した．脳外傷では社会性認知機能の障害が問題となることが多く，社会性行動障害は数値化して評価する手法がないことから，詳しい行動観察とそれを裏付ける神経画像に着眼することが必要となる．

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ニュース News

障害者の自立施策評価，06年度障害者白書
「就労で差別受けた」52%

政府は6月15日，2006年度障害者白書を公表した．06年度に講じた施策を①相互理解と交流，②社会参加へ向けた自立の基盤づくり，③日々の暮らしの基盤づくり，④住みよい環境の基盤づくりという視点からまとめるとともに，障害者が雇用・就業環境，支援サービスをどう評価しているかについてのアンケート調査結果も明らかにした．

障害児者数は，身体が352万人（在宅333万人，施設19万人），知的が55万人（在宅42万人，施設13万人），精神が303万人（在宅268万人，施設35万人）．精神障害者は02年に比べ45万人増えた．

06年度に講じた施策については，改正障害者雇用促進法，障害者自立支援法，バリアフリー新法などが施行されたことを報告．「再チャレンジ支援総合プラン」で障害者の就労へのチャレンジを支援することが盛り込まれたこと，「成長力底上げ戦略」で「『福祉から雇用へ』推進5カ年計画」の策定が決まったことなどを紹介し，障害者の自立と社会参加を促進するための施策が総合的に打ち出されたとした．

一方，5,015人（有効回答1,430人）を対象に実施した雇用などに関するアンケート調査の結果では，就業支援策のさらなる必要性が浮き彫りになった．

回答者は，現在働いている人が61%，就労経験のある人が26%．ほぼ9割に雇用・就業経験があった．

この10年間に「働きやすくなった」と感じた人は36%．40%は「変わらない」，14%は「働きにくくなった」と答えた．

また，56%が「障害者の就労に社会の理解がない」，52%が「就労で差別を受けたことがある」と回答．79%が「障害者がもっと働けるようにするための法整備が必要」とした．

こうした結果を踏まえ，白書は「障害を理由とした差別の禁止や権利擁護への一層の取り組みが必要」と提起した．

（福祉新聞・第2345号　2007年6月25日）

Severe Amnesic Syndrome and Collecting Behavior After Surgery for Craniopharyngioma

Osamu Iizuka, MD, Kyoko Suzuki, MD, and Etsuro Mori, MD

Abstract: Significant neuropsychologic sequelae were induced by total removal of craniopharyngioma via a frontobasal interhemispheric approach. A 50-year-old right-handed man developed severe amnesic syndrome and collecting behavior after total removal of a craniopharyngioma. He had very poor results on tests of learning, recall, and recognition for both verbal and nonverbal tasks. Magnetic resonance imaging revealed damage to the bilateral mammillary bodies and fornices, and *N*-isopropyl-p-[^{123}I]iodoamphetamine single photon emission computed tomography showed decreased cerebral blood flow in the bilateral frontal lobes, predominantly in the right, and regions around the third ventricle. The present case suggests that damage to the brain structures surrounding the third ventricle associated with surgery for craniopharyngioma may result in amnesic syndrome and collecting behavior. Generally, the frontobasal interhemispheric approach is the optimum choice for the removal of craniopharyngioma without significant sequelae related to the surgical method, but the risk of neuropsychologic disturbances must be kept in mind.

Key Words: craniopharyngioma, surgical treatment, cognitive sequelae, amnesic syndrome, collecting behavior

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Craniopharyngioma is a primary brain tumor arising from the suprasellar region and usually occurs in the first decades of life. Surgical treatment for craniopharyngioma carries the risk of damage to the memory-related brain structures around the third ventricle, including the thalamus, mammillothalamic tract, and basal forebrain. Neuropsychologic studies in adult patients suggested that surgical treatment could improve the memory and executive dysfunction.[1] Memory and frontal function is preserved in most patients except those treated via a pterional approach.[2] A few studies in children have reported cognitive sequelae after craniopharyngioma surgery.[3] We treated a patient with severe amnesic syndrome and collecting behavior after total removal of a craniopharyngioma.

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CASE REPORT

A 50-year-old right-handed man with a 12th grade education, a trustworthy city employee, was admitted to a hospital because of headache. Computed tomography demonstrated an intracranial tumor extending from the suprasellar region to the third ventricle, which was removed totally via the frontobasal interhemispheric approach 1 month later. No postoperative radiation therapy was administered. The histologic diagnosis was squamous-papillary type craniopharyngioma. Ventricular drainage was placed via the bilateral anterior horns of the lateral ventricles for 12 days because of postoperative hemorrhage in the third ventricle, which arose beside the pituitary stalk and just beneath the optic chiasma, and hydrocephalus. The hydrocephalus caused transient semicoma, but he was alert and no clinical signs associated with hydrocephalus, such as slowing of mental capacity, frequent falling, and incontinence, were detected despite removal of the drainage.[4] Panhypopituitarism as a sequela of the surgery was treated with hormone replacement therapy. The patient was soon discharged with marked disorientation, severe amnesia, and confabulation. Confabulation disappeared about 1 year later. However, he was admitted to our hospital because of persistent and unchanging amnesia and behavioral problems including hyperphagia and affective incontinence, which prevented his reinstatement for 2 years.

On admission, the patient was alert and cooperative, but demonstrated marked amnesia and collecting behavior. He forgot having eaten immediately after meals, and insisted that he had not had food. Confabulation was no longer present. He brought back toilet paper each time he visited the toilets, and collected the paper in his locker. Physical and neurologic examinations revealed no abnormalities except for bitemporal hemianopsia. The results of routine laboratory tests were within the normal ranges. Pituitary hormone levels were well controlled by replacement therapy. Detailed neuropsychologic examinations were performed during the following month.

NEUROPSYCHOLOGIC ASSESSMENT (Table 1)

Attention

Digit span forward was 6, backward 5. Spatial span forward was 6, and backward 4. General attention was preserved.

