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PICA ischemic stroke. The importance of urgent neurosurgical treatment

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ABSTRACT

The posterior inferior cerebellar artery (PICA) has a unique anatomical complexity, which is of great clinical importance and is involved in many pathologies, such as aneurysm, ischemic stroke, neurovascular compression syndrome (NVCS), arteriovenous malformation (AVM) and brain tumour (1).

PICA has a sinuous and variable trajectory, divided into 5 segments. PICA infarction usually manifests lateral bulbar syndrome and is more likely to cause mass effects. PICA frequently compresses the bulb and cranial nerves, resulting in various neurovascular compression syndromes (NVCS) (2).

The ischemic stroke caused by thromboembolism in the PICA segment is accounted for more than 2% of all cases of ischemic stroke (3). Moreover, it tends to be underdiagnosed due to the symptomatology, represented usually by vertigo which mimics a possible peripheral vestibulopathy (4).

CASE REPORT

The patient aged 50 years old, known with venous thrombosis of the transverse and sigmoid sinuses, proximal internal jugular vein on the right, HTA, thrombophilia, mild mitral insufficiency, without chronic treatment at home, presents herself in UPU Sibiu for balance disorder and postural instability with a sudden on-set, on 01.11.2022, around 22:00.

The symptomatology debuted due to the sudden voluntary stop of the anticoagulation medication by the patient, against the recommendation of the attending physician.

The patient had another 2 similar episodes 2 days ago and 7 days ago, respectively, spontaneously remitted. It was decided to hospitalize the patient in the Neurology department for further investigations and specialized treatment.

Keywords

PICA,
urgent neurosurgical
treatment,
ischemic stroke



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The patient presents altered general condition, norm ponderal, conscious, uncharacteristic facies, warm skin and mucous membranes, normally coloured and hydrated, normally represented adipose connective tissue, normal superficial ganglion system, osto-articular system mobile integrity; normal conformed thorax, vesicular murmur present bilaterally, SpO₂ = 98% spontaneous; heart noise rate, arterial pressure = 150/90mmHg, cardiac frequency = 73bpm; spontaneous and on palpation painless abdomen; liver and spleen nonpalpable; eGFR= 88,66 mL/min/1,73 m², Giordano Sign negative bilateral, cooperative, temporo-spatial oriented.

NEUROLOGICAL EXAMINATION AT ADMISSION

Upon admission, the neurological examination reveals the following:

- No signs of meningeal irritation, no involuntary movements
- Orthostatism and difficulty walking
- Cranial nerves: preserved ocular motricity, without nystagmus, without amputations of visual field
- Negative paresis samples
- No coordination disorder in bilateral I-N and C-G tests
- Osteotendinous reflexes Symmetrical triggered
- Negative Babinski Sign
- No sensibility disorder
- Normal control of sphincters
- Fluent language
- Conscious, cooperative, temporo-spatial oriented
- GUSS scale = 5/5 points
- Rankin Score before = 0 points
- Rankin Score after = 1 point
- NIHSS score = 0 points

PRE-OPERATIVE STATUS

On 01.11.2022, a native emergency head CT scan was performed.

Hypodense areas with the appearance of patchy ischemic strokes can be detected at the left cerebellar and right parasagittal cerebellar level.

On 02.11.2022, a head MRI is performed, which reveals an acute ischemic vascular lesion located in the inferior cerebellar (vermian and bihemispherical - predominantly on the left side) in the left PICA vascularization territory, established in FLAIR. Left retrobulbar Swan hyposignal image, along the path

of the left PICA artery, is suggestive for the presence of thrombus at this level.



Figure 1. Native CT Head performed on 01.11.2022.



Figure 2. MRI Head performed on 02.11.2022.

On 03.11.2022, the second native Head CT is performed, which shows a hypodense area in the right paramedian, vermian cerebellum and at the level of the lower left cerebellar hemisphere, with the deletion of the differentiation between white and gray matter and the cortical grooves, with mass effect on the brain stem and the IV ventricle.

The patient has an episode of worsening of the symptoms, after which she complains of intense frontal headache and nausea.

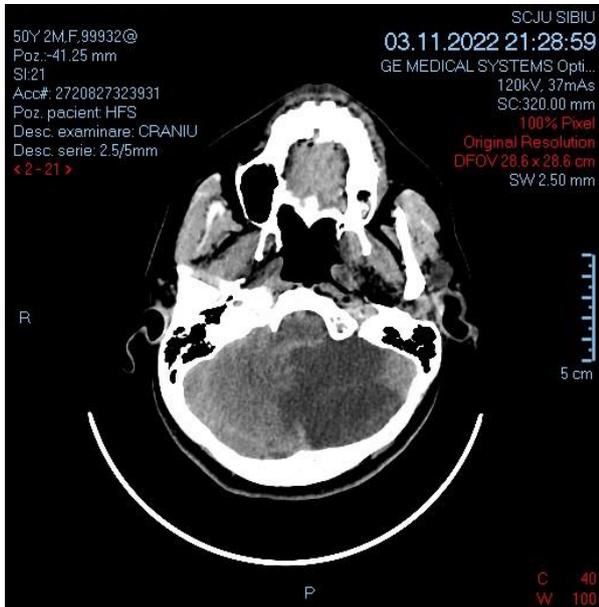


Figure 3. Native CT Head performed on 03.11.2022.

