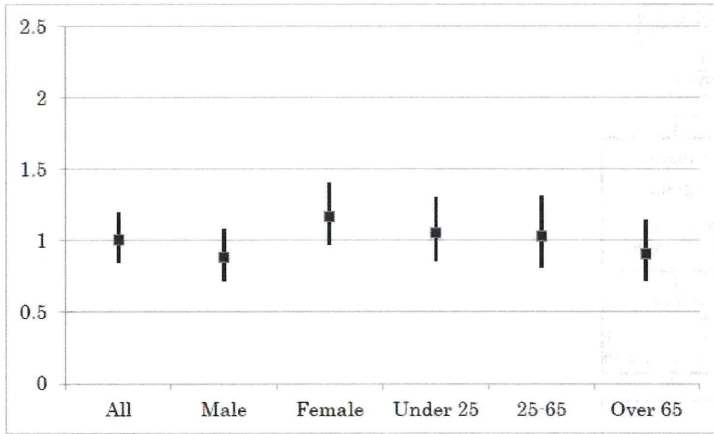


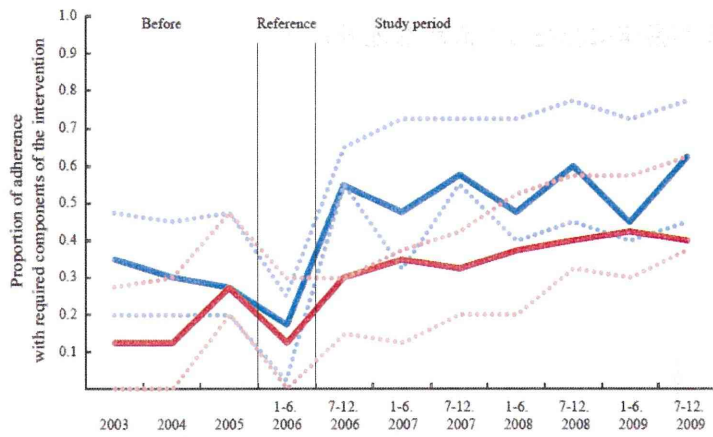
参考図 4 : 自殺既遂および未遂の率比 (人口規模の大きな都市部)

Primary outcome at all and subgroups (sex and age) in Group 2



(Ono et al., 2013 <http://dx.plos.org/10.1371/journal.pone.0074902>)

参考図 5 : プログラム実施率 (人口規模の大きな都市部)



(Ono et al., 2013 <http://dx.plos.org/10.1371/journal.pone.0074902>)

今後の自殺対策のあり方

大野 裕* 田島美幸*

◆はじめに

自殺対策の基本は、すべての住民が生き甲斐をもって生活でき、死にたいほどの困難を抱えた人々が未然に自殺を思いとどまり、より良い生活へ向けて再び希望を見出すことができるような地域づくりを行うことにある。自殺対策活動を開始する際には、従来の考えにとらわれることなく、地域のデータを丁寧に見返し検討して、その地域にあった独自のプログラムをつくることが重要である。こうしたプログラムづくりのプロセスは、地域の横の連携の広がりや深まりを促進することにもなる。

◆新宿区での自殺対策への提言

筆者はこうした認識に立ち、2005年度から5年に渡って行われた厚生労働科学研究費補助金こころの健康科学研究事業「自殺対策のための戦略研究(J-MISP)」の「複合的自殺対策プログラムの自殺企図予防効果に関する地域介入研究(NOCOMIT-J)」の研究リーダーとしての体験をもとに、新宿区自殺総合対策会議、国内外の先行研究、および臨床上の経験を踏まえて、新宿区の自殺の現状を解析し対策を提言した。以下にその概要を述べる。

1) 自殺既遂者の全数調査に基づく対策の立案

よりの確かな支援を行うために、自殺者の生活状況、医療や社会資源の活用状況について全数調査を行う。新宿区では、単身無職者の自殺が多く、また、自立支援医療制度(精神通院医療)の利用者が13.5%、監察医務院

のデータでは64.9%が精神疾患の既往歴があることから精神疾患の既往歴がある自殺者が多い可能性が示唆された。今後はさらに詳しく個別の事例の問題点を洗い出して対策につなげていくことが不可欠である。

2) ネットワークの構築

自治体内および地域とのネットワークを構築し、啓発活動を行い、必要な人に必要な資源が提供できるようにしていく。民生・児童委員、ハローワーク、法テラス、警察、消防、教育関係者、NPO団体などの資源を効果的かつ効率的に活用できる仕組みをつくる。その中で、精神疾患患者など公的なサービスに自らつながりにくい人々へのサービスを行えるように配慮する。

3) 多様な問題に対応できる相談窓口の設置

複数の問題を抱えて自殺を考えている場合、相談先がわからないために支援に結びつかない事例も少なくない。「よろず相談」のような窓口を設置し、自殺につながる多様な相談を扱う受け皿づくりが必要である。その後、相談内容に応じて専門相談機関と連携していけるような仕組みをつくる。また、電話やメールでの相談体制を強化し、本人の悩みに応じた情報提供を行うなどソーシャルワーク的な支援を提供できるようにする。相談の電話がつながりにくいという意見もあることから、電話の相談時間を10分から15分くらいに絞って具体的な問題について相談に乗るなどの工夫が必要である。こうした相談窓口は24時間無休で提供できるようにすることが望まれる。単身者や無職者など社会とのつながりが希

薄な住民に対して、このような相談窓口を周知できるように、コンビニエンスストアやスーパー、ファーストフード店、地域の商店街などにも協力を依頼し、相談窓口や支援団体などの情報が記載されたリーフレットやパンフレットを設置してもらったり、レシートの裏やクーポンにメッセージを書き込んでもらったりする。

4) 精神疾患患者に対する医療機関との連携強化

医療機関の受診歴や自殺企図歴のある自殺既遂者が多い現状を考えると、医療機関と地域支援グループの連携が不可欠である。心配な患者がいる場合に、医療機関は患者の了解をとったうえで地域支援グループに連絡をとって連携したり、地域で心配な住民を医療機関に紹介したりするなど、地域保健・医療・福祉が一体化したサービスを提供する。その場合、治療チームのアウトリーチや地域メンタルヘルスチームの設置や、患者や家族、悩みを抱えた人が地域で気軽に相談できる場の設置を自治体やNPOなどと協力して進め、住民に周知する。

5) 治療中断の防止と治療中断者のフォローアップ

これまでの先行研究や臨床上の経験から、自殺者に治療中断例が少なくないという知見が得られていることから、患者の了解を得たうえで医療機関からの要請で支援を行ったり、患者の相談に乗ったりするシステムをつくっていく。

