

表 特定健康診査の判定

腹囲	追加リスク		特定保健指導の区分	
	①空腹時血糖 ②中性脂肪 ③血圧	④喫煙歴	40～64 歳	65～74 歳
男性 85 cm 以上 女性 90 cm 以上	2 項目以上該当	なし	積極的支援	動機づけ支援
	1 項目該当	あり		
上記以外で、 BMI 25 以上	3 項目該当	なし	積極的支援	動機づけ支援
	2 項目該当	あり		
	1 項目該当	なし		

※追加リスク項目

- ①空腹時血糖 100 mg/dl 以上（空腹時血糖を行っていない場合は、HbA1c 5.6%以上）
 ②中性脂肪 150 mg/dl 以上
 ③血圧 収縮期血圧 130 mmHg 以上または拡張期血圧 85 mmHg 以上
 ④喫煙歴 ①～③のリスク項目がある場合に、1 項目として追加

る。BMI に関しては 25 kg/m^2 未満がもちろん目標になる。

問題なのは、まず成人から前期高齢者を一律な基準で評価することがよいのかどうかという点である。特定健康診査の目的は生活習慣病、とりわけメタボリックシンドロームに対する評価ならびに対策である。これ自体はたいへん重要であることは論を俟たない。しかし、上述したようにメタボリックシンドロームの健康障害に関連するリスク度は年齢により大きく異なる。また、同様に BMI の生命予後、健康障害に与える影響は対象者の年齢により異なる。実際、日本人の食事摂取基準（2015年版）各論のエネルギー・栄養素には年代別の観察研究において報告された総死亡率のもっとも低かった BMI の範囲（報告書 p52）が掲載されているが、18～49 歳では BMI $18.5 \sim 24.9 \text{ kg/m}^2$ 、50～69 歳では $20.0 \sim 24.9 \text{ kg/m}^2$ 、70 歳以上では $22.5 \sim 27.4 \text{ kg/m}^2$ であり、70 歳以上に関して上記の特定健康診査での BMI の基準 BMI $< 25 \text{ kg/m}^2$ と矛盾が生じている。もちろん、糖尿病発症などの生活習慣病のリスクの視点

も重要であり、必ずしも生命予後だけをターゲットにしているわけではないが、

一方で、75 歳以上の後期高齢者においては後期高齢者医療広域連合があくまでも努力義務として健康診査を実施しており、糖尿病などの生活習慣病の早期発見なども目的ではあるものの、むしろ QOL を重視する健康診査を目標にしている。

介護予防との兼ね合いの矛盾

65 歳以上の介護保険の第 1 号被保険者（要介護者を除く）に対しては、各市町村が主体となって「介護予防事業（地域支援事業）」として二次予防対象者選定のため生活機能評価（基本チェックリスト）を行うことになっている。基本チェックリストとは、高齢者の生活機能の評価し、要介護状態となるリスクを予測することを目的に開発された 25 項目の質問票である。No. 1～5 までは手段的日常生活活動（社会生活を営むうえで基本となる行為）、No. 6～10 までは運動機能、No. 11 と 12 は栄養、No. 13～15 までは口腔機能、No. 16 と 17 は閉じこもり、No. 18～20 まで

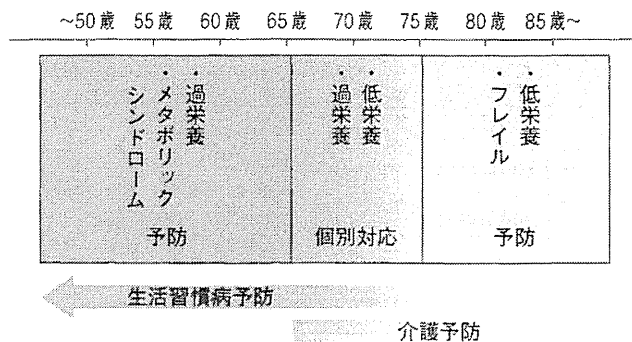


図4 年齢別栄養管理のギアチェンジとグレーゾーンの設定

は認知機能、No. 21~25 までは「うつ」を、それぞれ評価するものである。この栄養に関するNo. 11と12はそれぞれ、「6カ月間で2~3 kg以上の体重減少がありましたか」とBMIを問う設問であり、いずれも低栄養をターゲットとしている。

