Primary progressive aphasia: a case study☆

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Abstract

BACKGROUND: Primary progressive aphasia(PPA) is a degenerative disease of nervous system, which is very rare in clinics. Only 3 cases have been reported in our country. There is very little clinical information regarding the characteristics of PPA in linguistics and imageology.

OBJECTIVE: To report the language disorder and the characteristics of imageology of one PPA patient for the clarification of the clinical features of PPA.

DESIGN: A case analysis.

SETTING: Department of Neurology, Beijing Tiantan Hospital; Faculty of Psychology, Beijing Normal University.

PATICIPANT: Male, 56 years old, senior high school graduate, businessman before the onset of the disease. The case visited the department of Neurology, Tiantan Hospital, Beijing due to the complaint of three years of progressive decreasing in language skills, which was then diagnosed with PPA.

METHODS: Spoken language fluency evaluation in Chinese Aphasia Examination Set of the First Affiliated Hospital of Beijing Medical University was used to evaluate this patient, the type of Aphasia was judged by Western Aphasia Examination Set, and the severity gradation was classified by the Boston Diagnostic Aphasia Examination(BDAE). Memory, intelligence screening and imageology examination were performed as well.

MAIN OUTCOME MEASURES: The fluency of spoken language, the type of aphasia, and the severity of aphasia of the patient were judged, and whether the patient suffered from memory and intelligence disorder were observed as well as the features of imageology.

RESULTS: The patient had fluent spoken language, which was evaluated as sensory aphasia(SA) with the aphasia severity of level 4, and had no memory or intelligence disorder. MRI showed atrophy in left frontal lobe and temporal lobe, which was more significant in left side. MRI also showed that left temporal and frontal lobes had low metabolism and low perfusion.

CONCLUSION: PPA is a disease with language disorder as its dominant clinical manifestation, which no other cognitive disorder at its initial stage, and with its main pathological changes in left temporal and frontal lobes.

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INTRODUCTION

Primary progressive aphasia(PPA) is clinically characterized as progressive decreasing in language skills. Cognitive ability gradually decreases during the course of the disease, which affects daily life. It is always considered as a type of dementia, but it is different from other types of dementia due to the relative preservation of the memory functions in patients[1]; therefore, it should be carefully differentiated with the diseases that could induce dementia in clinical activity. Here, we would report one PPA case admitted by our hospital in 2004 and retrospectively analyze the clinical and imageological characteristics of language disorder in PPA.

SUBJECTS AND METHODS

Subjects

Male, 56 years old, businessman before the onset the disease, who was admitted by the Department of Neurology, Tiantan Hospital, Beijing on 20th March 2004 due to his complaint of "three years of progressive decreasing of language skills". The patient could not name the things of his daily life 3 years age but only could describe the function or the attribute of the thing instead of the name, although he was able to select this thing out of some provisions. The ability of understanding was almost normal at that time. Two years age, he still could manage his business. In the recent one year, the language disorder progressively aggravated with the gradually decreasing in listening understanding, but no significantly subside in memory. His personality gradually changed, such as, impatience and irritability, *etc.* And he was not able to perform his normal business activities at the time he visited. In his daily life, he could express his needs by word, he also could use his finger alphabet and body language to express himself, and he was capable of his own life. He used to visit many hospitals and treated with oral medication with the diagnosis of senile dementia but had no improvement after the treatment. Physical check up for nervous system(through writing): blood pressure: 130/80 mm Hg(1 mm Hg = 0.133 kPa), consciousness, poor language expression skill, incomplete understanding of others, certain degree of difficulty in naming, almost normal environmental interpretation, calculation, and memory. No abnormities in other examinations for nervous system. Four generations of this case were traced with no similar clinical manifestations were found.

Neuropsychological examinations

Aphasia examination

The fluency of spoken language was evaluated by the spoken language fluency criteria in Chinese Aphasia Examination Set of Beijing Medical University. The aphasia type was determined by western aphasia evaluation scale. The severity gradation was judged by Boston Diagnostic Aphasia Examination(BDAE).

Memory evaluation

Clinical scale for memory edited by the institute of psychology, Chinese Academy of Sciences was used.

Intelligence evaluation

Mini mental state examination(MMSE) and Wechsler adult intelligence scale(WAIS) modified by Hunan Medical University were used.

Imageology of nerve examination

Routine MRI and functional MRI were performed, and data collection and management were performed by SIEMENS Trio 2003T MRI and SIEMENS AG 2003 workstation.

