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Case Report

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Psychiatric Diagnostic Confirmed by Cerebral Simple Proton Emission Computed Tomography (SPECT)

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ABSTRACT

It is usual in psychiatric clinic arise diagnostic hypothesis for the same patient. Take for example the schizophrenia, the classic definition was of a disease of the thoughts, and that no machine explored the thoughts. The advent of cerebral SPECT (single photon emission computed tomography) made it possible the formation of Data Bank. The SPECT when made cerebral images is known as cerebral perfusion scintigraphy, it is done with a drug that in minute fraction is extracted of blood to the interior of the neurons, through the haemato-encephalic barrier, still there for hours. The psychiatry is one of the more needy medical specialities, in terms of complementary examinations, and the cerebral SPECT done with HMPAO could be used to help the clinician in doubt cases. In this work we present two clinical cases where the cerebral SPECT produce a confinable diagnostic about schizophrenia. The mathematical language used by nuclear medicine inform that the obtained image belongs to a psychiatric specific group of diseases.

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Problem presentation

It is usual in psychiatric clinic arise diagnostic hypothesis for the same patient. Hallucinations, delusions, insomnia, irritations, aggressions, and others, reported by mental patients, are common to diverse psychiatric syndromes [1].

Not always the typical clinical pictures of the diseases are external, and the physician need of complementary exams. We showed than this situation experimented by psychiatrist in cases of schizophrenia and bipolarity. The obtained images are very similar to the functional magnetic resonance [2].

Psychiatric speciality reality

When compared with other medical specialities, the investigation by exams, maybe will be the more needy, count virtually with the tomographic/ magnetic resonance of the brain and the electroencephalogram [3].

Take for example the schizophrenia, the classic definition was of a disease of the thoughts, and that no machine explored the thoughts [4]. Recently the advent of cerebral SPECT (single photon emission computed tomography) made it possible the formation of Data Bank, it is, a statistic set of cases where patients belonging to the bipolarity spectrum (Figure 1) while those of schizophrenia has different standard (figure 2). The result is only to the image belonging to the determined disease group. It is logic to believe that this patient belonging this disease.

Scintigraph image

The SPECT when made cerebral images is known as cerebral perfusion scintigraphy, it is done with a drug that in minute fraction is extracted of blood to the interior of the neurons, through the haemato-encephalic barrier (The base nuclei in the presented cases remained preserved), still there for hours. Two compounds are utilized, ECD and HMPAO.

The radiopharmaceutical used in the vast majority of studies of peri-ictal SPECT has been technetium-99m-hexamethylpropylene amine oxime (99mTc-HMPAO or 99mTcexametazime), which is unstable and needs to be reconstituted immediately before injection. Thus, the performance of true ictal SPECT studies with unstabilised 99mTc-HMPAO is difficult, particularly in patients with extra temporal seizures which are usually brief. Technetium-99m-ethyl cysteinate diethylester (99mTc-ECD or 99mTc-bicisate) is a relatively new brain SPECT perfusion radiopharmaceutical that has uptake kinetics and distribution similar to 99mTc-HMPAO, but is stable in vitro for up to 6–8 hours after constitution. Therefore, it does not require mixing just before injection. As a result, the use of 99mTc-ECD may facilitate earlier injections, and thereby, may improve seizure localisation. 99mTc-ECD has only recently been used clinically for peri-ictal SPECT studies, with small preliminary studies reporting generally encouraging results. However, some authors have suggested that the focal ictal uptake of 99mTc-ECD may not be as intense as with 99mTc-HMPAO. There is evidence that the two radiopharmaceuticals may show somewhat different distributions in some pathological conditions, which is a likely related to different mechanism of cerebral uptake. Therefore, the sensitivity and the specificity of 99mTc-ECD need to be evaluated,

especially in relation to those of the more established agent 99mTc-HMPAO [5].

