平成20～22年度研究成果の刊行に関する一覧表

雑誌

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Ⅴ．研究成果の刊行物・別刷

ELECTROPHYSIOLOGICAL STUDIES IN PATIENTS WITH SUBACUTE MYELO-OPTICO-NEUROPATHY BY MAGNETIC STIMULATION

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INTRODUCTION

Subacute myelo-optico neuropathy (SMON) is the neurological intoxication of Clioquinol, and SMON has affected about 10,000 patients in Japan until when Clioquinol formulations were released.
The sensory disturbance such as dysesthesia with peripheral neuropathy has been regarded as the major symptom of SMON. However, the subclinical disturbance of pyramidal tract functions has not been investigated.
So we investigated the central motor conduction times in SMON patients with the method of the transcutaneous magnetic stimulation.

METHODS

The functions of central conduction times were studied in 31 patients with SMON (47-74 Y.O), the transcutaneous magnetic stimulation was applied to the motor cortex and spinal cord.
The motor evoked potentials (MEPs) were elicited from the abductor pollicis brevis muscle and abductor hallucis muscle.
The central motor conduction times (CMCTs) were calculated from the latency difference between the MEPs elicited from motor cortex to cervical cord ,or the MEPs elicited from motor cortex and lumbar cord(Figure1).

RESULTS AND DISCUSSION

As the results, in normal subjects (21 cases, Age :42-67Y.O. Mean:58Y.O.), CMCTs between motor cortex and cervical level were 9.13 ± 0.92msec,and the upper limit of normal values (mean+3SD) was 11.89msec. CMCTs between motor cortex and lumbar level were 17.29 ± 1.31msec,and the upper limit of normal values was 21.22msec.
In SMON patients (N=31), CMCTs from motor cortex to cervical root were in normal range ,but the CMCTs from motor cortex to lumbar root were abnormal(over the upper limit of normal values) in 8 cases of moderate (N=11), and 4 cases of severe cases(N=7). In 3 cases of severe cases, evoked potentials could not evoked from leg muscles by transcranial magnetic stimulation. Furthermore, in mild cases (N=13) having not the pyramidal tract signs, 3 cases also showed the abnormal conduction times (Figure 2).

SUMMARY/CONCLUSIONS

The degree of prolongation of latencies of evoked potentials elicited from abductor hallucis muscles of legs by the transcranial magnetic stimulation was correlated with the grade of severity of clinical signs with SMON. These central motor conduction tmes (CMCTs) between motor cortex and lumbar level also reflected the subclinical disorders of pyramidal tracts in mild cases. Our results suggest that the transcranial magnetic stimulation is beneficial for evaluating the subclinical disturbance of

pyramidal tract signs of myelopathy such as in patients with SMON.

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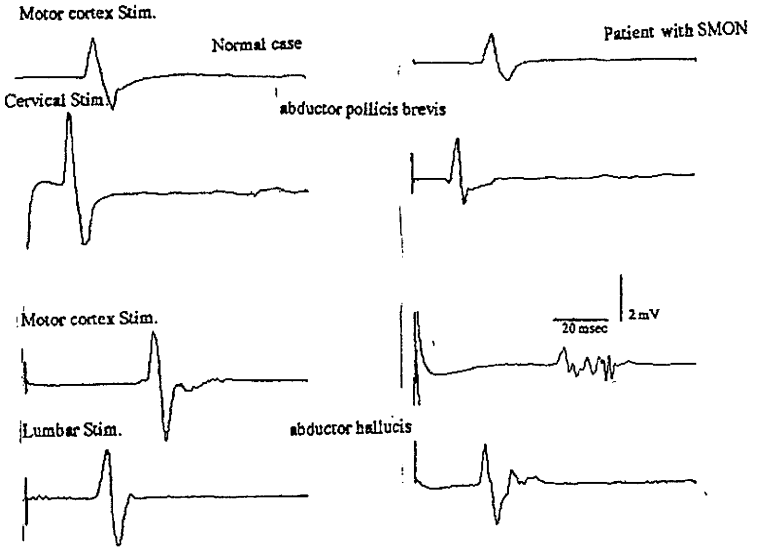

Figure 1: Motor evoked potentials elicited by magnetic stimulation

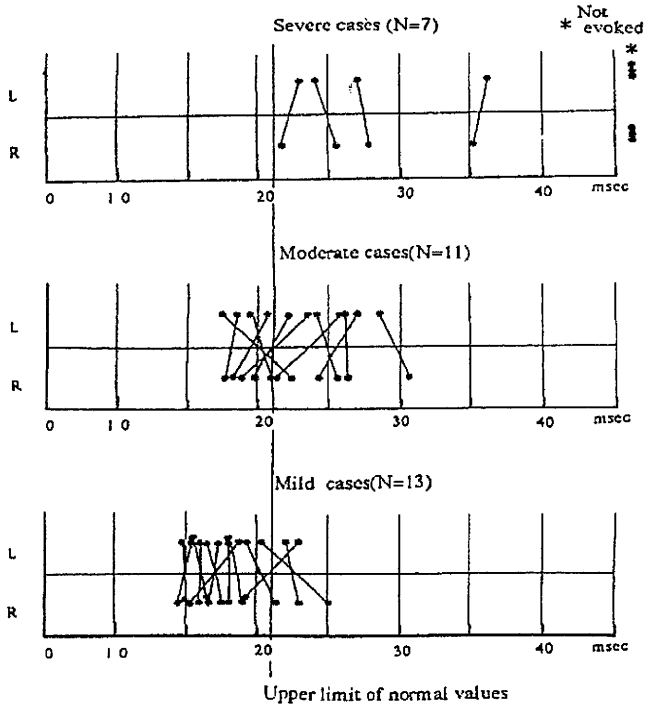

Figure 2:Central motor conduction times of motor evoked potentials from motor cortex to lumbar level in SMON patients

