   B. NM may be a paraneoplastic disease
   C. NM is associated with rheumatoid disorders
   D. NM is associated with thyroid dysfunction
   E. NM may occur in serum electrolyte disturbance

6. *Which of the following EMG techniques measures the function of the neuromuscular junction most reliably?*
   A. Macro EMG
   B. Quantitative EMG
   C. Single fibre EMG
   D. Small sample EMG
   E. Surface EMG

7. *What is the approximate speed of peripheral nerve regeneration?*
   A. 2 mm per day
   B. 5 mm per day
   C. 2 mm per week
   D. 1 mm per week

8. *What is the origin of the main contingent of afferent fibres to the dentate gyrus?*
   A. Area striata
   B. Entorhinal cortex
   C. Putamen
   D. Supplementary motor cortex
   E. Thalamus

9. *Which of the following statements is most valid for acute onset hemiballismus?*
   A. Hemiballismus can be effectively treated with dopamine antagonist drugs
   B. Hemiballismus mostly becomes bilateral at a late stage
   C. Hemiballismus may be the result of an acute lesion of the dorsal thalamic nuclei
   D. Hemiballismus symptoms mostly worsen by attempts to move
   E. Hemiballismus nearly always occurs as an isolated symptom

10. *Which of the following statements relating to treatment of Huntington's disease is most valid?*
   A. Cholinesterase inhibitors have been shown to be effective in treating dementia
   B. The dopamine depleter tetrabenazine is useful in ameliorating chorda
   C. The glutamate release inhibitor Riluzole slows disease progression
   D. Neuroleptic drugs worsen symptoms
   E. Selective serotonin reuptake inhibitors should be avoided

Open book questions

11. *A 27-year-old female complains of intermittent binocular diplopia for over one year. There is some asymmetric drooping of both eyelids. Double vision is apparent on awakening and subsides after about half an hour. In the late afternoon it may reappear and driving a car in the dark is not possible anymore. There are no further complaints. Her mother has experienced similar problems for a couple of years. She was diagnosed with a thyroid disorder. On examination there is slight skew deviation with looking upward, after 10 seconds of sustained looking to the right, the left eye drifts to the midline whilst the right eye shows some horizontal jerky laterally directed movements. There is ptosis on the left; with passive elevation, the right eyelid starts drooping. There is no pupillary involvement. Repetitive nerve stimulation (3/sec, orbicularis oculi and abductor digiti V muscle) normal, anti AChR-antibodies negative. Needle EMG of the facial muscles, adductor pollicis and quadriceps muscle is normal. Which diagnosis most likely explains the clinical features of this patient?*
   A. Lambert Eaton myasthenic syndrome
   B. Mitochondrial myopathy
   C. Multiple sclerosis
   D. Myasthenia gravis
   E. Thyroid myopathy

12. A 62-year-old female has swallowing problems and a hoarse voice. She states that the problem started suddenly 6 months ago after choking on a cup of coffee. She was not able to regain her voice that day, and although this improved, she was not able to produce a clear voice. She had lost 10 kg in weight but her body mass index remains considerable. She has been taking steroids for 2 years because of polymyalgia rheumatica. On clinical examination there is a left-sided atrophy of her tongue with some involuntary intramuscular movements at the left-side edge. She is not able to protrude her tongue into her right cheek, but is reasonable on the left side. The masseter reflex is completely absent; the pharyngeal reflex is normal on both sides. Her speech is slurred and has a hoarse quality. No other abnormalities were found on the remainder of the neurological examination.
Which diagnosis most likely explains the clinical features of this patient?

A. ALS type of motor neurone disease
B. Carotid dissection
C. Myositis
D. Pharyngeal tumor
E. Progressive supranuclear palsy

13. A 51-year-old male, with a history of herpetic shingles in dermatomes T7—10 three years ago complains about pain in the back side of his right leg. He mentioned that there has been some red discoloration of the skin on his right lower leg, but definitely no shingles. On physical examination, he demonstrated normal tone and full strength in all muscle groups bilaterally; reflexes were normal apart from the knee-reflex being somewhat decreased on the right; the adductor reflexes were symmetric. MRI of the lumbal spine showed degenerative disc disease at all lumbar levels, with slight bilateral foraminal stenosis at L3 and L4, but no herniated disc. Results of an electromyogram were normal. His cerebrospinal fluid showed a predominantly lymphocytic pleocytosis (110 cells/L), a raised protein level (570 mg/L) and intrathecal Ig-synthesis. Which diagnosis most likely explains the clinical features of this patient?

