



## Poststroke psychosis: a case report

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### Summary

**Background** Stroke is currently the second leading cause of death in the elderly population. Neuropsychiatric complications following stroke are common, can be overlooked, and are associated with low quality of life, increase in the burden of caregiving and impaired functional status.

**Methods** We report a case of poststroke psychosis in a woman without prior psychiatric history. In addition, a brief, nonsystematic review of the pertinent literature was performed.

**Results** Psychosis can present in almost 5% of stroke survivors. Many patients with poststroke psychosis have no previous psychiatric history and the most common lesion locations include the right frontal, temporal and parietal lobes, the white matter connecting those areas, as well as the right caudate nucleus. Compared to other stroke survivors, patients with poststroke psychosis are more likely to depend on assistance in their everyday lives, can have more difficulty coping with the sequelae of stroke, and have an increased 10-year mortality risk. Guidelines for diagnosing and managing poststroke psychosis are needed.

**Conclusion** Psychosis is a possible complication of stroke and is associated with impairment and increased mortality. Guidelines for diagnosing and managing poststroke psychosis are currently lacking. To assure evidence-based care, further research is needed.

**Keywords** Geriatric psychiatry · Psychotic disorders · Cerebrovascular diseases · Neuropsychiatry · Biological psychiatry

### Psychose nach Schlaganfall: ein Fallbericht

#### Zusammenfassung

**Grundlagen** Der Schlaganfall ist heute die zweithäufigste Todesursache in der älteren Bevölkerung. Neuropsychiatrische Komplikationen nach einem Schlaganfall sind häufig, können übersehen werden und sind mit geringer Lebensqualität, erhöhter Pflegebelastung und eingeschränktem Funktionsstatus verbunden.

**Methodik** In diesem Beitrag wird über einen Fall von Psychose nach Schlaganfall bei einer Frau ohne psychiatrische Vorgeschichte berichtet. Darüber hinaus erfolgte ein kurzes, nichtsystematisches Review der einschlägigen Literatur.

**Ergebnisse** Eine Psychose kann bei fast 5% der Schlaganfallüberlebenden auftreten. Viele Patienten mit einer Psychose nach Schlaganfall haben keine psychiatrische Vorgeschichte, und die häufigsten Läsionsorte sind der rechte Frontal-, Temporal- und Parietallappen, die weiße Substanz, die diese Bereiche verbindet sowie der rechte Nucleus caudatus. Im Vergleich zu anderen Schlaganfallüberlebenden sind Patienten mit einer Psychose nach dem Schlaganfall im Alltag eher auf Hilfe angewiesen, haben größere Schwierigkeiten, die Folgen des Schlaganfalls zu bewältigen, und haben ein erhöhtes 10-Jahres-Mortalitätsrisiko. Leitlinien für die Diagnose und Behandlung von Psychosen nach einem Schlaganfall sind erforderlich.

**Schlussfolgerung** Eine Psychose ist eine mögliche Komplikation des Schlaganfalls und geht mit Beeinträchtigungen und einer erhöhten Sterblichkeit einher. Leitlinien für die Diagnose und Behandlung von Psychosen nach einem Schlaganfall fehlen derzeit.

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Um eine evidenzbasierte Versorgung zu gewährleisten, sind weitere Forschungsarbeiten notwendig.

**Schlüsselwörter** Geriatrische Psychiatrie · Psychotische Störungen · Zerebrovaskuläre Krankheiten · Neuropsychiatrie · Biologische Psychiatrie

## Introduction

Stroke is currently the second leading cause of death in the elderly [1]. Neuropsychiatric complications following stroke occur in at least 30% of stroke survivors, can be overlooked, and are associated with low quality of life, increase in the burden of caregiving, and impaired functional status [1–3].