混乱を招いているのは65~74歳の年齢層には上記の生活習慣病予防（過栄養予防）をターゲットとした特定健康診査があり、同じ対象者に基本チェックリストが行政から郵送され、かたや低栄養の拾い上げを実施していることである。もちろん、前期高齢者には過栄養の注意喚起が必要な対象者もいれば低栄養を注意すべき対象者も混在していることが想像できる。この65~74歳の前期高齢者はそれこそ画一的な指導ではなく、個々の対象者の状況に合わせた栄養指導が求められる重要な時期であると思われる。

ただ、現場はたいへん混乱しており、前期高齢者は特定健康診査からはメタボリックシンドロームに注意するような声があがる一方で、介護予防事業では低栄養予防、フレイル予防が叫ばれる。極端な話、体重減少すれば特定健康診査では「ほめられ」、介護予防事

業では「注意される」、という現象が起きる。市民さらには医療者から「過栄養予防」と「低栄養予防」いったいどちらが重要なのだ、とよく質問される。この点をしっかりしたメッセージとして市民、指導する保健師、管理栄養士などに伝えていく必要がある。

年齢による 栄養の考え方のギアチェンジと グレーゾーンの設定の提言（図4）

私自身は64歳までは過栄養予防、メタボリックシンドローム予防の視点でよいと思う。75歳以上の後期高齢者においては、今後要介護状態にならないような対策が年齢的にも必要であり、低栄養の予防がたいへん重要である。それがフレイル予防にもつながる。65~74歳のいわゆる前期高齢者時代は過栄養、低栄養予防が必要な群が混在しており、個別の予防対策が必要と思われる。個人的には、すでに生活習慣病または動脈硬化疾病を抱えている対象者における二次予防以外は、より低栄養予防を重視していただきたいと思う。

フレイル・サルコペニアに関して

詳細は日本人の食事摂取基準（2015年版）を読んでいただければよいが、今後の超高齢社会を考えたときにこのフレイルの概念はたいへん重要となる。フレイルの診断項目にも組み込まれているが、低栄養（体重減少）はフレイルの重要な要因であることは間違いない。また、サルコペニアは加齢とともに出現しやすい四肢骨格筋量の減少ならびに筋力低下または身体機能低下の存在をさす。定義自体フレイルと重なっており、両者は多くの場合混在しているものと思われる。実はフレイルの概念は介護予防にも組み込まれており、上記の基本チェックリストを実施することによりフレイルを十分評価できるものと思われる。今後このフレイル・介護予防の概念が高齢者に広まり、さらには予防法が市町村に広がるのが日本の超高齢社会を乗り切る大きな医療政策上の重要視点であると思う。その予防対策の一つの重要項目に低栄養予防は位置づけられる。

なお、たんぱく質以外の個々の栄養素とフレイル、サルコペニアの関係はいまだ十分なエビデンスはなく、今後の研究が望まれるのは、認知症、とくにアルツハイマー病と栄養との関係と同様である。

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LETTER TO THE EDITOR

A Growing Mass in the Mediastinum: Hiatus Hernia



Bowditch first published a description of a hiatus hernia (HH) in 1853. In 1919, Soresi was the first to surgically reduce a HH. During the first half of the 20th century, the association between gastroesophageal reflux disease (GERD) and HH was established. HHs are classified into four types: type I indicates sliding hernia; type II, paraesophageal hernia (incidence $\leq 5\%$); type III, mixed sliding and paraesophageal hernia; and type IV, herniation of additional organs (colon, omentum, and spleen).¹ A giant HH is a hernia that includes at least 30% of the stomach in the thorax, and most commonly is a type III hernia.² There are two potential mechanisms of giant HHs: (1) GERD leads to esophageal scarring and shortening with traction on the gastroesophageal junction and gastric herniation; and (2) chronic positive pressure on the diaphragmatic hiatus with a propensity to herniation leads to gastric displacement into the thorax, resulting in causing GERD.² We report an elderly patient with a growing mass in the mediastinum on the roentgenogram, who was already treated for erosive esophagitis.