A. Neuroborreliosis
B. Neurosarcoidosis
C. Inflammatory plexopathy
D. Postherpetic neuralgia
E. Wartenberg syndrome

14. A 21-year-old female lost consciousness in a supermarket as she was paying for her shopping. She had hit the cash counter with her head. Her eyes were closed, there were some brief mild clonic jerks in her limbs. There was a pulse rate of 45/min with small pupils. She regained consciousness on the floor within seconds.Before the episode she reported feeling light-headed and dizzy for several seconds. After the episode she promptly felt well although suffering from some headache. She had already experienced numerous similar episodes since adolescence. Her mother is suffering from migraine.
Which diagnosis most likely explains the clinical features of this patient?

A. Basilar migraine
B. Cataplexia
C. Focal epilepsy
D. Reflex epilepsy
E. Vasovagal syncopes

15. A 62-year-old watchmaker has had Parkinson's disease for more than 6 years. He is taking a combination therapy of 600 mg L-Dopa and 16 mg ropinirole extended release (ER). His wife mentions that at times of insufficient motor control, her husband takes an additional soluble L-Dopa preparation, which can happen up to six times per day. Lately, he has become obsessed with fixing household equipment which he never completes, and has collected buttons in a vase spending hours sorting them according to colour.
What is this condition called?

A. Dopamine withdrawal syndrome
B. Impersistence
C. Impulse controle disorder
D. Punding
E. Utilization

16. A 36-year-old woman is regularly seeing a cardiologist due to a 3rd degree AV-block discovered after repeated episodes of fainting; other members in her family have the same problem. She is referred to the neurology ward after two attacks of visual blurring. The first occurred one year ago and involved the right eye and symptoms resolved after six weeks. A similar attack occurred in the left eye six months later and resolved after three weeks. On further questioning she describes sensory symptoms two years ago in her left arm for two weeks. Reflexes in her left side were brisker than on the right side. MRI of the brain shows 12 lesions, of which 2 are contrast enhancing. Which drug should NOT be prescribed in this situation?

A. Alemtuzumab
B. Fingolimod
C. Glatiramer acetate
D. Mitoxantrone
E. Natalizumab

17. An 18-year-old female complained of double and blurred vision when looking to the right. Clinical examination revealed a dissociated nystagmus when looking to the right. The saccades to the right were dysconjugate with impaired adduction of the left eye. Select the most likely eye movement disorder in this patient.

A. Internuclear ophthalmoplegia
B. Ocular bobbing
C. Optokinetic nystagmus
D. Rebound nystagmus
E. See-saw nystagmus

18. A 35-year-old male was involved in a minor car accident when returning home after a tennis match, and attended hospital because of not being aware of objects on his left side. There was no head injury but nevertheless he felt a throbbing right occipital headache, with no other symptoms. On clinical examination, two hours after the accident, there was a left hemianopia. Eye movements and pupillary function were normal. Blood pressure was 160/95 mmHg. No abnormalities were found on a cranial CT-scan. He reported previous attacks of severe unilateral pulsatile headache with nausea and photophobia between the ages of 15 and 35 years. The frequency of headache was about once in 6 months, with a duration of up to 24 hours. Which diagnosis applies best to this case?

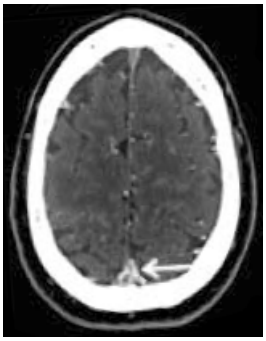
A. Internal carotid artery stenosis
B. Migrainous infarction
C. Reversible vasoconstriction syndrome
D. Posterior reversible encephalopathy syndrome
E. Vertebral artery dissection

ANSWERS

Closed Book

1. *C.* An empty delta sign

The «empty delta» sign originally was described on a contrast-enhanced head CT in thrombosis of the superior sagittal sinus. On axial images, the sign results from enhancement around the thrombus filling the superior sagittal sinus, which regularly has a triangular shape. Although there is no consensus on the pathophysiology of the surrounding enhancement, proposed mechanisms include enhancement of peridural and dural venous channels, clot organization, and partial recanalization of the thrombus. A similar appearance can be seen on MRI and in the transverse venous sinuses, where a triangular filling defect also may be seen.



