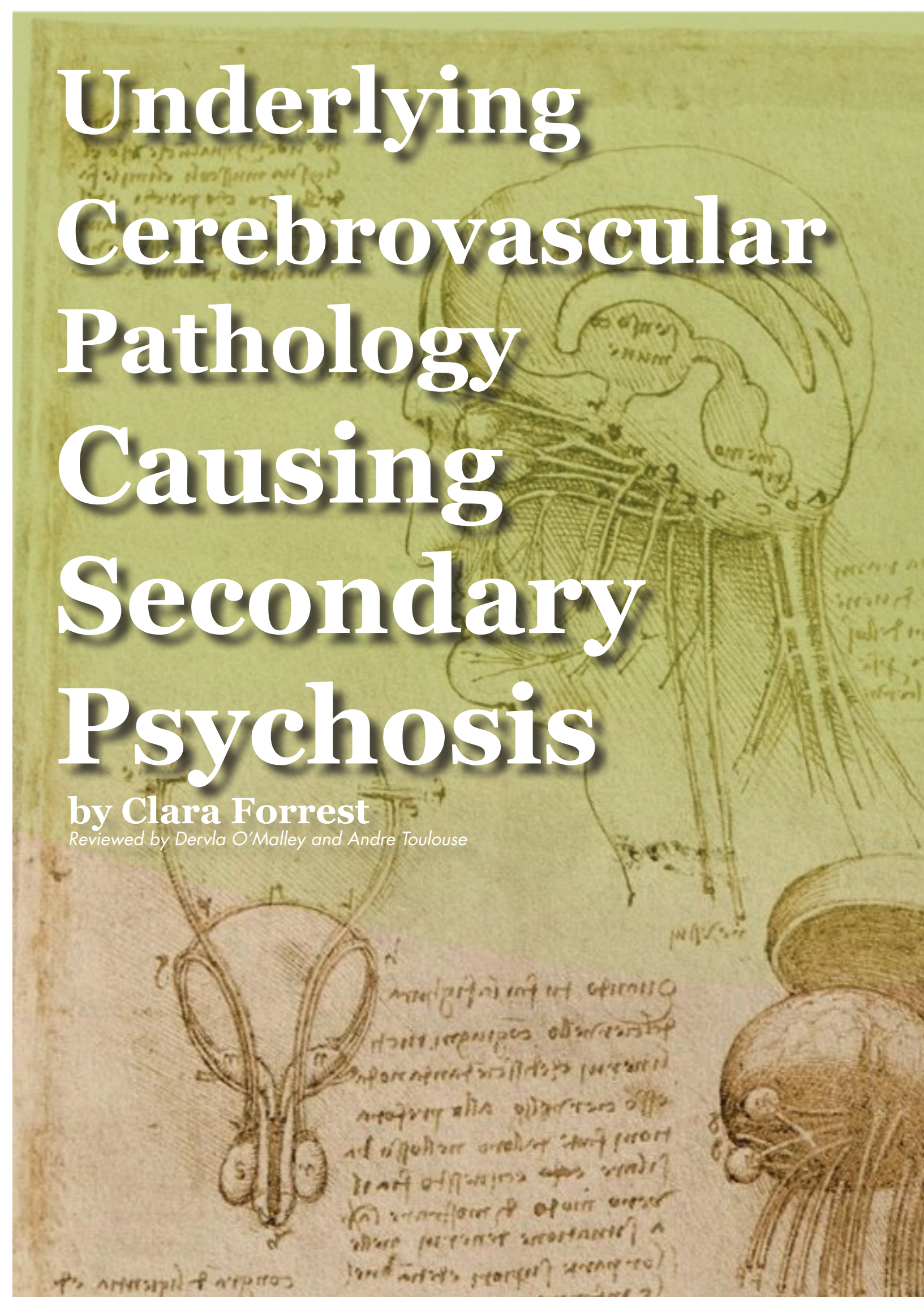


# Underlying Cerebrovascular Pathology Causing Secondary Psychosis

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# Abstract

## Case Background

Psychosis can be classified as primary if it is caused by a psychiatric disorder or secondary if it is due to a specific medical condition. Despite there being multiple identified causes of secondary psychosis, making such a diagnosis can prove challenging.

