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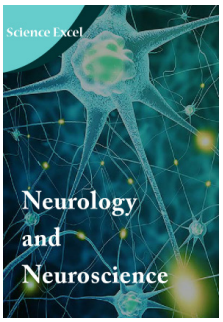

Long Term Sequelae of Stroke Treated with QIAPI 1®: Case Report

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Abstract

Despite significant decrease in mortality in stroke since 1950, the annual incidence of strokes in the general population remains at 1 or 2 per 1000 each year. There is an estimated of 50 000 new cases of stroke in Canada annually. There are approximately six to eight survivors of stroke per 1000 each year. Patients live an average of 7 years after stroke.

There appears to be low levels of knowledge of both risk factors and stroke warning signs among both high- and low-risk populations. Usually, knowledge about stroke risk factors is por, and as in myocardial infarction, delays from symptom onset to decision to seek medical attention are the most significant causes of delay in patients with stroke.

The most frequent symptoms are compatible with diagnoses of stroke, transient ischemic attack, intracerebral hemorrhage, or subarachnoid hemorrhage. It is common for the patients don't be unable to respond to questioning due to speech difficulties or an impaired mental status. Non-stroke diagnoses included dizziness/ataxia, seizure, dysarthria not otherwise specified (NOS), numbness NOS, syncope, migraine headache, anxiety, subdural hematoma, visual disturbances NOS, hepatic encephalopathy, alcoholic amnesic syndrome, acute poliomyelitis, soft tissue pain NOS, dementia, and other brain condition NOS. The non-stroke patients were like those with a final diagnosis of stroke in terms of age, race, and sex.

Supposedly, interventional thrombolytic stroke therapy (recombinant tissue plasminogen activator) is optimally effective only when administered within 3 hours of the onset of the vascular event.

The pharmacological modulation of the unsuspected capacity of eukaryotic cells to generate their own oxygen, dissociating the water molecules contained inside the cells, as in plants, opens new horizons regarding the prevention and treatment of one of the most epidemiologically important diseases.

Introduction

Many stroke survivors go on to develop a variety of medical, musculoskeletal, and psychosocial complications, years after the acute stroke.

Unilateral weakness, numbness, and speech abnormality were the most common symptoms recognized as warning signs of stroke

Investigators stress the need for early symptom recognition and intervention if thrombolytic therapy is to be effective [1].

Stroke remains the single most costly disease, surpassing cancer and heart disease in its cost to society as a whole [2]. Fifteen percent of stroke survivors require long-term institutional care, while 70 % are left with a significant functional disability in mobility, activities of daily living, social integration, and gainful employment.

Stroke recurrence is a continuous concern, as the occurrence of stroke is a significant risk factor for the development of further strokes. [3] Patients who have had a stroke are five times more likely to have another stroke than matched controls. [4]

Stroke is associated with a high incidence of concurrent cardiovascular disease [5]. The most common cause of death after an atherothrombotic stroke or transient ischemic attack is not a second stroke but rather a myocardial infarction, cardiac arrhythmia, or congestive heart failure [6]. Seizures occur in 5% to 9% of all stroke survivors [7].

Swallowing difficulties and the risk of aspiration are common in patients with bilateral hemispheric, brainstem, and even unilateral hemispheric strokes [8]. Following a stroke, patients often experience variable degrees of urinary frequency, urgency, or incontinence due to an incomplete neurogenic (upper motor neuron) bladder.

Musculoskeletal problems following a stroke invariably involve the hemiplegic side and, in some cases, do not become apparent until several years have passed. Stroke patients

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often complain bitterly about the pain associated with these complications.

Spasticity and hypertonicity are regarded as maladaptive responses to loss of higher central nervous system control. The increased tone that develops because of an upper motor neuron lesion leads to often painful and disfiguring contractures of joints [9].

Genu recurvatum, or hyperextension of the hemiplegic knee, is commonly seen. Repeated knee hyperextension can lead to progressive stretching of the posterior knee capsule and ligaments leading to ligamentous instability, thereby increasing the risk of osteoarthritis of the knee. [10]

Plantarflexion contracture of the ankle is a common complication that results in a decreased base of support and genu recurvatum during stance phase of gait and difficulty in clearing the foot during swing phase [11].

Inversion of the foot and ankle is often also present, causing the patient to walk on the lateral aspect of the foot, which can be quite painful. This inversion often interferes with proper fitting of an ankle-foot orthosis.

A painful hemiplegic shoulder is common following stroke, [12] occurring in up to 72% of hemiplegic patients. [13] The two conditions most frequently associated with shoulder pain are glenohumeral subluxation [14] and a frozen (spastic) shoulder. [15] Lateral and downward subluxation of the glenohumeral joint often occurs during the initial flaccid stage [16] and can lead to shoulder pain [17] or a brachial plexus traction injury. At present, a frozen or contracted shoulder is considered the major source of pain in hemiplegic patients [18].

Wrist and hand flexion contractures develop in the hemiplegic wrist and hand. A fixed flexion contracture of the hand interferes with restoration of hand function. It can be painful (therefore increasing spasticity) and often is unsightly.

Fractures of the hip, humerus, and distal radius on the hemiplegic side are not uncommon. Fractures of the lower extremity in an ambulatory patient should be managed aggressively. A fracture is often an event that leads to loss of independence for stroked patients and to eventual institutionalization.

For contractures, orthopedic surgical intervention is rarely required. Surgery should not be considered unless it improves the patient's level of function and bed or wheelchair positioning or allows for better hygiene [19].

Psychosocial complications of debilitating stroke, which are very common, almost inevitably, have a profound impact on the patient, as well as the immediate circle of family and friends.

Clinically significant depression occurs in more than 30% of stroke patients. [20] Family difficulties following a stroke are often not well appreciated. A stroke involving one member affects the well-being of the entire family. Family members providing care to stroke victims face their own adjustment problems, as their personal needs are often sacrificed to meet the care needs of the stroke patient. The brunt of the long-term care of the stroke patient generally falls onto the spouse and, where the spouse is unavailable, a daughter or son. [21]

Decreased sexual activity or abstinence is common following a stroke for several reasons, although sexual libido is generally unchanged. [22]

Driving a motor vehicle is one of the most complicated of learned skills, requiring good vision, intact reflex responses, and rapid decision making. If one or more of these factors is impaired, then the individual's driving skills need to be retested.