神経難病（スモン）とうつ病

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スモンは45の特定疾患の中に含まれる神経難病のひとつではあるが、原因がキノホルムによる中毒性神経疾患であり、我が国における難病政策の原点となっていることは周知のことである。昭和45年9月に厚生省が、整腸剤として処方されたキノホルムの製造販売および使用停止を決定してから新たなスモン患者の発生が見られなくなった。当初１万人を超えるスモン患者さんも現在約3000名となり、その平均年齢は70歳を超え、スモンの後遺症としての神経症状（視神経障害による視力障害、四肢特に下肢に強い脱力、独特な異常知覚、排尿障害など）および高齢化に伴う種々の合併症で苦しんでおられるのが現状である。

最近、近畿地区在住のスモン患者さんのうつ状態について調査研究を行う機会があり、今回その調査結果について述べる。その結果、スモン患者さんではうつ状態が強いことがあきらかとなり、スモン患者さんにおける大うつ病の推定罹患率は約15％と高く、この頻度は一般同年齢の対象老人と比べ約7倍の高頻度であった。またスモン患者さんの症状の中で、スモンに特有な異常知覚が強いほどうつ状態が強く、日常生活動作において障害の程度が強いほどうつ状態が強く、うつ状態に対する専門医によるメンタルケアが必要であり、スモンの臨床症状のうち異常知覚に対する治療や高齢化に伴う自立度の低下予防も重要な課題であることがあきらかにされた。

このスモン患者さんのうつ状態の調査研究は、厚労省の難治性疾患克服研究事業であるスモンに関する調査研究班の研究費のもと、近畿地区のスモン調査研究班員の先生方との共同研究として行われた。その結果は「スモン患者の精神障害」として、京都医学会雑誌[1]に掲載されている。

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研究の対象と方法

平成14年度に宇多野病院外来を受診したスモン患者26名（男性９名、女性17名、平均年齢70.7才）を対象に、スモン現状調査個人票、DSM-IV Ⅰ軸障害（以下、精神障害）の構造化面接、ミニ精神機能評価（Mini Mental State Examination: MMSE）、ベック抑うつ評価尺度（Beck Depression Inventory: BDI）を実施した。

スモン現状調査個人票、MMSE、BDIを近畿地区在住のスモン患者106名に施行し、スモン神経症状（視力障害、歩行障害、感覚異常、日常生活動作を表すバーテル指数等）の各パラメーターとの関連を検討した。

右京老人クラブ会員（300名）にBDI調査用紙を郵送・回収し、近畿地区在住のスモン患者のBDIと比較検討した。

(1) 精神障害疫学調査：各精神障害の発症年齢と経過を特定し、キノホルム服用前・服用中・中止後の各時点での有病率を算定し、それぞれの時点での頻度についてχ二乗検定を用いて検討した。精神障害発現に関する神経障害の影響を検討するため、精神障害の有無による２群に分けMann-WhitneyのU検定を用いて視力障害重症度、歩行障害重症度をそれぞれ既往、現症で比較した。

(2) 精神障害検出能評価：個人票による抑うつ群・非抑うつ群、構造化面接による大うつ病発症群・非発症群にそれぞれ分け、t検定を用いてBDI得点を比較した。個人票による健忘群・非健忘群に分けt検定を用いてMMSE得点を比較した。年齢、教育年数、BDI得点、MMSE得点の相関係数を算出した。

結果と考察

１）精神障害疫学調査

スモン経過と精神障害を検討し、各精神障害のキノホルム服用前、服用中、服用後での有病率の推移を検討した。大うつ病の罹患頻度はキノホルム服用中には38.4%に増加し、服用前の3.8%と比較してχ二乗検定で有意な罹患頻度の増大が認められ、服用後も15.4%と高い頻度を示した。せん妄を示した頻度はキノホルム服用中のみに7.7%見られたが、服用前後の頻度は、統計学的に有意な変動ではなかった。またキノホルム服用後にパニック障害に罹患した頻度が11.5%と高かった。痴呆、全般性不安障害、外傷後ストレス障害と診断した症例は認めなかった。

スモン徴候と精神障害との関連についての検討では、せん妄群は非せん妄群に比して視力障害重症度が高い傾向を示したが、統計学的に有意差は認めなかった。精神障害の有無に関し視力障害重症度、歩行障害重症度の有意差は認めなかった[2)]。

キノホルム服用中に最も高い有病率を示す大うつ病、せん妄は急性外因反応型の中毒性精神障害と考えられ、キノホルム服用後においても大うつ病とパニック障害が高頻度に残存した。神経障害重症度による精神障害発現の予測は出来なかったが症例数が少ないため統計学的有意差が得られなかった可能性もあると考えられた。

