Primary progressive aphasia: a case report

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Abstract

Primary progressive aphasia is a progressive neurodegenerative disorder characterised by deterioration in language function while other higher centre functions are relatively preserved initially. The diagnosis is made based on clinical presentation, linguistic testing and imaging, both functional and structural. Survival is similar to other dementias and the main form of intervention is speech therapy. We describe a case of primary progressive aphasia in a Vietnamese man with corresponding changes on positron emission tomography.

Keywords: primary progressive aphasia, positron emission tomography, neurodegenerative disorder, language, elderly

A 72-year-old Vietnamese, retired, male nurse presented with progressive speech difficulties over 18 months. The main problem was verbal expression with comprehension of both spoken and written language intact. His family had noticed emotional lability, which exacerbates his speech impairment. He also reported mild short-term memory loss, although this did not impact on his activities of daily living. Past medical history was unremarkable apart from hypertension.

Physical examination was normal. Mini-Mental State Examination score was 22 with deficits in recall and calculation. There were no signs to suggest parietal lobe involvement. His linguistic skills were assessed using Arizona Battery of Communication Disorders in Dementia, Boston Naming Test, and sub-tests of the Language for Cognition Screening Assessment. His speech in conversation was non-fluent, with effortful articulation and dyspraxic errors, but of normal content and syntax. He was able to name only six animals in 1 min. There were other higher centre deficits, including mild constructional dyspraxia (drawing clock face) and reduced attention to detail (clock hands omitted). He also had difficulties with mental calculations, but improved when using pen and paper for simple arithmetic. Reduced executive function was demonstrated by significant difficulties on verbal reasoning, abstract thinking and idea generation.

Laboratory haematology and biochemistry investigations were normal. Magnetic resonance imaging of his brain showed normal hippocampi. Single photon emission computed tomography showed a slight reduction in perfusion to the left frontal and medial frontal cortex and at the anterior temporal poles. Positron emission tomography demonstrated marked atrophy and hypometabolism of the medial frontal lobes, including the anterior cingulated gyrus (Figure 1). There was further hypometabolism of the temporal lobes and in the pre-frontal cortex, but preserved activity in the anterolateral frontal cortex. A diagnosis of primary progressive aphasia (PPA) was made based on criteria proposed by Mesulam [1] (Table 1).

The criteria identify a progressive deterioration predominantly in language function, while other higher centre functions are relatively preserved for at least the first 2 years, but may then become affected, though not as severe as the language impairment. Other specific causes for such presentation, for example stroke or tumour, need to be excluded. Therefore PPA can be distinguished from other types of neurodegeneration based on clinical course and imaging.

Structural and/or functional correlate of the clinical manifestations is visualised using specific brain imaging modalities. Magnetic resonance imaging of patients with non-fluent aphasia has revealed atrophy in the left frontal and perisylvian regions, including the inferior part of the motor cortex [2]. Decreased glucose utilisation to the frontotemporal region on positron emission tomography is...
Primary progressive aphasia

![PET images of the brain showing hypometabolism in the frontal lobes and temporal lobes.](image)

**Figure 1.** Positron emission tomography (PET) of the brain demonstrating hypometabolism of the medial frontal lobes, anterior cingulated gyrus and temporal lobes. Activity in the anterolateral frontal cortex is preserved.

**Table 1.** Features in the case patient compared with the diagnostic criteria for primary progressive aphasia

<table>
<thead>
<tr>
<th>Diagnostic criteria [1]</th>
<th>Case patient</th>
</tr>
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<tbody>
<tr>
<td>Gradual progression of word-finding, object-naming or word comprehension impairments</td>
<td>Word-finding difficulties over 18 months</td>
</tr>
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<td>All limitation of daily living activities can be attributed to the language impairment, for at least 2 years after onset</td>
<td>No limitations in daily living activities</td>
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<tr>
<td>Intact pre-morbid language functions</td>
<td>Intact pre-morbid language functions</td>
</tr>
<tr>
<td>Absence of significant apathy, disinhibition, forgetfulness for recent events, visuospatial impairment, visual recognition deficits or sensorimotor dysfunction within the initial 2 years of illness</td>
<td>Mild impairment of recall, marked visuospatial difficulties; no apathy, disinhibition or visual recognition deficits</td>
</tr>
<tr>
<td>Acalculia and ideomotor apraxia can be present even in the first 2 years</td>
<td>Mild difficulties with mental calculations</td>
</tr>
<tr>
<td>Other domains may become affected after the first 2 years, but language remains the most impaired function throughout the course of the illness and deteriorates faster than other affected domains</td>
<td>Mild difficulties in constructional praxis</td>
</tr>
<tr>
<td>Absence of specific causes such as stroke or tumour</td>
<td>No specific cause found on brain imaging</td>
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PPA appears to be the consequence of lobar atrophy, the cause of which is unclear, but evidence is emerging of a link between some cases of PPA and mutations within chromosome 17, where the tau gene is located [3–7]. Such mutations can lead to lobar atrophy, and may be associated with tau-positive inclusions, similar to Pick bodies. PPA may, therefore, be a manifestation within the spectrum of frontotemporal degeneration.

To our knowledge, there is no published evidence to suggest an associated vasculopathy and this corresponds with lack of vascular changes on magnetic resonance imaging.

The natural history of PPA is unknown but as it progresses, it can involve more than two domains of higher function, effectively evolving into dementia. However, this does not always occur. In a longitudinal study, patients with PPA developed impairment of activities of daily living after 6 years, with half requiring personal care assistance at 5 years [8]. Mutism occurred in 50% of subjects between 7 and 8 years of symptom onset, and 60% of patients died within 7 years [8]. The main cause of death was aspiration pneumonia in bedridden patients [8]. The survival is no longer than other dementias.

While cholinesterase inhibitors are beneficial in early Alzheimer's disease, it is ineffective in PPA as cholinergic innervation remains intact [1]. Currently there is no effective pharmacotherapy for PPA and the main treatment is speech therapy to explore alternative communication strategies. Education of the patient and family are also important to assist in coping with patient’s impairment.
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Key points
• Primary progressive aphasia is a progressive neurodegenerative disorder, possibly a form of frontotemporal degeneration.
• It is characterised by deterioration in language function while other higher center functions are preserved, at least initially.
• Positron emission tomography can detect early functional changes in the brain before anatomical changes are obvious on computed tomography.
• Main form of treatment is speech therapy.
• The rate of survival is similar to other dementias.

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None

References

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