Many stroke victims develop a variety of medical, musculoskeletal, and psychosocial complications, years after a stroke. These complications can add to the original disability imposed by the stroke.

The management of patients affected by cerebral vascular events and their complications usually falls to the family physician, but its scope was limited, given the complexity of the sequelae that accompany cerebral vascular events.

Contradictions of Gas Exchange at the Pulmonary Level

In 1977, Antoine Laurent Lavoisier emphasized the similarity between respiration and combustion stating that “respiration is nothing but a slow combustion of carbon and hydrogen, similar in all respects to that of a lamp or a lighted candle, and from this point of view, animals which breathe are equally combustible substances burning and consuming themselves.” [23] Lavoisier with his colleague Laplace made one major error when they stated that the combustion (oxidation) took place in the lung itself.

One of the most colorful controversies in the first decade of the 20th century concerned how oxygen moved across the pulmonary capillary wall into the blood. Christian Bohr (1855–1911) was a major proponent of the secretion ability of the lung, and in 1909, he referred to this as the lungs´ “specific function”. [24] J.S. Haldane (1860– 1936) visited Bohr’s laboratory and became one of the champions of oxygen secretion stating for example, “In the animals investigated the normal oxygen tension in the arterial blood is always higher than the alveolar air, and in some animals higher than the inspired air. The absorption of oxygen by the lungs thus cannot be explained by diffusion alone. [25]

Haldane continued to believe in oxygen secretion until his death in 1936, and in the second edition of his book Respiration, he devoted an entire chapter to the subject. Haldane pointed out that secretion of several substances against concentration gradients (i.e., by active transport) occurs in many glands and that in the swim bladder of fishes the Po2 is often much higher than in the surrounding water. Because the swim bladder, like the lung, is an outgrowth of the gut, he reasoned that oxygen secretion could be expected. [26]

Joseph Barcroft (1872–1947) led an expedition to Cerro de Pasco, Peru in 1921–1922 and showed that the arterial Po2 was always less than the alveolar value in humans [27].

He also made the important observation that the arterial oxygen saturation fell during exercise at high altitude and argued that this could be explained by the failure of equilibration of Po2 between alveolar gas and pulmonary capillary blood. This was one of the first direct demonstrations of diffusion limitation in normal lungs at high altitude, a finding that has been confirmed many times since.

In 1909, the Duke of the Abruzzi reached an extraordinary altitude of 7,500 m in the Karakorum mountains without supplementary oxygen. Haldane and his colleagues calculated the alveolar Po2 of the Duke to be only 30 mm Hg, and they concluded that adequate oxygenation of the blood would be impossible based on passive diffusion, and therefore, oxygen secretion must have occurred [28].

Thereby, the equations relating Po2 and Pco2 to the ventilation–perfusion ratio cannot be solved algebraically, [29] because oxygen and carbon dioxide dissociation curves are not only nonlinear but also interdependent. Numerous methods have been designed to try to measure both O2, CO2, and pH, based on sensors of various natures, but their use was so complex and

problematic that some could not be used clinically. Currently, oximetry based on hemoglobin color changes, developed by Takuo Aoyagi in 1972, is widely used clinically. [30]

But continuing to consider gas exchange as the main function of the lungs has caused many deaths, for example during the pandemic, which highlights that critically ill patients in the intensive care setting often have grossly disturbed pulmonary gas exchange, in spite many aspects of this are poorly understood. For example, altering the levels of positive end-expiratory pressure and/or the inspired oxygen concentration will often improve the arterial Po2, but many of the changes within the lung after these interventions are obscure.

As the discovery spreads that molecules derived from protoporphyrin IX, lignin and melanin possess the intrinsic property of transforming the power of light into chemical energy by dissociating water, then it will be possible to recognize that both Bohr and Haldane were right, which will make it possible to banish deeply rooted dogmas, such as:

1. Glucose alone is the universal precursor to any organic molecule. But it is not a source of energy.
2. No living entity takes oxygen from the environment that surrounds it, whether it is air, water, or the subsoil. All living things generate oxygen (and hydrogen) they require for their metabolism by dissociating the water molecules that each cell contains inside.
3. The main function of the lung is to expel CO2, and the air that is inhaled is intended only to dilute the toxic CO2 that accumulates in the lungs, so that it does not exceed 4.0% of the total volume inspired.
4. The bloodstream only transports the CO2 that is formed strictly inside each cell of our body, in the direction of the lungs.
    - The bloodstream does not carry oxygen from the lungs to the tissues, but hemoglobin, a molecule derived from protoporphyrin IX, generates it inside each erythrocyte.
    - When PCO2 rises, the dissociation of the molecule from water is interfered with, since it is a somberly accurate chemical reaction.
    - Just as the production of CO2 is strict at the intracellular level, so is the generation of oxygen, since both gases are generated inside each cell that makes us up, although by different mechanisms [31].

Pharmacological modulation of the dissociation of water molecules with QIAPI ®

The dissociation of water molecules into the granules of biological pigments [32] is a very exact process, amazingly exact, which has not changed since the beginning of time, for it coincides with the very origin of life as well as its further evolution.

Any chemical process inside cells initiates or is related to the dissociation of intracellular water, and as long as the generation of oxygen and hydrogen are in balance with the metabolic requirements of the cells, the body works well, because it is very well made, since nature forms them all without errors. Such is the rectitude of it; the Chinese philosophers express.

But in the present life, the once exact phenomenon of the dissociation of water is out of balance, and if the first chemical reaction of the body is wrong, then the body is worse, since we can consider the generation of hydrogen and oxygen from the dissociation of water, as one of the first, if not the very first reaction of life, from which the hatching of life begins.

Therefore, when the dissociation of water inside cells is out of balance with the cellular needs or the body itself, a generalized failure is detected either in tissues, organs or systems; which unpredictably affects the careful harmony of our body generating what we call diseases, and whose name is not relevant since our body does not pay attention to it, and on the other hand, all or almost all diseases begin in the same way: with the imbalance of oxygen.

