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Intracranial sinus thrombosis secondary to the consumption of inhaled speed

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Introduction. Speed is a psychostimulant of the Central Nervous System that can cause behavioral alterations, euphoria, psychosis and diverse organic medical pictures.

Clinical case. The case of a 19 year old male patient, who consumes amphetamines, who had behavioral alterations and heteroaggressiveness, circumstances that required psychiatric admission is presented. After performing brain imaging tests, intracranial venous sinus thrombosis was found, which has not, up to the present date, developed significant symptoms.

Conclusions. The aim of the above-mentioned report is to know the mechanism of action of the speed and to relate it consumption to the appearance of intracranial sinus thrombosis. To do so, a search was conducted in the PubMed database using the following terms: amphetamines and intracranial sinus thrombosis; street drugs and cerebrovascular disease; and adverse effects of the drugs.

Key words:
Psychiatric disorders, Amphetamines, Speed, Thrombosis

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Trombosis de seno venoso intracraneal secundaria al consumo de speed inhalado

Introducción. El *speed* es un psicoestimulante del SNC que puede provocar alteraciones conductuales, euforia, psicosis y diversos cuadros a nivel orgánico.

Caso clínico. Paciente de 19 años, consumidora de anfetaminas, que presentó alteraciones conductuales y heteroagresividad, circunstancias que requirieron ingreso psiquiátrico, en el cual tras la realización de pruebas de imagen cerebral se encontró una trombosis del seno venoso intracraneal que no había desarrollado sintomatología significativa hasta el momento.

Conclusiones. El objetivo de dicha comunicación es conocer el mecanismo de acción del *speed* y relacionar su consumo con la aparición de trombosis del seno venoso. Para ello se ha realizado una búsqueda en la base de datos PubMed con los siguientes términos: amphetamines y thrombosis sinus intracranial; street drugs y cerebrovascular disease; y adverse effects de las drogas.

Palabras clave:
Alteraciones psiquiátricas, Anfetaminas, Speed, Trombosis

INTRODUCTION

Speed is an amphetamine that belongs to the family of the rest of the MDMA type synthetic drugs. It is a psychostimulant of the CNS that provokes an alert state, increased in energy, decrease of sensation of tiredness, decrease in appetite, aggressiveness, increase in body temperature, effects on the cardiovascular system (related with cases of sudden death) and in high doses, euphoria and psychosis.[1]

It can be taken orally, injected, smoked or inhaled. The inhaled form is that which achieves the fastest action and highest concentrations in the brain. Its pharmacological action consists in elevating extracellular levels of monoaminergic neurotransmitters (dopamine, serotonin, noradrenalin) by means of a redistribution of them in the synaptic vesicles and reverse transportation through the plasma membrane.[1, 2]

CLINICAL CASE

This is the clinical case of a 19-year old female patient brought to the Emergency Service by the Emergency Medical

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Service due to an episode of uncontrollable aggressiveness, who caused serious incidents in her home and harm to third persons and even to herself.

As family backgrounds, she has an uncle on her mother's side who has schizophrenia, her mother, who has had two psychiatric admissions, and is diagnosed of Brief Reactive Psychosis and Atypical Psychosis, respectively, who is currently not following any treatment.

Standing out in regards to her personal backgrounds are hyperactivity and behavior disorders since childhood, worsening in adolescence, with consumed of smoked marihuana daily and alcohol on weekends. She was in boarding school until she quit her studies in her adolescence, and had caused many conflicts in said school.

When she was 19 years old, she underwent an operation due to salpinguectomy because of a difficult ectopic pregnancy.

The precipitating factor motivating her hospital admission was the presence of intense aggressiveness, especially aimed at her mother. Her mother states that she cannot control her, that she goes out at night, disappears from home for several days, has bad behavior, rages, etc. The patient was uncooperative in her initial interviews, with changeable attitude in the following days. Predominance of irritability, aggressiveness and alternating quarrelsome attitude with childlike behaviors. Emotional lability. Overevaluated ideas regarding body image. She denies suicidal ideation. Impulsive and at risk behavior, admitting recreational type use of a type of inhaled amphetamine (*speed*).