An 85-year-old female patient presented himself with a large mass in mediastinum on the chest roentgenogram. The patient had already received both treatments with a proton pump inhibitor for erosive esophagitis and a calcium channel blocker for hypertension. She had neither chest oppression nor respiratory distress. Her physical examination results showed that she was neither anemic nor febrile. Her blood pressure indicated 125/70 mmHg on the supine position. In fact, her chest roentgenography revealed a large mass overlapping with the heart (Figure 1A, arrows), which included the air–fluid level (arrowheads), with a pulmonary scar in the right lower field. Retrospective analyses using the chest roentgenograms showed that the mass was found on the film obtained 2 years ago (Figure 1B, arrows), and that it was not detected on the film 4 years ago (Figure 1C). Chest computed tomography indicated a large HH with intrathoracic stomach located behind the left atrium (Figure 1D) as previously described.³ A diagnosis of HH type III was made. At follow-up 1 year later, the patient was asymptomatic, although she received no further treatment.

Lim et al⁴ have recently reported a unique case of a massive HH in a 93-year-old woman patient, compressing on the left atrium, mimicking a left atrial mass. A massive HH and the thoracic stomach were also illustrated by barium swallow as images in cardiovascular medicine during left atrial catheter ablation for atrial fibrillation.⁵ Echocardiography is an investigational tool for

identifying cardiac masses. However, detection of extracardiac masses using echocardiography may lead to a misdiagnosis. The result from another asymptomatic patient with a paracardiac mass in the right lower lobe suggests the remarkable accuracy of chest computed tomography for diagnosing a massive HH containing the whole stomach and fatty omental tissue.³ A case of massive HH masquerading as a tension pneumothorax was also reported.⁶ Clinicians should consider a large HH when examining patients with a mass that is located behind the heart in the mediastinum on the roentgenogram. Our images concerning HH appear to be instructive for clinicians.

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Takashi Takahashi*

Laboratory of Infectious Diseases, Graduate School of Infection Control Sciences, Kitasato University, Tokyo, Japan

Masashi Okuro, Kunimitsu Iwai, Shigetomo Morimoto
Department of Geriatric Medicine, Kanazawa Medical University,
Ishikawa, Japan* Corresponding author. Takashi Takahashi, 5-9-1, Shirokane,
Minato-Ku, Tokyo 109-8641, Japan.
E-mail: T. Takahashi <taka2si@isci.kitasato-u.ac.jp>.