But now we understand that the origin of the oxygen and hydrogen contained in each of our cells is endogenous, that is: it occurs inside the cells themselves, which was to be expected, given that the levels of intracellular oxygen saturation are more than 90%, without reaching 100%. Because when the percentage of oxygen saturation is 100%, the possibility of flame is at any time, so rarely will a patient show such levels of saturation. This reflects the strict regulation of intracellular and/or body mechanisms to maintain a high percentage of oxygen saturation necessary with both life and health.

And the relatively few reports of spontaneous human combustion, dating back to 1746 [33], coincide with a time when the rate of alcoholism was unusually high in England, and cases of spontaneous human combustion began to become frequent enough so the English novelist Charles Dickens was arguably influenced by this when he had one of his characters in Bleak House die by spontaneous combustion [34].

Although attempts have been made to discredit the unusual association of a high rate of alcoholism with an increase in the frequency of cases of spontaneous human combustion [35], arguing that the combustion temperature that alcohol is capable of producing (around 200 °C), is far from reaching the characteristics described in spontaneous human combustion, because the formation of ash from the human trunk, and this in a matter of minutes, requires temperatures 10 times higher, that is, about 2000 ° C. And coincidentally it is the temperature at which hydrogen burns.

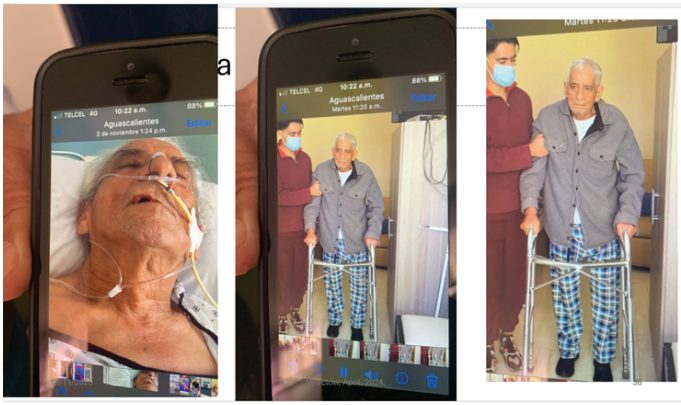

Figure 1. *Patient in the ninth decade of life, with a diagnosis of cerebral vascular event after COVID 19 vaccine. The patient in a coma (left) was hospitalized by his relatives, but the doctors who treated him gave him up and gave him up, so the patient's relatives consulted with us, and having learned of the case, we recommend the administration of QIAPI 1®, sublingual drops, at the dose of three drops under the tongue, every half hour. The patient began to react and within a few hours he came out of the coma, and in less than 48 hours, he was able to walk with help. (Center, right).*

And all our cells constantly contain a saturation percentage of both oxygen and hydrogen close to 100%. But our body's regulatory mechanisms, developed over eons of years of evolution, are extraordinarily efficient, as can be inferred from the relatively few reported from the eighteenth century onwards. And the role of ethanol should not be ignored, since it forms covalent bonds with the membrane receptors of cells, which are related to mechanisms as fundamental as the generation and control of the levels of both oxygen and hydrogen, from the dissociation of water, since these levels are notoriously high, because they are required so that the biology of the cell can give rise to life and maintain it, but without reaching the disaster of spontaneous combustion.

Pharmacological modulation of water dissociation in the management of sequelae in patients affected by stroke

For us, almost any disease originates when strict oxygen levels at the intracellular level are not in balance with the cell's incessant metabolic requirements. And stroke and the systemic alterations that accompany it are no exception.

In acute cases of cerebral vascular events, the recovery of affected patients is surprising (Figure 1).

The surprising results we obtain in acute cases of cerebral vascular events, such as the case illustrated in Figure 1; we attribute it to the fact that brain tissues, including those directly affected; are relatively preserved. And by restoring "normal endogenous oxygenation" (with QIAPI 1®), the tissue responds almost immediately. Being able to restore both form and function.

But in chronic cases, the story is different, since both the affected tissues and the surrounding or related tissues develop significant changes that affect recovery, both in form and function.

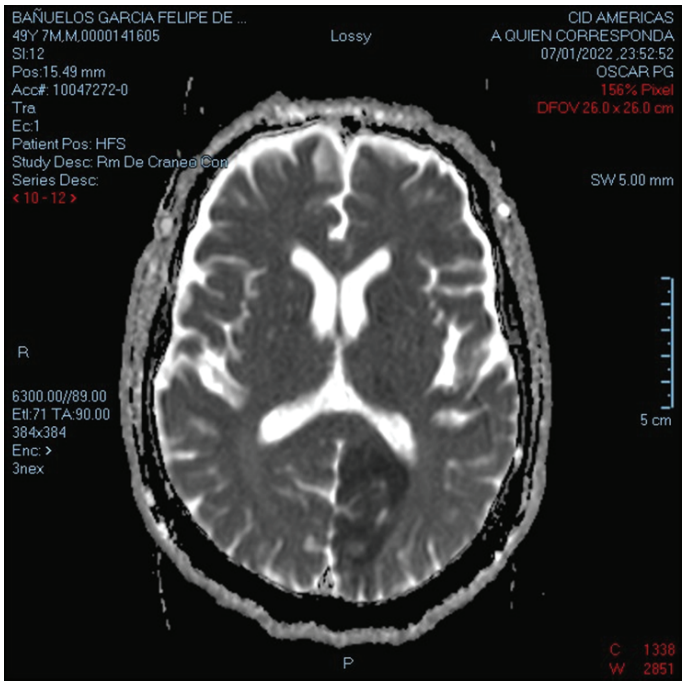

Figure 2. *Left temporal-occipital malacia brain zone, secondary to old ischemic vascular event, which corresponds to the territory of the left posterior cerebral artery.*

Management of the chronic sequelae of a stroke. Case report

This is a male patient with DATE OF BIRTH: 10/Nov./1972 TODAY'S DATE: 20/May/23 GENDER: Male. Taking as a place of residence Zapopan, Jalisco, México.

