

Discussion of Review on Protocols Treatments of Arachnoid Cysts Explored by Nuclear Medicine

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Received: April 23, 2020; **Published:** May 26, 2020

Abstract

Background: The fact of Nuclear Medicine (NM) still been the first cerebral exams to explore psychiatric patients initiate a discussion about the relationships between “findings” in the brain. Arachnoid cysts (AC) are the most common benign intracranial cyst, accounting for about 1% of all intracranial space-occupying lesions. Regarding the concomitance of arachnoid cysts with psychiatric disorders are scarce, but in this presentation brain scintigraphy no image associated psychic disturbs were founded, only a focal hypoperfusion. Aims: From an exclusively neurological point of view, there is a consensus of not operating an asymptomatic patient, but a new paradigm may be emerging with the increasing use of NM in psychiatry.

Methods: NM perfusion image with radiotracer HMPAO was made and shows an arachnoid cyst on left temporal lobe first.

Results: The increasing contribution of NM and psychiatry receiving patients before Computed Tomography (CT) (all patients symptomatic) may in the near future force a revision of the criteria for the treatment of arachnoid cysts with greater appreciation of psychiatric symptoms, and turn on this technique the first exam for psychiatric patients.

Conclusion: The AC treatment indefiniteness continues in patients that have only psychic complains, however without classic mental diseases diagnostic. This reality it's been growing in parallel with the participation of NM in psychiatry to reveals the psychosis components. A complementary investigation with CT or Nuclear Magnetic Resonance (NMR) it is necessary.

Keywords: *Nuclear Medicine; Arachnoid Cyst; Psychiatry; Computed Tomography; Nuclear Magnetic Resonance*

Introduction and Case Report

Arachnoid cysts are the most common intracranial cyst, bookkeeping for about 1% of all intracranial space-occupying lesions. Arachnoid brain cysts (AC) are benign lesions in all aspects, including the same fluid (cerebrospinal fluid, CSF) and the same histopathology, in general they are congenital, but can be acquired. As a rule, they are asymptomatic or oligo-asymptomatic [1]. The symptomatology depends more on the affected region than on its size. The treatment of symptomatic arachnoid cysts is evidently surgical. Only with symptoms, the treatment becomes surgical. Although there is consensus on surgical intervention in symptomatic cases, the ideal approach is still controversial. Their clinical appearances vary and are often undefined [1].

A few cases with associated psychiatric symptoms have been reported [2-8]. Case reports regarding the concomitance of arachnoid cysts with psychiatric disorders are scarce [9]. Arachnoid cysts are formed when the arachnoid membrane contains cerebrospinal fluid and are frequently located in the Sylvian fissure [10], middle cranial fossa, suprasellar area, temporal lobe, and posterior fossa. Clinical manifestations are random and vary from quiescence to active symptoms and natural vanishing [11]. The medical literature cites headaches, convulsions, cranial asymmetry, intracranial hypertension, mental retardation, aphasias, dizziness others defined as expansion of the meninges in the form of a bag and filled with CSF [12]. It can appear at any point covered by the arachnoid membrane. The symptomatology is more related to the topography than to the volume [13].

A recent surge of interest in AC and possible associations with psychosis has upstretched questions about etiologic and adequate therapeutic approaches [3,7].

Function of nuclear medicine

From an exclusively neurological point of view, there is a consensus of not operating an asymptomatic patient, but a new paradigm may be emerging with the increasing use of Nuclear Medicine (NM) in psychiatry [14]. Cerebral perfusion by SPECT using the HMPAO (HexaMetilPropilenAminaOxima) database makes it possible to group [26] diseases such as bipolar disorder, schizophrenia, Alzheimer’s, autism, etc. This new system directly receives from psychiatry patients who have not yet had a computed tomography (CT) or nuclear magnetic resonance (NMR) imaging, but is symptomatic for psychiatry [15,16]. Brain perfusion scintigraphy is a simple, safe, low-cost method, based on the use of a radiotracer (HMPAO) that crosses the blood-brain barrier and fixes itself inside neurons, also translating blood flow with hypo or hyper-perfused areas [17]. Arachnoid cysts are always hypo-perfused (Figure 1).

