Environmental Reduplication in a Patient with Right Middle Cerebral Artery Occlusion

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Environmental reduplication or reduplicative paramnesia is one of the content-specific delusions (CSD) which is characterized by reduplication of places. CSD has been reported in focal and diffuse cerebral disorders. A focal lesion such as frontal lobes and the right hemispheric lesion have been documented. The authors describe a 66 year-old woman who had a delusion of misidentification for place one month after right middle cerebral artery occlusion. The patient did not have any history of schizophrenia or other psychiatric diseases. The patient believed that her car, furniture and house were duplicated. She also mentioned that her son and friends tried to takeover all of her properties and told everyone that she was insane. The prominent cortical signs were tactile and visual neglect. Neuropsychological assessments revealed poor attention but she had neither confusion nor dementia. Clock drawing and construction tests revealed visuospatial impairment which was compatible with non-dominant hemispheric abnormality. MRI showed evidence of cerebral infarction in the right middle cerebral artery territory. Only one similar patient who had an intracerbral hematoma of the right frontal lobe has been reported in the literature. The role of occipito-parietal and fronto-temporal lobes or their connections in environmental reduplication is proposed.

Keywords : *Environmental reduplication, Reduplicative paramnesia, Delusion of misidentification, Right middle cerebral artery occlusion*

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Delusion of misidentification is one of the content-specific delusions (CSD). Subtypes of this delusion consist of misidentification for place and person. The synonyms of misidentification for place are environmental reduplication and reduplicative paramnesia. The delusion is associated with both idiopathic psychoses and neurological conditions[1]. Modern imaging technology has revealed an association between the delusion and focal central nervous system lesions. However, there have been few reports which demonstrated the anatomical localization and focal pathology of the brain in this delusion. The authors describe a patient who had delusion of misidentification for environment one month after an ischemic stroke in the territory of the right middle cerebral artery.

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Case Report

Three months ago, a 66 year-old a business woman had an acute attack of left hemiparesis. Magnetic resonance images (MRI) of the brain showed evidence of right parieto-temporal cortical and subcortical infarction in the distribution of right middle cerebral artery (Fig. 1). She was admitted to hospital for one month. During the admission, no delusion was notified. After discharge from the hospital, she had delusions which consisted of duplication of car, furniture and house. The reduplicated objects were slightly different from the original ones but she could not define the difference between them. She wandered in her house searching for her money and cash cheques. She accused her son and friend of stealing them. She repeatedly made telephone calls to all her debtors and asked for all of her money back. Later on, she started to think that her family tried to deceive her and intended to document that she was insane. She got lost whenever she went out of her house.

Fig. 1 FLAIR technique axial MRI revealed abnormal high signal intensity within the right middle cerebral artery territory

Apart from a history of diabetes mellitus and hypertension for ten years, she had no history of psychiatric disorders. During the interview, she talked fluently and was not confused. She circumstantially complained about her properties and her paralyzed arm. She claimed that her son, sister and friends had been trying to takeover all of her properties and document that she was insane. Physical examination revealed a right handed, well cooperative and fully conscious woman. Left-sided weakness grade 1 (MRC) on upper extremity and grade 4 (MRC) on lower extremity were noted. Pain sensation was decreased on the left side of the body and face. She had tactile and visual neglect on the left. On neuropsychological assessment, she had good orientation to time, place and person. Registration and recent memories were intact. Serial subtraction by seven was impaired but she could subtract the numbers by 3 correctly. She could perform 7 digits span forward but she could not perform it backward. Tests on language such as object naming, word repetition, comprehension, reading and writing were accomplished. On construction test, she could not properly copy the three dimension square box and intersecting pentagons. Thai Mini-Mental State Examination (TMSE) score was 26 out of 30. On clock drawing test, the numbers were written in a column and the line was out of the clock face. The arms of the clock were put in an improper position (Fig. 2A). Secondary prevention for stroke (aspirin) and treatment for underlying diseases which consisted of hypoglycemic (glipizide), anti-hyertensive (verapamil) as well as antipsychotic (quentiapine) medications were prescribed.