Unenhanced CT is usually the first imaging investigation performed given the nonspecific clinical presentation in this cases. When not associated with venous haemorrhage or infarction, it can be a subtle finding on CT images, relying on hyperdensity of the sinus being identified.

2. *B*. Hiccup

Lateral Medullary Syndrome

Known also as the Wallenberg syndrome (who described a case in 1895), this common stroke is produced by infarction of a wedge of lateral medulla lying posterior to theinferior olivary nucleus. The complete syndrome, comprises (a) symptoms derived from the vestibular nuclei (vertigo, nystagmus, oscillopsia, vomiting);(b) spinothalamic tract (contralateral or, less often, ipsilateral impairment of pain and thermal sense over halfthe body); (c) descending sympathetic tract (ipsilateralHorner syndrome-miosis, ptosis, decreased sweating); (d) issuing fibers of the ninth and tenth nerves (hoarseness, dysphagia, hiccough, ipsilateral paralysis of the palate and vocal cord, diminished gag reflex);(e) utricular nucleus (vertical diplopia an illusion of tilting of vision and rotation of the vertical meridianrarely so severe as to produce upside down vision); (f) olivocerebellar, spincerebellar fibers, restiform body and inferior cerebellum (ipsilateral ataxia of limbs, falling or toppling to the ipsilateral side, and the sensation oflateropulsion); (g) descending tract and nucleus of thefifth nerve (pain, burning, an impaired sensation overipsilateral half of the face); (h) nucleus and tractus solitarius (loss of taste); and rarely, (i) cuneate and gracile nuclei (numbness of ipsilateral limbs). Fragmentary syndromes are more frequent, especially at the onset of thestroke. These subsyndromes may consist of vertigo andptosis, toppling and vertical diplopia, hoarseness and disequilibrium, or other combinations short of the entire syndrome.

3. *D*. Reduced vibration sensation

Spastic paraplegia 4 (SPG4; also known as SPAST-associated HSP) is characterized by insidiously progressive bilateral lower-limb gait spasticity. More than 50 % of affected individuals have some weakness in the legs and impaired vibration sense at the ankles. About one third have sphincter disturbances. Onset is insidious, mostly in young adulthood, although symptoms may start as early as age one year and as late as age 76 years.

Synonyms: Hereditary Spastic Paraplegia, Spastin Type; SPAST-Associated HSP; SPG4.

4. *D*. Posterior cerebral artery

The loss of vision on the right half of the visual field of both eyes (right-sided homonymous hemianopia) occurs because neurons from the left half of each of the retinas do not reach the visual cortex. This would result from a lesion of the left visual pathway distal to theoptic chiasm, that is, the left optic tract, where the visual information from the nasal portion of the left retina (the right hemifield of the left eye's visual field) and the temporal portion of the right retina (the right hemifield of the right eye's visual field) are carried within the same nerve tract.

The optic tracts are supplied by small branches of the anterior choroidal and PCom arteries whereas small branches of the ACA and the superior hypophyseal supply the chiasm and intracranial portion of the optic nerves.

5. *B*. NM may be a paraneoplastic disease

Neuromyotonia is neurogenic muscle stiffness (cf. myotonia, myogenic muscle stiffness) which reflects peripheral nerve hyperexcitability. Clinically this ismanifest as muscle cramps and stiffness, particularly during and after muscle contraction, and as muscular activity at rest (myokymia, fasciculations). Tendona reflexia and abnormal postures of hands and feet may also be observed. Sensory features such as paraesthesias and central nervous system features (Morvan's syndrome) can occur. A syndrome of ocular neuromyotonia has been described in which spasms of the extraocular muscles cause a transient heterophoria and diplopia. Physiologically neuromyotonia is characterized by continuous motor unitand muscle fibre activity which is due to peripheral nerve hyperexcitability; itis abolished by curare (cf. myotonia). Spontaneous firing of single motor units as doublet, triplet, or multiplet discharges with high-intraburst frequency (40—300/s) at irregular intervals is the hallmark finding.

Around 20 % of patients have an underlying small cell lung cancer or thymoma, suggesting a paraneoplastic aetiology in these patients.