RESULTS

Neuropsychological examinations

Aphasia examination: The spontaneous conversation of the patient was fluent with only seldom mistake in meanings and difficulty in word searching of his expression with spoken language. When the patient needed verb to express himself, he could not accurately say that verb but could express with his actions. His tone and speed were normal. He had significant impairment in listening understanding. Short sentence could be understood but not complex sentences with grammar. He had favorable rehearsal. He could not name most of the items during the naming test but only used the utilization of such

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item to replace its name. Touch did not help him. He could not perform sentence completion, and reactive naming. The difference between this patient and patients with ordinary naming disorder was that although our case was unable to name the item, he could write the name down. And he also could favorably complete the reading comprehension of sentences and reading instruction as well during reading test; however, his performance in writing word and objective, picture matching was poor. He could not write down some verbs during writing and dictation. Sensory aphasia(SA) was the result of western aphasia examination set. And the severity gradation was level 3 after BDAE evaluation. Memory examination: He could smoothly finish all items. Clinical memory scale indicated his memory quotient was 111, which meant his clinical memory evaluation was in moderate and higher level. Intelligence examination: MMSE score was 27 point, which meant there was no cognitive disorder; WAIS general intelligence quotient was 102, which stood for normal intelligence.

Imageology of nerve examination

Routine MRI: Mild atrophy in left temporal and frontal lobes with more obvious changes in temporal lobe. Functional MRI: Left temporal lobe and frontal lobe were in a status of low metabolism and low perfusion.

DISCUSSION

Mesulam[2] reported 6 cases of PPA with the onset of language disorder for the first time in 1982. The abilities of memory, reasoning, judgment and cognition maintained normal in these patients, who were able to perform activities of their daily life independently. Naming disorder occurred in all 6 patients. Aphasia developed very slowly in 5 to 11 years, and the cognitive function of non-words and expressions maintained normal for several years. Weintraub *et al*[3] brought out the diagnostic criteria of PPA based on their clinical observations: ① at least more than 2 years of progressive decreasing in language skills; ② the decrease of language skills dominates, and the other cognitive functions are normal or relatively preserved; ③ able to perform activities in normal daily life independently. Mesulam[4] renewed this criteria in 2001 and brought out a new diagnostic criteria for PPA: ① Dormant onset and gradual development, the main manifestation in neuropsychological examinations are difficulty in word searching, naming impairment, or understanding disorder of words and expressions; ② Behavioral problems in daily life related with language disorder are the only manifestations in the initial 2 years after onset; ③ normal language skill before onset; ④ Case history, examination of the ability of daily life(ADL) or neuropsychological examinations indicate that there is no significant indifferent, disinhibition, retrograde amnesia, visual spatial impairment, visual identification defect, sensory disturbance or dyskinesia; ⑤ Miscalculation, ideokinetic apraxia, and mild structural disorder and persistence could be found in the first 2 years after onset, but the visual spatial impairment and disinhibition would not affect ADL; ⑥ Other cognitive disorders could be generated after 2 years. Language disorder is dominant during the entire course of the disease with the fastest development; ⑦ No special pathogens like cerebral apoplexy and brain cancer are found in imageology. Our case had dominant clinical manifestation of progressive decreasing in language skill after neuropsychological examinations. He had no defects in memory, calculation, and other cognitive functions in 3 years, and normal ADL as well. No cerebral infarct or hemorrhage or intracranial space-occupying lesion was found in imageology except brain atrophy. The patient had normal language skills before the onset of the disease. So he was in accordance with PPA diagnosis.

At present, the onset age of PPA is controversial. For example, Mesulam[2] pointed out that PPA onset is in senile prophase with slow development, which has a benign progress compared with other diseases; however, other scholars[5,6] believe PPA onset also could be in senile stage with rapid development, such as Karbe *et al*[7] used to follow up 10 PPA cases, most of which generated in senile stage with relative rapid development. The situation of the disease deteriorated in every check up, and the language disorder in some patients even reached complete aphasia; therefore, they point out that PPA might be the prelude of general dementia. Mendez *et al*[8] further point out that about 77% of PPA patients develop dementia in the advances stage. Sonty *et al*[9] reported the average onset age of PPA in 14 cases was(64 ± 6. 6) years old. Our patient was 56 years old with the onset age of 53 years old, which was slightly earlier than the onset age reported by the literature.

Most of the job in language training for aphasia is to long-termly, repeatedly and individually train the language understanding and language expression abilities of the patients for the rehabilitation of different degrees[10-12]. The common language disorder of PPA patients is naming difficulty, *i. e.*, unable to say accurate word during conversation or unable to accurately name some objects during the examination. When the patients are asked to name in writing, some of them can accurately write down the name of the object, with grate preservation in the grammar of the words and sentences. During the development of the disease, naming difficulty occupies a very long period, which gradually develops into word searching difficulty, and the patients are inclined to use short sentences in spoken language with the deficiency of some substantial words. Some patients also suffer from abnormal word sequence, wrong tense, conjunctions and prepositions[13]. Some patients have grammar deficiency, or understanding impairment of words. The understanding impairment usually starts with incapability of understanding single word, which develops into incapability of understanding the contents of the conversation in spoken language. The rehearsal ability of the patients could be or not be impaired. The reading and writing skills could be impaired as well but less than spoken language.