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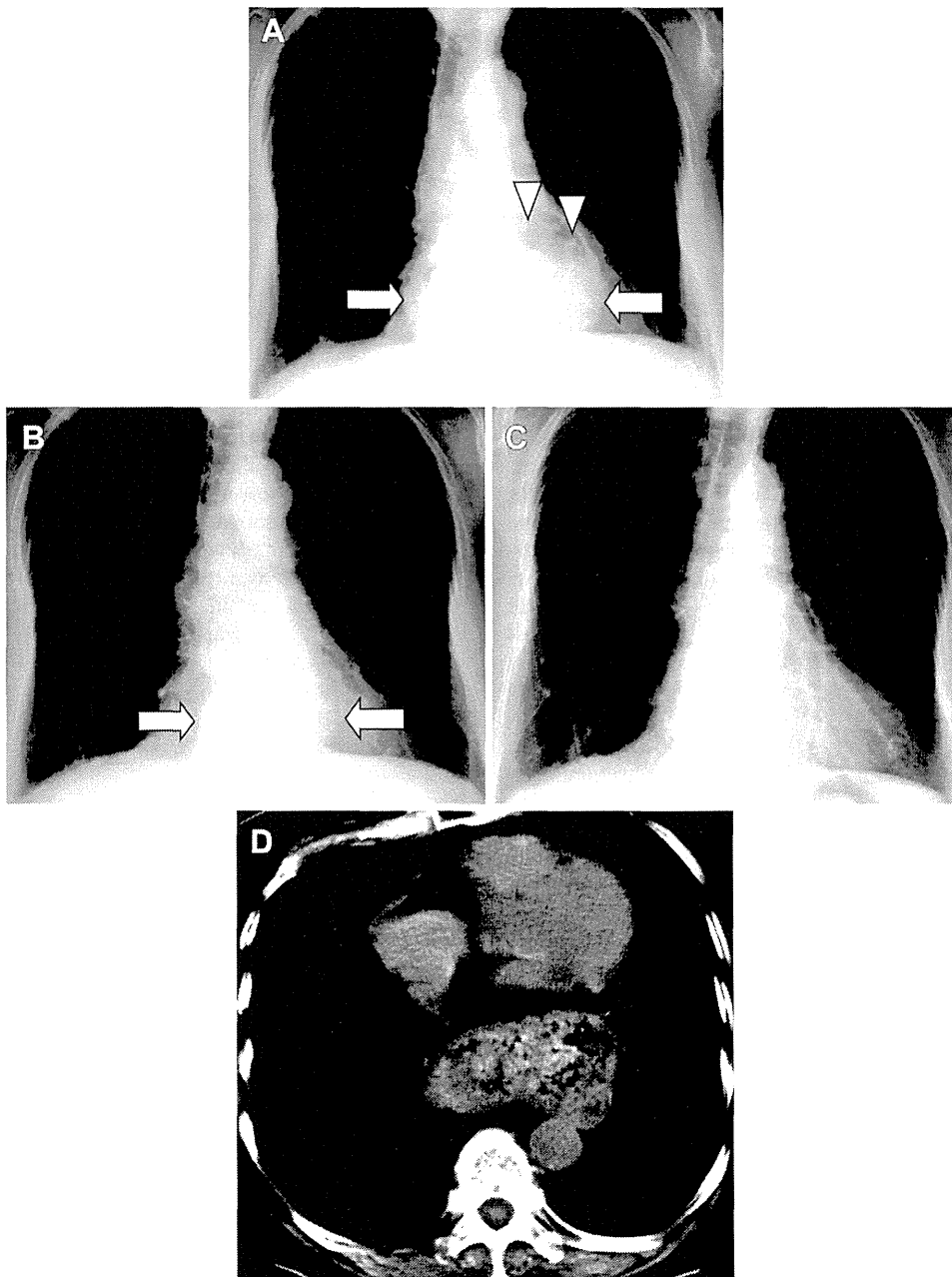


Figure 1 Chest roentgenography reveals (A) a large mass overlapping with the heart (arrows), which includes the air–fluid level (arrowheads), with a pulmonary scar in the right lower field. Retrospective analyses using the chest roentgenograms show that (B) the mass was found on the film obtained 2 years previously (arrows), and that (C) it was not detected on the film 4 years ago. (D) Chest computed tomography indicates a large hiatal hernia with intrathoracic stomach located behind the left atrium.

ORIGINAL ARTICLE

Association between blood pressure and disability-free survival among community-dwelling elderly patients receiving antihypertensive treatment

Osamu Iritani¹, Yumi Koizumi², Yuko Hamazaki², Hiroshi Yano¹, Takuro Morita¹, Taroh Himeno¹, Tazuo Okuno¹, Masashi Okuro¹, Kunimitsu Iwai¹ and Shigeto Morimoto¹