２）精神障害検出能評価

抑うつ症状を評価する方法としてBDIを施行し、その総点数を検討した結果、抑うつ群（11名）、大うつ病発症群（４名）ではそれぞれ有意に総点数が高かった（t=5.3、p<0.001；t=3.6、p<0.016）。BDIのカットオフポイントを２５点（２５点以上を異常）とすると、大うつ病診断の感受性は1.0、特異性は1.0となり、大うつ病の診断に有用であることが示された。

健忘症状評価の目的でMMSEを施行し、MMSE点数を健忘群（10名）と非健忘群（16名）で検討したが、MMSE得点に有意差を認めなかった。年齢、教育年数、BDI得点、MMSE得点のうち、任意の２項目間でいずれも有意な相関は認めなかった[2)]。

スモン調査研究班で施行している個人調査票の問診内容は抑うつ、健忘とも自覚症状を反映してその罹患頻度は高頻度であるが、精神科専門医師の診断とは合致せず、精神障害の検出目的には専門医師の診察が必要と考えられた。種々の検査と大うつ病との関連の検討から、大うつ病検出にはBDIが有用であった。

３）近畿地区在住スモン患者の精神障害の特徴

平成14年度に近畿地区でスモン研究班員によるスモン検診を受診したスモン患者は合計174名（男性44名、女性130名、平均年齢74.3才）であった。現状個人調査票の項目中の不安・焦燥、心気的、抑うつの精神症状を訴えた患者は約3-4割で、うつ状態を訴えた患者は高齢化に従って有意（p<0.05）に増加した。不安焦燥は各年代で約3割の患者が自覚し、心気的な自覚は80台以上の高齢になるとむしろ頻度が減少した（図）。何故高齢者で心気的な自覚が減少するかの理由は明らかではないが、スモン後遺症で長期療養するうちに、スモンという疾患が受容できるようになったことが一因であるかもしれない。しかし、若年層から不安・焦燥の頻度が高く、介護者の高齢化などの将来に対する不安が強いことをうかがわせる。

近畿地区でスモン検診を受診した174名のスモン患者のうち、BDI調査に参加した患者は106名（男性28名、女性78名、年齢51-91才、平均年令73.5才）であった。これらの患者のBDI点数と現状個人調査票の中の項目にある臨床症状（視力障害、歩行障害、感覚異常、バーテル指数、重症度等）の各パラメーターとの関連の検討では、スモン患者全体ではMMSE点数、罹病期間およびバーテル指数と有意な相関を示したが、男性と女性スモン患者で相関するパラメーター項目の内容が異なっていた（表）。

男性患者の平均年齢（71.2才）は女性患者（74.3才）より約3才若いが、有意差はなかった。男性スモン患者は年令およびMMSE点数とBDI点数とが有意な相関を示し、高齢になるほど、また痴呆の程度が強くなるほどBDI点数が高かった。女性スモン患者では異常知覚の程度、スモン罹病期間およびバーテル指数とBDI点数とが有意な相関を示した。女性スモン患者ではスモン患者特有の両下肢のジンジン・ピリピリ・締め付け・冷感等の異常知覚の程度と罹病期間とに強い相関が見られたことは、スモン特有の異常知覚が女性スモン患者のうつ傾向を

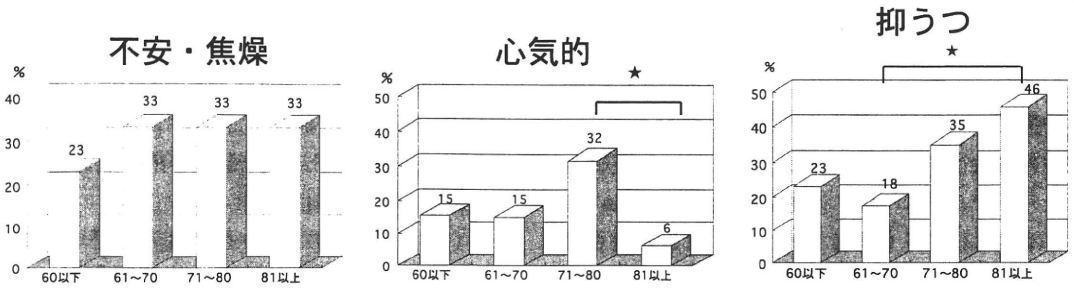

図　近畿地区在住スモン患者（174名）の各年代別精神症候の自覚頻度
（★：χ二乗検定で５％レベルでの有意差を示す）

増強させていると考えられた。また高齢化に伴ってその頻度が増加する種々の合併症の併発によって、日常生活動作の低下が女性において著しく、高齢化に伴う合併症の併発がうつ状態を増強させていると考えられた。高齢化に伴い頻度が増加する転倒骨折による受傷、関節疾患などが日常生活動作の低下の要因になっており、自立度が低下すると介護が必要となり、身内の介護者の高齢化も不安やうつ状態の増大の原因にもなっている。