General Intelligence

On the Wechsler Adult Intelligence Scale—Revised, his full scale intelligence quotient (IQ) was 102, verbal IQ 107, and performance IQ 95. His subtest scores except for

TABLE 1. Results of Neuropsychologic Tests

Test	Full Score	Patient's Score	Normative Data*
Wechsler Memory Scale—Revised			
Logical memory I	50	8	22.0 (7.1)
Logical memory II	50	0	16.8 (7.0)
Verbal Paired Associates I	24	10	16.7 (3.8)
Verbal Paired Associates II	8	2	7.0 (1.2)
Figure Memory	10	6	6.5 (1.3)
Visual Paired Associates I	18	5	12.2 (4.0)
Visual Paired Associates II	6	5	5.0 (1.3)
Visual Reproduction I	41	22	36.6 (5.0)
Visual Reproduction II	41	14	33.1 (6.4)
Index for Attention Concentration	—	105	101.59 (15.07)
Recognition Memory Test			
Words	50	23	(Definitely chance level)
Faces	50	31	(Definitely chance level)
Autobiographical Memory Interview			
Autobiographical Incidents			
Childhood	9	9	(Acceptable range)
Early Adult Life	9	9	(Acceptable range)
Recent Life	9	1	(Definitely abnormal)
Personal Semantic			
Childhood	21	21	(Acceptable range)
Early Adult Life	21	19.5	(Acceptable range)
Recent Life	21	8	(Definitely abnormal)
Wisconsin Card Sorting Test			
Categories Achieved	6	5	3.7 (1.9)
Perseveration Errors of Nelson	0	3	4.2 (5.4)
Trail Making Test (seconds)			
Part A	—	56.4	32.0 (8.4)
Part B	—	110.2	76.0 (27.9)
Verbal Fluency (1 min)			
Semantic Category (Animal)	—	11	16.1 (3.6)
Phonemic Categories (fu a ni)	—	31	28.1 (9.0)

*Number in parentheses reveals SD.

digit symbol subtest score were within 2 standard deviations (SDs) of the age-corrected mean normative standardized sample. Impaired digit symbol subtest score indicates retardation of psychomotor speed, like the Trail Making Test as described later.[5]

Language

His spontaneous speech was fluent, and neither dysprosody nor paraphasia were detected. Auditory comprehension, repetition, confrontation naming, reading, and writing were all intact. His aphasia quotient was 98 by the Western Aphasia Battery (Japanese edition).[6]

Frontal Function

Frontal executive function was slightly defective, as shown by the following findings: 5 categories achieved on the Wisconsin Card Sorting Test, slightly longer time on the Trail Making Test Part A and Part B than the norms, 56.4 seconds and 110.2 seconds, respectively, and verbal fluency for animals of 11 words.[7]

Memory

The patient had severe anterograde amnesia with preserved retrograde and procedural memory as follows. The Wechsler Memory Scale—Revised showed general memory index was 54, verbal memory index 64, visual memory index 50, delayed recall index < 50, and attention/concentration index 105. Recognition memory test for both faces and words did not exceed the chance level. Retrograde amnesia was examined using the autobiographical memory interview (AMI), which showed that incidents recalled were 9/9, 9/9, and 1/9, and personal semantic memory was 21/21, 19.5/21, and 8/21 for childhood, early adult life, and recent life, respectively. His recall was impaired only for recent life.[8] However, there is almost no doubt that retrograde memory was preserved, because the recent life questions in the AMI consist of almost premorbid episodes, and additionally he sometimes recalled a traffic accident which had occurred 2 months before the surgery. Procedural memory was examined with the Tower of Hanoi test, which revealed normal procedural learning, although he had no recall of the task. Confabulations were never observed in either spontaneous speech or the confabulation battery.[9]

Others

Praxis and calculation were intact. No constructional disorder or unilateral spatial neglect was noted.

NEUROIMAGING

Brain magnetic resonance (MR) imaging showed a cystic structure of residual craniopharyngioma in the third ventricle, which compressed the body of the fornix (dashed arrow) and reduced its thickness, and presumably induced the dilation of the anterior horns of the bilateral lateral ventricles (Figs. 1A, D). However, this structure had not enlarged after surgery. The bilateral crus of the fornix were thinned and partially destroyed on the left (dashed arrow) (Fig. 1B). Cystic change was detected in the right mammillary body and atrophy in the left (arrow) (Fig. 1B). No abnormal areas were detected in the thalamic structures, the medial temporal lobe, or the basal forebrain except for a small infarct in the right thalamic polar artery territory (Figs. 1C, D). *N*-isopropyl-p-[^{123}I]iodoamphetamine single photon emission computed tomography (SPECT) showed decreased cerebral blood flow in the bilateral frontal lobes, predominantly in the right, and regions around the third ventricle (Figs. 2A–C).

DISCUSSION

Our patient showed amnesic syndrome characterized by marked anterograde amnesia and collecting behavior after total removal of a craniopharyngioma. However, he had no retrograde amnesia and confabulation. Unfortunately, we have no premorbid

neuropsychologic data, but he did not show any signs of amnesia, and could perform his work without problems before surgery, so we believe that his cognitive and behavioral impairments developed immediately after the surgical operation. MR imaging revealed no atrophy of the hippocampus, amygdala, or entorhinal cortex, and SPECT showed no reduction of cerebral metabolism in the temporoparietal association cortices and the posterior cingulate cortex, which are both well-established findings in patients with Alzheimer disease. MR imaging also showed no atrophy or abnormal intensity in the hippocampal formation, which are characteristics of mesial temporal sclerosis.[10–12] These findings indicate that his symptoms were not induced by any degenerative disease.

Surgical approaches to the removal of craniopharyngioma depend on the location of the tumor. Intrasellar tumors located in the subdiaphragmatic portion can be treated via a transsphenoidal approach. However, this procedure is less suitable for pituitary adenoma; because of the strong adhesion between the craniopharyngioma capsule and the pituitary stalk or the diaphragma, or both. Sellar and suprasellar tumors with extension into the third ventricle can be treated via a pterional approach. This approach allows access to the third ventricle through the lamina terminalis to remove craniopharyngioma tissue from the lower and anterior third ventricle, as well as through the opticocarotid triangle and the prechiasmatic space. Tumors extending from the sellar and suprasellar region to the third or lateral ventricle with the risk of iatrogenic damage to the optic pathway and the hypothalamus can be treated via a frontobasal interhemispheric approach. The basal interhemispheric approach combined with translamina terminalis provides a good view of the structures of infundibulohypophyseal axis, and tends not to require strong retraction of the frontal lobes. Furthermore, the arteries and veins coursing along the exposed dorsal and medial surfaces of the frontal lobe and over the corpus callosum can be preserved, in contrast to the pterional approach. Generally, the basal interhemispheric approach is a valid choice for the removal of craniopharyngioma without significant sequelae related to the surgical method, and is rarely associated with transient mild memory disturbance owing to infarction of perforating vessels.[13–15] MR imaging revealed a right anterior thalamic lesion in our patient, which was probably owing to occlusion of the thalamic polar artery caused by the surgery. Right anterior thalamus infarction of the polar artery territory is characterized by anterograde visuospatial amnesia without retrograde amnesia, anomia, low verbal fluency, and frontal lobe dysfunction including impairment of executive function, abulia, and depression. Although these findings partially accord with the symptoms of our patient, functional recovery of the polar artery occlusion is generally good except for amnesia and abulia.[16] Therefore, the thalamic small lesion was not solely responsible for his symptoms. The amnesia in our patient may have involved effects on the basal forebrain that was adjacent to the surgical approach. However, our patient never learned any of the features of his attending physician, whom he met every day for a month. No cues stimulated recall or recognition. Therefore, damage to the basal forebrain was unlikely to account for his amnesia.[17]