A reduction of elevated blood pressure (BP) is an important treatment goal in elderly hypertensive patients. However, excessive reduction of systolic BP (SBP) and/or diastolic BP (DBP) might be harmful in such patients. We investigated whether this was the case with regard to risk of incident disability or death in community-dwelling elderly subjects. We analyzed 570 patients receiving antihypertensive treatment aged 65–94 years. The endpoint was the composite outcome of incident disability, defined as first certification of a support/care need or death. Relationships among each of the four classes of SBP or DBP and the risk of incident disability or death were estimated using the Cox proportional hazards model. Over four years, 77 (13.5%) incident disabilities or deaths occurred. After adjustment for age, sex and variables selected according to their univariate analysis P -value < 0.20 , the risk of events was significantly higher in subjects with baseline SBP < 120 mm Hg (hazard ratio (HR) = 2.81, $P = 0.023$) and ≥ 160 mm Hg (HR = 4.32, $P < 0.001$), compared with subjects with baseline SBP of 140–159 mm Hg, who showed the lowest incidence of events. This J-curve relationship was observed in very elderly patients (≥ 75 years) but not in younger patients. Patients with SBP < 120 mm Hg tended to have a higher risk of incident disability caused by cerebral events, and those with SBP ≥ 160 mm Hg had a higher risk of incident disability caused by falls/bone fractures. These observations indicate that excessive BP reduction could cause discontinuance of disability-free survival in community-dwelling elderly patients.

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Keywords: disability; elderly; J-curve; treatment

INTRODUCTION

Providing high-quality treatment to older adults with elevated blood pressure (BP), which is aimed at both the prevention of cardiovascular/cerebrovascular (CV) morbidity/mortality and the promotion of cognitive/physical function, is growing in importance because of the improved survival of patients with hypertension into old age. Many large-scale intervention trials, including a meta-analysis of eight large-scale intervention trials in elderly hypertensive patients aged ≥ 60 years,¹ recent clinical trials limited to elderly patients aged ≥ 60 years,^{2–7} and Hypertension in the Very Elderly Trial,⁸ which enrolled those aged ≥ 80 years, have revealed significant reductions in CV morbidity/mortality with antihypertensive treatment. By contrast, several long-term interventional trials also have demonstrated J-curve phenomena for the relationships of achieved systolic BP (SBP),^{3,9–11} diastolic BP (DBP)^{12,13} and both¹⁴ with CV morbidity/mortality in elderly hypertensive patients with various CV conditions, including coronary heart disease. Moreover, hypertension is also known to be linked to frailty in the elderly.^{15,16} In Japan, the public Long-Term Care Insurance system provides services to

disabled older adults who have been certified as requiring support (levels 1–2) or care (levels 1–5).^{17,18} However, few studies have examined the association of BP with disability-free survival in community-dwelling elderly hypertensive patients. Therefore, we sought to determine the appropriate BP for elderly patients receiving antihypertensive treatment by examining the associations between baseline BP and the risk of incident disability or death.

METHODS

Subjects

The target area was a town with a population of $\sim 30\,000$ in Ishikawa, Japan. The proportion of elderly people aged ≥ 65 years in the total population was 19.6% (2010). The local government provides a public health center-based annual health check-up to these elderly subjects. In April 2008, of all 4050 community-dwelling uncertified elderly subjects aged ≥ 65 years, 1091 supplied complete information at the time of their health check-ups. Of those subjects, 62.6% were hypertensive, defined as BP $\geq 140/90$ mm Hg or receiving current antihypertensive treatment ($n = 683$). Among hypertensive subjects,

¹Department of Geriatric Medicine, Kanazawa Medical University, Ishikawa, Japan and ²School of Nursing, Kanazawa Medical University, Ishikawa, Japan
 Correspondence: Professor S Morimoto, Department of Geriatric Medicine, Kanazawa Medical University, 1-1 Daigaku, Uchinada, Ishikawa 920-0293, Japan.
 E-mail: shigeto@kanazawa-med.ac.jp

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84.8% were receiving antihypertensive treatment ($n = 579$)¹⁹ and were included in our study.