Poststroke psychosis (PP) was once considered a rare phenomenon; however, current prevalence estimates indicate around 4.87% of postacute stroke patients exhibit either delusions or hallucinations with poor cognitive insight [1, 2]. The average age of presentation for PP is 66.6 years and it is more frequent in men [2]. Psychosis may develop acutely in a matter of days following stroke; nonetheless, an average time to onset of 6.1 months has been reported [1–3]. The most frequent clinical presentation is delusional disorder, followed by schizophrenia-like disorder, and mood disorder with psychotic features [2]. Regarding delusional theme, persecutory delusions are the most common, and the most frequently reported hallucinations are auditory [2]. Many patients have no previous psychiatric history and the most common lesion locations include the right frontal, temporal and parietal lobes, the white matter connecting those areas, as well as the right caudate nucleus [1, 2].

There are currently no specific diagnostic guidelines nor evidence-based treatments for PP [1, 2]. Antipsychotic drugs, namely haloperidol, risperidone, olanzapine, and quetiapine are empirically used, even though they might increase the risk of a new cerebrovascular event [1, 2]. Psychological interventions, psychosocial measures, and neuromodulation therapies may also be useful, but remain scarcely studied [1, 2].

The most common outcome of standard psychiatric management of PP with antipsychotics is complete resolution [1, 2]. The average time to complete resolution is currently estimated to be 3.5 months [2]. Despite these encouraging outcomes, long-term findings suggest a strikingly different picture: compared to other stroke survivors, patients with PP are more likely to depend on assistance in their everyday lives, can have more difficulty coping with the sequelae of stroke, and have an increased 10-year mortality risk [2, 3].

The prevalence of psychosis is high in neurocognitive disorders (NCD), at around 30% in Alzheimer's disease (AD), 75% in dementia with Lewy bodies, and 15% in vascular dementia (VD) [4]. Thus, NCD are an

important differential diagnosis for psychosis in the elderly.

In this article, we present a case of poststroke psychosis, hoping to add to the literature and raise awareness for this condition. Written informed consent was obtained from the patient.

## Case report

A 77-year-old woman was brought to our emergency department in October 2021. She was retired, had worked as a sewing professional, and had attended primary school. No family history of mental illness was known. The patient took no medication and had no known neuropsychiatric symptoms until December 2020. At this time, she started telling her son that multiple strangers entered her house at night, partied, and had sex. She heard male and female voices chatting, laughing, and commenting her actions. The patient did not shower for months because the strangers were watching her remotely. She reported having felt a snake in her bed once, which she could not see, and suspected the strangers might have put it there. To protect herself, she locked the doors every day and tried to chase away the strangers with a broomstick, but she could not find them. In addition, she stated being a prophet with divine protection and special powers. Her primary care physician had requested psychiatry outpatient follow-up, but the patient never attended the appointment. He also tried prescribing the antipsychotic olanzapine, but the patient never filled the prescription.

On admission, the patient was vigilant and oriented. Attention was maintained and no cognitive changes were evident. There were no motor symptoms or dysarthria. Speech was spontaneous, with normal rhythm and tone. No semantic nor syntax changes were noted. The patient was suspicious, and persecutory, grandiose and mystic delusions, held with great conviction and with high dynamism, were elicited. Her thoughts were circumstantial. There was history compatible with auditory hallucinations, namely voices commenting her actions, and tactile hallucinations. The patient was euthymic and affects were resonant. She had no insight regarding her illness.

Complete blood count revealed no abnormalities, while renal and hepatic functions and electrolytes were normal. Inflammatory markers were not increased. Urine analysis showed no pathological findings. An electrocardiogram was performed, and no pathological changes were noted. Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) testing was negative. Toxicology screening was negative. Computed tomographic imaging of the head revealed an old lacunar ischemic lesion in the right caudate nucleus, with no other relevant findings. Neither imaging nor clinical findings suggested head trauma.

Since the patient refused care, had no insight regarding her mental illness, and was a risk for her own

health, compulsory admission to the inpatient psychiatry ward was done in accordance with the Portuguese Mental Health Act. Treatment with paliperidone 6 mg/day was started and the dose was titrated up to 9 mg daily 14 days after admission. No adverse effects were noted.

In the inpatient setting, magnetic resonance imaging of the head was performed and confirmed the findings of an old ischemic lesion in the right caudate nucleus. Additional blood analyses showed no pathological findings in thyroid function, folic acid, and vitamin B12 levels. Serological study was negative for hepatitis B and C, syphilis, and human immunodeficiency virus. Multiple SARS-CoV-2 tests were negative. Vital signs remained within normal ranges throughout the whole stay in the inpatient ward.

