

CASE REPORT

Fulminant Course of Sporadic Frontotemporal Dementia in a 30-Year-Old Man Visualized by FDG-PET

Kim Hinkelmann¹, L. Jenicke², Klaus Wiedemann¹, and Holger Jahn¹

¹Department of Psychiatry, University of Hamburg, Martinistr. 52, 20246 Hamburg, Germany;
²Department of Nuclear Medicine, University of Hamburg, Martinistr. 52, 20246 Hamburg, Germany

Corresponding author: Dr. Kim Hinkelmann, Department of Psychiatry, University of Hamburg, Martinistr. 52, 20246 Hamburg, Germany, E-mail: hinkelma@uke.uni-hamburg.de

Abstract

Frontotemporal dementia is a rare diagnosis in young people and initially often misdiagnosed. We report the case of a 30-year-old man who developed severe dementia within a year. The patient was originally referred with the diagnosis of psychosis. Applying the Lund and Manchester criteria and an FDG-PET finally led to the diagnosis of frontotemporal dementia. FDG-PET showed a clearly circumscribed hypometabolism confined to the frontal lobe, correlating well with the clinical picture in our case, while MRI/CCT results were not decisive. We discuss aetiology and diagnosis criteria of frontotemporal dementia and emphasise the importance of PET in the early diagnosis of these rare cases (German J Psychiatry 2006; 9: 27-30).

Keywords: dementia; frontotemporal dementia; Lund and Manchester Criteria; PET

Received: 30.9.2005

Revised version: 9.12.2005

Published: 1.1.2006

Introduction

Early-onset dementia (at age <65 years) is an uncommon but, in view of its devastating impact on the lives of these patients and their families, important group of disorders, that deserve attention of neurologists and psychiatrists. Many cases, especially those of the very young, are initially misdiagnosed. We describe the case of a young man with rapid mental decay which was finally diagnosed as frontotemporal dementia using FDG-PET.

Case Report

A 31-year-old man was admitted to the hospital originally diagnosed with psychosis. After he had lost his job as an office clerk, due to inappropriate behaviour and feeling

persecuted by his colleagues, his general practitioner assumed delusions. His family had noticed changes in behaviour and personality: Formerly a decent and introverted gentleman, the patient now insulted family members and even harassed a female neighbour. For some time he appeared agitated, dwelling on abusive jokes, increasingly neglecting eating and washing. Shortly before admission, he refused to get out of bed, showing apathy. This decline occurred over less than 12 months. Childhood and prior development were apparently normal. No neuropsychiatric disorders could be assessed in the family. He did not take drugs, including alcohol. However, low dose methotrexate (10mg per week) for psoriatic arthritis was administered for 4 years. No other medication was taken.

On admission, he presented with severe avolition, emotional bluntness, perseverations, behavioural stereotypies and lack of insight. Except for incontinence and a discrete dysarthria, the physical examination revealed no further neurological deficits, especially no speech impairment, seizures or myoclonia were observed. The Mini Mental State Examination