Baseline examinations

A self-administered questionnaire, which included medical history and time since the last meal,²⁰ was completed at baseline. The blood condition was defined as fasting if blood was collected more than 8 h after the last meal. Chronic kidney disease was defined as an estimated glomerular filtration rate, calculated using the modification of diet in renal disease equation with coefficients modified for Japanese patients,²¹ of $<60 \text{ ml min}^{-1} 1.73 \text{ m}^{-2}$. Diabetes mellitus was defined as fasting blood glucose $\geq 7.0 \text{ mmol l}^{-1}$ (126 mg dl^{-1}), non-fasting glucose $\geq 11.1 \text{ mmol l}^{-1}$ (200 mg dl^{-1}), HbA1c $\geq 6.5\%$ by a standardized method, or the use of hypoglycemic agents and/or insulin.²² Dyslipidemia was defined as fasting serum total cholesterol $\geq 220 \text{ mg dl}^{-1}$, triglycerides $\geq 150 \text{ mg dl}^{-1}$, HDL cholesterol $<40 \text{ mg dl}^{-1}$, or use of the lipid-lowering agents.²³ Hyperuricemia was defined as serum uric acid $\geq 7.0 \text{ mg dl}^{-1}$ in men and $\geq 6.0 \text{ mg dl}^{-1}$ in women or the use of uric acid-lowering agents.²⁴ Hypoalbuminemia was defined as serum albumin $<4 \text{ g dl}^{-1}$.²⁵

Measurements of baseline BP were performed based on the guidelines for the management of hypertension,²⁶ by trained observers using a mercury sphygmomanometer.

Analysis

The primary endpoint of the present study was the composite outcome of incident disability, defined as the first certification for any level of support/care need, or death. Support/care need was judged by the Regional Comprehensive Support Center (RCSC) of the local government, on the basis of the investigation form completed by interview by the RCSC staff and of the doctor's assessment form completed by the physician in charge.¹⁷ We also examined the first disease causing the need for support/care need on the papers of all certificated persons, and we classified the diseases into four categories, namely cerebral events, falls/bone fractures, dementia/depression and other diseases. Baseline SBP and DBP were each classified into four classes (SBP: <120 , 120 – 139 , 140 – 159 and $\geq 160 \text{ mm Hg}$; DBP: <70 , 70 – 79 , 80 – 89 and $\geq 90 \text{ mm Hg}$).^{3,9} The results for continuous variables in baseline clinical characteristics were compared using Mann–Whitney *U*-analysis. Discrete variables were compared by χ^2 -analysis. Comparisons of data among the groups of SBP and DBP were performed by the Kruskal–Wallis test with Bonferroni's correction. Proportional hazards regression (Cox) models²⁷ were used to estimate the unadjusted hazard ratio (HR) of incident disability or death with 95% confidence intervals (CIs) by age, sex, risk factors shown in Table 1, and classes of SBP or DBP. Multivariate models were used to adjust for potential confounding factors at $P < 0.20$.²⁸ Using Cox regression, the HR for each baseline BP (SBP: 140 – 159 mm Hg ; DBP: 70 – 79 mm Hg) and the corresponding 95% CI were calculated. Data were analyzed using IBM-SPSS software (v. 18.0, IBM-SPSS, Chicago, IL, USA).

Ethical considerations

The study was formally approved by the Clinical Research Ethics Committee of Kanazawa Medical University. It was also approved by official agreement between the mayor of the town and us. We received baseline data and information of new onset of disability or death, which were irreversibly anonymized, during the follow-up period from the RCSC of the town.

RESULTS

Study population

Out of the 579 treated hypertensive elderly patients, nine moved out of the area during the four-year period and were also excluded. A total of 570 subjects (225 men and 345 women) were included in this analysis. Table 1 shows the baseline clinical characteristics of all of the patients at study entry. The mean \pm s.d. age of subjects was 74.2 ± 6.1 years (65–94 years). The percentage of patients aged ≥ 75 years was 46.3% (Table 1).