One month later, the reduplication of place and surrounding objects had subsided. Physical examinations revealed a slight improvement of the motor power of her left arm. Neuropsychological assessment revealed improvement of the clock drawing test with all numbers and clock arms inside the clock face but they were all on the right side and the arms were distorted (Fig. 2B).

Two months later, her disorientation of place had improved. Paranoid delusions still persisted. On neuropsychological assessment, she could perform 7 digits span forward and 3 digits span backward. Clock drawing test was improved with numbers distributed on both sides of the clock face but she wrote them with poor planning. The sequence of numbers was wrong and the clock arms were put in the wrong way (Fig. 2C).

Discussion

Delusion is a psychological symptom, which has diverse manifestations[2]. Content-specific delusions (CSD) or monosymptomatic delusions are delusions that have a specific theme or topic[3]. The delusion of misidentification consists of misidentification of place and person[4,5]. The patients with misidentification of place may think that a place exists in one or more locations or a place exists in an impossible location or a familiar place is a strange place for them[3]. The patient with misidentification of person may believe that the persons who are well known to them are doubles or strangers (Capgras syndrome), or may think that he has his own double (Doppelganger), or a person has the capability of taking the appearance of others while retaining his own psychological identity (Fregoli syndrome), or a person changes both appearance and

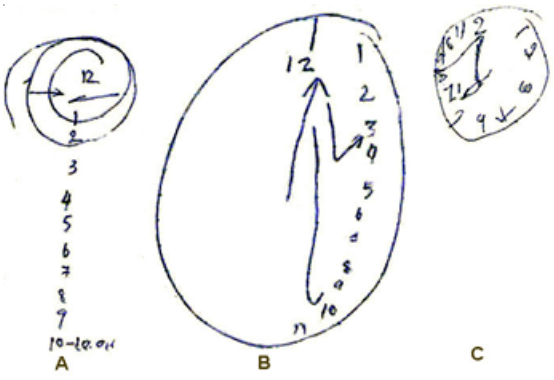

Fig. 2 Clock drawing test during the three month follow up
A: The first visit, B: The second visit, C: The third visit

psychological identity (Intermetamorphosis)[3]. The term "Reduplicative Paramnesia" was coined in 1903 and was characterized by reduplication of familiar places or persons[6]. Later on, the reduplicative delusion of person was reported separately as Capgras syndrome [6] while the reduplication of place is still termed reduplicative paramnesia. Ruff and Volpe used the term environmental reduplication[7] for place misidentification which seems to be a more specific and appropriate term.

CSD has been related to diffuse brain disorder such as toxic-metabolic disorder or focal cerebral lesions[3]. The anatomical localization of CSD in focal cerebral lesion is the frontal lobes and right hemisphere and the etiologies include head trauma, cerebral infarction, intracranial hemorrhage and encephalitis[3]. This patient had environmental reduplication which consisted of misidentification of places and surrounding objects. Neuropsychological assessment revealed an intact memory. She had attention deficit which was demonstrated by serial subtraction and digit span. Her visuospatial and visuoconstruction skill were also impaired. The MRI demonstrated cerebral infarction within the territory of the right middle cerebral artery. The infarction mainly involved the right temperoparietal cortex with partial involvement of the frontal and occipital cortices as well as subcortical white matter in the corresponding areas. The precise lesions which produce environmental reduplication have been rarely reported[7]. Documented cases of misidentification for place and person were caused by bilateral frontal lobe and right cerebral hemisphere lesions[6,8,9]. Only one similar case of environmental reduplication without misidentification for persons has been reported in the literature[10]. Neuropsychological assessment indicated that she had memory disturbance, problem solving impairment and left sided inattention. CT scan revealed a hematoma in the right frontal lobe with surrounding edema[10].