6) 経済支援・就労支援

無職の若年層の自殺が多いことから、背景には精神障害の早期発症によって社会参加が困難であったり、また、雇用先がないなどの就労問題を抱えていたりすることが推測される。ハローワークや法テラスと連携しながら、経済支援・就労支援に関する情報をわかりやすく伝えていく。

7) 複数の医療機関の受診を制限する制度の整備

自殺企図者、未遂者ともに複数の精神科医療機関を受診している者が多いことが明らかになった。国や東京都と協議して、健康保険組合、国民健康保険組合、薬剤師会などと連携して、複数の医療機関の受診を制限したり、大量多剤処方を制限したりする仕組みをつくることが望まれる。

8) 自死遺族ケア

自殺発生後、サポート資源の情報が遺族に届きにくい現状がある。遺族が必要とするサポート資源に関する情報を記載したパンフレットやリーフレットを作成し、最初に遺族にコンタクトすることが多い警察や消防、葬儀屋などの協力を得て配布してもらう。また、自殺発生後に遺族と接する機会が多い警察や消防、葬儀屋などはゲートキーパーになりうる存在である。基本的な自殺対策の知識や遺族との接し方について研修を実施する。

A study on the relationship between chief complaints of patients admitted to psychiatric emergency services and their diagnoses and outcomes

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Abstract

The appropriate use of psychiatric emergency services for community residents with mental disorders is becoming increasingly important. To facilitate this, consideration should be given to appropriate triage for determining the necessity of emergency room visits and individuality of each patient. We investigated characteristics of patients consulted at an emergency center with the primary/secondary emergency rooms of Iwate Medical University Hospital or an emergency medical care center and examined elements that lead to the proper operation of psychiatric emergency services.

A total of 12,342 patients who presented to the center were included in this study and were investigated for chief complaints, background, ICD-

10 diagnostic classification, treatment, and outcome. Chief complaints were categorized into 12 groups and a multiple logistic analysis was performed with chief complaints as dependent variables and items related to the ICD-10 diagnostic classifications and outcomes as explanatory variables.

The most common type of chief complaint was physical complaints followed by self-mutilation/suicide attempt. A majority of patients had physical symptoms as well as psychiatric disorders that required differential diagnosis and treatment. During triage, it is important that psychiatrically serious conditions, such as psychotic symptoms and suicidal ideation, are not overlooked, in addition to adequately treating physical symptoms.

Key words : psychiatric emergency service, appropriate use, chief complaint, triage, outcome

I. Introduction

In Japan, government-led psychiatric emergency service systems have been developed in each prefecture since 1997. In parallel to this, attempts have been made to encourage the discharge of long-term inpatients and promote community-based

care. There is also an increasing need for psychiatric emergency services for better management of community residents with increased severity of mental disorder. The essential element of a psychiatric emergency system is cooperation between psychiatrist and other health care

professionals, paramedics and police¹⁾. At the same time, consideration should be given to triage to determine the necessity of medical attention and the needs of individual patients, in order to provide necessary and sufficient medical care, prevent burn-out of medical staff and streamline administrative processes. In Japan, however, only a limited number of large-scale fact-finding studies have been conducted to examine the pattern of emergency room visits and the outcomes of each chief complaint based on actual consultation data.

We at Iwate Medical University Hospital provide psychiatric emergency services at the primary and secondary emergency rooms and Iwate Prefectural Advanced Critical Care and Emergency Center (hereinafter referred to as the emergency center) within the hospital. The objective of this study was to identify factors that lead to the proper operation of the psychiatric emergency service system by reviewing the chief complaints of patients who presented to the primary and secondary emergency rooms or the emergency center.

II. Materials and Methods

The study population consisted of 198,863 patients who presented to the primary and secondary emergency rooms of Iwate Medical University Hospital or the emergency center within the hospital during the 7-year period between April 1, 2004 and March 31, 2011. Among them, 12,342 patients who presented to the psychiatric emergency room were included in this study.

The records of these patients were reviewed for chief complaints that led to

the emergency room visit, and diagnoses and outcomes. Chief complaints were categorized into 12 groups (physical complaints, self-mutilation/suicide attempt, anxiety, agitation, insomnia, running out of prescribed medications, depression, psychotic symptoms, psychomotor excitement, suicidal ideation, alcohol-related complaints, others).

Diagnoses were classified according to the Mental and Behavioral Disorders section of the International Classification of Diseases and Related Health Problems, 10th Revision (hereinafter referred to as ICD-10), into F0 (Organic, including symptomatic, mental disorders), F1 (Mental and behavioral disorders due to use of psychoactive substances), F2 (Schizophrenia, schizotypal and delusional disorders), F3 (Mood [affective] disorders), F4 (Neurotic, stress-related and somatoform disorders), F5 (Behavioral syndromes associated with physiological disturbances and physical factors), F6 (Disorders of personality and behavior in adult persons) and Other.

Evaluations and diagnoses for each item were conducted by 10 emergency psychiatrists or psychiatrists on duty at the university hospital, under the supervision of a senior psychiatrist (a designated psychiatrist).

SPSS 19.0 J for Windows was used for statistical processing. As the first step of analysis, a multiple logistic analysis using the forced entry method was performed to extract chief complaint-related factors, considering each of the 12 types of chief complaints during consultation as dependent variables and the occurrence of each diagnosis as explanatory variables. Then, in

Table 1. Overview of chief complaints

Physical complaints (%)	4163 (33.7)
Self-mutilation/suicide attempt (%)	2539 (20.6)
Anxiety (%)	1669 (13.5)
Agitation (%)	783 (6.3)
Insomnia (%)	780 (6.3)
Running out of prescribed medications (%)	643 (5.2)
Depression (%)	477 (3.9)
Psychotic symptoms (%)	426 (3.5)
Psychomotor excitement (%)	316 (2.6)
Suicidal ideation (%)	221 (1.8)
Alcohol-related complaints (%)	123 (1.0)
Other (%)	202 (1.6)
Total (%)	12342 (100)

order to extract outcome-related factors, a multiple logistic analysis using the forced entry method was performed considering each chief complaint as dependent variables and the occurrence of each outcome as explanatory variables.

The significance level was set at 5% in all tests, with probabilities of significance presented numerically. Personally identifiable information was removed from the data and the management and processing of the data were carried out to ensure the protection of personal information. This study was conducted with the approval of the ethics committee at Iwate Medical University.