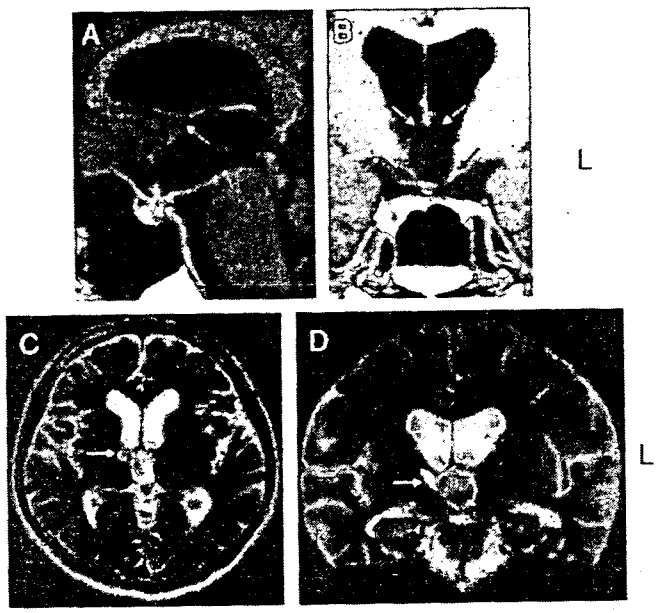

FIGURE 1. Sagittal (A) and coronal (B) T1-weighted, and axial (C) and coronal (D) T2-wighted brain MR images. MR images showed a cystic structure of residual craniopharyngioma in the third ventricle, which compressed the body of the fornix (dashed arrow) and reduced its thickness, and presumably induced the dilation of the anterior horns of the bilateral lateral ventricles (A, D). However, this structure had not enlarged after surgery. The bilateral crus of the fornix were thinned and partially destroyed on the left (dashed arrow) (B). Cystic change was detected in the right mammillary body and atrophy in the left (arrow) (B). No abnormal areas were detected in the thalamic structures, the medial temporal lobe, or the basal forebrain except for a small infarct in the right thalamic polar artery territory (white arrow) (C, D). L indicates left side.

Our patient had damage to the fornix and mammillary bodies. Localized damage of these structures in or adjacent to the hypothalamus may cause amnesia. Damage to the unilateral or bilateral fornices can result in severe anterograde amnesia with less impairment of retrograde amnesia and recognition, indicating that the retrieval process of memory is preserved in amnesia induced by fornix injury, which is not exactly similar to our patient.[18–20] At the same time, whether damage to the mammillary body can cause amnesia has been controversial. There is a previous case of marked anterograde amnesia without retrograde amnesia caused by craniopharyngioma, but the presence or absence of recognition memory impairment was not described.[21] Another case of marked verbal memory impairment included recognition memory that followed a penetrating bilateral mammillary bodies injury caused by a snooker cue, which entered

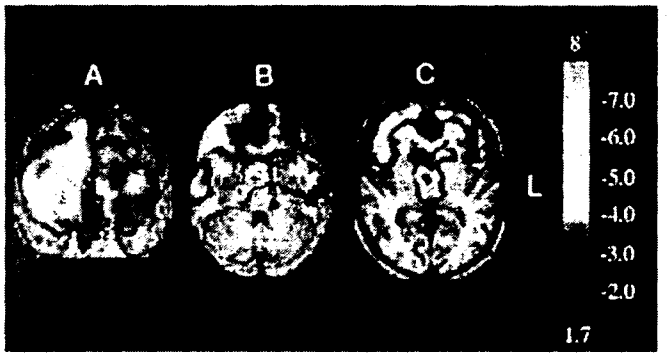

FIGURE 2. N-isopropyl-p-[^{123}I] iodoamphetamine SPECT scans of regional cerebral blood flow (rCBF) on the anterior surface (A), inferior surface (B), and axial slice (C) at the level of the third ventricle. The SPECT data were collected in 64 x 64 matrices, and were reconstructed in sections parallel to the anterior commissure-posterior commissure plane with 8-mm thickness. Z-score maps were produced with the easy Z-score Imaging System (Daiichi Radioisotope Laboratory, Tokyo, Japan) using SPM99 (The Wellcome Department of Neurology, London, UK) to implement anatomic standardization and smoothing algorithms. On the basis of rCBF images of 20 healthy subjects, normative mean and SD images were constructed. The voxel value of the patient was converted to a Z score [Z = (individual value − mean in the healthy subjects)/SD in the healthy subjects]. A Z-score map showing voxels exceeding the threshold of Z score >1.7 (1-tailed $P<0.05$) was plotted on the standardized anatomic space. The regions of decreased rCBF included the bilateral frontal lobes, especially in the right, and regions around the third ventricle. Right column indicates the color bar of Z score. L indicates left side.

through the left nostril.[22] The retrograde amnesia was very mild, and nonverbal memory was relatively preserved.[22] We suppose that this apparent difference in severity between verbal and nonverbal amnesia results from the laterality of damage in the mammillary bodies. The patient also had significantly increased appetite, just like our patient, which suggested damage to the ventromedial nuclei of the hypothalamus.[21,22] For all of these reasons, we think that the amnesia of our patient was mainly induced by damage to the bilateral mammillary bodies, and possibly also by the damage to the bilateral fornices. Interestingly, the amnesia pattern of our patient differed from the memory deficits in children that is characterized by good performance on recognition tasks.[3] Apparently, the difference may be related to the damaged area.

In contrast with the MR imaging findings, SPECT revealed hypoperfusion of the thalamus surrounding the third ventricle. This finding reflects both the dilation of the third ventricle and the hypofunction of the medial thalamic nucleus including the medial dorsal thalamic nucleus (MD). The MD has strong reciprocal connections with the prefrontal cortex. In particular, the medial part of the MD is linked with the medial and orbital prefrontal cortices. This lesion is likely to induce apathy, abulia, and disinhibition, resulting in failure to inhibit inappropriate behaviors.[23] Lesions associated with collecting behavior are located in the mesial frontal region including the right polar sector and the anterior cingulate cortices.[24] Though collecting behavior caused by MD lesion has not been reported, such a remote effect is presumably caused by the hypoperfusion in the right mesial and dorsal prefrontal regions, which may be involved in the development of collecting behavior, as well as the mild executive dysfunction in our patient.