From the neurobehavioural point of view, the right parieto-occipital region is responsible for visual interpretation and the temporal lobe is responsible for familiarity while the frontal lobe is responsible for reasoning and judgment[3]. Disorder in one of these areas may produce a syndrome of misidentification. Alexander and Fisher proposed that symptoms of misidentification occur when visuospatial dysfunction of the right cerebral hemisphere has recovered from the acute insult while the frontal lobe dysfunction has not improved. As a consequence, the patient is incapable of resolving the mental conflict[6,11]. In this period, the temporal lobe, which can produce symptoms such as d j vu and jamais vu may play a part in the misidentification and associated syndromes[3]. The delusion of this patient occurred after a delayed period of one month and supported this hypothesis. It has also been proposed that the misidentification syndrome may be one of the disconnection syndromes[12]. Therefore, a pathology in any anatomical sites which disrupts the connections between right parieto-occipital and fronto-temporal region can create the syndrome. Since, there are very few clinical data in the literature, the opportunity to document various anatomical localizations of environmental reduplication is still open.

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เอนไวโรเมนททอลรีดุพลีเคชั่นในผู้ป่วยโรคหลอดเลือดแดงมิดเดิลซีรีบรอลด้านขวาอุดตัน

ยุทธชัย ลิขิตเจริญ, กัมมันต์ พันธุมจินดา

เอนไวโรเมนทอลรีดุพลีเคชั่นหรือรีดุบพลีเคทีฟพาแอมนีเซียเป็นชนิดหนึ่งของโรคหลงผิดที่มีเนื้อหาจำเพาะคือหลงผิดว่ามีสถานที่ซ้ำกัน โรคหลงผิดที่มีเนื้อหาจำเพาะได้ถูกรายงานในความผิดปรกติของสมองที่เป็นเฉพาะที่ หรือที่เป็นกระจัดกระจายทั่วไป โรคบริเวณสมองกลีบฟรอนทอลและสมองซีกขวาได้ถูกกล่าวไว้ในผู้ป่วยที่มีอาการหลงผิดที่มีเนื้อหาจำเพาะ ผู้ป่วยในรายงานนี้เป็นผู้ป่วยหญิงอายุ ๖๖ปีที่มีโรคหลอดเลือดแดงสมองมิดเดิลซีรีบรอลด้านขวาอุดตัน ผู้ป่วยรายนี้ไม่เคยมีประวัติของโรคจิตเภทหรือโรคทางจิตอื่น ๆ มาก่อน ผู้ป่วยเชื่อว่ารถยนต์ เครื่องเรือนและบ้านของผู้ป่วยได้ถูกทำจำลองขึ้น ผู้ป่วยกล่าวว่าลูกชายของผู้ป่วยและเพื่อนของผู้ป่วยพยายามครอบครองสมบัติของผู้ป่วยและกล่าวหาว่าผู้ป่วยมีสติฟั่นเฟือน ผู้ป่วยมีลักษณะผิดปรกติของเปลือกสมองที่เด่นชัดคือ ไม่สนใจสิ่งกระตุ้นสัมผัสและภาพทางด้านซ้ายเมื่อมีสิ่งกระตุ้นพร้อมกันทั้งสองด้าน การทดสอบทางประสาทวิทยาและจิตวิทยาคลินิกพบว่าผู้ป่วยมีสมาธิไม่ดีแต่ไม่มีลักษณะอาการสับสนหรือสมองเสื่อม ผู้ป่วยมีความผิดปรกติในการทดสอบวาดรูปนาฬิกาและการทดสอบวาดภาพที่เข้าได้กับรอยโรคในสมองซีกไม่เด่น ภาพสมองจากคลื่นแม่เหล็กไฟฟ้าพบว่ามีรอยโรคสมองขาดเลือดในบริเวณที่เลี้ยงโดยหลอดเลือดสมองมิดเดิลซีรีบรอลด้านขวา ก่อนหน้านี้มีผู้ป่วยเพียงหนึ่งรายที่มีอาการหลงผิดลักษณะเดียวกันผู้ป่วยรายนั้นมีเลือดออกในสมองกลีบฟรอนทอลด้านขวา ความเกี่ยวข้องของสมองกลีบออกซิปิโท-พารายเอทอล กลีบฟรอนโต-เทมเพอรอลด้านขวา หรือเนื้อสมองในส่วนที่เชื่อมโยงสมองส่วนต่าง ๆ ดังกล่าวกับเอนไวโรเมนทอลรีดุพลีเคชั่นได้ถูกเสนอ