## Case Details

This case report presents a 57-year-old male who was brought by ambulance to the emergency department following an intentional jump from a first storey window due to visual and auditory hallucinations and persecutory paranoid delusions. MRI findings on admission were consistent with cerebral autosomal dominant arteriopathy with subcortical infarcts and leukoencephalopathy (CADASIL). The patient's background included an ischaemic stroke with haemorrhagic transformation five years previously. He experienced psychotic symptoms during the immediate recovery period. Prior to this he had no psychiatric history.

## Discussion

Post-stroke psychosis and the condition of CADASIL are both entities that are relatively rarely described in the literature. However, this may be due to missed diagnosis and therefore not reflective of true prevalence.

## Conclusion

Identifying a cause-effect relationship and establishing a diagnosis of secondary psychosis can be confounded by many factors. Nevertheless, this patient's case demonstrates the importance of considering an underlying cause, particularly when the presentation is atypical and there is a temporal relationship between the proposed medical condition and the symptoms of psychosis.

Patient Consent Obtained: Yes

# Case Report

## Case Background

The National Institute of Mental Health describes the clinical construct of psychosis as a condition “that affects the mind, where there has been some loss of contact with reality”. They report that 3% of people will experience an episode of psychosis at some time in their lives. Psychosis causes significant suffering for the patient and their family, as well as considerable social and economic consequences (1). In the past, psychosis was classified into two groups. Organic psychoses were caused by identifiable, structural defects while functional psychoses lacked such a discrete pathology. However, this classification has limited utility today as evidence builds that functional psychoses, such as schizophrenia, now reflect some form of organic brain dysfunction. Therefore, the alternative distinguishing terms ‘primary’ and ‘secondary’ are more applicable in modern practice and this changing terminology will be forefront in the 11th International Classification of Diseases (2). They are differentiated by the fact that secondary denotes when a “pathogenic substrate” has been identified (3).

This substrate can range from autoimmune disorders, toxic substances and traumatic brain injuries to name a few. Nonetheless, establishing a cause-effect relationship can be challenging (4).

This paper presents a case of cerebrovascular pathology causing secondary psychosis. It aims to demonstrate the diagnostic challenge presented by secondary psychosis and highlight the importance of considering underlying causes of psychosis.

## Case Details

### Presentation

A 57-year-old male was brought in by ambulance to the accident and emergency department in the early hours of the morning following an intentional jump from a first storey window because of visual and auditory hallucinations and a persecutory paranoid delusion of a pursuant “gang”. He reported seeing people coming up his stairs and onto

the landing. He heard them saying to one another that they were going to harm him. The patient felt his only option was to barricade his bedroom and escape through the window. As a result, he sustained a vertebral L2 and nasal bone fracture.

At admission, a mental state examination revealed disordered thought content in the form of persistent persecutory delusions. Active second-person auditory hallucinations were also present in the form of male voices planning to hurt the patient. There was no evidence of visual hallucinations or suicidal ideation during the examination. The patient had no insight into the nature or significance of his symptoms.

### Past Medical History

Five years ago, the patient suffered an ischaemic stroke with haemorrhagic transformation at the age of 52. He had no residual physical deficits, but his recovery was complicated by the development of psychotic symptoms. During this admission he was seen by liaison psychiatry for paranoid ideas, a personality change, auditory, visual and olfactory hallucinations. He had no prior psychiatric history.

Thereafter, he disengaged from services and discontinued both his antipsychotic and anticonvulsive medication. According to family member’s collateral history, the stroke marked the beginning of his continued psychotic behaviour. He had not received medical attention since his stroke. He also developed an alcohol dependence consuming between five and ten units on most days of the week. He had minimal social supports and was estranged from the majority of his family.

### Investigations

All investigations including electroencephalogram, paraneoplastic antibody screen, echocardiogram and carotid doppler test had normal results.

He received an MRI brain scan which showed extensive white matter signal changes throughout the corona radiata bilaterally and extending into the periventricular white matter of both frontal lobes suggesting small vessel

ischaemia. Changes in these regions of the brain have been reported in late-life onset psychosis because white matter lesions can disrupt the frontal area of the brain causing behavioural changes and symptoms that have been described as mimicking schizophrenia (5).

