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Case report

Anizocoria – a diagnostic challenge. Case report

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Abstract

Introduction: Anisocoria is a condition characterized by unequal pupils. There are two described types: physiologic and pathologic. Pathologic anisocoria is caused by interruption in reflex arc. Reason of anisocoria can be difficult to define due to variety of possible diseases that may be causing it.

Aim: Case presentation of anisocoria caused by congenital cystic lesions of the brain.

Case study: 12-year-old girl after head trauma was admitted to the Emergency Department due to anisocoria noticed by family doctor. Patient had headache, sleepiness, dizziness and lacrimation. After looking at patients' childhood photo it was stated, that anisocoria was present before the injury. In physical examination decreased mobility of left eyeball, left-sided ptosis and left-sided decreased reaction to the light (both, direct and consensual) were noted. Head CT scan was performed, which revealed bilateral cystic lesions in basal ganglia, thalamus and in mesencephalon. The biggest lesions were located in left thalamus – 29x15mm. Biopsy of the biggest cyst was performed. No neoplastic tissue was found. Final diagnosis was stated: diencephalic and mesencephalic polycyclic lesions of unknown origin. Surgical approach was departed and conservative treatment was applied (regular head MRI scans).

Results and discussion: Described case report was an example of diagnostic difficulties which can be caused by anisocoria. In this case pathologic anisocoria was caused by congenital cystic lesions of the brain that were detected in the age of 12.

Conclusions: Anisocoria can be a sign of many different pathologies, but also can be physiologic. If pathologic anisocoria is suspected, imaging diagnostics should always be performed.

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1. INTRODUCTION

Unequal size of the pupils is a condition known as anisocoria. It can be divided to two types: physiologic and pathologic. Approximately 10%–20% of the population has an anisocoria that has no pathological background.[1] The asymmetry is more prominent in dim light and rarely more than 1 mm. Pathologic anisocoria is caused by interruption in reflex arc. There are many possible conditions that may be causing pathologic anisocoria, such as: Horner's syndrome, glaucoma, pharmacological agents, migraine Adie's pupil, increased intracranial pressure (e.g. head trauma, brain tumors and lesions), eye surgery.[2–4] Reason of anisocoria can be difficult to define due to variety of possible diseases that may be causing it.

2. AIM

This paper presents a case of anisocoria caused by congenital cystic lesions of the brain.

3. CASE STUDY

Patient, 12-year-old female was admitted to the Emergency Department in Regional Specialistic Childres' Hospital in Olsztyn due to anisocoria and headache noticed by a general practitioner (GP). Patient was complaining of lacrimation, dizziness and sleepiness that occurred after head injury. Additionally, patient declared recurrent headaches appearing for 2 years twice a week. Few hours before admition to the hospital girl hit her head on the window-still. No loss of consciousness or vomiting were reported. At the time of examination, patient presented decreased mobility of left eyeball during adduction and looking up, left-sided ptosis and left-sided decreased reaction to the light (both, direct and consensual). She had a small bruise on her left parietal region, bilaterally extended nodules in 1b segment. Meningeal sings and Romberg's test were negative. Patient disclaimed any sensory loss. After looking at patients' childhood photo it was stated, that anisocoria was present before the injury. Patient was admitted to the Pediatric Surgery and Urology Clinical Ward for an observation. Laboratory tests were performed including toxicological tests. Ophthalmologist excluded glaucoma as a cause of anisocoria. Chest X-ray was performed to exclude Pancosts' tumor. Head computer tomography (CT) was performed and it revealed bilateral cystic lesions in basal ganglia, thalamus and in mesencephalon. The biggest lesions were located in left thalamus and measured 29 × 15 mm. Patient was admitted to the Neurology Ward and head magnetic resonance imaging (MRI) scan was performed to confirm brain lesions. Furthermore, morphology revealed 20% eosinophilia. Due to brain cysts and eosinophilia specific test for echinococcosis was performed, which turned out to be negative. It appeared that the patient had coexisting enterobiasis. She was treated with albendazole. Patient was passed to the Childrens' Memorial Health Institute immediately for further diagnostics of brain cysts. Biopsy of the biggest cyst was performed. No neoplastic tissue was found. Final diagnosis was stated: diencephalic and mesencephalic polycyclic lesions of unknown origin. Surgical approach was departed and conservative treatment was applied (regular head MRI scans).