Because language disorder can affect the memory and reasoning of the patient, but patient has no difficulty in remembering the affair occurred in daily life, which suggests that the abilities of extrinsic memory, reasoning and social activity are relatively intact in the patients. The symptoms and physical signs can be limited in language disorder for as long as 10 to 14 years in some patients, while some other patients would have some other cognitive disorders in few years, although language disorder always dominates, and develops faster than other disorders[3].

Patients can use finger alphabet or body language to express their thoughts, accept new information, and learn new techniques, and some of them have permanently improved their communicative abilities by symbol language[14]. At the final stage of the disease, both generation and understanding of the language would be suffered, and sometimes, behavioral changes like depression and irritation could occur.

About the type of language disorder in PPA, Price *et al*[15] bought out that it could have multiple types, and the spoken language could be fluent or non-fluent, while Neary *et al*[16] suggested that PPA is a influent aphasia with abnormal grammar and tone meaning but relatively preserved word meaning, and thereby they suggested to use the concept of "progressive non-fluent aphasia". Mesulam[4] divides PPA into fluent aphasia that is also called as semantic dementia(SD), and progressive non-fluent aphasia(PNFA). Karbe *et al*[7] reported 10 PPA cases, 10 senile dementia cases, and 10 cases of left cerebral middle-sized artery occlusion. He found that 9 cases with PPA were naming aphasia and 1 case was conductive aphasia after western aphasia examinations and then pointed out that naming disorder, mild grammar deficiency and impaired fluency in spoken language are the principle features of PPA. In the first examination, fluency scores for spontaneous language especially

spoken language were lower in PPA patients than that of senile dementia and naming aphasia induced by the occlusion in left cerebral middle-sized artery. At present, most of the professionals believe that the spoken language of PPA could be either fluent or non-fluent.

The onset of our case is that he was unable to say the name of the object in daily life 3 years ago but only could use the utilization and features of that object to replace the name. His visual understanding was favorable, which meant he could write down the name of the object. The impairment of verb was more serious than noun. The development of the disease was slow. He suffered from difficulty in word searching since 1 year ago, which made him unable to understand some words and sentences until he could not understand completely the contents of the conversation, although he was still able to communicate with words and perform daily activities as usual with intact personality. He had self-knowledge about his language disorder and still kept his hobbies(play chess, fishing, *etc.*). He became irritability and dysphoria in recent year. The aphasia examinations indicated he had fluent spoken language in spontaneous conversation and his aphasia type was SA.

PPA has family transmissibility as reported in the literatures, such as, Krefft *et al*[17] found 3 PPA patients in one PPA family, which had four siblings, and all of them onset with difficulty in word searching and naming disorder. The language disorder was the only symptom in at least 2 years. One of them had behavioral disorder in advanced stage of the disease, one of them developed into dementia, and the onset age of all 3 cases was above 60 years old. Some report[18] pointed out PPA is autosomal dominant inheritance, which might be related with the 17th chromosome carrying tau protein. The author traced four generations of our case and temporarily did not find similar clinical manifestations. The author will continue tracing the language disorder, the development of the disease and the family transmissibility in this case.

Strict neuropsychological examinations are good for PPA diagnosis, which also have certain limitations[3]. The disrelated speech of the patients and the incomplete understanding of the questions brought out by the testers might be considered as dementia. Our case was SA, which used to be diagnosed as senile dementia in other hospitals and received corresponding therapy for almost 1 year, while his language skills still progressively decreased. This situation reminded the author that the possibility of PPA should be considered during the diagnosis of dementia. Once PPA is diagnosed, this particular language phenomenon should be explained to the family members of the patients by offering them how this type of aphasia affects the expression and the understanding of the spoken language, and the communicative methods should be taught to the family members as well to make them more effectively help the patient.

The epidemiology and the risk factors of PPA are unclear, and there is no effective medicine available at this stage. The existence of PPA provides a chance for the research on the molecular mechanism of local neural degeneration and the neuropsychological mechanism of language skills.

In conclusion, PPA is a disease of nervous system with the only or dominant clinical character of progressive decreasing in language skill. Cognitive ability gradually decreases in the advanced stage of the disease with the loss of the ability of daily life(ADL). Language rehabilitative training can delay the progress of PPA.