４）京都市右京老人クラブ会員との比較検討

京都市右京区在住老人クラブ会員のなかでBDI調査に参加した会員（以下「一般老人」と略）は92名（男性41名、女性51名、年齢57-91才、平均年令75.8才）で、その平均年齢はスモン患者と有意差はなかったが、平均年齢で2.3歳高齢であった。近畿地区在住のスモン患者106名から得られたBDI点数との比較検討では、男女スモン患者共に一般老人に比べて有意な（ｐ＜0.01）BDI点数の高値が見られた。スモン患者あるいは一般老人においてBDI点数25点以上の比率は各々16/106（15.1％）と2/92（2.2％）であり、有意に（ｐ＜0.01）スモン患者にその頻度が高かった。男女別に検討すると、女性スモン患者（78名中12名）で一般老人女性（51名中１名）と比べχ二乗検定で有意に25点以上を示す患者の比率が高かったが、男性スモン患者（28名中４名）と一般男性老人（41名中１名）とでは比率には有意差は見られなかった。

近畿地区在住スモン患者106名のアンケート調査でのBDI点数が25点以上の頻度（15.1％）は、精神科専門医が京都在住の26名のスモン患者を診察して明らかにした15.4％の大うつ病の頻度と一致するものであった。京都市右京区在住の一般老人の大うつ病有病率は2.2％と推定され、スモン患者はその7倍の頻度であった。欧米での65才以上の老人の大うつ病の有病率は３％前後であり、これまでの欧米と日本での複数の疫学調査による有病率は0.1％～5.6％の範囲内であった。今回の平均年齢約76才の一般老人においてBDI点数の25点以上から推定した大うつ病の有病率の2.2％であり、従来の疫学調査結果の範囲内の頻度を示した。

表　スモン患者全体および男女別のベック点数と各臨床パラメーターとの相関（数字はp値を表し、斜字はp値が５％以下の有意な相関を示す）

	全員（106名）	男性（28）	女性（78）
年齢	0.543	*0.032*	0.73
MMSE点数	*0.016*	*0.001*	0.162
異常知覚	0.104	0.459	*0.009*
罹病期間	*0.011*	0.168	*0.044*
視力障害	0.606	0.599	0.95
歩行障害	0.188	0.915	0.151
バーテル指数	*0.017*	0.417	*0.037*

京都および近畿地区在住のスモン患者の精神障害の検討からスモン患者の約15％の患者が大うつ病を罹患していると推定され、一般老人の約７倍の頻度を示した。専門医による高齢スモン患者のメンタルケアが重要であると考えられた。

５）うつ状態や痛みに対する治療

うつ状態に対して、精神科や心療内科で治療を受けられている患者さんは少数であり専門的な治療を希望する患者さんも多い。異常知覚に対してはり・灸が効果がある患者さんは継続治療をされているが、はり・灸治療効果が乏しい場合には種々の薬物が試みられている。一般的に用いられる鎮痛剤（ロキソニンなど）、メキシチール、ノイロトロピン、リボトリールなどがその副作用に注意しながら処方されることがあるが効果のほどは個人ごとに異な

る。宇多野病院の看護部の調査[3]では下肢の痛みをやわらげるために、暖める、もむ、温湿布を貼る、薬物療法（内服）が効果的である事が分かった。その他の方法は、自分なりの道具を用いた緩和方法や、マッサージ、注射、エアーマットの使用などがあり、足をしばる、足を低くするなどそれぞれの患者さんが独自に工夫しながら痛みに対処していた。従来の異常知覚に対する薬物療法や、はり・灸の漢方療法以外に異常知覚を緩和する新たな医療の開発や高齢化に伴って低下するADLの低下予防のための専門医による対策が必要である。高齢化に伴い頻度が増加する転倒骨折による受傷、関節疾患などが日常生活動作の低下の要因になっており、自立度が低下すると介護が必要となり、身内の介護者の高齢化も不安やうつ状態の原因にもなっている。

まとめ

1．現在、国内には3000名前後のスモン患者が生存し、その平均年齢は70才を越え毎年高齢化している。これまでスモン患者の精神障害の研究が十分なされていないため、今回スモン患者の精神障害の検討を行った。

2．京都在住スモン患者の精神障害有病率の検討を行った。その結果キノホルム服用中に最も高い有病率を示す大うつ病、せん妄は急性外因反応型の中毒性精神障害と考えられた。大うつ病検出にはBDIが有用で、BDI点数25点をカットオフポイントにすれば、25点以上の患者が大うつ病に罹患していると診断できた。

3．近畿在住スモン患者におけるBDI点数とスモン症状との関連では、男性では年齢・MMSE点数と有意に相関し、女性では異常知覚・バーテル指数と有意な相関を示した。

4．平均年齢75.8才の一般老人と、平均年齢73.5才のスモン患者のBDI点数の比較では、スモン患者で有意な点数の増大が見られ、スモン患者の15％が大うつ病を罹患していると推定され、その頻度は一般老人の約７倍であった。

5．スモン患者のうつ病の治療には専門医によるメンタルケアが大切であり、スモン特有の異常知覚軽減のための医療と高齢化が進むスモン患者のADL低下の防止対策が必要である。

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INTERNAL MEDICINE

□ ORIGINAL ARTICLE □

Depression in Patients with Subacute Myelo-Optico-Neuropathy (SMON)

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Abstract

Objective We investigated the psychiatric disorders in subacute myelo-optico-neuropathy (SMON) patients by structured interview. The prevalence of major depressive disorder in SMON patients was estimated by structured interview and using Beck's depression inventory (BDI) questionnaires.