Figure 1. A plain cranial CT scan reveals only slight signs of cerebral atrophy

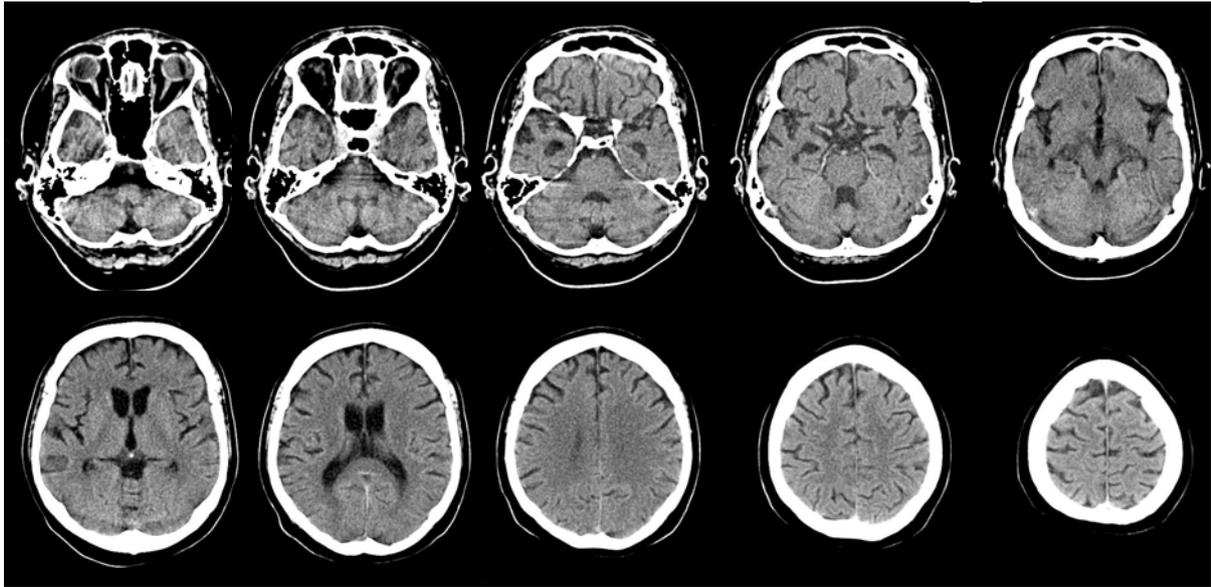


Figure 2. An MRI scan (T1 weighted with contrast medium) of the patient revealing also only slight signs of cerebral atrophy

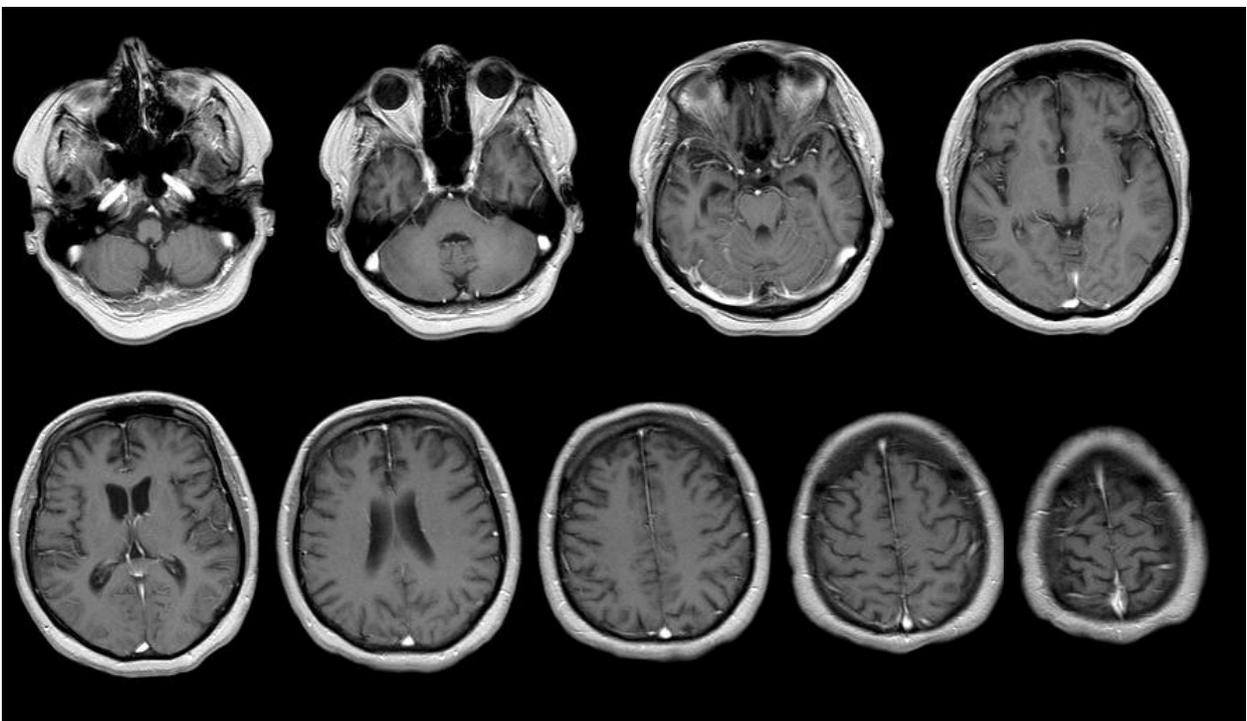
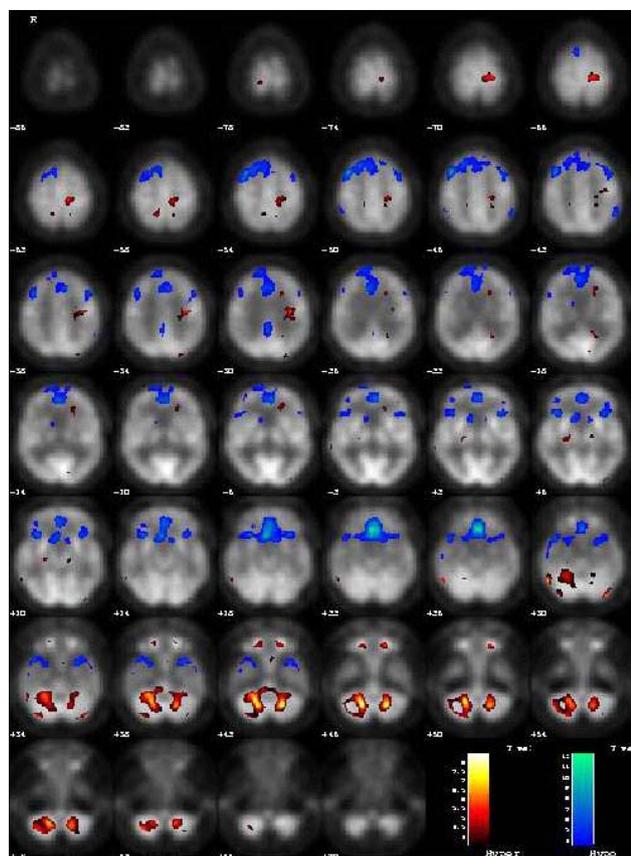