Patients could change his behaviour abruptly in the last 2 to 3 months. Previously, he was calm, cooperative, well connected and had no clinical complaints. Today the patient could be defined as “another person”, aggressive, rebellious, with little tolerance for facts and people, to the point of practicing physical aggression without justification. There are no reports of alcoholism, smoking or drug use in the clinical history. The physical examination was normal and the neurological tests were perfect.

The aggressively is the principal complain. The psychiatrist resorted to NM as the first image exam (Figure 1), which did not show a pattern seen in cases of bipolarity, schizophrenia, etc. It showed a focal area of hypo-perfusion in the topography of the left temporal lobe (Figure 1). This area had 5 standard deviations below the mean, for the radiotracer under-uptake. This focal image in a patient with strong complaints of behaviour change is the main reason for this work. Evidence of the link between NM and psychiatry, at the same time, reflect that psychiatric complaints, when present, prevent the use of the term asymptomatic.

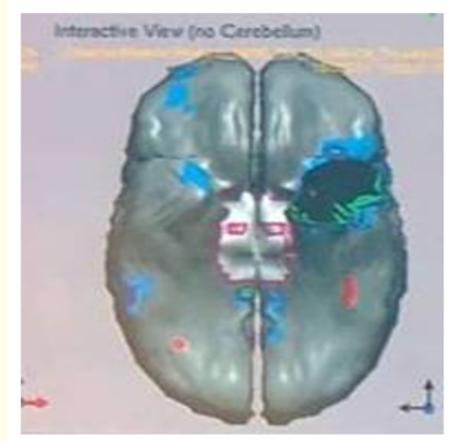


Figure 1: SPECT with HMPAO showing deficit perfusion of radiotracer on left temporal lobe. Image of cerebral perfusion in a patient with HMPAO (lower view).

In the scintigraphy report, complementation by CT was suggested, when realised, concluding with an arachnoid cyst, well delimited and unique in the radiological classification, type II, on a scale of I to III, with 3.7 x 2.5 cm. The figure 2 illustrates a similar case.

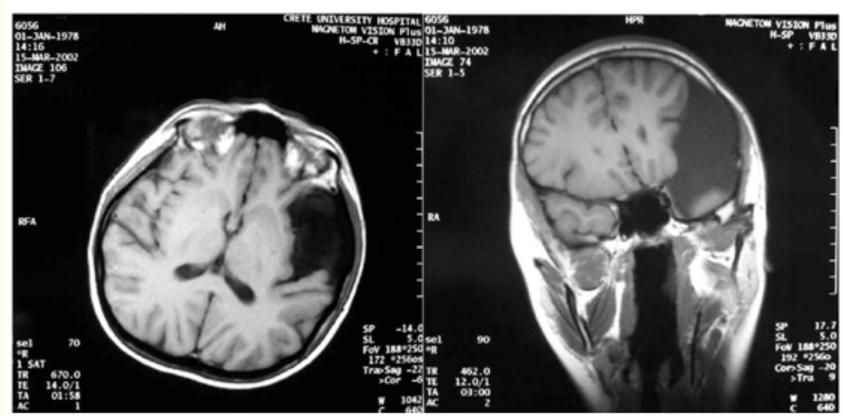


Figure 2: Computed Tomography showing the arachnoid cyst on left temporal lobe, pattern founded in all clinical literature. Image obtained from Vakis, et al. 2006.

On scintigraphy, it was noted that there were no classic findings of bipolarity, schizophrenia, attentive deficit or autism [26]. Only a well-defined and hypo-perfused focal area in the left temporal lobe was founded.

Discussion and Conclusion

Some authors recommend not treating arachnoid cysts except those that cause a “mass effect” (compression) [18]. Other authors refer to emotional complaints as rare. The authors of this work would like to present a question about how exam, it will be the first to elucidation the diagnostic of the psychiatric disturb, we think that NM exam as scintigraphy could be this new approach. In this situation all patients are symptomatic.