III. Results

1. Overview of chief complaints (Tables 1 and 2)

The most common type of chief complaint was physical complaints, accounting for 33.7% of all chief complaints, followed by self-mutilation/suicide attempt. These two accounted for more than half of all chief complaints (Table 1). Other chief complaints included, in descending order of frequency, anxiety, agitation,

Table 2. Breakdown of physical complaints

Hyperpnea/respiratory discomfort (%)	500 (12.0)
Disturbed consciousness (%)	428 (10.3)
Nausea/vomiting (%)	417 (10.0)
Heaviness of head/headache (%)	373 (9.0)
Dizziness (%)	271 (6.5)
Other (%)	267 (6.4)
Fatigue/malaise (%)	244 (5.9)
Stomach discomfort/abdominal pain (%)	206 (4.9)
Adverse reaction to psychotropic drugs (%)	205 (4.9)
Pain in parts of body (%)	191 (4.6)
Spasm (%)	158 (3.8)
Chest agony/chest pain (%)	127 (3.1)
Palpitation (%)	111 (2.7)
Cold (%)	102 (2.5)
Weakness (%)	104 (2.5)
Numbness (%)	89 (2.1)
Stagger (%)	71 (1.7)
Trauma (%)	67 (1.6)
Fever (%)	68 (1.6)
Trembling (%)	53 (1.3)
Anorexia (%)	43 (1.0)
Constipation/diarrhea (%)	42 (1.0)
Drunkenness (%)	26 (0.6)
Total (%)	4163 (100)

insomnia, running out of prescribed medications, depression, psychotic symptoms, psychomotor excitement and suicidal ideation (Table 1). When physical complaints were further broken down, hyperpnea/respiratory discomfort was the most common, followed by disturbed consciousness, nausea/vomiting, heaviness of the head/headache and dizziness (Table 2).

2. ICD-based diagnoses of each chief complaint at presentation (Tables 3 and 4)

Overall, the highest percentage of patients who presented with physical complaints, self-mutilation/suicide attempt and anxiety were diagnosed with F4, F3/F4 and F4, respectively. Those with agitation, insomnia, running out of prescribed medications, psychotic symptoms or psychomotor excitement were frequently given the diagnosis of F2, while those

Table 3. ICD-based diagnoses for each chief complaint at presentation

	F0	F1	F2	F3
Physical complaints (%)	247 (5.9)	183 (4.4)	919 (22.1)	710 (17.1)
Self-mutilation/suicide attempt (%)	61 (2.4)	64 (2.5)	311 (12.2)	897 (35.3)
Anxiety (%)	35 (2.1)	18 (1.1)	458 (27.4)	372 (22.3)
Agitation (%)	28 (3.6)	5 (0.6)	314 (40.1)	137 (17.5)
Insomnia (%)	38 (4.9)	21 (2.7)	305 (39.1)	172 (22.1)
Running out of prescribed medications (%)	18 (2.8)	12 (1.9)	194 (30.2)	162 (25.2)
Depression (%)	11 (2.3)	3 (0.6)	77 (16.1)	267 (56.0)
Psychotic symptoms (%)	31 (7.3)	15 (3.5)	337 (79.1)	11 (2.6)
Psychomotor excitement (%)	31 (9.8)	14 (4.4)	109 (34.5)	65 (20.6)
Suicidal ideation (%)	4 (1.8)	6 (2.7)	46 (20.8)	89 (40.3)
Other (%)	8 (4.0)	5 (2.5)	31 (15.3)	71 (35.1)
Alcohol-related complaints (%)	5 (4.1)	71 (57.7)	9 (7.3)	13 (10.6)
Total	517 (4.2)	417 (3.4)	3110 (25.2)	2966 (24.0)

Table 4. ICD-based diagnoses for each chief complaint at presentation

ICD-based diagnoses at presentation		F0	F1
Physical complaints	OR	2.19	1.88
	95%CI Lower limit	1.62	1.37
	Upper limit	2.97	2.57
	p	0.000	0.000
Self-mutilation/suicide attempt	OR	0.25	0.35
	95%CI Lower limit	0.18	0.24
	Upper limit	0.36	0.49
	p	0.000	0.000
Anxiety	OR	0.73	0.45
	95%CI Lower limit	0.43	0.25
	Upper limit	1.23	0.84
	p	0.242	0.012
Agitation	OR	1.37	0.29
	95%CI Lower limit	0.69	0.10
	Upper limit	2.74	0.83
	p	0.373	0.021
Insomnia	OR	1.61	1.08
	95%CI Lower limit	0.86	0.54
	Upper limit	3.03	2.16
	p	0.136	0.829
Running out of prescribed medications	OR	0.73	0.60
	95%CI Lower limit	0.36	0.27
	Upper limit	1.50	1.32
	p	0.396	0.207
Depression	OR	2.14	0.71
	95%CI Lower limit	0.59	0.14
	Upper limit	7.75	3.57
	p	0.244	0.682
Psychotic symptoms	OR	2.66	1.56
	95%CI Lower limit	1.16	0.63
	Upper limit	6.12	3.87
	p	0.021	0.340
Excitement	OR	1.40	0.76
	95%CI Lower limit	0.72	0.35
	Upper limit	2.73	1.65
	p	0.317	0.494
Suicidal ideation	OR	0.33	0.61
	95%CI Lower limit	0.09	0.20
	Upper limit	1.12	1.83
	p	0.075	0.377
Alcohol	OR	1.45	30.47
	95%CI Lower limit	0.28	7.41
	Upper limit	7.52	125.29
	p	0.658	0.000

F4	F5	F6	F7	Other	G40	Unknwon	Total
1552 (37.3)	20 (0.5)	149 (3.6)	221 (5.3)	75 (1.8)	74 (1.8)	13 (0.3)	4163 (100)
805 (31.7)	14 (0.6)	210 (8.3)	68 (2.7)	83 (3.3)	6 (0.2)	20 (0.8)	2539 (100)
552 (33.1)	4 (0.2)	94 (5.6)	103 (6.2)	24 (1.4)	6 (0.4)	3 (0.2)	1669 (100)
182 (23.2)	2 (0.3)	50 (6.4)	51 (6.5)	12 (1.5)	2 (0.3)	0 (0)	783 (100)
147 (18.8)	22 (2.8)	35 (4.5)	21 (2.7)	13 (1.7)	5 (0.6)	1 (0.1)	780 (100)
155 (24.1)	11 (1.7)	49 (7.6)	17 (2.6)	12 (1.9)	11 (1.7)	2 (0.3)	643 (100)
89 (18.7)	1 (0.2)	18 (3.8)	8 (1.7)	3 (0.6)	0 (0)	0 (0)	477 (100)
15 (3.5)	0 (0)	6 (1.4)	3 (0.7)	6 (1.4)	1 (0.2)	1 (0.2)	426 (100)
45 (14.2)	0 (0)	21 (6.6)	14 (4.4)	12 (3.8)	4 (1.3)	1 (0.3)	316 (100)
39 (17.6)	1 (0.5)	26 (11.8)	2 (0.9)	6 (2.7)	1 (0.5)	1 (0.5)	221 (100)
62 (30.7)	3 (1.5)	9 (4.5)	4 (2.0)	3 (1.5)	0 (0)	6 (3.0)	202 (100)
13 (10.6)	0 (0)	8 (6.5)	2 (1.6)	2 (1.6)	0 (0)	0 (0)	123 (100)
3656 (29.6)	78 (0.6)	675 (5.5)	514 (4.2)	251 (2.0)	110 (0.9)	48 (0.4)	12342 (100)