Evidence of a previous infarct involving the distribution of the right middle cerebral artery was also reported. There was also a small focal point of increased signal intensity in the left occipital lobe which could represent a recent lacunar-type infarct. These changes were stated to be very extensive for a patient of his age and a condition such as cerebral autosomal dominant arteriopathy with subcortical infarcts and leukoencephalopathy (CADASIL) was likely.

## Management

Inpatient management consisted of orthopaedic treatment of the patient's fractures as well as regular assessment by the liaison psychiatry team and the commencement of anti-psychotic medication. The patient was also treated for alcohol withdrawal due to the consumption of over 10 units a day.

Figure 1. Inpatient Medication Timeline  
Based on a diagnosis of secondary psychosis due to cerebrovascular disease, management was multifaceted so as to address biological, psychological and social factors. Once the patient's mental and physical con-

dition stabilised and improved, he was discharged. He would be reviewed regularly by the community mental health team with regards to the efficacy of the treatment as well as side-effects, adherence and physical health considering the patient had significant cerebrovascular disease and many antipsychotics can exacerbate this (6). They would also manage the reduction of his alcohol intake and a family member agreed to facilitate the patient's attendance to a local support group. Alcohol exacerbates psychotic symptoms (6), further impairs decision-making processes and increases cardiovascular risk.

With regards to social factors, the patient was provided with links to community social work services in order to apply for social welfare and adapt his current domestic situation to support his needs.

## Discussion

This case report presents a 57-year-old male, with a background of ischaemic stroke with haemorrhagic transformation five years previously, who suffered an acute episode of psychosis resulting in physical injuries. MRI findings on admission were consistent with CADASIL.

Post-stroke psychosis is thought of as a rare phenomenon (3). A systematic review published last year reported that the most common post stroke psychosis was a delusional

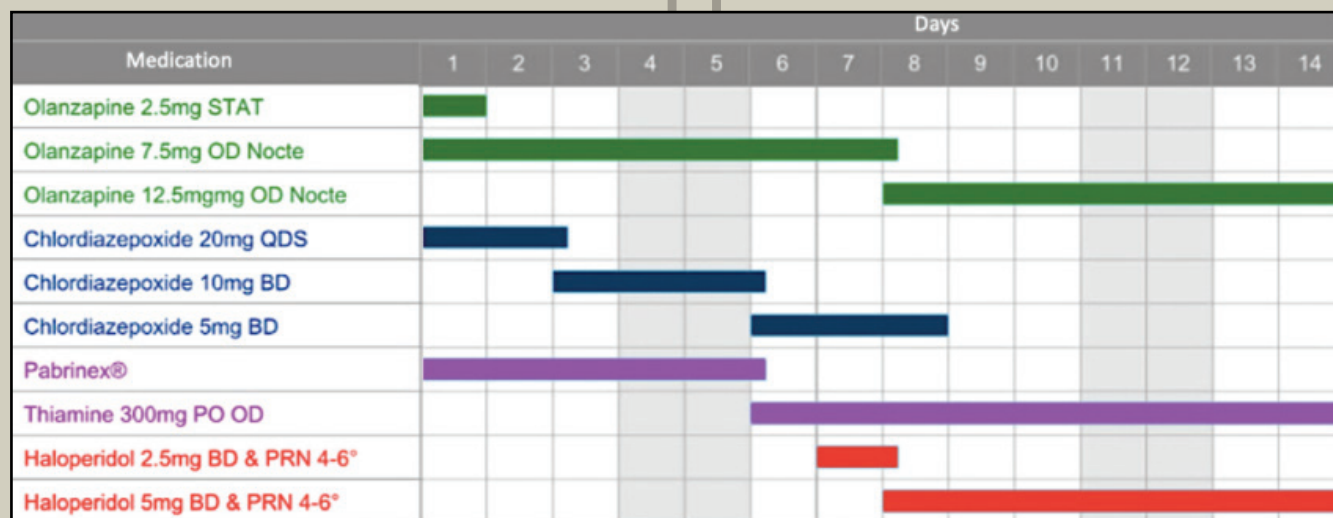


Figure 1:  
Inpatient Medication Timeline

# Case Report

disorder which was followed by schizophrenia-like psychosis. It estimated that the prevalence of such conditions in patients post stroke is 4.86% and so perhaps is not as rare as previously imagined (7). The nature of the psychotic symptoms can be contrasted with schizophrenia as post-stroke psychosis is more likely to include visual, tactile, and olfactory hallucinations such as was the case with this patient (4).