Disability and death

A total of 77 subjects (33.8/1,000 person-years) either became disabled or died. These patients included 62 cases of incident disability (27.2/1,000 person-years) and 15 deaths without disability (6.6/1,000 person-years). Seven patients died after incident disability (3.1/1,000 person-years), and a total of 22 died (9.6/1,000 person-years) during the period (Table 1). Compared with patients with disability-free survival, patients with incident disability or death showed a significantly higher mean age and higher female sex rate (Table 1). The incidence rates of the composite outcome of incident disability and death for patients with baseline SBP <120 , 120 – 139 , 140 – 159 and $\geq 160 \text{ mm Hg}$ were 45.9, 34.7, 19.7 and 75.6/1,000 person-years, respectively, while those for patients with baseline DBP <70 , 70 – 79 , 80 – 89 and $\geq 90 \text{ mm Hg}$ were 37.5, 33.3, 33.3 and 32.9/1,000 person-years, respectively. The Kruskal–Wallis test revealed higher incidences of a past history of heart disease in the lower SBP groups and higher incidences of past histories of stroke, chronic kidney disease and diabetes mellitus in the lower DBP groups (Table 2).

Age, female sex, past history of stroke, past history of heart disease, chronic kidney disease, diabetes mellitus, hyperuricemia, and hypoalbuminemia were associated with the risk of incident disability or death in univariate analyses and were sequentially included in the final Cox proportional hazards regression model. The relationship between baseline SBP or DBP and the incidence of events is shown in Figure 1. After adjustment for these factors, the HR for disability or death over four years was significantly higher in subjects with baseline SBP $<120 \text{ mm Hg}$ (HR = 2.81, 95% CI = 1.15–6.82, $P = 0.023$) and $\geq 160 \text{ mm Hg}$ (HR = 4.32, 95% CI = 1.90–9.83, $P < 0.001$), compared with subjects with baseline SBP of 140 – 159 mm Hg , which yielded the lowest incidence of events (Figure 1). After adjustment for the same factors, the HR for disability alone was also significantly higher both in subjects with baseline SBP $<120 \text{ mm Hg}$ (HR = 3.37, 95% CI = 1.18–9.60, $P = 0.023$) and in those with baseline SBP $\geq 160 \text{ mm Hg}$ (HR = 4.09, 95% CI = 1.03–8.16, $P = 0.043$), compared with control subjects (Figure 1). Compared with the same control group, the HR for all-cause death was significantly higher in those with baseline SBP $\geq 160 \text{ mm Hg}$ (HR = 6.10, 95% CI = 1.33–19.5, $P = 0.017$) but not in those with $<120 \text{ mm Hg}$. There was no difference in HR among each of the baseline DBP classes (Figure 1).

In the subgroup of patients aged ≥ 75 years, subjects with baseline SBP $<120 \text{ mm Hg}$ or $\geq 160 \text{ mm Hg}$ had a significantly higher risk of all events (SBP $<120 \text{ mm Hg}$: HR = 3.30, 95% CI = 1.18–9.21, $P = 0.023$; SBP $\geq 160 \text{ mm Hg}$: HR = 4.41, 95% CI = 1.62–12.0, $P = 0.004$) (Figure 2) and of incident disability alone (SBP $<120 \text{ mm Hg}$: HR = 3.61, 95% CI = 1.12–12.0, $P = 0.032$; SBP $\geq 160 \text{ mm Hg}$: HR = 3.67, 95% CI = 1.20–11.2, $P = 0.022$), compared with subjects with baseline SBP of 140 – 159 mm Hg . There were no differences in HRs in the subgroup of patients aged 65–74 years (Figure 2).

Among the 62 disabled subjects, 11 patients were disabled owing to cerebral events, 15 owing to falls/bone fractures, 17 owing to dementia/depression, and 19 owing to other diseases. Of the 11 patients disabled owing to cerebral events, 10 did not have a previous history of stroke at the baseline examination. Conditional Cox hazard analysis revealed that the HR for disability owing to cerebral events was increased in subjects with baseline $<120 \text{ mm Hg}$ (HR = 27.3, 95% CI = 1.09–684, $P = 0.044$), while that for disability owing to falls/bone fractures was increased in patients with SBP $\geq 160 \text{ mm Hg}$ (HR = 25.0, 95% CI = 1.61–388, $P = 0.021$), compared with the control group (Figure 3).