The frontal dysfunction is unlikely to result entirely from the operation procedure. Therefore, damage to the structures surrounding the third ventricle caused by the craniopharyngioma and the surgical procedure were probably jointly responsible for the amnesic syndrome and frontal dysfunction in our patient. Craniopharyngioma surgery and third ventricle tumor surgery both carry the risk of memory deficits.[3,25] The present case suggests that damage to the brain structures surrounding the third ventricle associated with surgery for craniopharyngioma may result in amnesic syndrome and collecting behavior. Generally, the frontobasal interhemispheric approach is the optimum choice for the removal of craniopharyngioma without significant sequelae related to the surgical method, but the risk of neuropsychologic disturbances must be kept in mind.

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Short communication

Frontal-lobe syndrome and psychosis after damage to the brainstem dopaminergic nuclei

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Abstract

A patient developed frontal-lobe syndrome and psychotic symptoms after infarction in the pontomesencephalic junction. Stereotaxic lesion localization on magnetic resonance imaging and statistical analyses of regional cerebral blood flow (rCBF) disclosed an involvement of the rostral brainstem dopaminergic nuclei and hypoperfusion in the frontal-subcortical circuit components. We suggest that the patient's cognitive and behavioral disturbances were associated with disruption of ascending dopaminergic projections to the frontal-subcortical circuits.

Keywords: Frontal-lobe syndorome; Frontal-subcortical circuits; Hallucinations; Mesocorticolimbic dopaminergic system; Rostral brainstem

1. Introduction

Dopaminergic neurons in the rostral brainstem innervate the frontal cortices, limbic structures, ventral striatum, and thalamus, forming the mesocorticolimbic dopaminergic system (MDS) [1–3]. Animal studies have provided evidence of involvement of the MDS in cognition, motivation, and the sleep–wake cycle. Although abnormalities of the MDS have been implicated in psychoses, schizophrenia, and cognitive and behavioral symptoms in Parkinson's disease and dementia with Lewy bodies [3,4], human evidence of circumscribed damage to the rostral brainstem dopaminergic nuclei or their projections to the telencephalon is scarce [5].

We performed stereotaxic lesion localization on magnetic resonance imaging (MRI) and statistical analyses of regional cerebral blood flow (rCBF) in a patient who developed frontal-lobe syndrome and psychotic symptoms after infarction in the pontomesencephalic junction. The results suggest that the patient's symptoms are ascribable to disruption of the ascending dopaminergic projections to the frontal-subcortical circuit components.

2. Report of a case

A month before referred to our hospital, a 74-year-old woman suddenly developed visual and auditory hallucinations, visual illusions, and nocturnal roaming. The patient had no metabolic problems or medication history that may have affected her behavior and cognitive function. She complained of "floods pouring out from the bureau drawer," that "the door looks distorted," and "I hear an old popular song about a sad love affair playing all day". She roamed around in her house in the middle of the night and served cups of coffee to guests who were not there. The visual hallucinosis and nocturnal

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Table 1
Results of neuropsychological tests

Neuropsychological tests [full score]	1 month after the onset	2 months	4 months
Mini mental state examination	21*	27	30
WAIS-R VIQ/PIQ/FIQ		107/91/99	
WMS-R verbal/visual/ general memory index / attention/delayed recall		89/112/98/ 91/94	
Category fluency (/min)	7*	10*	10*
Raven's colored progressive matrices		28	
Trail making test A/B (sec)		195*/ gave up*	
Color-form sorting initial/ altered sorting		Achieved/ failed*	
Porteus maze (years)		9*	
Tower of Toronto 3 discs		Gave up*	
Wisconsin card sorting test categories/perseveration		4/31	

Asterisks indicate defective performance scores.
WAIS: Wechsler Adult Intelligence Scale-Revised; WMS-R: Wechsler Memory Scale-Revised.

restlessness disappeared after a few days, but she lost spontaneity and occasionally complained that she was useless.

On her first visit to our hospital, one month after the onset of her symptoms, the patient showed evidence of apathy, psychomotor retardation, and mild depression. Neurological examination revealed hypophonia and postural instability. There was no evidence of other parkinsonian signs, such as rigidity and resting tremor, pyramidal signs, or cranial nerve abnormalities. Her vision and hearing were normal, and she scored 21 on the Mini Mental State Examination (MMSE). One month later, she was admitted to our hospital for further investigation.

On admission, the patient still had auditory hallucinations and visual illusions, but her spontaneity and cooperation were considerably improved, and the hypophonia and postural instability had completely resolved. She achieved 27 on the MMSE and performed poorly on tests of executive function, including color-form sorting, Porteus Maze, Trail Making Test, and Tower of Toronto (Table 1). She had no impairment of memory, language, or visuospatial abilities. Her residual symptoms subsided spontaneously without any specific treatment, and she achieved a full score on the MMSE 4 months after the onset of her symptoms.

3. Neuroimaging

MRIs revealed an infarct in the left upper pons and a small previous infarct, which was already known about, with a diameter of 0.5 mm in the dorsocaudal part of the left external globus pallidus (Fig. 1A and B). A stereotaxic lesion analysis was performed on 3D-SPGR images (256×256 matrices, 220 mm field of view, 1.0 mm thick). Sections reconstructed parallel to the plane through the mamillary body and posterior commissure were superimposed over the corresponding atlases at the levels of the middle and lowermost margin of the inferior colliculus [6]. The lesions involved the parabrachial pigmented nucleus (PBPG) and the medial substantia nigra pars compacta (SNc) (Fig. 1C and D). The corticospinal tract and cranial nerves and their nuclei seemed to have been spared.

Regional CBF was assessed using *N*-isopropyl-*p*-[^{123}I] iodoamphetamine (IMP)-single photon emission computerized tomography (SPECT) at 1 month and 4 months after the onset. The SPECT data were collected in 64×64 matrices, and were reconstructed in sections parallel to the anterior commissure–posterior commissure plane with 8 mm thickness. The count of each voxel was normalized to the average voxel count of the whole brain. *Z*-score maps were produced with the easy *Z*-score Imaging System (Daiichi Radioisotope Laboratory, Tokyo, Japan), in which SPM99 (The Wellcome Department of Neurology, London, UK) implements anatomical standardization and smoothing algorithms [7]. Based on the rCBF images of 20 healthy subjects (mean age 65.6 years, SD=10.6), normative mean and standard deviation (SD) images were constructed. Then each of the patient's voxel values was converted to a *Z*-score (Z=[individual value−normative mean]/normative SD). A *Z*-map showing voxels exceeding the threshold of *Z*-score>1.7 (one-tailed $p<0.05$) was demonstrated on the standardized anatomical space. At the first session, the regions with decreased rCBF included the dorsolateral and medial