F2	F3	F4	F5	F6	F7	G40
1.01	0.75	1.77	0.83	0.68	1.81	4.93
0.78	0.58	1.37	0.47	0.50	1.33	3.08
1.30	0.98	2.29	1.46	0.92	2.45	7.88
0.966	0.036	0.000	0.510	0.014	0.000	0.000
0.21	0.82	0.54	0.42	0.86	0.29	0.11
0.16	0.64	0.42	0.22	0.64	0.20	0.05
0.28	1.06	0.69	0.78	1.15	0.41	0.26
0.000	0.133	0.000	0.006	0.304	0.000	0.000
1.74	1.44	1.79	0.54	1.63	2.52	0.58
1.16	0.96	1.19	0.18	1.04	1.61	0.23
2.62	2.18	2.69	1.61	2.56	3.96	1.45
0.008	0.079	0.005	0.270	0.034	0.000	0.244
2.69	1.16	1.25	0.63	1.91	2.63	0.44
1.49	0.63	0.69	0.14	1.00	1.38	0.10
4.84	2.12	2.27	2.87	3.65	5.03	2.01
0.001	0.633	0.459	0.550	0.049	0.003	0.291
2.21	1.25	0.85	8.00	1.11	0.87	0.97
1.28	0.72	0.49	3.86	0.59	0.43	0.34
3.83	2.19	1.49	16.57	2.10	1.73	2.76
0.005	0.428	0.578	0.000	0.741	0.686	0.954
1.35	1.18	0.90	3.34	1.59	0.70	2.26
0.78	0.67	0.51	1.45	0.87	0.34	0.99
2.36	2.06	1.58	7.69	2.93	1.43	5.15
0.285	0.570	0.716	0.005	0.135	0.326	0.052
2.50	9.76	2.46	1.28	2.70	1.56	0.00
0.79	3.11	0.77	0.13	0.79	0.41	0.00
7.99	30.65	7.83	12.49	9.25	5.93	
0.121	0.000	0.127	0.831	0.113	0.514	0.997
5.07	0.16	0.17	0.00	0.37	0.24	0.38
2.38	0.06	0.07	0.00	0.12	0.06	0.05
10.82	0.40	0.42		1.12	0.95	3.15
0.000	0.000	0.000	0.997	0.080	0.043	0.372
0.80	0.49	0.27	0.00	0.71	0.62	0.83
0.44	0.27	0.15	0.00	0.35	0.29	0.26
1.44	0.91	0.51		1.43	1.33	2.60
0.454	0.023	0.000	0.997	0.334	0.217	0.750
0.63	1.29	0.45	0.54	1.67	0.16	0.38
0.28	0.59	0.20	0.07	0.72	0.03	0.05
1.40	2.81	1.01	4.47	3.89	0.79	3.15
0.254	0.521	0.054	0.569	0.234	0.024	0.372
0.43	0.65	0.53	0.00	1.78	0.58	0.00
0.09	0.15	0.12	0.00	0.38	0.08	0.00
2.00	2.91	2.36		8.44	4.14	
0.283	0.577	0.405	0.997	0.467	0.587	0.997

Table 5. Outcomes of each chief complaint

	Discharged to home	Admitted to emergency center	Admitted to psychiatric ward
Physical complaints (%)	3417 (82.1)	190(4.6)	422(10.1)
Self-mutilation/suicide attempt (%)	911 (35.9)	538(21.2)	958(37.7)
Anxiety (%)	1583 (94.8)	2 (0.1)	73(4.4)
Agitation (%)	739 (94.4)	1(0.1)	36(4.6)
Insomnia (%)	746 (95.6)	2(0.3)	24(3.1)
Running out of prescribed medications (%)	637 (99.1)	0(0)	1(0.2)
Depression (%)	443 (92.9)	1(0.2)	29(6.1)
Psychotic symptoms (%)	270 (63.4)	1(0.2)	138(32.4)
Psychomotor excitement (%)	133 (42.1)	0(0)	172(54.4)
Suicidal ideation (%)	132 (59.7)	1(0.5)	81(36.7)
Other (%)	184 (91.1)	1(0.5)	13(6.4)
Alcohol-related complaints (%)	68 (55.3)	8(6.5)	44(35.8)
Total	9263 (75.0)	745(6.0)	1991(16.1)

with depression or suicidal ideation were most commonly diagnosed with F3. Those with alcohol-related complaints were most commonly diagnosed with F1, as expected (Table 3).

In the multiple logistic regression analysis, significant correlations were found for physical complaints with F0 (odds ratio (OR) = 2.19), F1 (OR = 1.88), F4 (OR = 1.77), F7 (OR = 1.81) and G40 (OR = 4.93); for self-mutilation/suicide attempt with F0 (OR = 0.25), F1 (OR = 0.35), F2 (OR = 0.21), F4 (OR = 0.54), F7 (OR = 0.29) and G40 (OR = 0.11); for psychotic symptoms with F2 (OR = 5.07), F3 (OR = 0.16) and F4 (OR = 0.17); for psychomotor excitement with F4 (OR = 0.27); for anxiety with F4 (OR = 1.79) and F7 (OR = 2.52); for agitation with F2 (OR = 2.69) and F7 (2.63); for insomnia with F2 (OR = 2.21) and F5 (OR = 8.00); for depression with F3 (OR = 9.76); for running out of prescribed medications with F5 (OR = 3.34); and for alcohol-related complaints with F1 (OR = 30.47) (Table 4)

3. Outcomes of each chief complaint

(Tables 5 and 6).

The chief complaints that led to the outcome of discharged to home in a significantly higher ratio of 90% or more of cases were anxiety, agitation, insomnia, running out of prescribed medications and depression. Physical complaints, suicidal ideation and psychotic symptoms led to this outcome in approximately 50-80% of cases. Psychomotor excitement led to admission to the psychiatric ward in 50% or more of cases, while self-mutilation/suicide attempt, psychotic symptoms, suicidal ideation and alcohol-related complaints led to this outcome in 30-40% of cases. About 20% of patients with self-mutilation/suicide attempt were admitted to the emergency center, although the overall frequency of this outcome was not very high (Table 5).