During her stay in the Acute Psychiatric Unit, she spoke about her way of relating with others, of the conflicts with her partner and the closing of her circle of friends in recent times. She reports fears and obsessions regarding a jaw defect which, it seems, as she tells it, conditions the problems found in her interpersonal relations. The complementary studies performed were:

- Complete blood count, biochemistry and coagulation normal. Normal urine analysis, with *screening* for abuse drugs in urine positive for cannabinoids. Thyroid hormones, vitamin B12 and folic acid normal.
- Electrocardiogram: informed as sinus rhythm, possible atrial growth and alterations in ST segment repolarization. An evaluation was made by Cardiology, who, after performing a study with Echocardiogram, determined that there was no evidence of organic heart disease.
- Electroencephalogram: values for fundamental activity is normal without superadded focal or generalized signs.
- Brain magnetic resonance (Figure 1).

Given the following findings, the case was communicated to the Neurology Service. They performed a neurological study in which only a left pupillary excavation could be observed. The rest of the study was totally normal. Considering the risks derived from said vascular alterations, treatment was initiated with low weight molecular heparin at a dose of 40 mg subcutaneously every 12 hours. The study was completed with another battery of tests, to rule out underlying organic condition, and a magnetic angioresonance was performed.

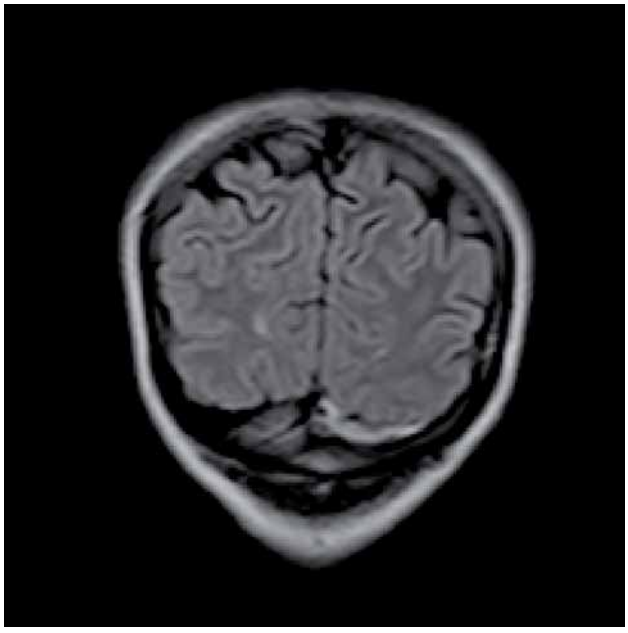
- Magnetic Angioresonance (Figure 2).
- Special tests: HIV serology, Rose Bengal, Brucilla (agglutination) and negative RPR. Negative hepatic markers, with the exception that immunization is seen.
- General proteins (IgG, IgA, IgM) within normality.
- Anti DNAn antibodies, Anti-Sm and anti-RNP antibodies anti-SSA/Ro, anti SSB/LA antibodies - negative. Anticardiolipin IgG and IgM and anti β2-glyprotein I antibodies within normality. ANA positive, that does not entail important significance in the diagnosis, given the high percentage of positivity in the normal population.

After 20 days of hospitalization, given the improvement of the behavior alterations and favorable course of the thrombosis, hospital discharge was decided with the following treatment: Olanzapine 10 mg at bedtime, Escitalopram 10 mg at breakfast and Risperidone injectable 37.5 mg every 14 days.

The diagnosis at discharge was dependence on multiple psychoactive substances (F19.2) and intracranial venous sinus thrombosis resolved.

CONCLUSIONS

One of the action mechanisms of amphetamines is that mediated by the dopaminergic neurotransmitter system. This is probably related to the perpetuation of the consumption of said drug that finally causes so many problem in the young population, considering its repercussions on the behavioral level. such as, for example, accidents, homicides and suicides. On the physical level, the repercussions may be putting the patients lives at risk, either due to the severity of the picture produced and due to its presentation form, which is sometimes silent. Dopamine is the neurotransmitter responsible for motivation and pleasure, so that it is postulated that it is related to addictive behavior of the consumers and the compulsive desire that leads us to not abandon said consumption in spite of its adverse consequences (*craving*).[1-3]



An increase is seen in the FLAIR sequence signal in the left transverse sinus consistent with thrombosis of said sinus.