Both are labelling with Technetium-99m (99mTc), and will be radiotracer, this is, could be followed, when submitted to the Gama Camera machine. All our cases were doing with HMPAO. The use of data bank, some with more than 100 thousand cases would be considered by the psychiatric, always respecting the maxima: The clinic is sovereign to any complementary exam [6-9].

Methodology

The radiopharmaceutical used was HMPAO labelled with 99mTc obtained by Radiopharmacy Laboratory Ltda, Hungary. The dose used was 25 mCi/ml administered at intravenous injection. Patients: RJJ with 20 years old, male, with a strong suspicion of bipolarity but with exacerbate violent and with familiar history of schizophrenia, and FMD with 19 years old, male, with hallucinations and persecution delirious, but presenting alternance between depression and euphoria.

They were submitted to a cerebral SPECT with HMPAO. The image of both patients was obtained with a Symbia Gama camara made by Siemens Industry, Germany. All images were analysed by a nuclear physician and discussion with a psychiatric and the diagnostic then obtained and confirmed.

Results

In the first presented case a young of 20 years old have a strong clinical suspicion of bipolarity, but with exacerbate violence and with family history of schizophrenia, data that admits another diagnostic. The patter of hyper perfusion indicates to alteration of the humour, when the bipolarity and the attention deficit as comorbidity (frontal hyper perfusion, biparietal and superior) (Figure 1, red colour).

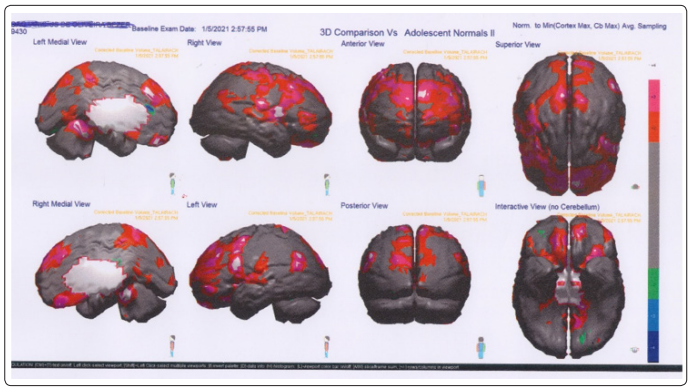


Figure 1: Pattern of hyper perfusion indicates bipolarity

In the inverse situation, occurred in the second case, also a young (19 years old) with hallucinations and persecution delirious, with the Schizophrenia, but that recently have alternance between depression and euphoria. With these data were solicited a cerebral SPECT that reproduce the Schizophrenia patter (left lateralized hypoperfusion, inferior) (Figure 2, green colour).