Among its antecedents we have:

Phototype V (Fitzpatrick classification). He began with health problems several years ago. Diagnosed with a problem of osteoporosis, bone wear, spine, heart attack, thrombosis, he cannot walk well, hernias in the spine, sequelae of stroke, he cannot see well, worn hips, knees, osteoarthritis, he forgot to read, he reads very slowly.

He began to go to a doctor who gave him treatment for sequels of heart attack, hemorrhage, thrombosis, low vision, with poor results, and the images move. He has not been able to walk since 2020.

Following are some images of the studies that the patient brought with him to the first consultation:

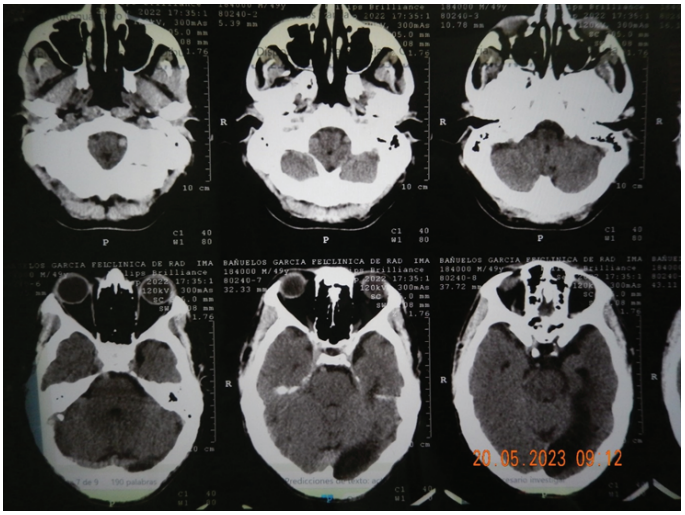

Figure 3. *The images are compatible with involvement of the temporal-occipital zone, corresponding to the area irrigated by the left posterior cerebral artery.*

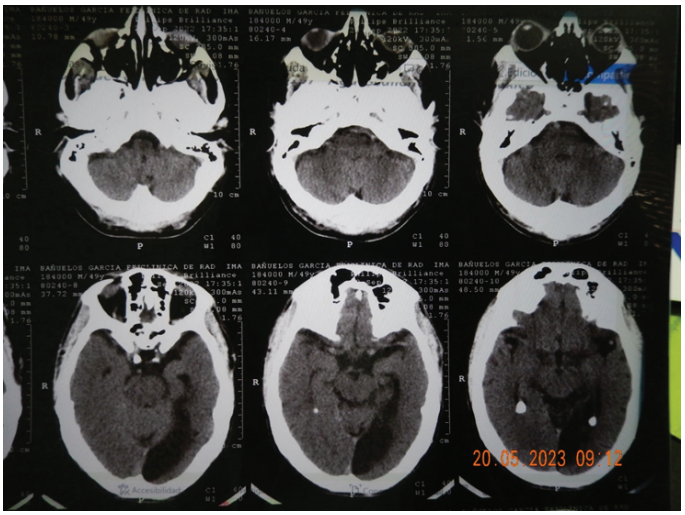

Figure 4. *The CT scan shows a relatively large area of atrophy in the area that supplies the left posterior artery on the left.*

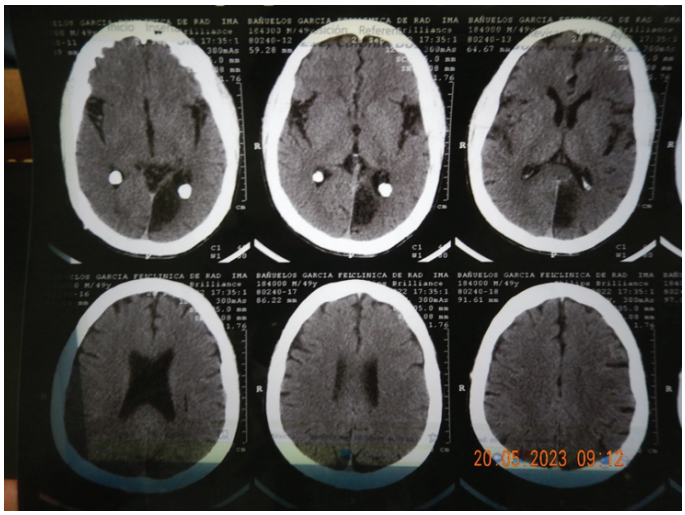

Figure 5. *In contrast tomography, in addition to the affected temporo-parietal area, there is also a deviation of the midline, as well as an increase in the volume of the ventricles.*

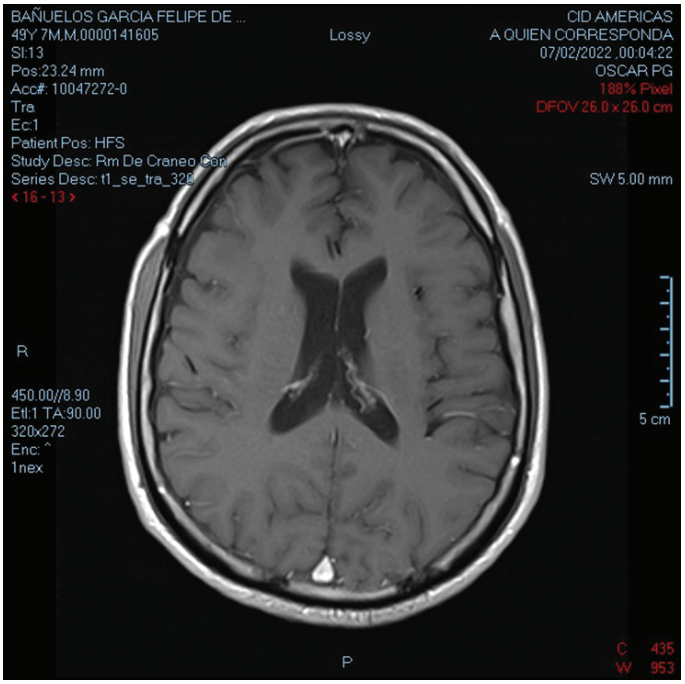

Figure 6. *The MRI image shows the growth of the ventricles, and the choroid plexuses inside them, relatively small.*