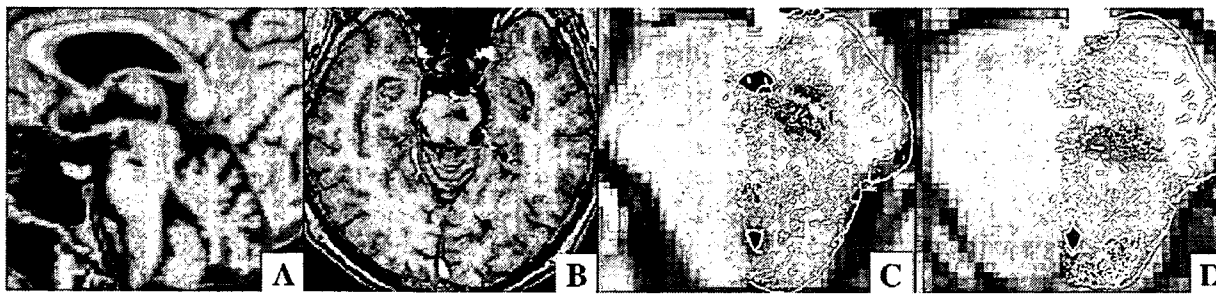

Fig. 1. MRIs showing an upper pontine infarct (A and B). Sections reconstructed parallel to the plane through the mamillary body and posterior commissure were indicated with the corresponding atlases at the levels of the middle (C) and lowermost margin (D) of the superimposed inferior colliculus. The colored areas indicate the lesion (red), the substantia nigra pars compacta (green), and the parabrachial pigmented nucleus (blue).

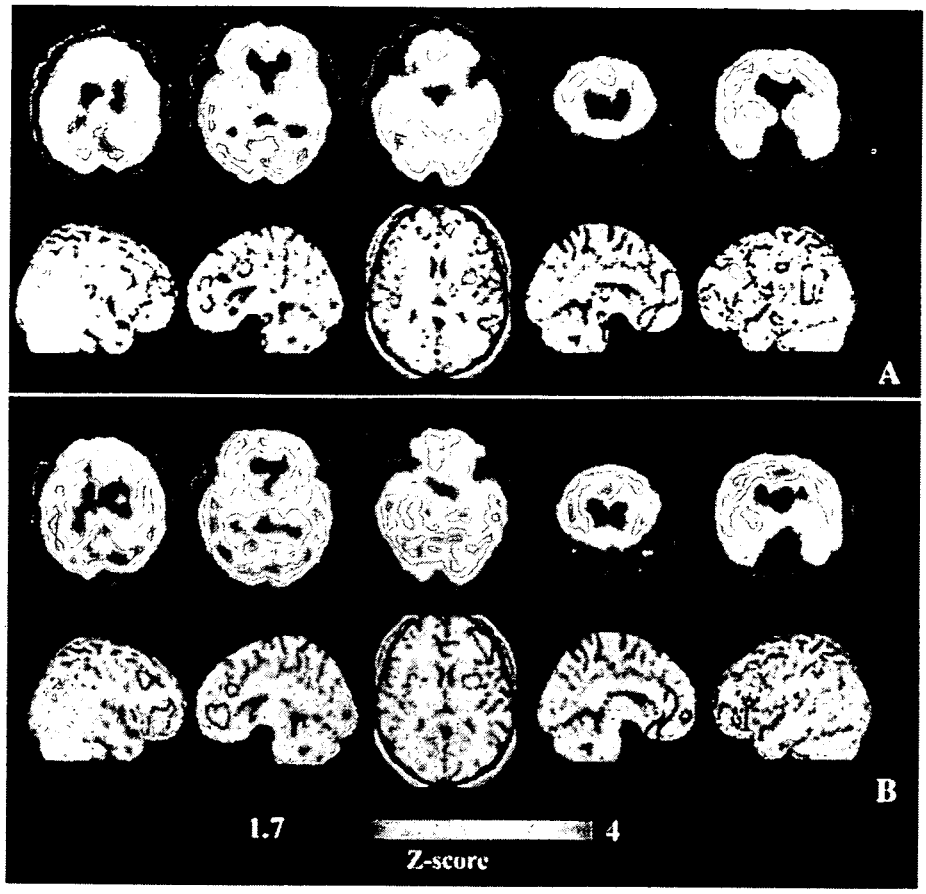

Fig. 2. rCBF images and Z-maps of the first (A) and second (B) SPECT sessions. The colored areas indicate regions with decreased rCBF of Z-score > 1.7 (one-tailed $p < 0.05$). The regions with decreased rCBF include the dorsolateral and medial prefrontal cortices, the anterior cingulate cortex bilaterally, and the left medial thalamus and temporo-parietal junction at the first session (A). Hypoperfusion was substantially improved 2 months later, when the symptoms had resolved (B).

prefrontal cortices, anterior cingulate cortex bilaterally, and the left medial thalamus and temporo-parietal junction (Fig. 2A). The second examination, which was performed after the patient's symptoms subsided, showed improvement of rCBF in these structures (Fig. 2B).

4. Discussion

The patient described here developed apathy and executive dysfunction after a rostral brainstem infarct. These symptoms are similar to those of frontal-lobe damage and are often observed in diseases involving subcortical structures, e.g., striatal and thalamic vascular diseases, progressive supranuclear palsy, and Huntington's disease [8]. These types of frontal-lobe-like syndromes associated with subcortical lesions arise from disruption of the frontal-subcortical circuits. The dorsolateral prefrontal cortex (DLPFC), orbitofrontal cortex (OFC), and anterior cingulate/medial prefrontal cortex (ACC/MPFC) form parallel closed circuits with the striatum, pallidum, substantia nigra, and thalamic nuclei. Different types of cognitive and behavioral syndromes emerge subsequent to disruption of each circuit: (i) a dorsolateral prefrontal syndrome with impaired "executive" cognitive function, (ii) an orbitofrontal syndrome with personality changes characterized by disinhibition and irritability, and (iii) an anterior cingulate/medial prefrontal syndrome with marked reduction of spontaneity. Since these circuits share common subcortical components, diseases affecting the subcortical structures result in mixed symptoms of more than one distinct circuit [9,10]. As with these cases, our patient, who suffered from rostral brainstem infarction, developed "mixed-type" frontal-lobe syndrome. Corresponding to the clinical features, such as apathy and executive dysfunction, rCBF reduction was found in both ACC/MPFC and DLPFC on SPECT.

Our patient developed psychotic symptoms, i.e. hallucinations and delusions, and disturbance of the sleep–wake cycle as well as a frontal-lobe syndrome. Hallucinosis associated with rostral brainstem lesions was first described in the early 20th century and is known as "peduncular hallucinosis" [11]. Disruption of the ascending modulatory neurotransmitter system has been proposed as a putative pathomechanism. The lesion in our patient involved the PBPG and medial SNc in the upper pons, which are the caudal extension of the dopaminergic nuclei of the ventral midbrain [6]. These structures project to the prefrontal cortices, limbic structures, ventral striatum, and thalamus, forming the MDS [1–3]. Besides the rostral brainstem, hallucinations and delusions are observed in damage to the ventral striatum and paramedian thalamus

[12,13]. This constellation of anatomical locations suggests that disruption of the MDS is a crucial factor in the emergence of hallucinosis. Although serotonergic and cholinergic dysfunction reportedly contributes to the emergence of hallucinations, the serotonergic and cholinergic nuclei, e.g., the supralemniscal nucleus, median raphe nucleus, and pedunculopontine and dorsolateral tegmental nuclei, were not involved in our patient.