Materials and Methods Psychiatric conditions were evaluated in 26 SMON patients (9 males, 17 females, mean age 70.7 years) living in Kyoto prefecture through a structured interview given by psychiatrists. BDI questionnaires and clinical symptoms of SMON were investigated in 106 patients, ranging from 51 to 91 years in age (mean, 73.5) with SMON patients living in Kinki area. BDI questionnaires were obtained from 92 age-matched aged healthy people, ranging from 57 to 91 years in age (mean, 75.8), living in Kyoto city.

Results Among the psychiatric disorders in SMON patients, the prevalence of major depressive disorder and suicidal ideation significantly increased during the period of clioquinol intake and four patients (15.4%) out of 26 SMON patients still suffer from major depressive disorder. The prevalence of major depressive disorder in SMON patients was estimated at 15.1% (16/106) and this percentage was about seven times as frequent as in the age-matched aged healthy people (2.2%; 2/92). In female SMON patients, the degree of the depressive states was significantly correlated with the severe degree of dysesthesia of the lower extremities, and it was inversely correlated with the duration of SMON disease and the total scores of the Barthel index.

Conclusion This is the first report that shows the prevalence of major depressive disorder in SMON patients at present, which was seven times more frequent than age-matched aged healthy persons.

Key words: clinical study, major depressive disorder, clioquinol, SMON, Beck's depression inventru, psychiatric disorders, dysesthesia

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Introduction

Subacute myelo-optico-neuropathy (SMON) is a disease caused by clioquinol intoxication, characterized by subacute onset of sensory and motor disturbance in the lower extremities with visual impairment following abdominal symptoms, which mainly occurred during 1950-60's in Japan (1-3). After the ban of the sale of drugs containing clioquinol in September 1970, a sharp decrease in the number of SMON patients was observed in Japan. It is estimated that the number of SMON patients only slightly exceeded three thousand in 2002, and the mean age of 1,031 SMON patients exceeded 70 years old (mean age±SD, 72.9±9.6) with female predominance (males: females; 1: 2.75) (4). According to the nation-wide survey of 1031 SMON patients by SMON Research Committee, the prevalence of psychological complications was 51.8% and the depressive state was observed in 19.8% of SMON patients (4).

As the prevalence of major depressive disorder in SMON

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Table 1. Prevalence of Psychological Symptoms Before, During and After the Period of Clioquinol Intake (6)

	Before	During	At present
Major depression	3.8%	38.4%★	15.4%
Delirium	0%	7.7%	0%
Panic disorder	0%	0%	11.5%
Hypochondriasis	0%	0%	3.8%
Conversion disorder	0%	0%	3.8%
Alcohole abuse	3.8%	0%	3.8%
Sleep disorder	0%	0%	7.7%
Suicidal ideation	0%	23.1%★	0%
Committing suicide	0%	11.5%	0%

Before : before the clioquinol intake period

During: during the clioquinol intake period

★: $p<0.01$ by χ square test between before and during clioquinol intake period

patients in Japan has not been studied, we estimated the prevalence of major depressive disorder by structured interview by psychiatrists using Beck's depression inventory (BDI) questionnaires. We also compared the depressive states of SMON patients with age-matched healthy persons using BDI questionnaires. At the same time, we tried to clarify the factors causing deterioration of the depressive states in SMON patients associated with their clinical symptoms.

Materials and Methods

Psychiatric conditions were evaluated in 26 SMON patients (9 males, 17 females, mean age 70.7 years) living in Kyoto prefecture through a structured interview given by psychiatrists using BDI questionnaires. BDI questionnaire and clinical symptoms of SMON were investigated in 106 patients (28 males, 78 females), ranging from 51 to 91 years in age (mean, 73.5), living in the Kinki area. Before the entry of this study, we explained to each patient the aim of this study, and promised to keep the results private. Only patients who understood and agreed with the aim of this study were entered. BDI questionnaire was mailed to 300 aged people at random belonging to the golden age club at Ukyo area in Kyoto city, and had reply from 92 old people (41 males, 51 females), ranging from 57 to 91 years in age (mean, 75.8). Thus, the response of the BDI questionnaire was 30.7% (92/300). The clinical symptoms of SMON were evaluated using medical check-up records established by the SMON Research Committee. The degree of the peculiar dysesthesia in SMON patients (2), which includes adherent sensation to sole and sensation of scrubbing, tingling, stabbing or coldness, was classified into four groups; none, mild, moderate and severe. Visual impairments were classified into seven groups; normal, nearly normal, mild, moderate and severely impaired, only perceiving blight sensation and total blind. The gait scores were obtained from condition of gait, which was classified into nine grades as follows: unable to walk, able to move by using a wheelchair, able to walk with aid, walk by holding walls, walk on crutches, walk with a stick, moderately unstable gait, mild unstable gait, normal gait. In each patient, total scores of Barthel index were calculated as the sum of ten questionnaires (total score; 100) (5). Mini-mental state examination (MMSE) was done in all SMON patients and the patients whose scores were less than 23 points were excluded. The study was approved by the ethics committee of Utano National Hospital.