4. RESULTS AND DISCUSSION

Anisocoria coexisting with history of a head trauma can suggest increased intracranial pressure, e.g. bleeding or brain edema.[5] Furthermore, after head injury 10% of the patients suffer due to severe cerebrocranial trauma.[6] Therefore, diagnostic procedures of patients with anisocoria admitted to the Emergency Department, are firstly focused on establishing history of trauma and its' after-effects.

Medical interview, clinical examination and neurological examination are important stages of excluding central nervous system (CNS) damage. Since 10%–20% of the population have physiologic anisocoria,1 medical interview should include asking, if unequal pupils were noticeable ever before. Mechanism and time of the injury, loss of consciousness and memory loss are crucial information's in establishing possibility of brain damage. Pupils' size, examination of the spine and head including both ears should be assessed. Glasgow coma scale (GCS) score should be evaluated along with full neurological examination.[7]

Further diagnostic procedures such as skull X-ray and CT varies according to medical interview and clinical findings. Also, MRI can be performed. MRI is less commonly used than CT in pediatric Emergency Departments. It is caused by lower availability and long scan times intolerance in children.[8]

CT is more detailed examination than X-ray and provides information about intracranial injury structure (for example hematoma). It should be performed on patients with amnesia and GCS score 13–15 for accurate evaluation of CNS.[9] Due to radiation dose CT is not risk free, especially in children's population. Effective dose of the radiation is higher in younger children,[10] therefore decision about performing CT should be made carefully in patients with low risk of CNS trauma. Anisocoria, if not physiological, is considered a neurological symptom and should be indication for CT.

While head CT is the best method to exclude traumatic cause, it can also reveal brain tumors or lesions. MRI is more sensitive in brain tumors imaging, but it is not more specific. In colloid cysts diagnosis both, MRI and CT, are useful.[11]

After excluding physiologic and traumatic causes of anisocoria, other possible causes should be evaluated. Horner's syndrome, glaucoma, pharmacological agents, migraine,[2] Adie's pupil, eye trauma, eye surgery,[3] oculomotor nerve palsy, carotid artery aneurysm, trauma, brain tumors and lesions[4] are the most common pathologic causes of anisocoria.[12] Eye and neurological examination can exclude Horner's syndrome, glaucoma, Adie's pupil, eye trauma and oculomotor nerve palsy. Therefore, clinical examination with assistance of the ophthalmologist and neurologist is indicated. Suspicion of migraine, pharmacologic pupil or history of an eye surgery can be made basing on medical interview.

Compression on oculomotor nerve can be a possible cause of anisocoria and it can be noticed in carotid artery aneurysm and posterior communicating artery aneurysm adjacent to its junction with intracranial part of carotid artery. This cause of anisocoria can be excluded in CT angiography, MRI angiography, or in Doppler ultrasonography.[13]

Cystic lesions of the brain are common findings during systematic head imaging. Those findings are usually a diagnostic challenge.[14] Brain cysts can be divided into following groups: cysts associated with degenerative diseases, cysts containing CSF-fluid and cysts with fluid-secreting walls. Also, brain cysts can be classified as non-neoplastic lesions (including: congenital and infectious), and neoplastic lesions (including: benign and malignant tumors).[14]

Differential diagnosis of cystic lesions should include brain metastases, primary brain tumor, sarcoidosis and brain abscess.[15]

Hydatid cysts (lesion caused by a parasitic infection) localized in the brain are very rare, nevertheless it can be suspected when head CT and MRI show well-defined oval cystic mass. Serologic examination has limited use due to low diagnostic specificity and sensitivity.[16]

Colloid cysts contain gelatinous material of the brain and are a rare finding in children's population.[17] Colloid cysts usually are benign, congenital and localized in third ventricle. Both CT and MRI can be used in diagnosis, but MRI more optimally demonstrate the location of the cyst.[18]

5. CONCLUSIONS

Anisocoria can be a sign of many different pathologies, but also can be physiologic.

If pathologic anisocoria is suspected, imaging diagnostics should always be performed.

Described case report was an example of diagnostic difficulties which can be caused by anisocoria.

In this case pathologic anisocoria was caused by congenital cystic lesions of the brain that were detected in the age of 12.

Conflict of interest

None.

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