We found rCBF reduction also in the left temporo-parietal cortex at the first SPECT session. The projections arising form the rostral brainstem dopaminergic nuclei dominate in the frontal cortices but also terminate in the posterior cortical regions [6,14]. Hypoperfusion in the temporo-parietal cortex is explicable as a remote effect of the brainstem lesion. Hypoperfusion in this region was circumscribed and transient in contrast to wide-spread frontal hypoperfusion. These SPECT findings are consistent with the patient's symptoms, i.e. predominant frontal-lobe symptoms and lack of parietal symptoms such as alexia, agraphia, and constructive deficit.

Clinical observations and the results of neuroimaging analyses suggest that our patient's frontal-lobe-like and psychotic symptoms are ascribable to damage to the rostral brainstem dopaminergic nuclei and its projections to the frontal-subcortical circuit components. Our findings provide human evidence of a significant role of the rostral brainstem dopaminergic neurons in cognition and behavior and a functional relationship between the MDS and frontal-subcortical circuits. However, there is a possibility to underestimate an involvement of the other regions other than the frontal cortices because our SPECT analyses were based on relative rCBF decrements not on absolute ones. In addition, direct association between the observed symptoms and SPECT findings is not clarified in this case report. To confirm our findings, it is necessary to analyze the relationship between neuroimaging findings and behavioral characteristics in a greater number of the patients with the rostral brainstem damage. Despite some limitations, we believe that the present results have important implications for understanding the pathomechanisms of psychoses, schizophrenia, and cognitive and behavioral problems in Parkinson's disease and dementia with Lewy bodies.

Acknowledgement

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社会的行動障害　事例検討

高次脳機能障害者に対する地域支援ネットワークの構築に関する研究
厚生労働科学研究　東海ブロック
平成19年12月14日（金）
三重県身体障害者総合福祉センター

第一部　13:00～14:15

社会的行動障害事例

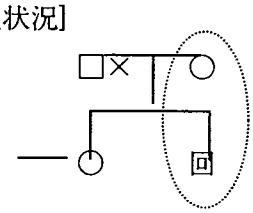
社会的行動障害：三重県のケース

○転職歴50社以上で借金数百万を抱え暴力行為もある、病識のない方への援助

ケース概要

母親と本人の2人暮らし。18歳の時交通事故を起こす。軽度の身体障害と重度の高次脳機能障害が残存したが、1年後自動車整備士として復職。すぐに解雇される。以後、50社以上転職を繰り返した。

母親に対する暴力行為があり、また消費者金融等から数百万円の借金がある。その請求通知を配達する郵便局員に対してまで威圧的行為に及んだ。途方に暮れた状況となって初めてコーディネーターに相談があがった。（身障手帳2種6級）

利用者	S・S	性別	男	生年月日	昭和43年○月○日（39歳）
相談内容	母親：私も年を取り、健康面で自信がない。何とか働いてはいるが最低限の生活の維持がやっと。息子のことを考えると、一緒に死ぬしか方法がないと思う。				
生活歴・ 生活状況	[生活歴] 地元の高校卒業後、自動車整備士として就職。その年に交通事故を起こした。以後転職を繰り返す。		[家族状況] 		
健康状態	事故後、てんかんの薬を飲んでいる。飲み忘れるとてんかんをおこすため必ず飲むようになった。生活のリズムは不安定で昼夜逆転している。				
ADL	身辺動作は自立している。 入浴については促さないと入らないことが多い。				
IADL	家事についてはこれまでずっと母親が行っている。金銭管理は元々アバウトな方だったが、現在はあるだけ使ってしまう。自動車は気をつけて運転しているものの道順はなかなか覚えられない。				
コミュニケーション能力・認知	全般的な知的低下あり。記憶は軽～中度の低下、新しい情報や複雑な情報の記銘力が低下している。 日常生活上の会話はできるが、複雑な話は不可。				

○支援の経過

時期	目標	支援内容
初期	母親の安全確保 本人の触法行為中止	本人の暴力について当時かかりつけの SU 病院から同系列の SA 病院（精神科）を紹介していただき、平成○年○月～平成○年○月まで（10 か月）入院治療した。その間、名古屋の○弁護士を通じて自己破産と成年後見の手続きを行った。借金の清算と年金申請を行い、軽快のため在宅復帰を果たした。
[ポイント！] ２人で面接実施。本人へ「借金を清算し一からやり直そう」と説得。借金とりはさすがにこたえるようで納得。精神病院の選定は、フォロー病院から同系列の精神病院を紹介いただき、コーディネーター・母親同席し直接困難な状況を説明し入院となった。		

支援時期	目標	支援内容
中期	精神状態の安定継続 ステップアップ	帰宅訓練実施し、情緒は落ち着き暴力行為もなくなった。 退院の連絡があり支援開始。高次脳機能障害の検査にのれそうなため拠点病院にて精査実施。（IQ65）身障手帳所得し福祉的就労から始めることとなった。身障授産施設を実習したが本人「もっと稼ぎたい」「自分のいる場所でない」と判断し１日で辞めた。
[ポイント！] 低賃金に納得できず、ステップアップの理解に乏しいため福祉的就労への理解はない。本人の了解という面では、得られないまま支援を進めたようなところがあった。		

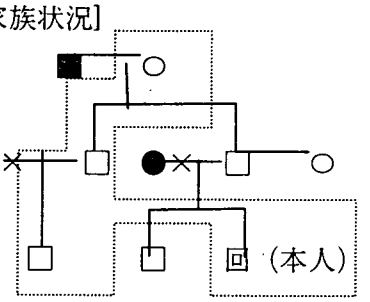
現在の状況
○県身体障害者総合福祉センターにて「自立訓練-機能訓練」を受けている。プログラムとしては職業リハの作業系を中心に、入所訓練実施。生活面全体を通じた評価を行い、その後通所訓練を行っている最中である。 病識を持つ・単独で実りのない就職活動を繰り返さない・職業センター及びハローワークの特別支援部門を活用することをコンセプトにしている。 成果としては、情緒が安定していることと、あれだけ嫌がった福祉施設の利用継続ができているところにある。本人の障害を理解した職員集団と同じ障害を持った利用者の中で訓練を受けることは可能になった。今後は彼の実力と企業側のニーズをいかにマッチングさせるのかがポイントであると考えている。