Statistical analysis was made using Spearman's rank correlation, Wilcoxon's rank-sum test, or χ square test. A level of $p<0.05$ was considered to be statistically significant.

Results

Psychiatric disorders in SMON patients

Structured interview by psychiatrists toward 26 patients with SMON who live in Kyoto area disclosed an increase in the prevalence of major depressive disorder, delirium, suicidal ideation and commitment of suicide during the clioquinol intake period (*during* in the Table 1). The increase was significant in major depressive disorder and in the suicidal ideation during the clioquinol intake period (6). Four patients (15.4%) out of 26 SMON patients suffered from major depressive disorder at present (*present* in the Table 1). Significant changes of the prevalence of psychiatric disorders, such as panic disorders, hypochondriasis, conversion disorder, alcohol addict and insomnia, were not observed during the periods of medication of clioquinol and present (6). The suicidal ideation and commitment of suicide during

the clioquinol intake period were observed with the patients, only who were diagnosed as having major depressive disorder at the same time.

Total BDI scores of SMON patients and aged people

The total scores of BDI questionnaire of these four SMON patients with major depressive disorder in Kyoto prefecture exceeded 25 points, and the score of the other SMON patients without major depressive disorder was under 24 points. It is consistent that 24/25 of the total scores of BDI questionnaire is considered for tentative cut-off point for suffering from major depressive disorder or severe depressive mood in this study. The number of SMON patients with a total BDI score exceeding 25 points was sixteen (15%) out of 106. On the other hand, the score in 2 (2%) out of 92 aged people exceeded 25 points. The difference of these two groups was significant by χ square test ($p<0.01$).

Table 2. Spearman's Rank Correlation Coefficient between Total BDI Scores and Age, Scores of Barthel Index, in Each Gender

	Males (28)	Females (78)
Age	−0.246	0.034
MMSE scores	−0.198	−0.128
Dysesthesia	−0.099	0.292★
Duration of disease	−0.361	−0.270★
Visual impairment	0.164	0.009
Gait disturbance	−0.021	−0.216
Barthel index scores	−0.064	−0.299★★

★: $p<0.05$, ★★: $p<0.01$

Correlation between total BDI scores and clinical characteristics of SMON patients

In order to clarify factors which might influence the scores of BDI questionnaire, Spearman's rank correlation were examined among total BDI scores and the scored clinical characteristics of SMON patients analyzed in each gender groups (Table 2). In each gender, the total BDI scores did not correlate with age nor with the MMSE scores. In female SMON patients, the BDI scores were significantly correlated with the severe degree of dysesthesia of the lower extremities and were inversely correlated with the duration of SMON disease and the total scores of the Barthel index. In contrast, the BDI scores of male SMON patients did not show a significant correlation with any clinical characteristics.

Comparison of the total BDI scores among SMON patients and aged people

The distribution of BDI scores from 92 aged people living in Kyoto city and 106 SMON patients in Kinki area is shown in Fig. 1. Although the mean age of aged people was 2.3 years older than that of SMON patients, the Wilcoxon's

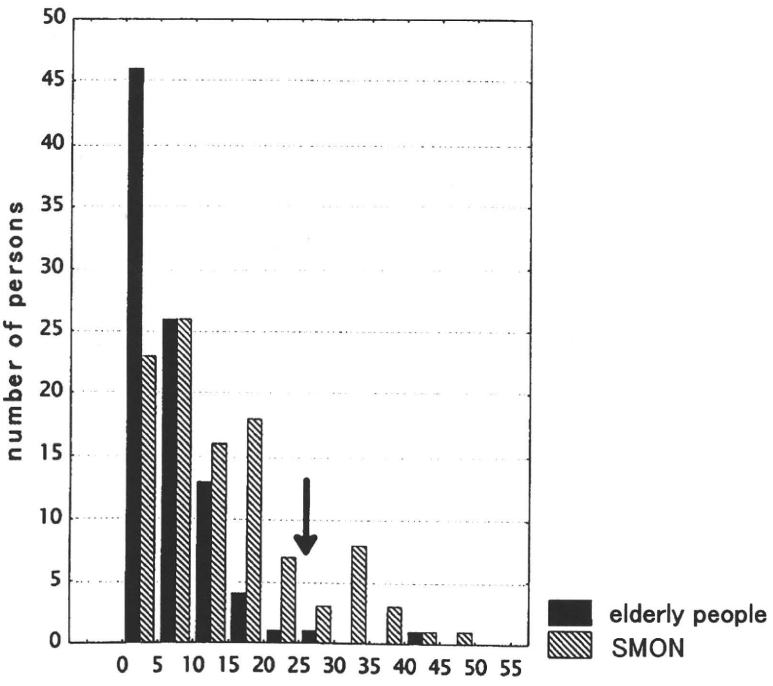

Figure 1. Distribution histogram of BDI scores of SMON patients and aged people. An arrow indicates cut-off point of 25 score.

rank-sum test of BDI scores showed that SMON patients had significantly high scores compared to age-matched aged people ($p<0.0001$). Using tentative criterion of having major depressive disorder estimated from the high points of BDI scores exceeding 25 (arrow in Fig. 1), two (2.2%) out of 92 aged people and 16 (15.1%) out of 106 SMON patients were suggested to suffer from major depression. The percentage of the patients having estimated major depressive disorder in SMON patients was significantly high compared with those of aged people by χ square test ($p<0.01$). There was no difference in percentage exceed 25 points among male patients [14.8% (4/27)] and female patients [15.2% (12/79)]. The SMON patients were suggested to be suffering from major depressive disorder seven times more frequently compared with the age-matched aged people.