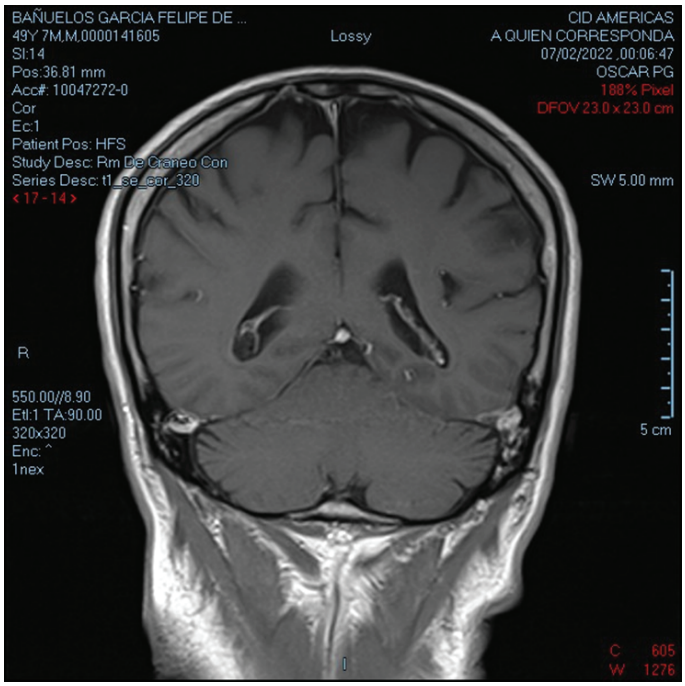

Figure 7. *The choroid plexuses, inside the enlarged ventricles, are hypo trophic.*

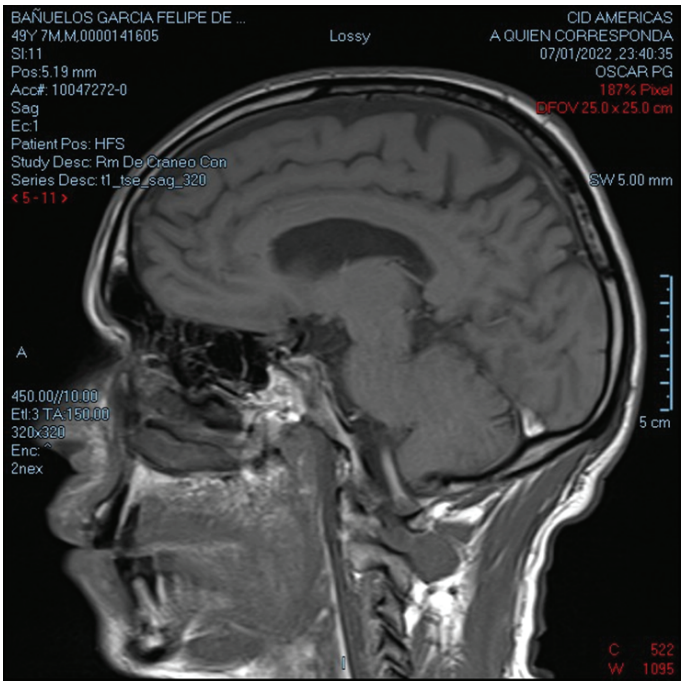

Figure 8. *In addition to temporo-parietal involvement, enlargement of the ventricles and subarachnoid space is observed.*

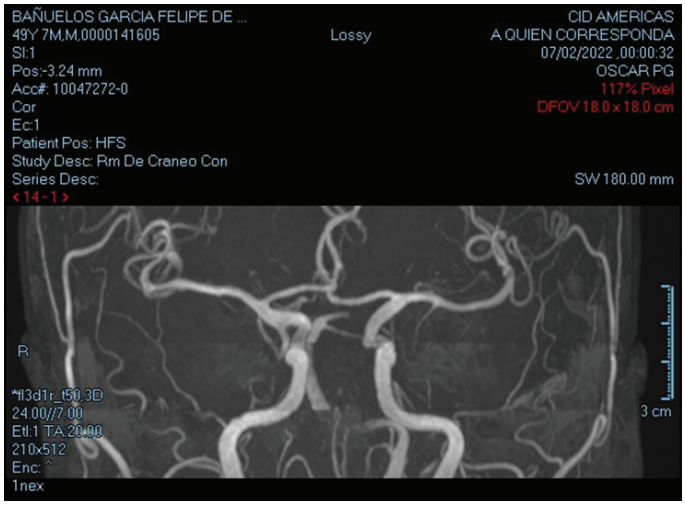

Figure 9. *Digital subtraction angiography does not show significant changes.*

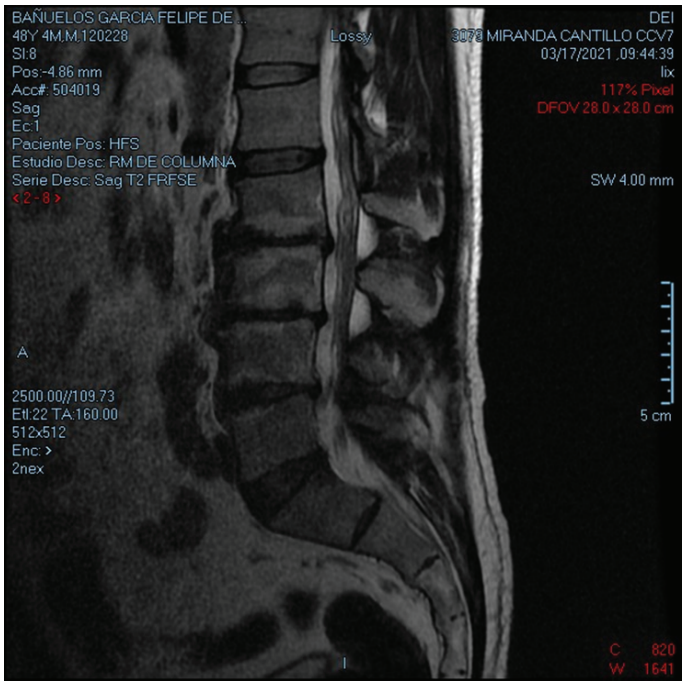

Figure 10*. Lumbosacral spine magnetic resonance imaging identifies rectification of the lumbar axis with subchondral degenerative changes, type MODIC II at levels L 2 -L 3, L 3 – L 4, L 4 – L 5; where changes due to spondylosis are added. As well as disc dehydration with bulges in the levels L 2 -L 3, L 3 – L 4, L 4 – L 5, where a narrow channel acquired due to facet hypertrophy is added, in which the lateral recesses are compromised.*