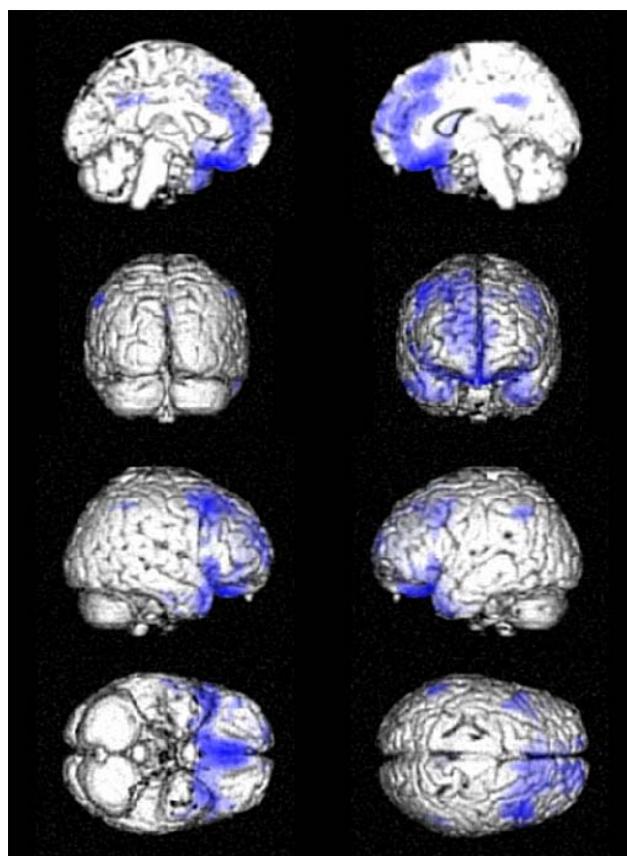
Figure 3. Colour-coded horizontal layers (split 4mm) of a PET scan showing the disequilibrium of glucose utilization between frontal cerebrum and cerebellum.



score was suspicious of dementia (21 of 30) and led together with the initially observed behavioural disinhibition to the working diagnosis of frontotemporal dementia.

The examination of CSF showed a slight disturbance of the blood-brain barrier (albumin of 526 mg/l, normal cell count of 2/3 cells). Neuron-specific-enolase and *tau-protein* were moderately raised, at 8.4 ng/ml and 609 ng/ml, respectively. 14-3-3 protein was negative. 14-3-3 is a chaperone protein that protects the tertiary structure of other proteins and is a biomarker for CJD, in which it is usually found increased in CSF. Several EEGs were normal. CCT and MRI scans revealed only unspecific signs of a global volume reduction of the brain (Figure 1 and 2). There was no indication of a toxic leucoencephalopathy as a rare adverse event of a high dosage methotrexate treatment in the MRI. The MRI also did not show a hyperintensity of the basal ganglia or a pulvinar sign, which might have pointed to Creutzfeldt-Jakob disease (CJD). No gene mutations in the prion gene, APP-gene or presenilin genes could be identified. A subsequently performed FDG-18-PET showed a clearly decreased glucose