Discussion

A nation-wide survey of SMON patients showed more than a half SMON patients were suffering from various kinds of psychological complications, such as depressive mood and hypochondriasis (4). The mean age of these SMON patients was over 70 years old.

Here, we disclosed two significant points. First, the prevalence of major depressive disorder and delirium increased during the clioquinol intake period suggesting that these psychiatric disorders were due to the reactions of acute phase of SMON. Secondly, the prevalence of major depressive disorder in SMON patients at present was about 15% of SMON patients, estimated by two different ways, which percentage of major depressive disorder in SMON patients was seven times more frequent than age-matched aged people. One way of estimation of the prevalence of major depressive disorder among SMON patients was done from structured interview of 26 SMON patients by psychiatrists and four (15.4%) out of 26 patients was diagnosed as having major depressive disorder. The other estimation was obtained using BDI questionnaire from 106 SMON patients, in which 24/25 points of BDI scores was arbitrary used as the cut-off point for the estimation of the prevalence of major depressive disorder. This cut-off point of 25 scores was considered as having moderately to severely depressed patients in the hospitalized medically ill patients (7). Using our tentative cut-off point, 16 (15.1%) out of 106 SMON patients were estimated to be suffering from major depressive disorder which coincided with the results obtained by the structured interview by psychiatrists.

The prevalence of major depressive disorder in aged people was 2.2% (2/92), estimated by the percentage of people, which BDI scores exceeding 25. This estimated prevalence in this study is compatible with other studies of aged people. The six-month prevalence of major depression in three different communities showed 2.2-3.5% with less frequency in aged people over 65 years old (8). The prevalence of major depressive disorder in aged people over 65 years old was reported as 3.7% (9). In Japan, there were two studies on the prevalence of major depressive disorder in elderly people over 65 years old, in which the prevalence was 1. 1% (10) and 5.6% (11).

From the correlation study between severity of clinical parameters of SMON patients and BDI scores, the worsening factors for depressive state in female SMON patients closely related with the severity of the degree of dysesthesia of the lower extremities and the degree of disability of ADL. These findings suggest that improvement of the level of ADL and a reduction of dysesthesia of the lower extremities are important factors for the treatment of depressive state in SMON patients. We expect that the alleviation of these factors in the near future by the application of new medications or rehabilitation in SMON patients with a high BDI score will reduce the degree of the depressive mood associated with the reduction of BDI scores.

Abbreviation: ADL: activities of daily living

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RESEARCH PAPER

Factors associated with life satisfaction in Japanese stroke outpatients

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Abstract

Purpose. To measure life satisfaction in Japanese stroke outpatients and randomly-sampled community residents and to investigate variables influencing their life satisfaction.

Method. Data on the demographic and clinical profiles, Satisfaction in Daily Life (SDL), other measurements, were obtained from 869 stroke outpatients (552 males, 317 females) and 748 community-dwelling elderly (360 males, 388 females), aged 55 years and older. Differences in categorical variables and continuous variables were tested by chi-square test and ANCOVA with age as the covariate, respectively.

Results. The 11 SDL items were subjected to a factor analysis, which extracted two factors. Factor 1 (F1), labeled as 'satisfaction with one's own abilities', included satisfaction with housework, self-care, gait, physical health, hobby and leisure, social intercourse and mental health. Factor 2 (F2), 'satisfaction with external factors', included satisfaction with partner/family relationship, economic state and social security, and house facilities. Both F1 and F2 scores were significantly lower for stroke outpatients ($M = 19.7$ and 10.9, respectively) than for community-dwelling elderly ($M = 28.2$ and 12.0, respectively) ($p < 0.001$). Living conditions were significantly associated with F2, but not with F1. Males living alone scored lowest on F2 than the others for both groups. Among stroke outpatients, both F1 and F2 scores differed significantly by the type of hemiparesis and the severity of aphasia.

Conclusions. SDL of stroke outpatients, which was lower than community-dwelling elderly, differed by the type of hemiparesis, the severity of aphasia, and living conditions. The effects of living conditions might vary with gender.

Keywords: *Stroke, life satisfaction, satisfaction in daily life, principal component analysis*

Introduction

Although medical treatments for stroke have been progressing, stroke is still one of the major causes of death in most industrialized countries [1–3] and impairments and disabilities after stroke persist in many cases. After acute medical and/or neurosurgical treatments for stroke, rehabilitative treatments play a major role at the subacute and chronic stages, including improvement in hemiplegia, independence in activities of daily living (ADL), encouragement to participate in social activities, and improvement in quality of life (QOL). Activity limitations and participation restrictions, as well as life satisfaction, which constitute a subjective perception of the individual and is a subjective domain of QOL, are very important in community rehabilitation programs and home-care and home-help services. Previous studies have revealed that life satisfaction of post-stroke patients was influenced by race [4,5], gender [6,7], marital status [1,7], living conditions [8], aphasia [4,9,10], social support [3,11,12], and returning to work [14]. However, the influence of these factors on patients' satisfaction remains controversial due to inconsistent findings.