社会的行動障害：三重県のケース

○元々素行が悪く、感情コントロール不良と病識の低下がある方への支援事例

ケース概要

飲酒運転でバイク事故を起こし受傷。当初から全く病識がなく、暴言等不穏行動が頻回に見られた。強い希望で病院を退院するが、元の単身生活は困難だったため、育ての親である祖母宅に引き取られる。間もなく祖母が「このままではいけない」と感じ当センターに相談。本人はリハビリの必要性を感じていないが、周囲の説得や見学などを通じてなんとか入所訓練が開始される。(身障手帳2種3級)

利用者	M・M	性別	男	生年月日	昭和56年○月○日（25歳）
相談内容	祖母：このままでは働けないため、なんとか良くなってほしい。できれば仕事ができるようになってほしい。 本人：もう治っている。いつでも仕事ができる。何も困っていない。				
生活歴・ 生活状況	[生活歴] 乳児の時母親と死別。4歳の時祖母宅に引き取られる。社会人になり結婚。平成16年離婚し、以後交流なし。就労は社会保険のない会社で働き、寮で単身生活をしていた。			[家族状況]  	
健康状態	予防的に抗てんかん薬を飲んでいたが勝手に中止している。(今のところてんかんは起こっていない)　その他は特に問題ない。				
ADL	身辺動作は自立している。				
IADL	家事は祖母が行っている。 公共交通機関の利用は行っていない。				
コミュニケーション能力・認知	知的低下、記銘力・注意機能の低下などがある。 社会的行動障害があり、反社会的な言動と行動が多い。記憶障害のため学習効果が低く、同じ事を何度も言っている。				

○支援の経過

時期	目標	支援内容
初期	生活のリズム獲得 障害の自己認識を図る	施設入所し生活のリズムをつける。 日中活動は、作業訓練・スポーツ訓練など本人に必要な訓練と希望する訓練を実施した。 実力は福祉的就労レベルであった。
[ポイント！]　問題点などを指摘しながら訓練を実施。施設で生活のリズムをつけつつ、訓練場面を通じて問題点を指摘した。しかし、病識のなさは筋金入りであり、なかなか状況は変わらず、訓練にも乗りにくい。		

支援時期	目標	支援内容
中期	障害の自己認識を図る	施設入所により生活のリズムはついてきた。しかしながら制約のある団体生活にはなじめず、外出訓練で単独通所が可能になったため通所に変更する。 この頃から「もう働ける」という思いが強くなるが、「大統領になる」などと言い、依然として病識に乏しい。働く希望はしっかりとあるため授産施設にて実習を開始したが、先方とトラブルを起こし利用を拒否される。
[ポイント！] ステップアップの為に授産施設で実習を行ったが、利用は不可と判断される。それがなぜなのか理解できず「普通に働ける」といつも言っている。記憶が悪いことは少し自覚してきたものの、基本的には状況が変わらず施設として対応に行き詰る。		

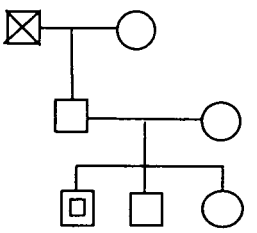
現在の状況
本人の希望通り、当センターを退所し自ら社会に出て単独で就職活動を行ってもらう。社会という現実的なフィールドでしばらく苦労するのも良いのではないかと支援者は考えた。電話連絡で近況を聞いていたが、1ヶ月程就職活動した後、結局全て上手くいかなかったようで、「どうしたらいいか」とはじめて本人から相談にやってくる。 就職が決まらない理由については、本人「障害者だから差別された」と言っているが、感情爆発などで周囲と上手くいかないのが一番の原因であることを伝える。我慢をして仕事をする練習のため、授産施設の利用を進める。1週間程右往左往したが本人の絶対的な上司として任命した授産施設担当者がキーパーソンとなり、現在は大きなトラブルなく施設に通う事が出来ている。特に屋外作業が気に入っている。 今後この授産施設は就労移行支援事業も開始する予定であり、上手くいけばそちらからステップアップすることが可能である。

社会的行動障害：岐阜県のケース

○　感情のコントロールが悪く、怒りや自責感から自傷行為にいたる高校生のケース

ケース概要

中学 3 年時に自転車通学中の交通事故により受傷、M病院に搬送入院。急性期病棟に 6 ヶ月、回復期リハ病棟に 6 ヶ月、計 1 年間同病院に入院。回復期リハ病棟転棟時からは病棟にてN養護学校の訪問授業を週 3 回受ける。感情のコントロールが悪く、些細なことで怒ったり被害的になったりする。パニックを起こし自傷行為に至ることもある。興奮が収まると自分を責めて落ち込む。回復期リハ病棟入院中、N養護学校の先生とM病院の MSW から支援コーディネーターに相談があった。

利用者	T・R	性別	男	生年月日	平成 2 年○月○日（17 歳）
相談内容	本人が精神的に不安定、特に音に過敏に反応。毎日付き添いをし様子を見ている母親も高次脳機能障害や今後のことについて不安が高まっている。病棟や訪問教育でも本人への対応に試行錯誤している。				
生活歴・ 生活状況	[生活歴]　中学 3 年時に受傷。通常の高校受験はできず、入院したままN養護学校の訪問教育に在籍となる。受傷前は長男として厳しく育てられ、神経質・几帳面な性格。			[家族状況] 	
健康状態	退院後にけいれん発作を起こしたため、以来、抗てんかん薬を服用。頭を打ち付けたり大声を出して車椅子から転落するなどパニックが激しいため、相談開始後に精神科受診。投薬は抗不安薬の頓服のみ。				
ADL	車椅子自走可能、移乗可能。杖歩行練習中。食事・更衣は自立。入浴は要介助、排泄は自立。特に左手先の巧緻性が低い。身体障害者手帳 2 級。生活習慣の乱れはない。				
IADL	外出は好き、ただ人混みは不可。地域の行事などで地元の友だちとの交流もある。学習意欲もある。学校の授業や行事で車椅子スポーツをする。携帯電話もある程度使える。テレビはドラマも集中し理解可。				
コミュニケーション能力・認知	全般的な知能低下があり境界水準。記憶能力も明らかな低下あり。勉強ができなくなった・怒りっぽい・忘れてしまうなどの認識あり。会話はゆっくりでたどたどしいが、十分可能。あいさつをする・敬語を交えるなど礼儀正しい。不自然で独特な笑いをすることがある。				