The multiple logistic regression analysis revealed significant correlations for physical complaints with discharged to home (OR = 0.45); for self-mutilation/suicide attempt with admission to the emergency center (OR = 54.04), admission to the psychiatric ward (OR = 8.81) and discharged to home

Waiting at emergency outpatient roomward	Referred to other department	Admitted to other ward	Transferred to other hospital	Death	Other	Total
47(1.1)	15(0.4)	38(0.9)	23(0.6)	4(0.1)	7(0.2)	4163 (100)
36(1.4)	0(0)	16(0.6)	22(0.9)	55(2.2)	3(0.1)	2539 (100)
9(0.5)	0(0)	0(0)	2(0.1)	0(0)	0(0)	1669 (100)
4(0.5)	0(0)	0(0)	3(0.4)	0(0)	0(0)	783 (100)
7(0.9)	1(0.1)	0(0)	0(0)	0(0)	0(0)	780 (100)
0(0)	0(0)	0(0)	1(0.2)	0(0)	4(0.6)	643 (100)
3(0.6)	0(0)	0(0)	1(0.2)	0(0)	0(0)	477 (100)
6 (1.4)	0(0)	1(0.2)	10(2.3)	0(0)	0(0)	426 (100)
0(0)	0(0)	1(0.3)	7(2.2)	0(0)	3(0.9)	316 (100)
3(1.4)	0(0)	0(0)	4(1.8)	0(0)	0(0)	221 (100)
1 (0.5)	1(0.5)	0(0)	0(0)	0(0)	2(1.0)	202 (100)
2 (1.6)	0(0)	0(0)	1(0.8)	0(0)	0(0)	123 (100)
118 (1.0)	17(0.1)	56(0.5)	74(0.6)	59(0.5)	19(0.2)	12342 (100)

(OR = 0.05) ; for psychotic symptoms with admission to the psychiatric ward (OR = 6.97) and discharged to home (OR = 0.17); for psychomotor excitement with admission to the psychiatric ward (OR = 17.37) and discharged to home (OR = 0.07); for suicidal ideation with admission to the psychiatric ward (OR = 8.41) and discharged to home (OR = 0.15); for running out of prescribed medications with discharged to home (OR = 10.39) and admission to the psychiatric ward (OR = 0.02); and for alcohol-related complaints with admission to the emergency center (OR = 13.98), admission to the psychiatric ward (OR=8.10) and discharged to home (OR = 0.12) (Table 6).

IV. Discussion

In psychiatric emergency service settings, as with in other departments, medical activities should be performed based on bio-psycho-socio-ethical considerations, and the triage function is important in this context. However, due to the diversity and ambiguity of psychiatric

disorders, it is often difficult to identify patients who need urgent care and those who can wait until the following day during triage in an emergency setting, as compared to triage in other departments. In view of the multidimensional nature of psychiatric emergency services, triage should be done based on various considerations : the severity of physical condition (biological aspect) , severity of psychotic symptoms (psychological aspect) , whether the patient is adaptive or anti-social (social aspect) and whether treatment should be given spontaneously or forcedly (ethical aspect) ²⁾ .

Even if the staff carrying out triage do not have expertise, effective triage can be done over the telephone within a limited time if the patient profile can be retrieved from the patient's data at presentation and if a standardized methodology can be applied. During triage, a patient's chief complaint serves as a bridge between the staff carrying out the triage and the patient. The ability to narrow down a range of relevant diagnoses and outcomes that can

Table 6. Relationship between chief complaints and outcomes

Outcome		Discharged to home	Admitted to emergency center	Admitted to psychiatric ward	
Physical complaints		OR	0.45	9.61	1.64
	95%CI	Lower limit	0.27	1.34	0.93
		Upper limit	0.73	68.94	2.90
		p	0.001	0.024	0.089
Self-mutilation/suicide attempt		OR	0.05	54.04	8.81
	95%CI	Lower limit	0.03	7.56	4.99
		Upper limit	0.09	386.41	15.54
		p	0.000	0.000	0.000
Anxiety		OR	1.80	0.24	0.66
	95%CI	Lower limit	1.06	0.02	0.36
		Upper limit	3.06	2.67	1.22
		p	0.030	0.246	0.189
Agitation		OR	1.64	0.26	0.70
	95%CI	Lower limit	0.93	0.02	0.36
		Upper limit	2.91	4.13	1.35
		p	0.089	0.337	0.286
Insomnia		OR	2.15	0.52	0.46
	95%CI	Lower limit	1.19	0.05	0.23
		Upper limit	3.89	5.73	0.92
		p	0.012	0.591	0.029
Running out of prescribed medications		OR	10.39	0.00	0.02
	95%CI	Lower limit	4.06	0.00	0.00
		Upper limit	26.54		0.17
		p	0.000	0.992	0.000
Depression		OR	1.27	0.42	0.94
	95%CI	Lower limit	0.70	0.03	0.48
		Upper limit	2.31	6.78	1.85
		p	0.425	0.543	0.860
Psychotic symptoms		OR	0.17	0.47	6.97
	95%CI	Lower limit	0.10	0.03	3.83
		Upper limit	0.29	7.60	12.66
		p	0.000	0.597	0.000
Psychomotor excitement		OR	0.07	0.00	17.37
	95%CI	Lower limit	0.04	0.00	9.49
		Upper limit	0.12		31.77
		p	0.000	0.994	0.000
Suicidal ideation		OR	0.15	0.91	8.41
	95%CI	Lower limit	0.08	0.06	4.50
		Upper limit	0.25	14.70	15.72
		p	0.000	0.949	0.000
Alcohol-related complaints		OR	0.12	13.98	8.10
	95%CI	Lower limit	0.07	1.73	4.13
		Upper limit	0.22	113.21	15.86
		p	0.000	0.013	0.000

be expected from a given chief complaint should make triage more accurate and easier.

Medically unexplained physical symptoms (MUPS) are commonly observed in nearly half of patients in primary care and one-third of outpatients^{3,4)}. A survey of outpatients in North America revealed that only 16% of patients with chest pain,

dyspnea, dizziness or headache were found to have organic disease⁵⁾. Although pathology that cannot be explained by physical causes, such as MUPS, should also be treated in emergency settings, a survey on the status of emergency outpatient service in the United Kingdom revealed the frequency of somatoform disorders to be as low as 3.8%⁶⁾.

In this study, physical complaints were

the most common type of chief complaint in patients admitted to psychiatric emergency services. This may reflect the fact that our hospital is a base hospital staffed by full-time medical professionals, including internal medicine physicians and surgeons, where patients with non-psychiatric complaints can be readily referred to other departments.