On 04.11.2022, a native head CT scan is performed, in which an extensive cerebellar ischemic stroke can be observed, with infratentorial mass effect, with supratentorial hydrocephalus; the ventricular system is on the median line, asymmetric, enlarged supratentorial.

Also, during the neurological examination, the patient is conscious, drowsy, answers questions with difficulty, opens her eyes spontaneously and on command with difficulty, spontaneously mobilizes bilateral inferior member, presents divergent strabismus of the right eye, squeezes the examiner's fingers with bilateral superior member on command; Urgent neurosurgical consultation is requested.

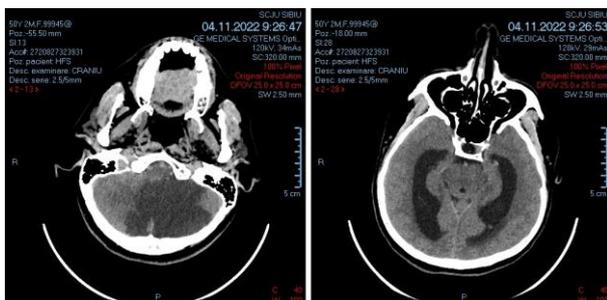


Figure 4. Native CT Head performed on 04.11.2022.

The 50-year-old patient is transferred from the Neurology ward, in critical condition, comatose, GCS score 4 points and equal pupils and admitted to the Neurosurgery department for investigations and specialized treatment.

OPERATION STAGE

On 04.11.2022 at 07:25 a.m., neurosurgical intervention takes place under general anaesthesia by performing an occipital craniectomy, to reduce the infratentorial and supratentorial mass effect, caused by the massive cerebral edema due to bilateral ischemic PICA stroke, having a history of previous thrombosis of transverse and sigmoid venous sinus and right internal jugular vein.

POST-OPERATIVE EVOLUTION

The evolution on the ICU and Neurosurgery ward is favourable under painkillers, anti-inflammatory, antibiotic and hemostatic treatment with a clean, exposed surgical wound, without Celsian signs, the wound being closed with sutures suture to the skin.

The native head CT is re-performed on 05.11.2022 post-operatively, in which an extended infratentorial hypodense area and patchy occipital craniectomy area are observed, with a reduction of the infra and supratentorial compressive effect.

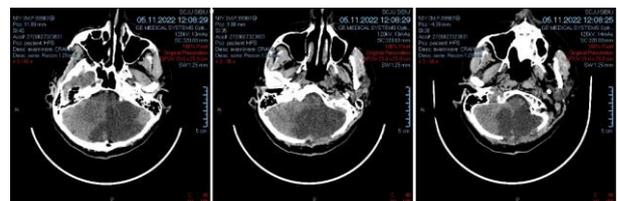


Figure 5. Native CT Head performed on 05.11.2022.

Post-intervention haematological status for massive cerebral edema, due to ischemic stroke. Patient had a history of thrombosis of transverse and sigmoid venous sinus and internal jugular vein, hyperhomocysteinemia and lupus anticoagulant for which she took Warfarin and later Aspirin and Plavix, later discontinued.

Due to the increased risk score for thrombosis, required anticoagulation with Clexane 0.6 x2- 30 days + therapy of the neurological and neurosurgical department. After 30 days, it will be decided whether to switch to Sintrom or another anticoagulant.

On 11.11.2022, the transfer to the Neurology ward was decided, the patient being conscious, cooperative, temporo-spatial oriented, in good general condition, afebrile with neurological symptoms in remission.

DISCUSSIONS

The conservative medical approach is a factor that leads to an increase in the mortality rate among patients with extensive bilateral ischemic strokes, because these patients have a very high risk of developing massive cerebral edema with mass effect if the neurosurgical treatment is delayed (5).

These aspects are important to be taken into consideration since the therapeutic benefit requires early intervention, before the adjacent brain structures are affected by the mass effect (6).

The thromboembolism represents a key point when speaking about an ischemic stroke. It is usually seen in atrial cardiopathy, such as atrial fibrillation, which cause is determined by a systemic vascular disease that affects the tissue of the atria (7).

The atrial fibrillation represents one of the main factors that can determine an ischemic stroke due to the formation of the thrombus inside the left atrium. Due to this situation, it is shown the importance of following the treatment with anticoagulant, without a voluntary sudden stop by the patient (8).

The recent studies show that the decompressive craniectomy approach represents that golden standard for space occupying infarctions, but it must be performed up to 48 hours since the first sign of ischemic stroke for the best results (9).

Moreover, the goal of a very quick, "ultra-early" surgical intervention is to reduce the mortality rate, not the disabilities that are permanent consequences of the strokes (10).

CONCLUSIONS

The goal of a very quick, "ultra-early" surgical intervention is to reduce the mortality rate, not the disabilities that are permanent consequences of strokes.

Decompressive craniectomy remains the only chance of survival for patients who develop malignant edema after an episode of stroke.

Decompressive craniectomy is not a therapeutic method but a life-saving one when other methods have failed.

Decompressive surgical treatment reduces mortality, but the family must know that this intervention does not guarantee a quick and spectacular recovery and that the patient will present a certain degree of disability.

The procedure should be performed within the first 48 h from the onset of the heart attack or as soon as possible.

In patients with suspected TIA or stroke, general and neurological examination, followed by diagnostic brain imaging should be performed immediately upon arrival at the hospital so that treatment can be initiated promptly.

Post-operative recovery also depends on the comorbidities that the patient has before the onset of the stroke

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