Cerebral autosomal dominant arteriopathy with subcortical infarcts and leukoencephalopathy (CADASIL) was first described in the 1990s and it was "characterized, in the absence of hypertension, by recurrent subcortical ischaemic strokes, starting in early or mid-adulthood" (8). Today it is recognised as a multifaceted syndrome which can present with many signs and symptoms including migraine with aura, subcortical transient ischemic attacks, mood disorders or psychosis (9-11).

Research regarding secondary psychosis is hampered by continued debate regarding classification which leads to diagnostic difficulty. There are often numerous factors which can act synergistically and accumulate to an acute psychosis, but these can cause the boundaries between primary and secondary psychosis to blur. Both post-stroke psychosis and CADASIL are relatively uncommon in research literature but this may be attributable to difficulty in diagnosis and therefore not reflective of prevalence. However, diagnosing secondary psychosis can assist in the timely management of such patients.

## Conclusion

Secondary psychosis should be considered in patients presenting with psychotic symptoms. The temporal relationship of the stroke and the symptoms of psychosis as well as the atypical nature of the symptoms were red flags that this patient's presentation was due to medical disease. Had the patient's psychiatric condition and underlying cerebrovascular disease been recognised sooner, he could have received treatment early. This emphasises the importance of increased awareness around

secondary psychosis, post-stroke psychosis and CADASIL.

## Acknowledgements

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## References

1. Rössler W, Salize HJ, van Os J, Riecher-Rössler A. Size of burden of schizophrenia and psychotic disorders. *Eur Neuropsychopharmacol*. 2005;15(4):399-409.
2. Reed GM, First MB, Kogan CS, Hyman SE, Gureje O, Gaebel W, et al. Innovations and changes in the ICD-11 classification of mental, behavioural and neurodevelopmental disorders. *World Psychiatry*. 2019;18(1):3-19.
3. Joyce EM. Organic psychosis: The pathobiology and treatment of delusions. *CNS Neurosci Ther*. 2018;24(7):598-603.
4. Keshavan MS, Kaneko Y. Secondary psychoses: an update. *World Psychiatry*. 2013;12(1):4-15.
5. Miller BL, Lesser IM, Boone K, Goldberg M, Hill E, Miller MH, et al. Brain white-matter lesions and psychosis. *Br J Psychiatry*. 1989;155:73-8.
6. WHO Mental Health Gap Action Programme (mhGAP) Intervention Guide. World Health Organization; 2016.
7. Stangeland H, Orgeta V, Bell V. Poststroke psychosis: a systematic review. *J Neurol Neurosurg Psychiatry*. 2018;89(8):879-85.
8. Tournier-Lasserre E, Joutel A, Melki J, Weisenbach J, Lathrop GM, Chabriat H, et al. Cerebral autosomal dominant arteriopathy with subcortical infarcts and leukoencephalopathy maps to chromosome 19q12. *Nat Genet*. 1993;3(3):256-9.
9. Lagas PA, Juvonen V. Schizophrenia in a patient with cerebral autosomally dominant arteriopathy with subcortical infarcts and leukoencephalopathy (CADASIL disease). *Nord J Psychiatry*. 2001;55(1):41-2.
10. Ho CS, Mondry A. CADASIL presenting as schizophreniform organic psychosis. *Gen Hosp Psychiatry*. 2015;37(3):273.e11-3.
11. Mishra DK, Kishore A, Niranjana V. CADASIL syndrome (cerebral autosomal dominant arteriopathy with subcortical infarcts and leukoencephalopathy) presenting as psychosis. *Gen Psychiatr*. 31. England2018. p. e100017.