The patients diagnosed with F0 (247/517; 47.8%), F1 (183/417; 43.9%), F4 (1552/3656; 42.5%), F7 (221/514; 43.0%) or G40 (74/110; 67.3%), according to the ICD-10, had physical complaints more frequently than those given other diagnoses, and physical complaints were most commonly reported by these patients. Many of the patients diagnosed with F0 (especially dementia-related), F4 or F7 had somatization disorder, a physical symptom specific to psychiatric patients. These patients tended to present repeatedly with the same chief complaints and most of them were discharged to home. However, since many of the dementia patients are elderly, even those with mild physical disorders may experience worsening of their condition. Moreover, patients with intellectual disability may not be able to express their physical complaints correctly even if they are already in a severe condition. Even though many patients are expected to be discharged to home, the possibility of underlying physical problems should always be considered and care should be taken not to forget to measure vital signs or overlook clear physical abnormalities, as with in non-psychiatric emergency settings.

The most common physical complaint was hyperpnea. In our previous study, patients who presented to the emergency

center with hyperventilation syndrome (HVS) accounted for 0.7% and 4.6% of all male and female patients presenting to emergency outpatient services, respectively. These symptoms were most commonly observed in those in their 20s and diagnosed with a psychiatric disorder in more than half of the cases according to the principal diagnosis⁷⁾. In the diagnosis of psychiatric disease, the average prevalence of stress-related disorders and mood disorder among those with and without previous history were about 40% and 20%, respectively, while that of panic disorder was only 8% in both groups. HVS patients are relatively commonly encountered in emergency outpatient services. As this condition is accompanied by anxiety and significant depressive symptoms⁷⁾, it needs to be referred from the emergency department to the psychiatric department.

For those patients who repeatedly report similar physical complaints despite detailed physical examinations, prior medical records should be referred to. For those with a complaint clearly different from the previous one and those experiencing new symptoms, a system should be in place to obtain information from the patient's primary care physician to rule out the presence of a new physical disorder. Disturbed consciousness was another common physical complaint, but many of these patients were actually stuporous. In such cases, it is also preferable to obtain information from primary care physicians beforehand, since it is difficult to distinguish between disturbed consciousness and stupor in an emergency setting.

Self-mutilation/suicide attempt was the second most common type of chief complaint after physical complaints. Since these chief complaints are accompanied by serious mental and physical symptoms, psychiatric treatments required and outcomes expected are greatly different from those for physical complaints. Clearly contrasting odds ratios were obtained for those admitted to the emergency center (54.04) and those discharged to home (0.05). Psychiatric disorder is recognized as a risk factor for suicide attempt⁸⁻¹⁰⁾, and it is reported that F3 has been associated with more severe methods of suicide-attempt than F4¹¹⁾. The most common diagnostic category for these complaints, according to the ICD-10, was F3, followed by F4 and F2, which is consistent with the results of our previous study¹²⁾. F0, F1, F2, F4, F7 and G40 were all significantly correlated with self-mutilation/suicide attempt, although the correlation was negative with an OR of less than 1.

With regard to outcomes, we have previously shown that patients admitted to hospital, especially those admitted to the emergency center, were found to be in biopsychosocially serious conditions in terms of disturbed consciousness [Japan Coma Scale (JCS)], general health performance [Global Assessment Scale (GAS)], psychiatric symptoms [brief psychiatric rating scale (BPRS)], and life events [life change unit (LCU)], while most patients not admitted to hospital were women who tended to repeat suicide-related behaviors induced by relatively light stress¹²⁾. It was also been shown that 10% or more of patients with suicide

attempt were diagnosed with F2 and tended to have not only psychotic (and related) symptoms and negative symptoms, but also psychomotor excitement, anxiety and depression, which are symptoms also observed in F3 accompanied by severe depressive symptoms¹³⁾. In view of these findings, the severity of general condition as assessed by GAS, stress level, severity of psychiatric symptoms such as BPRS and history of suicide attempt may be more closely associated with presentation to emergency medical services with self-mutilation/suicide attempt than the psychiatric diagnostic classification¹²⁾.

These chief complaints were associated with mild physical complications, but were psychiatrically serious and eventually led to admission to the psychiatric ward in many cases. The majority of patients with psychotic symptoms were diagnosed with F2, while a high percentage of those with suicidal ideation were diagnosed with F3, as expected. Both chief complaints are commonly encountered in psychiatric practice. Since some patients considered to have only suicidal ideation based on pre-visit information have been found to be engaged in an unexpected suicide attempt behavior and sudden psychomotor excitement may be associated with organic disorder in some cases, these patients should undergo as many physical examinations as possible even if they are eventually admitted to the psychiatric ward.

Ruddell and Curwen have warned that the occurrence of planned suicidal ideation with severe methods within 24-48 hours after presentation reflects high risk and

indicates the need for admission¹⁴⁾. The fact that admission to the psychiatric ward was extracted as an outcome in this study indicates that the risk of patients with suicidal ideation was adequately considered. For psychotic symptoms, a 2-step process has been proposed where preliminary intervention is performed to calm the patient by a brief evaluation (the first step), and then more extensive psychiatric evaluation is performed to develop an appropriate treatment plan (the second step)¹⁵⁾. The observed correlation between psychotic symptoms and admission to the psychiatric ward as a result of this research reflects the implementation of the 2-step process. It has been shown that building a trusting relationship with patients and talking with them quietly, patiently and unpretentiously are essential skills for health care professionals practicing in general hospitals and emergency rooms and that the rapid determination of a clear treatment plan, including effective medication therapy, facilitates the improvement of acute-phase clinical features¹⁶⁾. It is also important to provide the emergency medical service staff with an educational program that aims to facilitate these practices, even in an emergency setting where no psychiatrist is available.

One of the factors common to these chief complaints is that 90% or more of such patients were discharged to home. Although this outcome may make these chief complaints appear to be non-urgent, emergency treatment should also be given to these patients based on the patient's subjective experience. A survey of

emergency patients and inpatients revealed that 42% and 47% of the patients in the emergency departments (ED) and medical departments (MD) groups, respectively, were found to be positive with a GHQ 30 score of 4 or more, with no significant difference in the frequency of positive patients. Anxiety disorder and depression were most common in the ED (18.1%) and MD (21%) groups, respectively, with a significant difference in the frequencies of these complaints between groups. These findings highlight the need for treatment for these patients¹⁷⁾.

Some patients tend to experience enhanced anxiety in the evening. In some of these cases, anxiety can be relieved by a few minutes of listening to the patient's story, even if not for a long time. For patients with mild intellectual disability, a patient education program is not expected to be very effective and therefore the provision of other types of social support should be considered. Appropriate triage can be done based on the understanding that psychiatric problems are vague and uncontrollable to patients (more than to health care professionals) and flexible responses according to regional and patient characteristics.