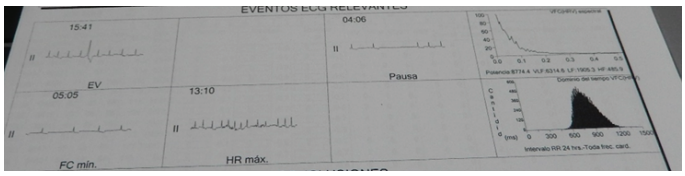

Figure 11*. The report of the electrocardiographic recording showed the following: Atrial fibrillation throughout the recording, isolated ventricular extrasystole of the simple type.*

The laboratory analyses, dated close to the day of the first consultation, showed the following data:

Urea: 52.6 mg/dL

Blood urea nitrogen (UMP): 24.6 mg/dL

Creatinine: 0.94 mg/dL

Triglycerides: 52 mg/dL

HDL cholesterol: 31.9 mg/dL

Colesterol LDL directo: 104.0 mg/dL

General urine test within normal limits

Glucose 109 mg/dL

Uric acid: 11.9 mg/dL

Glomerular filtration rate: 71.6 ml/min/1.72 m2

Ultra-sensitive C-reactive protein: 5.12 mg/dL

Immunoglobulin A: 552 mg/dL

Erythrocytes: 4.39 million/microliter

Hemoglobin: 13.4 g/dL

Hematocrite: 39.8 %

The following images show the difficulty in the mobility of the patient, who arrived at the office in a wheelchair, and for short distances, could move around in a walker.

Figure 12*. The previous photographs show the remarkable difficulty of the patient moving, even with the help of the walker. The loss of muscle mass is significant.*

The physical examination of the patient, during the first consultation, found a digital oximetry of SpO2 %: 88 %, Heartbeat: 32 x´; and a sciascopy (objective refraction) of:

OD no possible, OI ++/++.

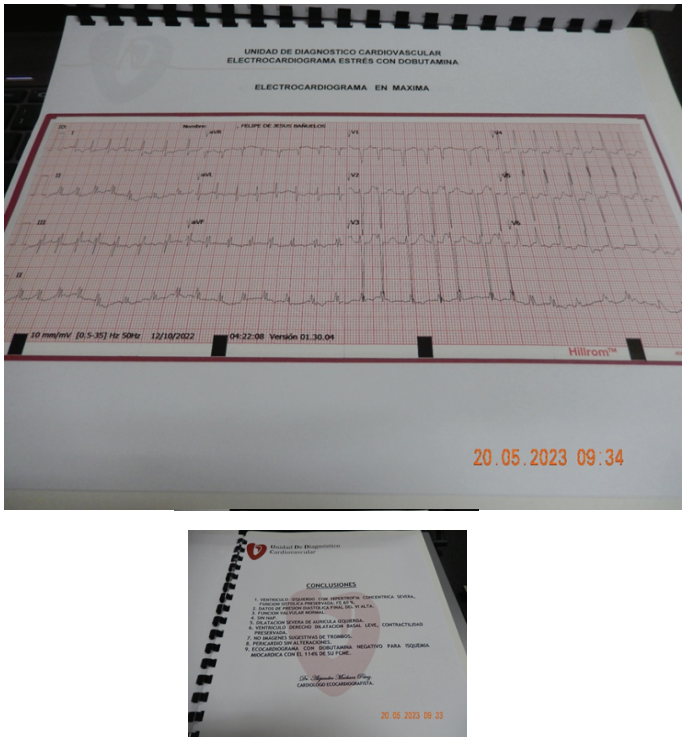

Figure 13. *The diagnoses regarding cardiac alterations were as follows: 1) Left ventricle with severe concentric hypertrophy, preserved systolic function: EF 60%. 2) High left ventricular end diastolic pressure data. 3) Normal valve function, 4) No pulmonary arterial hypertension (PAH), 5) Severe dilation of the left atrium, 6) Right ventricle with mild basal dilation, preserved contractility, 7) No images suggestive of thrombi, 8) Pericardium without alterations, 9) Echocardiogram with Dobutamine negative for myocardial ischemia, with 114 % of its MHR.*

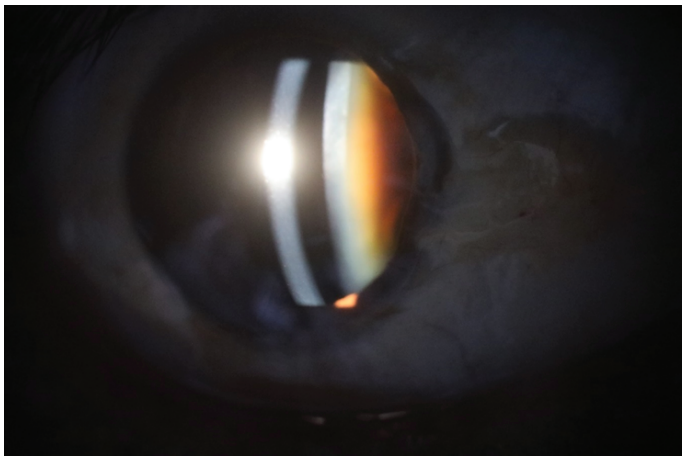

Figure 14. The biomicroscopic image shows a preserved anterior segment of the right eyeball, showing only a brown opacity in the lens.