As to the effect of aphasia, for example, Christensen and Anderson [9] reported that patients with aphasia showed lower satisfaction than those without aphasia in the central region of the USA, whereas Ross and Wertz [10] showed that life satisfaction might be independent of aphasia in the southwestern region of the USA. As to gender, marital status, and living arrangements, Jaracz [6] observed that life satisfaction of stroke patients was not significantly correlated with their gender, marital status, or living arrangements in Poland, whereas

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Kauhanen [7] found that various aspects of QOL, including life satisfaction, were associated with marital status in Finland. Thus, it seems reasonable to hypothesize that the association of these factors with life satisfaction may differ across nationality and race/ethnicity or culture.

On the other hand, the sample sizes of the previous studies were relatively small, i.e., mostly less than 100 patients. Because life satisfaction is a subjective perception of the individual, it may fluctuate easily. Thus, a larger number of subjects are needed to obtain a stable result concerning life satisfaction. As far as we know, however, only one previous report has demonstrated the life satisfaction and its related factors among post-stroke outpatients with more than 800 subjects. Wyller et al. [12] reported that the subjective well-being (SWB) of 1,417 post-stroke patients in Norway, which may be regarded as interchangeable with life satisfaction mentioned here, was considerably lower than that of the counter-age community residents. They also described its relationship with female gender, older age, good general and mental health, and a firm social network. A body of large-scale investigations is necessary to obtain a consensus about life satisfaction of patients living at home with disabilities, such as stroke, subacute myelo-optico-neuropathy [13] and others.

The aims of the present study are to measure the life satisfaction of a large number of stroke patients living at home and community-dwelling elderly in Japan, and to disclose the features and influencing factors of their life satisfaction. We paid particular attention to the influence of living condition, which might play a supportive role for the outpatients after stroke, and to the influence of the time duration after onset of stroke as well. In the future, we intend to investigate the SDL of patients with subacute myelo-optico-neuropathy.

Methods

Stroke outpatients

All of Japan was divided into 10 regions, and one to three hospitals were selected from each region based on the following criteria: (i) the hospital has first-grade rehabilitative facilities in the legal medical insurance system, (ii) a board-certified doctor of rehabilitation medicine organizes the department of rehabilitation medicine, and (iii) the hospital serves the region. Finally, 16 hospitals were chosen from all over the country, and were asked to join the collaborative study. The board-certified doctor in each hospital was asked to select a maximum of 80 consecutive stroke outpatients according to our common inclusion criteria: patients (i) are 55 years of age or older, (ii) have a history of stroke confirmed with computed tomography or magnetic resonance image, (iii) have already received stroke rehabilitation in the hospital, (iv) have no dementia or extremely severe aphasia, or who could not understand the questionnaire, (v) are able to respond to a self-rating questionnaire, and (vi) agree to join this study.

The SDL and other questionnaires were administered to stroke outpatients by these doctors. The doctors evaluated the severity of aphasia into 4 degrees: no aphasia, mild aphasia, moderate aphasia and severe aphasia. Stroke outpatients with aphasia were interviewed by trained speech therapists who were allowed to be proxy for patients with aphasia who were unable to complete the questionnaires by themselves, while the other outpatients and community residents responded to each item by themselves.

Although the doctors sent us anonymous data on 1,070 stroke outpatients from 16 hospitals nationwide, only 869 participated in the study (Table I), as the remaining 201 patients were in long-term hospital or nursing home care, or had missing values. Of the 869 patients, 59.0% had cerebral infarction, 35.1% had cerebral hemorrhage, 4.3% subarachnoid hemorrhage (SAH), 0.9% others, and 0.7% unknown; and the duration from onset was 5.3 ± 4.8 years (mean $\pm$ standard deviation).

Community-dwelling elderly

One thousand community-dwelling elderly were randomly selected from the register of electors of Yahatanishi Ward, Kitakyushu City, Japan. Kitakyushu City, a large city located in a rural province of Japan, was designated by the national government as a model city for treating the elderly. Yahatanishi Ward is a residential area of the city, and its elderly residents were regarded as representative of aged persons in Japan. First, we sent a letter of request and questionnaires to 1,000 elderly people, asking them to participate in the survey; 780 agreed to take part in it. One hundred forty-nine did not respond, 46 refused to join the survey, and 25 had died or moved. Members of our survey team then called at the subjects' homes, and collected 748 questionnaires (Table I), as 32 of the 780 were excluded because they were in a hospital or nursing home, or less than 55 years old. Details regarding the data collection have been described elsewhere [15]. Of the 748 community-dwelling elderly, 451 (205 males, 246 females) received some medical treatments and rehabilitation services.

Instruments

The questionnaires consisted of a subject's profile sheet, the Satisfaction in Daily Life (SDL) [16],