Patients with depressive symptoms present to emergency outpatient services of general hospitals. Mimiaga et al. conducted a survey involving patients who presented to emergency medical services of general hospitals and reported that being female, being unemployed and low annual income were correlated with severe depressive symptoms¹⁸⁾. Patients with depressive symptoms were also found to be positive

for alcohol dependence by screening, hence the need for medical intervention for these patients has been pointed out.

For agitation arising from various medical and psychiatric conditions, it is important to immediately determine whether it is due to medical or non-medical causes. In addition to routine examinations, a targeted search for its cause should also be performed. Rapidly occurring agitation may be caused by deterioration in the general condition. Thus, previous history of physical disorders should be carefully assessed for these patients, especially for those outside of the known age range for developing psychosis¹⁹⁾. A study on psychiatric emergency services showed that medication therapy for relieving agitation was given to 25% of all patients included²⁰⁾.

There were many patients who were unable to see their primary care physicians during the day time and presented to emergency services after running out of the prescribed medications they used regularly or on an as-needed basis. For these patients, patient education programs should be provided to encourage them to see their primary care physicians at appropriate times. However, given the odds ratio of 3.34 for those diagnosed with F5, the possibility should also be considered that they ran out of medications as a result of substance abuse. As these cases also involve problems of drug dependence, a system should be in place that facilitates cooperation with primary care physicians and rapid information collection from them. The relatively easy access to emergency medical services in Japan may also be reflected in

the large number of patients presenting with running out of prescribed medications. If that is the case, this seemingly simple problem of running out of prescribed medications, may be the most serious representation of problems that remain to be solved for the proper use of emergency medical services.

Alcohol-related chief complaints were naturally correlated with the diagnosis of F1. A study in Germany has shown that 30.7% of the patients presenting to emergency outpatient services are alcohol abusers and many of them are reported to have alcoholic intoxication, suggesting the need for society-wide initiatives to reduce such cases²¹⁾. In a study of 6865 cases of substance abuse in the southern United States, alcohol dependence accounted for 26.0%, alcohol abuse for 35.5%, cocaine for 21.2% and multi-substance abuse for 17.4% of all cases. For alcohol dependence and alcohol abuse, since both complaints are associated with high risk of repeated emergency room visits (≥ 4 visits), the need for linkage between initial emergency outpatient care and more cost-effective subsequent interventions has been suggested²²⁾.

This study aimed to examine the relationship between the chief complaints of patients admitting to psychiatric emergency services and their psychiatric diagnoses and outcomes for more streamlined triage and facilitating the proper use of emergency medical services.

The study revealed the characteristics of each type of chief complaint, from those

closely related to physical emergencies to those specific to psychiatric emergencies, and identified issues to be considered when treating patients with each type of chief complaint.

Overall, as demonstrated by physical complaints being the most common type of chief complaint, the majority of patients had physical symptoms as well as psychiatric disorders that required differential diagnosis and treatment. Care should also be taken not to overlook psychiatrically serious conditions, such as psychotic symptoms and suicidal ideation. For conditions associated with serious psychiatric and physical symptoms, such as suicide attempt, a linkage between physical and psychiatric emergency services is essential.

Chief complaints that usually do not lead to hospital admission, such as insomnia and running out of prescribed medications, can be, in a sense, a touchstone for the realization of the proper use of psychiatric emergency services, because these chief complaints are the least compelling reasons for the proper use of emergency room visits but can lead to subsequent severe conditions/diseases. To reduce these chief complaints, there should be discussion between a patient and his or her primary care physician in advance in daily clinical practice so that such situations do not occur, as well as preparation of measures to be taken in case they do. These measures are required in all cases of emergency room visits and thus should be considered as a guide to the appropriate use of emergency medical services.

With a wide variety of conditions requiring psychiatric emergency care, a

psychiatric emergency service system should include an institution that provides both physical and psychiatric emergency services. If both services are not provided by a single institution, a management system is still required to ensure appropriate triage and linkage between both services. In Japan, physical and psychiatric emergency services are structurally separated in most institutions, and emerging problems include a decreasing number of psychiatrists in general hospitals. On the other hand, as an anti-suicide measure, cooperation between physical and psychiatric emergency services in providing care for suicide attempts is being promoted under the Basic Act on Suicide Prevention. These crossover activities are increasingly being carried out, providing a bright outlook in this field. In Japan, it will be increasingly important to develop stricter criteria for triage based on the characteristics of each chief complaint, as well as establish emergency service systems that can handle both physical and psychiatric emergencies.

Acknowledgements

This study did not include physical primary/secondary emergency medical institutions that handle relatively mild cases. Physical complaints were only derived from patients admitting to psychiatric emergency services, and therefore the breakdown of these complaints also differs greatly from those from physical primary/secondary emergency service providers. Finally, this study was conducted in an institution located in a core provincial city and thus may not reflect the characteristics in rural and coastal areas.

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精神科救急における受診時主訴に関する背景因子
及び精神医学的診断からの検討

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要旨

近年, 地域で暮らす精神障害者が重篤化した症状に早期対応するため, 精神科救急サービスの重要度は高まっており, 患者への情報提供の方法論の標準化と個性への配慮が求められる。本研究では岩手医科大学附属病院併設の1次2次外来と救急センターを受診した患者特性を調査し, 精神科救急システムの適性運用につながる要素を検討した。同施設の精神科救急を受診した患者 12,342 件を対象とし, 背景因子, 受診時主訴, ICD-10 診断, 処置, 転帰を調

査した。受診時主訴は 12 区分し, 各主訴を説明変数, 背景因子, ICD-10 診断, 処置, 転帰に関する項目を従属変数とし, それぞれ多重ロジスティック分析を実施した。主訴の全体像では身体的愁訴が最多で, 次いで自傷自殺であり, 二つで半数以上を占めた。身体症状を呈しつつ精神疾患の鑑別や対応を要した症例も多く, 精神病症状や希死念慮のように精神的重篤度が高い主訴も見逃さない対応を要する。

RESEARCH ARTICLE

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Predictors for delayed encephalopathy following acute carbon monoxide poisoning

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Abstract

Background: In Japan, many carbon monoxide (CO) poisoning cases are transported to emergency settings, making treatment and prognostic assessment an urgent task. However, there is currently no reliable means to predict whether “delayed neuropsychiatric sequelae (DNS)” will develop after acute CO poisoning. This study is intended to find out risk factors for the development of DNS and to characterize the clinical course following the development of DNS in acute CO poisoning cases.

Methods: This is a retrospective cohort study of 79 consecutive patients treated at a single institution for CO poisoning. This study included 79 cases of acute CO poisoning admitted to our emergency department after attempted suicide, who were divided into two groups consisting of 13 cases who developed DNS and 66 cases who did not. The two groups were compared and analyzed in terms of clinical symptoms, laboratory findings, etc.