REFERENCES

1 Mesulam MM. Primary progressive aphasia－a language-based dementia. *N Engl J Med* 2003; 349(16): 1535－42
2 Mesulam MM. Slowly progressive aphasia without generalized dementia. *Ann Neurol* 1982; 11(6): 592－8
3 Weintraub S, Rubin NP, Mesulam MM. Primary progressive aphasia: longitudinal course. Neuropsychological profile and language features. *Arch Neurology* 1990; 47: 1329－35
4 Mesulam MM. Primary progressive aphasia. *Ann Neurology* 2001; 49: 425－32
5 Creen J, Morris JC, Sandson J, *et al*. Progressive aphasia: a precursor of global dementia? *Neurology* 1990; 40: 423－9
6 Poeck K, Luzzatti C. Slowly progressive aphasia in three patients: the problem of accompanying neuropsychological deficit. *Brain* 1988; 111: 151－68
7 Karbe K, Kertesz A, Polk M. Profiles of language impairment in primary progressive aphasia. *Arch Neurology* 1993; 50: 193－201
8 Mendez MF, Zander BA. Dementia presenting with aphasia: clinical characteristics. *Neurol Neurosurg Psychiatry* 1991; 54: 542－5
9 Sonty SP, Mesulam MM, Thompson CK, *et al*. Primary progressive aphasia: PPA and the language network. *Ann Neurology* 2003; 53: 35－49
10 Qiu WH, Dou ZL, Wan GF, *et al*. Application of non-obstacle computer language system U1 in the language training rehabilitation in patients with aphasia. *Zhongguo Linchuang Kangfu*(中国临床康复) 2004; 8(1): 28－9
11 Xiong HZ, Bai XL, Han ZZ, *et al*. Origins of phonological errors in picture naming in patients with aphasia. *Zhongguo Linchuang Kangfu*(中国临床康复) 2004; 8(13): 2490－1
12 Chen ZM, Huang SS, Li QW. The category of language disorders on the basis of computer arithematical character. *Zhongguo Linchuang Kangfu*(中国临床康复) 2003; 7(7): 1133－5
13 Thompson CK, Ballard KJ, Tait ME, *et al*. Patterns of language decline in non-fluent primary progressive aphasia. *Aphasiology* 1997; 11: 297－321
14 Beland R, Ska B. Interaction between verbal and gestural language in progressive aphasia: a case report. *Behav Neurol* 1993; 6: 159－63
15 Price BH, Gurvit H, Weintraub S, *et al*. Neuropsychological patterns and language deficits in 20 consecutive cases of autopsy-confirmed Alzheimer's disease. *Arch Neurology* 1993; 50: 931－7
16 Neary D, Snowden JS, Mann DM. The clinical pathological correlates of lobar atrophy. *Dementia* 1993; 4: 154－9
17 Krefft TA, Graff-Radford NR, Dickson DW, *et al*. Familial primary progressive aphasia. *Alzheimer Dis Assoc Disord* 2003; 17(2): 106－12
18 Basun H, Almkvist O, Axelman K, *et al*. Clinical characteristics of a chromosome 17-linked rapidly progressive familial frontotemporal dementia. *Arch Neurology* 1997; 54: 539－44

原发性进行性失语1例分析☆

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摘要

背景：原发性进行性失语是一种神经系统变性疾病，临床少见，国内仅报道了3例。关于原发性进行性失语的言语学及影像学特点，临床资料较少。

目的：报道1例原发性进行性失语患者言语障碍及影像学特点，阐述原发性进行性失语的临床特征。

设计：病例分析。

单位：北京天坛医院神经内科、北京师范大学心理学院。

对象：患者男，56岁，高中毕业，发病前经商。主因"言语能力进行性下降3年"就诊于北京天坛医院神经内科，诊断为原发性进行性失语。

方法：对该例患者进行北京医科大学第一医院的汉语失语成套测验中口语流利性评定、应用西部失语成套测验判断失语症类型及波士顿诊断性失语严重程度分级标准进行失语症严重程度分级，进行记忆力、智力筛查及影像学检查。

主要观察指标：该例患者的口语流利型，失语症类型，失语症的严重程度是否有记忆力及智力障碍，影像学特点。

结果：患者为流利型口语，西部失语症成套测验评定为感觉性失语，失语严重程度为4级，无记忆力及智力障碍；MRI显示左侧额叶及颞叶萎缩，以左侧明显，功能磁共振显示左侧颞叶和额叶呈低代谢、低灌注状态。

结论：原发性进行性失语以言语障碍为突出临床表现，发病初始无其他认知功能障碍，病变部位主要在左侧颞叶、额叶。

主题词：失语；原发性进行性失语；神经心理学测验；影像学

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