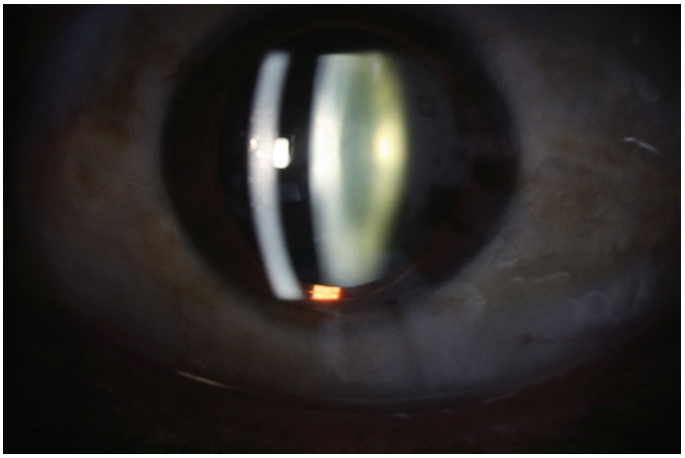

Figure 15. *The bio-microscopy image of the left eye shows an anterior segment (conjunctiva, cornea, lens, anterior chamber, and anterior third of the vitreous) in good condition.*

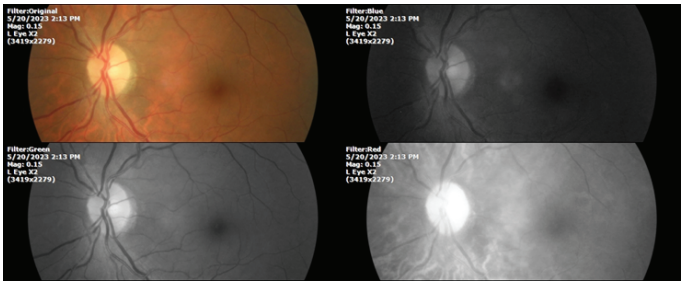

Figure 16. The examination of the fundus of the left eye, during the first consultation that took place on 05/20/2023, shows moderate vascular alterations, such as sinuosity, alterations in the artery/vein relationship, and attenuated choroidal vessels and some constricted.

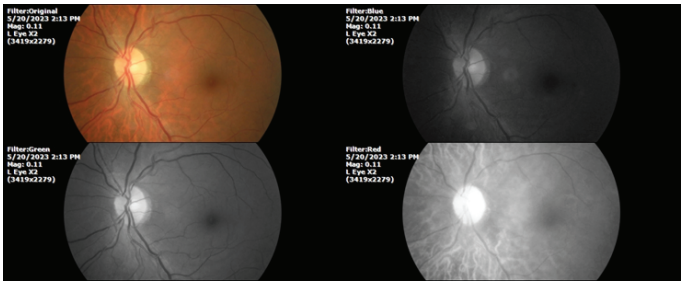

Figure 17. In this second image of the same left eye, no anatomical alterations of the retina, optic disc, and pigmented epithelium can be seen.

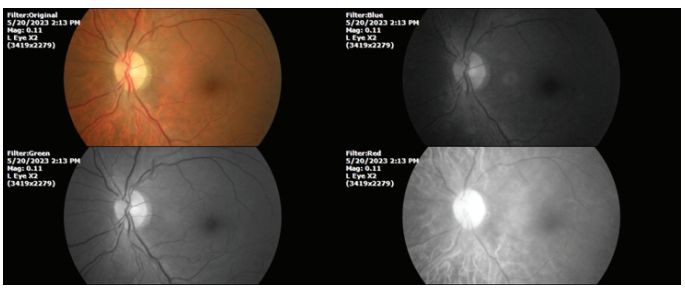

Figure 18. In the fundus photograph on the right side, the crystalline opacity of the eyeball does not allow an adequate visualization of the elements of this anatomical area, only an optic nerve that preserves its anatomy is guessed.

Once the theoretical bases of our therapeutic approach were explained to the patient and their families, and once the pertinent informed consent was signed, the use of QIAPI 1® sublingual drops was advised, at the dose of three sublingual drops every hour or every half hour, during the entire time of the day that the patient was awake. trying to maintain SpO2 values above 90%. By making a new appointment in six months.

The patient returned for a second examination on the day March 22, 2024.

And when questioned, the patient reported the following:

Much better, he walks more, he didn't walk at all. Right eye sees a little more. He has some binocular diplopia because the better vision with OI.

He can read now, he had forgotten.

The feet feel very heavy.

He's already growing hair.

A physician already wanted to operate on his hip.

On physical examination, SpO2 values, measured by digital oximeter, showed a reading of 93%. The heart rate was 67 x´; and objective refraction (Sciascopy) showed values of +++/+++.

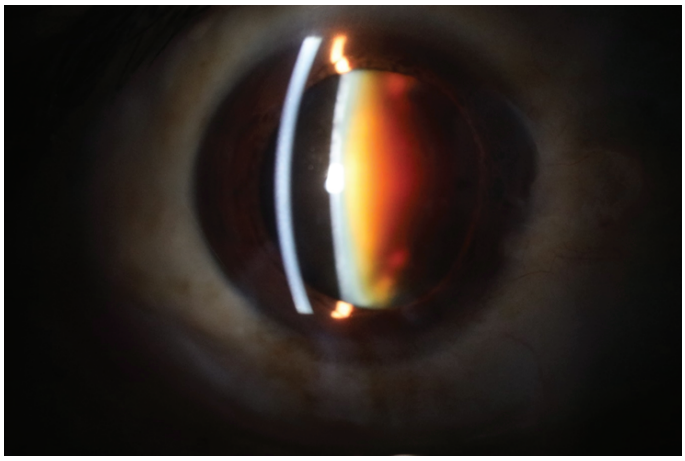

Figure 19. The reddish color of the lens of the right eye does not show significant changes, although it seems less dense, even the patient reports having better vision with that eye.