Neuromyotonia usually improves with symptomatic treatments such as carbamazepine, phenytoin, lamotrigine, and sodium valproate, in combination if necessary. Paraneoplastic neuromyotonia often improves and may remit after treatment of the underlying tumour.

6. *C*. Single fibre EMG

Single — fiber EMG (SFEMG) is the most sensitive test to detect pathology at the neuromuscular junction.

7. *A*. 2 mm per day

The growth rate varies from nerve to nerve. The median grows 2—4 mm/ day, ulnar 1.5 mm/day and radial, 4.5 mm/day. On average, the regeneration speed is 1 mm/day.

8. *B*. Entorhinal cortex

The trilaminar cortex of the dentate gyrus is the least complex of the hippocampal fields. Its major cell type is the granule cell, found in the dense granule cell layer. Granule cells (approximately 9×106 in the human dentatogyrus) have unipolar dendrites that extend into the overlying molecular layer,which receives most of the afferent projections to the dentate gyrus (primarily from the entorhinal cortex).

9. *A*. Hemiballismus can be effectively treated with dopamine antagonist drugs

Ballism or ballismus is considered a very severe form of chorea in which the movements have a violent, flinging quality. In Greek, ballismus means «a jumping about» or «dancing». Ballism has been defined as «continuous, violent, coordinated involuntary activity involving the axial and proximal appendicular musculature such that the limbs are flung about».

This movement disorder most often involves only one side of the body (ie, hemiballism or hemiballismus). Occasionally, bilateral movements occur (ie, biballism or paraballism). Many patients with hemiballism have choreiform movements and vice versa, and hemiballism often evolves into hemichorea. Currently, ballism should be viewed as a severe form of chorea.

- Only symptomatic treatment is available for patients with chorea. Chorea may be a disabling symptom, leading to bruises, fractures, and falls, and may impair the ability of patients to feed themselves. In addition, patients sometimes express a desire for antichorea treatment for cosmetic reasons.
- The most widely used agents in the treatment of chorea are the neuroleptics. The basis of their mechanism of action is thought to be related to blocking of dopamine receptors. Neuroleptics can be classified as typical and atypical. Typical neuroleptics include haloperidol and fluphenazine. Atypical neuroleptics include risperidone, olanzapine, clozapine, and quetiapine.
- Dopamine-depleting agents, such as reserpine and tetrabenazine, represent another option in the treatment of chorea.
- GABAergic drugs, such as clonazepam, gabapentin, and valproate, can be used as adjunctive therapy.

10. *B*. The dopamine depleter tetrabenazine is useful in ameliorating chorda

Huntington's disease (HD) is the commonest cause of inherited chorea, which manifests as dementia, psychiatric disturbance, and a mixed movement disorder (dystonia, parkinsonism, and chorea).

Treatment

First line: tetrabenazine or antipsychotics. Second line: amantadine or riluzole. Open book questions

11. *D*. Myasthenia gravis

This patient has myasthenia gravis. Age of onset is bimodal for both men and women. For women the peak incidence is at age 20to 24 and 70 to 75 years, while men have peak incidence at 30 to34 and 70 to 74 years. In the early-onset group the female to male ratio is 7 : 3 and in late-onset it is 1 : 1. Myasthenia gravis is a disorder of neuromuscular junction transmission. It is most commonly autoimmune in etiology, though there are rare cases of congenital myasthenia that are genetic. Myasthenia gravis may present with a myriad of symptoms; the hallmarks are fluctuations and fatigability, with weakness worsening with increased muscle use. Ocular muscles are most commonly involved, with ptosis and diplopia as the presenting symptom in 70 % to 90 % of cases. Up to 80 % of such patients generalize to involve bulbar, limb, neck, and/or respiratory muscles within 2 years. In a minority (10 % to 15 %), involvement remains restricted to the eyes, so-called ocular myasthenia. Other patients present with predominantly bulbar symptoms due to involvement of muscles of mastication, speech, swallowing, and facial expression, leading to weakness and/or fatigability of chewing, dysphagia, and/or dysarthria. Limb and neck weakness may also occur. Myasthenic crisis, or respiratory failure due to involvement of respiratory muscles, can be the presenting symptom, but more commonly occurs in those with exacerbation of symptoms in the setting of stressors such as infection or surgery. Myasthenia gravisis more common in family members of patients with this disorder. It has been associated with human leukocyte antigen types B8, DR1, DR2, and DR3. Patients with myasthenia gravis are at an increased risk of other autoimmune disorders including thyroid disorders, and these should be tested for as clinically indicated.