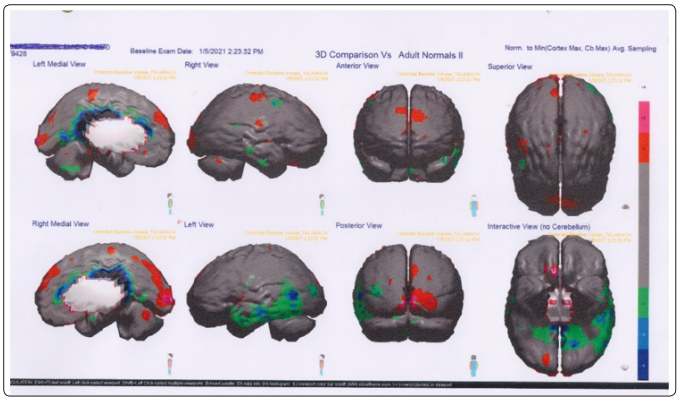
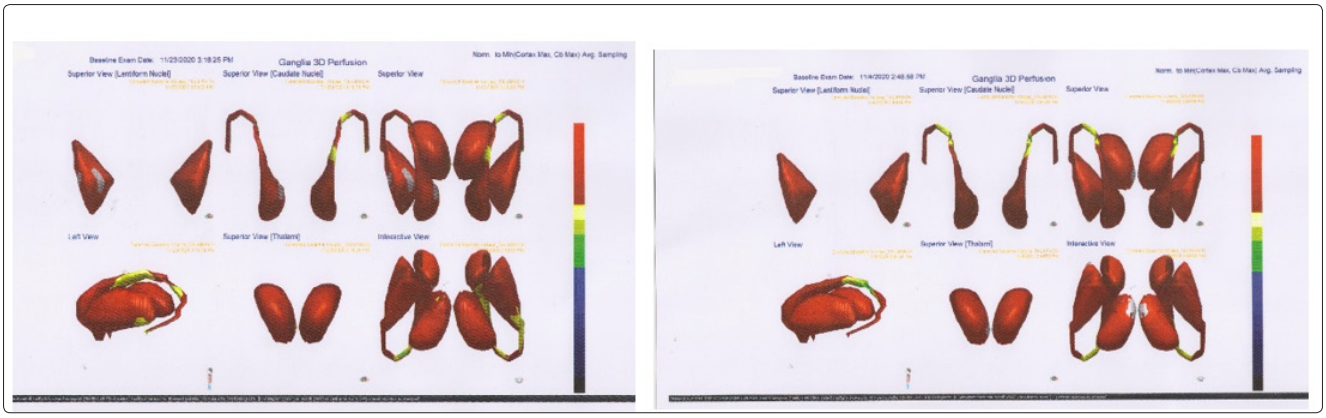


Figure 2: Pattern of hypoperfusion indicates schizophrenia

The nuclear medicine confirmed the diagnostics. The base nuclei in both cases were preserved (Figure 3).



a. Patient with bipolarity

b. Patient with schizophrenia

Discussion

Although the intrinsic mechanisms of the hyperperfusion in the bipolarity cases still would be unknown, in the presented exams corroborate with medical literature [10]. For the spectrum of schizophrenia had hypoperfusion, also indicate in the same bibliographic research. The hypocapitation phenomena there are not known and a variety of hypotheses are cited, as an example, the magnetic field alterations [11].

Clarify that an exam totally free of small areas hypo/hyper perfused is difficult to occur. In this way, it is accepted than the presence of discrete areas of hypo/hyper perfusion The visual area (occipital) must always be, in the normal cases, hyperperfunded [10]. The

visual analysis of the figure 1 shows red colour (hyperperfusion) seen in the frontal cortex, biparietal and of superior face, with minimal alterations of base nuclei. By other side, the visual analysis of the figure 2 shows green colour (hypoperfusion) seen in the inferior left posterior capitation. The visual analysis of the figure 3 shows the representation of the thalamus, of the caudate, and of the lentiform, this last cited is the reunion of the putamen and pale nuclei, because the nuclear medicine cannot distinguish both in the obtained image [10,12].

The nuclear medicine research indicates that the image obtained used HMPAO radiopharmaceutical shows the perfusion in the cerebral areas where this radiopharmaceutical is used metabolically [12]. The specialized medical literature cite that the attention deficit occurs frontally and indicates comorbid to bipolarity spectrum [13,14]. In both evaluations the base nuclei (caudate, lentiform and thalamic) can show normal aspect. In the literature we founded that the intuition phenomena occur in caudate base nuclei topography [11].

The nuclear medicine with the SPECT exam could complementary the information about the obtained in PET (photon emission tomography) examination [15].

Conclusion

The psychiatry is one of the more needy medical specialities, in terms of complementary examinations, and the cerebral SPECT done with HMPAO could be used to help the clinician in doubt cases. In some cases when we have the association of cerebral SPECT with computed tomography and/or magnetic resonance could precede the mental diseases diagnostic [15,16]. Using a mathematical language the nuclear medicine inform that the obtained image belong to a psychiatric group of diseases (for example, bipolarity, schizophrenia, and others).

Conflict of interest

The Authors have declared that there are no conflicts of interest in relation to the subject of this study

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