Gradual clinical improvement was observed, with remission of hallucinatory activity and a marked decrease in delusional affective dynamism. On the 14th day of treatment, our patient scored 28 points out of 30 in the Mini-Mental State Examination (MMSE). One week later, compulsory treatment was ceased since the patient accepted the proposed treatment and was no longer considered to pose a risk to herself. On the 29th day of inpatient care, the patient scored 28 points in the MMSE, 27 points in the Montreal Cognitive Assessment (MoCA) test, and 16 points in the Frontal Assessment Battery (FAB). These results are summarized in Table 1. Due to global clinical improvement and the possibility of social support by her son, with whom she lived, the patient was discharged the following day. At this time, the only relevant psychopathological findings were persecutory, mystic, and grandiose delusions which lacked any dynamism, and no insight concerning her mental illness.

The patient was observed 3 weeks after discharge in a follow-up appointment. At this time, no psychotic symptoms were elicited, although there was no insight for the previous illness period. The patient's son accompanied her to the appointment and reported no behavioral changes after discharge.

## Discussion

Our patient presented late-onset psychotic symptoms in the absence of previous psychiatric history, relevant cognitive impairment, motor signs or symptoms of delirium. Brain imaging revealed an old infarct of the right caudate nucleus. Since this location has been associated with PP, and this condition can present itself months after the stroke, we consider it as the most probable diagnosis [1, 2]. The presenting symptoms included persecutory delusions and auditory hallucinations, both of which are common in PP [2].

According to the International Psychogeriatric Association, psychosis can present in major and mild cognitive impairment [4]. As the patient had evidence of cerebrovascular disease, it is vital to evaluate the

**Table 1** Cognitive assessment tests at day 14 and 29 postadmission

	MMSE	MoCA	FAB
D14	28/30	–	–
D29	28/30	27/30	16/18

MMSE Mini Mental State Examination, FAB Frontal Assessment Battery, MoCA Montreal Cognitive Assessment, D14 day 14, D29 day 29

possibility of vascular NCD. In Portugal, MMSE values for mild cognitive impairment (MCI) in a person with primary education are below 24 and our patient scored 28 points. Additionally, the optimal cutoff values in the Portuguese version of MoCA have been suggested to be under 22 for MCI and below 17 for AD and VD [5, 6]. As our patient scored 27, these results do not favor a diagnosis of NCD. The absence of clinical features such as apathy and attention impairment also helps counter a diagnosis of VD.

Although very late-onset schizophrenia could be possible, the absence of family history of schizophrenia, the lack of negative and cognitive symptoms and the fact that is a rare disorder make it unlikely [7].

Exposure to pollutants has been associated with neuropsychiatric symptoms such as psychosis [8]. The patient lived in a rural area and had no known specific environmental or occupational exposure; nonetheless, the lack of laboratory testing for heavy metals is a weakness in our diagnostic investigation.

In our case, there was an initial incomplete remission of the psychotic symptoms, since the patient maintained delusions, albeit with a marked decrease in dynamism. It has been argued that non-acute PP can be more persistent. However, at longer follow-up, complete remission of psychosis was observed, in accordance with the evidence [2, 9].

Treatment was started empirically with paliperidone and was well tolerated. Nonetheless, if clinical relapse occurs, antipsychotic switching or augmentation may be required. This poses a dilemma, since antipsychotic treatment can increase the risk of a new stroke and there is no robust data to determine how and for how long refractory PP should be treated [1, 2, 9]. These topics are relevant avenues for future research.

## Conclusion

Psychosis is a possible complication of stroke and is associated with impairment and increased mortality. Guidelines for managing poststroke psychosis are currently lacking and to assure evidence-based care, further research is needed.

## Declarations

**Conflict of interest** D. Reis Gomes received support from Alter, S.A. to attend a meeting. The funding source had no role in the design, practice or analysis of this work. R. Mota

Freitas, J. Antunes Pedro, and A. Guerra declare that they have no competing interests.

**Ethical standards** Informed written consent was obtained from the patient.

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