12. *D*. Pharyngeal tumor

People with oropharyngeal cancer may experience the following symptoms or signs: hoarseness or change in voice, difficulty chewing, swallowing, or moving the jaws or tongue, unexplained weight loss.

The median age at diagnosis is 62 years and more than 70 % of cases occur after the age of 55 years. Rates of this cancer vary among countries. For example, they are much more common in Hungary and France than in the United States and much less common in Mexico and Japan.

13. *A*. Neuroborreliosis

Lyme disease, or borreliosis, is a zoonosis with an incubation period of 3—32 days, transmitted by Borrelia burgdorferi, a member of the family of spirochetes. Lyme disease involves skin, heart, joints, and, in 15 % of affected individuals, the CNS. Early manifestations of the diseaseinclude severe headache, neck pain, fever, chills, musculoskeletal pains, malaise, and fatigue. Sometimes, the CNS is already involved at the onset of the clinical manifestations of borreliosis; however, most often the CNS is involved only months after onset, and the disorder appears as aseptic meningitis or fluctuating meningoencephalitis, and neuropathy of cranial nerve. The seventh cranial nerve is most often involved. Involvement of peripheral nerve (radiculitis) is also possible. Cases with seizures, choreiform movements, cerebellar ataxia, dementia, and myelitis syndrome are rarely described. As another rare complication, cerebral vasculitis can be induced by B. burgdorferi, possibly leading to aneurysms, subarachnoid hemorrhage, intraparenchymal brain hemorrhage, or ischemic stroke. Vessel irregularities occur mainly in the vertebrobasilar territory and have mainly been observed in the third stages(chronic meningoencephalitis) of borreliosis. Some reports on large cerebral vessel disease in borreliosis have been published. Multifocal encephalitis has been reported. Focalencephalitis may be induced by direct invasion of the brainby spirochetes or occur secondary to vasculitis. Common imaging findings are multiple hyperintense lesions in the periventricular area on T2-weighted MR images, most probably corresponding to foci of demyelination. Lymeencephalopathy is a neuropsychiatric disorder beginning months to years after the onset of infection. Objective evidence of memory impairment is usually present on formal neuropsychological testing. Other symptoms may include milddepression, irritability, fatigue, and excessive daytime sleepiness. In these patients, brain MRI is usually normal, although in some patients, white matter lesions are seen. In SPECT studies, Lyme encephalopathy patients have hypoperfusion of frontal subcortical and cortical structures. Rare ophthalmic manifestations of borreliosis include external ocular and intraocular inflammations, retinal vasculitis, and optic neuropathy.

14. *E*. Vasovagal syncopes

Truly neurologic causes of syncope are uncommon. Strokes and TIAs generally do not cause syncope, but certain vascular diseases such as basilar artery insuffciency may. Psychiatric causes such as somatization and panic attacks can cause syncope; however, these are diagnoses of exclusion and are largely based on history and context.

Imitators:

- Seizure
- Metabolic disorders:
  - Hypoglycemia
  - Hypercapnia
  - Hypocapnia (e.g., from hyperventilation)

Whether a patient who suffered collapse experienced a seizure or syncope is a common diagnostic dilemma. As both conditions will have frequently resolved by presentation in the ED, and the patient generally will not recall the event, bystander history becomes critically important. Although not always available, EMS and family members can provide key information. Seizure patients more commonly havepostictal confusion and a report of convulsive movements and present with oral trauma or urinary incontinence. In contrast, syncope patients more commonly have a prodrome of palpitations, diaphoresis, nausea, or vertigo, as well as situational triggers such as needle sticks, a hot environment, or prolonged sitting or standing. Metabolic conditions such as hypoglycemia and hypercarbia can lead to loss of consciousness; however, these will typically not self-correct.

15. *D*. Punding

Punding activity is characterized by compulsive fascination with and performance of repetitive, mechanical tasks, such as assembling and disassembling, collecting, or sorting household objects. For example, punding may consist of activities such as:

- collecting pebbles and lining them up as perfectly as possible;
- disassembling wristwatches and putting them back together again;
- building hundreds of small wooden boxes;
- trying but failing to systematically remove the entire contents of all the drawers and shelves

in the home and sort through all their contents.