An analysis of the description of the arachnoid cysts, points to a new reality, created by NM, especially by the American psychiatrist Daniel Amen, who develops a warm discussion in a similar case [19]. The question remains today: what is the cause/effect relationship in the psyche of people with arachnoid cyst?

In a bibliographic review made in 2019, of a total of 26 articles, only 3 cited cognitive complaints as important [20]. The case presented in this work fits those shown in the literature, which cites the ratio of 4: 1 in men and the temporal area on the left, as see on SPECT image of left temporal lobe arachnoid cyst where HMPAO had a hypo-perfusion cerebral area (Figure 1).

Other radiological images, as CT (Figure 2), shows the compromised area but not related to the psychiatric problem.

With the advent of neuroimaging, there has been an increased incidence of detection of incidental asymptomatic arachnoid cysts. Although these lesions are considered congenital, the exact etiologic is still not clear. The arachnoid cyst is a benign congenital collection of cerebrospinal fluid that accounts for about 1% of all space-occupying non-traumatic intracranial lesions [21]. The principal location is the temporal fossa. The clinical signs and symptoms of the cyst, if any (it is often an incidental finding), depending on the cyst’s location, size and on the patient’s age. This case report discusses the possibility of a causal relationship between the arachnoid cyst and the patient’s psychotic symptoms. It is possible that the patient’s cerebral lesion was superimposed upon an underlying psychiatric disorder, and that the brain lesion was an incidental finding without functional importance. Although limited by the absence of definite informa-

tion about the development of the cystic lesion, we conclude that the patient's abnormal behavior was associated with an arachnoid cyst for the following reasons: (i) No past and familial psychiatric history and it was the first abrupt onset of episode; (ii) Psychotic symptoms accompanied with a severe compartment modifications; (iii) No other clinically relevant findings were seen or absence of use drugs; (iv) Cases presenting with schizophrenia-like psychosis associated with an arachnoid cyst [22], furthermore, recently Lanczik, *et al.* reported a schizophrenia-like psychosis associated with an arachnoid cyst which mainly affected the left temporal lobe [23].

In the present call the attention the form abruptly of strong psychiatric symptoms, and without any other physical symptoms. With the evolution of modern imaging techniques; psychiatrists will determine an increasing number of structural brain abnormalities, which certainly raises the question about the relationship of psychiatric disorders to the organic brain results. In the future, more precise diagnostic tools and techniques which participates clinical manifestations and structural findings will increase the diagnostic consistency and validity. The unexpected onset of psychotic symptoms in a patient without personal or family antecedents of psychosis enables us to evaluate the possibility of a causal relationship between the arachnoid cyst discovered by brain imaging and the set of symptoms. Despite the rarity of arachnoid cysts, there are other case reports of patients with associated psychotic symptoms that could be explained by pressure generated by the cyst. Although the cyst seems to be congenital, it does not cause any symptoms earlier in life. According to current clinical practice, there are two aspects to the therapeutic approach of organic psychotic disorders: (i) Conservative controlling the symptoms; (ii) Correcting the etiological situation. Although arachnoid cysts are symptomatic in a small number of patients, they are associated with a benign natural history for those presenting without symptoms [24].

Excluding or not considering, patients with psychiatric clinical complaints with alterations, also in the cerebral perfusion scintigraphy in NM seems to be a serious omission to the human being. It is logical that a causal relationship between arachnoid cyst and symptomatology needs to be deepened to avoid unnecessary surgery.

The increasing contribution of NM and psychiatry receiving patients before CT (all symptomatic) may in the near future force a revision of the criteria for the treatment of arachnoid cysts with greater appreciation of psychiatric symptoms and turn on this technique the first exam for psychiatric patients. A complementary investigation with CT or NMR it is necessary.

The AC treatment indefiniteness continues in patients that have only psychic complains, however without classic mental diseases diagnostic. This reality it's been growing in parallel with the participation of NM in psychiatry.

Acknowledgments

Authors are thankful with Clínica Nuclear de Natal and UNICEUNA for the support to this work.

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Volume 3 Issue 6 June 2020

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