Figure 1 | FLAIR coronal cut

MIP (maximum intensity projection) in coronal plane where the sinus repatency is confirmed.

Figure 2 | Magnetic angioresonance by phase contrast (MAR PC)

Speed, a methamphetamine belonging to the family of the rest of synthetic drugs, MDMA type, produces an increase in dopamine in the striate body and nucleus accumbens, which in the long run causes a decrease of said levels, therefore causing extrapyramidal symptoms. It has been suggested that there are other systems that mediate in the drug action mechanism of *speed*, given the efficacy of the antagonist agents of the opiate receptors in the treatment of amphetamine abuse, as is the endogenous opioid release system. In addition, although not as typical, a serotoninergic neurotoxicity is produced. Its protection mechanism has still not been elucidated completely. It is thought that it may be related with the metabolites of the dopamine and the administration form; the neurotoxicity appears through the systemic pathway.[2, 4]

In the long term, structural changes may occur in the brain. These have been seen in the autopsies performed in amphetamine consumers.[1] These changes consist in harm in the nigrostriatal dopaminergic pathway, causing Parkinsonism. This in turn contributes, as previously mentioned, to the decrease in dopamine levels and decrease in its own transporter and to an innervation of the serotonergic synaptic terminals.[1, 4]

In regards to the potentially mortal adverse effects on the CNS, subarachnoid hemorrhage, intracranial hemorrhagic, cerebral infarction and venous sinus thrombosis stand out.[2] As possible mechanism, acute hypertension, inflammation of the cerebral vessels (thrombogenic effect) and dehydration stand out, as far as the amphetamines produce hyperthermia *per se* that derived from the overcrowding of the consumption sites and the high energy output of the consumers.[5]

In 1993, PM. Rothwell and R. Grant described a case of venous sinus thrombosis secondary to amphetamine consumption. In this note, a 22 year old female patient developed neurological symptoms (headaches, nauseas, photophobia, dysphasia and hemisensory loss). The examination was normal except for pupillary excavation. In a CT scan performed, normality was observed in the image, but not in a later angioresonance, in which thrombosis was observed. Furthermore, in this case, a lumbar puncture was performed and was normal except for the CSF exit, which was increased. Treatment was prescribed with intravenous heparin until resolution of the symptoms. In our case, there was absence of symptoms, where the venous sinus thrombus occurred as a casual finding in an imaging test that had still not shown neurological type manifestations and in which the purpose was only to establish the consumption of *speed* as a precipitant, given that the rest of the tests performed were within normality limits. In both cases, heparin treatment resolved the thrombosis.[6]

REFERENCES

1. Barr AM, Panenka WJ, MacEwan GW, Thornton AE, Lang DJ, Honer WG, et al. The need for speed: an update on methamphetamine addiction. J Psychiatry Neurosci. 2006 Sep;31(5):301-13.
2. Kish SJ. Pharmacologic mechanisms of crystal meth. CMAJ. 2008 Jun 17;178(13):1679-82.
3. Winslow BT, Voorhees KI, Pehl KA. Methamphetamine abuse. Am Fam Physician. 2007 Oct 15;76(8):1169-74.
4. Nakagawa T, Kaneko S. Neuropsychotoxicity of abused drugs: molecular and neural mechanisms of neuropsychotoxicity induced by methamphetamine, 3,4-methylenedioxymethamphetamine (ecstasy), and 5-methoxy-N,N-diisopropyltryptamine (foxy). J Pharmacol Sci. 2008 Jan;106(1):2-8.
5. M Farré, S Poudevida. Éxtasis y drogas de diseño. Encuentros nacionales sobre drogodependencia.
6. PM Rothwell, R Grant. Cerebral venous sinus thrombosis induced by "ectasy". J Neurol Neurosurg Psychiatry. 1993;56:1035.