Figure 4. 3-D render display of positron emission tomography scans. Brain areas of the patient with significant hypometabolism are depicted in blue. Both frontal lobes are heavily affected but also the anterior parts of the temporal lobes. (PET: tracer 370MBq [F^{18}]-deoxyglucose iv., delay 45 minutes, emission-scan 20 minutes, transmission-scan 10 minutes)



utilisation bifrontally, finally allowing on-the-spot diagnosis of a disorder spreading from the frontal lobes (Figures 3 and 4).

Discussion

The patient suffered from a dementia with early onset. The differential diagnosis of CJD could be excluded with the clinical picture lacking typical neurological signs and typical alterations in EEG, CSF and MRI.

Methotrexate is known to be neurotoxic. Nevertheless, there are no reports whatsoever of methotrexate causing dementia syndromes. Very high dosages of methotrexate, especially intrathecal administration, can cause cerebral white matter changes, often with acute onset of hemiparesis or aphasia. There is one case report where high-dose methotrexate administration caused encephalopathy and coma without any changes in MRI and CT in a child (Valik et al. Oncology 2005).

Neurotoxic side effects caused by low dose MTX have not been described in the literature. A hypothetic involvement of the methotrexate in the aetiology of the patient's dramatic condition therefore seems unlikely, since neurotoxic dosages were never administered to the patient.

Clinical symptoms presented by this patient did not fit the diagnosis of Alzheimer disease. Last, but not least, the frontally and temporally marked lobar pattern of impaired glucose metabolism are pathognomonic for an FTD.

Frontotemporal dementia (FTD), a clinical term coined by the Lund-Manchester groups (1994) to establish reliable diagnostic criteria, is a family of disorders, including Pick's disease, frontotemporal lobar degeneration, progressive aphasia and semantic dementia. First cases were described as "Pick's disease" by Alois Alzheimer, named after Arnold Pick, who had cared for these patients and demonstrated that cerebral atrophy could be circumscribed (Pick 1892). Kertesz et al. (1998) proposed "Pick Complex" for all FTD, including corticobasal degeneration, though the name frontotemporal dementia is preferred. FTD occurs in about 1 in 5000 people and is the second most common cause of dementia in the age group under 65 years. The normal course of the illness lasts between 10-15 years, with an onset in the early fifties. Some patients, however, have been described as young as 20-30 years at age of onset and are then frequently misdiagnosed as schizophrenic, delusional, depressed or obsessive-compulsive, like in our case. Applying the clinical Lund-Manchester-criteria, our patient with psychiatric problems such as disinhibition, loss of behavioural control, blunted affect, and lack of insight can be classified as frontal-variant FTD. The unusually sudden and rapid decline remains noticeable and is possibly associated with the early onset.

Some familial FTD have been linked to the *tau*-gene on chromosome-17. *Tau*-mutations, however, do not account

for the majority of familial cases and are rarely seen in sporadic FTD.

Dementias in younger people are often of the FTD type. FTD is a possible differential diagnosis in young patients with delusions or psychotic syndromes that show an unfortunate clinical course with fast deteriorations. The metabolic functional deficits revealed by PET or SPECT are not always congruent with the changes in brain morphology visualized by MRI/CCT, but are often in line with the clinical picture, as in our case (Elfgren et al. 1996). Our case shows that the metabolic functional deficits visualized by PET preceded detectable changes in the routine MRI/CCT scans and that PET therefore remains a useful and powerful diagnostic tool that should be applied in patients who are suspicious for FTD.

References

- Elfgren CL, Ryding E, Passant U. Performance on neuropsychological tests related to single photon emission computerised tomography findings in frontotemporal dementia. *Br J Psychiatry*, 1996, 169 (4):416-422.
- Kertesz A, Munoz D. Pick's disease, frontotemporal dementia, and Pick complex: emerging concepts. *Arch Neurol*, 1998, 55:302-304.
- The Lund and Manchester Groups. Clinical and neuropathological criteria for frontotemporal dementia. *J Neurol Neurosurg Psychiatry*, 1994, 57 (4):416-418.
- Pick A. Über die Beziehungen der senilen Hirnatrophie zur Aphasie. *Prager Medizinische Wochenschrift*, 1892,17:165-167.