Results: Predictors for the development of DNS following acute CO poisoning included: serious consciousness disturbance at emergency admission; head CT findings indicating hypoxic encephalopathy; hematology findings including high creatine kinase, creatine kinase-MB and lactate dehydrogenase levels; and low Global Assessment Scale scores. The clinical course of the DNS-developing cases was characterized by prolonged hospital stay and a larger number of hyperbaric oxygen (HBO) therapy sessions.

Conclusion: In patients with the characteristics identified in this study, administration of HBO therapy should be proactively considered after informing their family, at initial stage, of the risk of developing DNS, and at least 5 weeks’ follow-up to watch for the development of DNS is considered necessary.

Keywords: Delayed encephalopathy, Carbon monoxide poisoning, Delayed neuropsychiatric sequelae, Suicide attempt, Psychiatric emergency

Background

Carbon monoxide (CO) poisoning has been a preferred method of suicide due to its high success rate of approximately 30% [1], its simplicity, and the minimal external injury involved. According to the 2011 “White Paper on Suicide (*Jisatsu Taisaku Hakusho*)” compiled by the Japanese Cabinet Office, “briquettes or similar materials” were the second most used means of suicide used by men (2,137 persons, 10.2%), next only to “hanging” (14,354 persons, 68.5%), with their use spread across a wide range of

age groups from those in their twenties to those in their sixties [2].

In general, CO poisoning occurs due to such causes as inhalation of exhaust gas from automobiles, or incomplete combustion of charcoal, briquettes, fuel gas or oil in a closed place, or in such settings as a fire. Its pathology consists mainly of dysfunction of various organs due to tissue hypoxia. Since hypoxia is reversible, early removal of CO is essential and high levels of oxygen should be administered wherever possible during transportation, examination and treatment. Means to administer high concentrations of oxygen include normobaric oxygen (NBO) and hyperbaric oxygen (HBO) therapies. Previous studies comparing the two therapies have reported that HBO therapy is effective

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as a treatment to reduce the incidence of DNS and reduce its severity in cases of acute CO poisoning [3-6]. Other studies, however, have disputed that finding, so there is still worldwide controversy regarding the effectiveness of HBO therapy [7]. In addition, various studies worldwide have cited different criteria for administering HBO therapy during acute CO poisoning due to the ambiguity of indices of the clinical severity of acute CO poisoning. Criteria for administering HBO therapy have yet to be standardized. Moreover, a patient transfer from a medical facility with no HBO chamber to a facility with an HBO chamber has to be considered [8].

CO poisoning is generally classified as acute CO poisoning or chronic CO poisoning depending on the duration of CO exposure. CO poisoning is categorized into different forms based on the clinical manifestations resulting from CO exposure over time. With acute CO poisoning, the patient recovers without sequelae, but with delayed CO poisoning or intermittent CO poisoning the patient can be left with neurologic sequelae.

Delayed CO poisoning refers to impaired consciousness that develops at the time of poisoning and that persists without improving. This form of poisoning causes brain cells to be deprived of oxygen and can lead to sequelae such as amnesic syndrome, loss of initiative, affective incontinence, and parkinsonism [9]. Intermittent CO poisoning is pathology where, after a certain asymptomatic period (from several days to four weeks; an average of two weeks) following recovery from acute-phase symptoms, neuropsychiatric symptoms develop rapidly, such as amnesia, disorientation, loss of mathematical ability, slowness of movement, urinary incontinence, apathy, anxiety or emotional lability. These symptoms may lead to Apallic syndrome in some cases and/or to death in worst cases [5]. Intermittent CO poisoning is thought to develop as a result of the progression of focal demyelination of the cerebral white matter and subsequent neuronal death. Intermittent CO poisoning has been reported to occur in 2.8% of acute CO poisoning cases and 11.8% of those who were hospitalized [10]. These two types of CO poisoning are sometimes referred to collectively as "delayed neuropsychiatric sequelae (DNS)."

Iwate Medical University Hospital ("Hospital") has an HBO chamber, and its emergency department accepts more than 10 cases of attempted suicide with CO poisoning annually. The Hospital sometimes accepts CO poisoning cases in a very acute phase from neighboring medical institutions with no HBO chamber. Virtually all of these cases have been hospitalized after admission and have received treatment including HBO therapy, with some developing DNS and remaining having been hospitalized for prolonged periods.

While it is necessary to predict the potential development of DNS at the initial stage following admission to

the emergency department, no correlation has been found between CO-Hb level in the blood and clinical severity [11]. It has also been found impossible to predict prognosis from EEG findings obtained at the initial stage [12]. Based on the fact that DNS is caused by demyelinating changes in the cerebral white matter, some researchers have pointed out the need to measure myelin basic protein (MBP) levels in the cerebrospinal fluid (CSF) soon after injury [13], as well as to assess nerve fibers in the white matter by diffusion tensor imaging [14] or ¹H-magnetic resonance spectroscopy [15]. However, since head MRI depicts all the various histological changes, it may not be possible to accurately tell the progress of the condition in the cerebral white matter [16]. In addition, there have been cases who developed DNS despite having subnormal MBP levels in the CSF two weeks immediately following injury [17]. A recent study examined development of cognitive sequelae and genetic factors 6 weeks after CO poisoning. The study found that the apolipoprotein (APOE) epsilon4 allele was not associated with development of cognitive sequelae [18]. Taken together, at present no reliable means to predict DNS have been established, making prediction during the acute phase difficult.

However, if the development of DNS can be predicted during the acute phase, it would help making decisions on treatment strategy, by such means as identifying cases to which HBO therapy should be actively administered and setting an appropriate period of hospital treatment. In the present study, we studied cases of attempted suicide with acute CO poisoning admitted to our emergency department, and reviewed and analyzed these cases with the intention of identifying risk factors for developing DNS and characterizing the clinical course after the development of DNS.

Methods

This is a retrospective cohort study of 79 consecutive patients treated at a single institution for CO poisoning. This study included 79 cases who were admitted to the Hospital's emergency department due to CO poisoning after attempted suicide during the period between 2002 and 2011. All subjects were divided into two groups, consisting of 13 cases who developed DNS and 66 cases who did not, and were reviewed for clinical symptoms and laboratory findings at admission to the emergency department, circumstances of injury, treatment received during the acute phase, and other information to the extent available in the emergency department setting.

Patient medical records were retrospectively reviewed, and patients who developed DNS and patients who did not develop DNS were compared in terms of 16 items: gender, age, location of exposure, estimated duration of exposure, whether or not the patient was transported from another hospital, severity of impaired consciousness (i.e.,