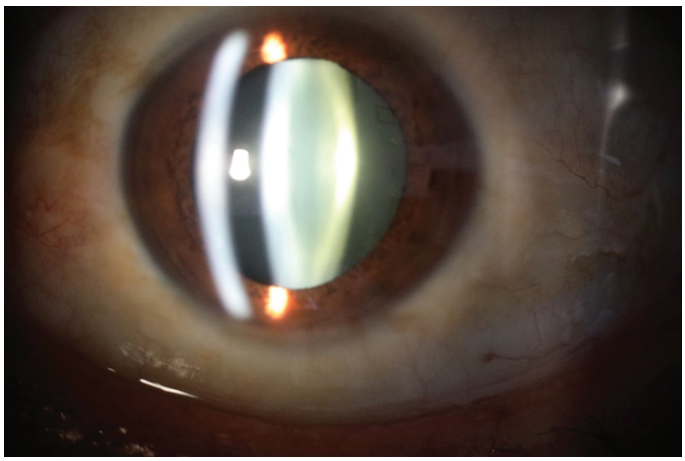

Figure 20. Bio-microscopy of the anterior segment of the left eye shows the preserved anatomy.

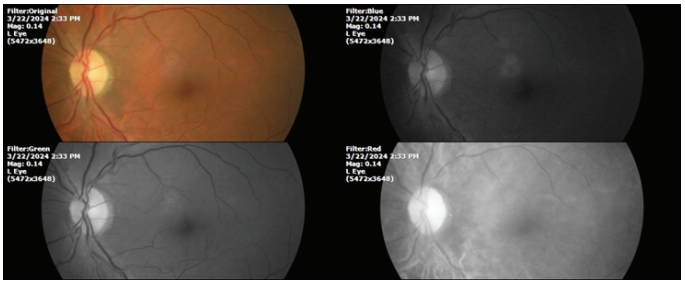

Figure 21. The structures of the posterior pole of the left eye do not present significant changes.

Figure 22. The improvement in March 2024, is remarkable. He has gained weight; he no longer uses a walker or a wheelchair.

Figure 23. The patient reported generalized improvement, which was to be expected, given that the generation of oxygen at the intracellular level is the basis of life and health. And by re-balancing this fundamental process, the body begins to recover by itself, the complex harmony that characterizes it.

The patient reports that he can read better. The patient is an architect by profession, and has not been able to work since 2021, he still cannot do so, but he thinks that as his vision improves, he could work.

In this second consultation, she has been using QIAPI 1® for about 9 months. He reports improvement in his physical capacity; he notices that his heart no longer fatigues in the same way. Before he could not hold a conversation, he has started driving in the city where he lives (Guadalajara, Mexico). He is already better, even when he travels.

Figure 24. *The movements are not entirely normal, but the posture and balance recovered are remarkable, given that, when he went for the first time (05/20/2023), he arrived in a wheelchair.*

February 13, 2025.

The patient comes for the third time, says that he has continued to improve, and that since November 2024, he has already returned to work in his profession as an architect. He already drives even on the highway. He already speaks better, reads better, hears better, and is already easily located. It is already well located in space, time and place.

In the consultation for the third time, the patient's wife also went to the consultation, because in the intervening between the second and third consultation, she developed disabling pain in the coxofemoral region, compatible with degenerative osteoarthritis. Once she was reviewed, she was also started on treatment with QIAPI 1®, at the dose of three sublingual drops every hour or every half hour, depending on the severity of the discomfort; for as long as she is awake.

Figure 25. *The patient has significantly improved his mobility, to the extent that he can now help his wife to ambulate.*

Figure 26. *The change in the patient's capacity is remarkable, to such an extent that he helps his wife, who is affected recently by degenerative osteoarthritis.*

Comment

The unsuspected ability of human eukaryotic cells to dissociate the water molecules that the cells contain inside them, modifies old and deeply rooted concepts, such as that our body takes oxygen from the air that surrounds it. Both oxygen and CO2 are generated inside each cell that makes up, breaking into a thousand pieces the belief that the lung obtains oxygen from the environment that surrounds it. As long as the generation of oxygen at the intracellular level is in balance with the metabolic needs of the cells, the body works well because it is very well made. But in today's life, this fundamental process for life is out of balance due to the pollution of water, air and food.

Figure 27. *He no longer requires the help of the walker, and although his gait is not entirely normal, it is noticeably better than 18 months ago.*

Figure 28. *The photograph corresponds to the first consultation on 05/20/2023, when he went for the first time, arriving in a wheelchair, and could move in small spaces with a walker. His wife (left) had to help him constantly. The image contrasts with photograph 25, where there is significant difficulty in walking or moving.*

Apparently, all diseases, or almost all; They start when oxygen becomes unbalanced. And this imbalance manifests itself in any way. Therefore, stroke is no exception, hence the notable improvement in terms of rebalancing intracellular oxygen levels with the administration of QIAPI 1®.

Conclusion

Stroke is attributed to acute local damage to the central nervous system caused by cerebral blood vessel problems such as cerebral infarction, cerebral hemorrhage, and subarachnoid hemorrhage. It is becoming a health problem worldwide due to increasing elderly population and poor air and water quality [36].

In 2019, stroke was the third most common major disease and the fifth most common cause of death worldwide. [37] Cerebrovascular disease is the fourth most common cause of death, accounting for 7.3% of all deaths (42 deaths/100,000 people). [38]

There are currently 1.5 million stroke survivors in the United States. More than half of these individuals have significant residual physical disability and functional impairment [39].

An increasing number of patients are receiving rehabilitation after stroke. But the impact of intensive rehabilitation on the long-term prognosis of patients with stroke remains to be elucidated [40]. Advances in stroke treatment have significantly reduced the overall mortality but increased survivors with complications and disabilities [41].

Patients with stroke initially experience loss of consciousness and functional decline. Subsequently, various functions, including physical disability, cognitive impairment, memory loss, and swallowing, are impaired. [42]

Prolonged hospitalization in the intensive care unit promotes immobility, and thus, contributes to functional decline. Therefore, intensive rehabilitation rather than traditional bed rest might help prevent complications and promote recovery of bodily functions, including speech and swallowing functions. [43]

The pharmacological modulation of intracellular oxygen levels, from the dissociation of water, opens new and better possibilities for patients affected by cerebral vascular events. Both in the acute phase and its recovery, including in the prevention of such events.

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Conflict of interest: The finding of the unsuspected intrinsic property of eukaryotic cells to dissociate the water molecule, and the development of QIAPI, was carried out at our facilities.

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