Punding is characterized by repetitive pointless behaviours, with a compulsive flavour to them, carried on for long periods of time to the exclusion of other activities (like writing a book). It is frequently related to previous occupation or hobbies but is seldom pleasurable. It occurs in Parkinson's disease but the incidence is low (1.4 % in one study). It is thought to be related to dopaminergic stimulation and may be associated with impulse control disorder such as pathological gambling and hypersexuality.

16. *B*. Fingolimod

Fingolimodis authorised to treat relapsing-remitting multiple sclerosis in patients whose disease has failed to respond to at least 1 disease-modifying therapy or which is severe and rapidly progressive. Fingolimod can cause transient bradycardia and second-degree or third-degree atrioventricular (AV) block in early treatment. In January 2013, we highlighted the need for cardiac monitoring after the first dose of fingolimod. However, some patients can have persistent bradycardia, which can increase the risk of serious cardiac arrhythmias. A recent routine EU review identified 44 post-marketing reports of serious ventricular tachyarrhythmia and 6 reports of sudden death worldwide in patients taking fingolimod up to the end of February 2017. To this date, cumulative exposure to fingolimod post-marketing was estimated to be 397,764 patient-years. The routine EU review recommended that warnings against the use of fingolimod in patients with underlying cardiac disorders should be strengthened to contraindications.

17. *A*. Internuclear ophthalmoplegia

Internuclear ophthalmoplegia (INO) is a disorder of conjugate lateral gaze in which the affected eye shows impairment of adduction. When an attempt is made to gaze contralaterally (relative to the affected eye), the affected eye adducts minimally, if at all. The contralateral eyes abducts, however with nystagmus. Additionally, the divergence of the eyes leads to horizontal diplopia. That is, if the right eye is affected the patient will «see double» when looking to the left, seeing two images side-by-side. Convergence is generally preserved.

Clinical Manifestations of INO

1. Unilateral internuclear ophthalmoplegia (INO): Due to the unilateral lesion of the medial longitudinal fasciculus (MLF). Unilateral weakness of adduction and preserved capabilities of abduction and convergence. It develops mainly due to cerebrovascular disorders, as the blood supply of the brainstem is symmetrically unilateral and end-arterial till the territory of the paramedian system. In contrast, asymmetrical forms often develop multiple sclerosis.
2. Bilateral INO: Making the patient look into both directions in the horizontal plane, the adduction movements are paretic, while the abduction is spared. However, when the convergence also becomes affected; even upon straight gaze a «divergent misalignment» can be noticed. This is the «Wall-Eyed Bilateral Internuclear Ophthalmoplegias» (WEBINO) syndrome, when upon straight gaze both eyesare in «divergent misalignment».
3. The «one and a half» syndrome: The name derives from the fact that beside intact vertical eye movements, the patient's eye on the affected side cannot move into either horizontal direction. Furthermore, the contralateral eye only can abduct in the horizontal plane.

18. *E*. Vertebral artery dissection

Vertebral artery dissection (VAD) is a relatively rare but increasingly recognized cause of stroke in patients younger than 45 years. Although the term spontaneous VAD is used to describe cases that do not involve significant blunt or penetrating trauma as a precipitating factor, many patients with so-called spontaneous VAD have a history of trivial or minor injury involving some degree of cervical distortion.

Signs and symptoms

The typical patient with VAD is a young person who experiences severe occipital headache and posterior nuchal pain following a head or neck injury and subsequently develops focal neurologic signs attributable to ischemia of the brainstem or cerebellum. The focal signs may not appear until after a latent period lasting as long as 3 days, however, and delays of weeks and years also have been reported. Many patients present only at the onset of neurologic symptoms.

When neurologic dysfunction does occur, patients most commonly report symptoms attributable to lateral medullary dysfunction (ie, Wallenberg syndrome). Patient history may include the following:

- Ipsilateral facial dysesthesia (pain and numbness) — Most common symptom
- Dysarthria or hoarseness (cranial nerves [CN] IX and X)
- Contralateral loss of pain and temperature sensation in the trunk and limbs
- Ipsilateral loss of taste (nucleus and tractus solitarius)
- Hiccups
- Vertigo
- Nausea and vomiting Diplopia or oscillopsia (image movement experienced with head motion)
- Dysphagia (CN IX and X)
- Disequilibrium
- Unilateral hearing loss