○支援の経過

時期	目標	支援内容
初期	パニック状況の分析や対処法の検討 退院後の在宅生活の安定・新年度の学校選択 母親の精神的な安定 学校の障害理解の向上	月１回定期的に面談。母親とも個別に面談した。支援病院にて精査・評価を実施。N養護学校の先生とは障害の特性・パニック時の対応・新年度の生活についてメールでやり取りした。自宅近隣のＹ精神病院の受診調整を行った。
[ポイント！] 支援拠点機関の相談枠を利用して定期的に面談。パニック時の状況や対処法を話し合った。パニック後の自責感を汲み、障害の認識があることは肯定的に評価。母親に対してはパニック時の対応を支持し、不安に傾聴した。学校側は障害の理解に熱心で連携しやすかった。精神科も受診したものの、定期的な受診には至らなかった。		

支援時期	目標	支援内容
中期	新しいＳ養護学校での適応の支援＜本人の適応の向上と学校の障害理解の向上＞ 在宅生活の支援	新しい環境に慣れず、学校や寄宿舎でパニック。てんかん発作も起こし短期入院。結局、自宅から通学。 支援病院に場所を移して定期的な面談を継続。当初に比べ会話がスムーズになった。振り返って対応を検討したり本人なりの想いを支持したりした。メモとりや携帯の活用も評価した。Ｓ養護学校の先生とも面談した。
[ポイント！] 学校と生活両方の急な変化を考慮して段階的な環境調整をすべきであったと反省。本人には障害の回復(＋成長発達)が感じられ、この点も肯定的に評価した。		

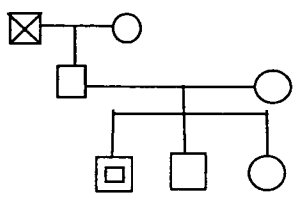
現在の状況
最近では週２～３泊寄宿舎で過ごす。話し相手がいて家よりも楽しいと話すこともあるとのこと。本人は怒りっぽいことを気にしているが、母親によると一時より落ち着いているよう。刺激に対しても前より受け流すことができるようになってきたと。授業内容や試験については学校が協力的で本人に合わせて対応してくれている。 本ケースは入院中の病院ＭＳＷの介入が適切であり、支援コーディネーターも早期から関与できた。母子に定期的に面接し、対応を話し合ったり気持ちを支持したりした。学校とは障害の理解・学校の選択・新しい学校での適応にあたり連携した。当面は本人の精神面や学校生活のさらなる安定が目標。寄宿舎生活の定着は将来的な生活の自立を考えても意味があるだろう。その他に家族支援も必要。長期的には卒業後の進路選択も課題となる。

社会的行動障害：岐阜県のケース

○　病識がなく復学を希望して問題行動を起こした青年のケース

ケース概要

20 歳(大学 2 年)の時にバイク走行中の交通事故で受傷。大学近くのA県内の病院へ搬送入院。リハビリ目的での転院を経て、N リハセンター病院に入院。Nリハ入院中、更生施設の利用および退所後の支援について、実家のある岐阜県の支援病院へ依頼があった。本人に病識がなく“大学へ戻りたい”と強く希望し、更生施設を抜け出すなどの問題行動を起こした。家族も回復期待が強く、現実を認めることが困難であった。

利用者	O・M	性別	男	生年月日	昭和 60 年○月○日（21 歳）
相談内容	本人・家族ともに復学を希望。そのためにNリハの更生施設で訓練を受けたい。自立した生活が送れるようになって欲しい。				
生活歴・ 生活状況	[生活歴]　岐阜県内の高校を卒業後、N大学に進学しA県内で単身生活。アルバイトやサークル活動にも熱心だった。大学 2 年時に受傷。	[家族状況] 			
健康状態	施設入所中に無断外出をするなどの問題行動が生じたため、精神科を受診。以後、受診を継続し、抗精神病薬を長期服用。				
ADL	右上下肢不全麻痺あるが、歩行自立、階段の昇降可。入浴・排泄・更衣も可能。発動性がやや低下しており、整容など一部の生活行動は促しが必要。1 つ 1 つの動作が緩慢で時間がかかる。				
IADL	単独外出は不可。漢字が読めないことから本や新聞は読めない。テレビは毎日見る番組がある。ゲームは決まったゲームのみ。友人との交流あり。財布にはいつも 5 千円程度、浪費はせず、むしろ貯めたがる。				
コミュニケーション能力・認知	全般的な知的能力に著しい低下あり。記憶力についてはさらに低下が著しい。ただ、繰り返せば学習の効果は期待できる。中程度の失語もあり、複雑な会話は困難。あいさつなどの礼節は保たれている。障害認識はかなり薄い。				

○支援の経過

時期	目標	支援内容
初期	入所訓練に関しての他機関との連携 精神科入院についての関係機関との調整	更生施設での入所訓練にあたりＮリハや家族と連絡を取り調整。訓練は始まったが、学生生活への想いが強く施設から無断外出。クールダウンの必要性から支援病院関連のＮ精神病院への入院調整。約２ヶ月の入院治療後、Ｎリハでの入所訓練を再調整。しかし、訓練に乗れず再び無断外出などあり、結局、退所。
[ポイント！] 更生施設退所後のことを見据えて入所時から関わり始めた。この時期は本人と直接関わることは少なく、関係機関との連携・調整が主であった。精神科入院中は母親からの電話での訴えを聴くとともにＰＳＷから病棟での本人の様子を聴いた。		

支援時期	目標	支援内容
中期	在宅生活の支援＜生活リズムの確立と次のステップへの移行＞	退所後しばらくは家族や関係機関と電話連絡。自宅からの無断外出あり。数ヵ月後から本人と父親に定期的な面談を開始。担当教授の促しと母親の強い希望で大学の特定の講義を条件付きで聴講し始める。通学と通院で生活は安定、本人・家族の精神面も安定。無断外出などの行動化はおさまる。大学夏季休暇のタイミングで作業所通所の調整、通所開始。
[ポイント！] 本人および家族に継続的に面談し関係を作った。通学にあたっては現実への直面や大学生活へのこだわりの増強などのリスクを話し合った。作業所利用は当初は促しても本人・家族ともに受け入れられず。タイミングを見て緩やかな移行を支援した。		

現在の状況
作業所への適応は問題なし、本人、通所に積極的。大学の夏季休暇が終わった後も作業所へ継続的に通所。現在は週３日大学＋週２日作業所＋通院で生活面・精神面安定している。本ケースは当初、本人・家族ともに受傷前の生活へのこだわりが強く混乱していた。結局、入所訓練は続けられず、面談や精神科通院を継続しながら限定的な通学をして安定し、ある程度納得したところで作業所への移行を支援した。今後の生活について、家族は生活の場を大学から作業所に移していく方向で考え始めているが、本人は通学がなくなることはまだ了解しにくいようであり、この点が課題となる。また、最近、家庭状況がさらに複雑で難しい局面にあることから、注意して見守る必要がある。