Table 1 Baseline characteristics of the total population with antihypertensive treatment

	Death						
	Total, n = 570	Disability or death, n = 77	Disability, n = 62	Total, n = 22	Death with disability, n = 7	Death without disability, n = 15	Disability-free survival, n = 493
Demographics							
Age (years)	74.2 ± 6.1	79.5 ± 5.6***	80.6 ± 5.1***	78.1 ± 6.9**	84.3 ± 4.9***	75.1 ± 5.7	73.4 ± 5.7
Age > 75: n (%)	264 (46.3%)	63 (81.8%)*	55 (88.7%)*	15 (68.2%)#	7 (100%)*	8 (53.3%)	201 (40.8%)
Females: n (%)	345 (60.5%)	54 (70.1%)#	46 (74.2%)*	10 (45.5%)	2 (28.6%)	8 (53.3%)	291 (59.0%)
BMI (kg m ⁻²)	23.5 ± 3.2	23.5 ± 3.9	23.4 ± 3.8	23.0 ± 4.3	21.0 ± 3.2#	23.9 ± 4.5	23.5 ± 3.1
Complications							
Past history of stroke: n (%)	31 (5.5%)	8 (10.5%)#	4 (6.5%)	5 (22.7%)*	1 (14.3%)	4 (26.7%)*	23 (4.7%)
Past history of heart disease: n (%)	100 (17.9%)	23 (30.3%)*	20 (32.3%)*	4 (18.2%)	1 (14.3%)	3 (20.0%)	77 (15.6%)
Chronic kidney disease: n (%)	216 (37.9%)	37 (48.1%)#	33 (53.2%)*	7 (31.8%)	3 (42.9%)	4 (26.7%)	179 (36.3%)
Diabetes mellitus: n (%)	125 (21.9%)	23 (29.9%)#	22 (35.5%)*	4 (18.2%)	3 (42.9%)#	1 (6.7%)	102 (20.7%)
Dyslipidemia: n (%)	298 (52.3%)	43 (55.8%)	36 (58.1%)	11 (50.0%)	4 (57.1%)	7 (46.7%)	255 (51.7%)
Hyperuricemia: n (%)	114 (20.0%)	17 (22.1%)	12 (19.4%)	7 (31.8%)#	2 (28.6%)	5 (33.3%)#	97 (19.7%)
Hypoalbuminemia: n (%)	30 (5.3%)	12 (15.6%)*	9 (14.5%)*	7 (31.8%)*	4 (57.1%)*	3 (20.0%)*	18 (3.7%)
Blood pressure at entry							
Systolic (mmHg)	137.2 ± 14.3	139.3 ± 16.4	137.6 ± 15.9	141.7 ± 16.7	132.0 ± 11.5	146.2 ± 17.1*	136.9 ± 13.9
< 120: n (%)	49 (8.6%)	9 (11.7%)*	8 (12.9%)*	2 (9.1%)	1 (14.3%)	1 (6.7%)	40 (8.1%)
120–139: n (%)	288 (50.5%)	40 (50.5%)*	35 (56.5%)*	10 (45.5%)	5 (71.4%)	5 (33.3%)	248 (50.3%)
140–159: n (%) ^a	190 (33.3%)	15 (19.5%)	11 (17.7%)	5 (22.7%)	1 (14.3%)	4 (26.7%)	175 (35.5%)
≥ 160: n (%)	43 (7.5%)	13 (16.9%)*	8 (12.9%)*	5 (22.7%)*	0 (0.0%)	5 (33.3%)*	30 (6.1%)
Diastolic (mmHg)	78.4 ± 9.0	78.2 ± 9.4	77.3 ± 9.3	80.1 ± 8.5	76.0 ± 6.2	81.9 ± 8.9	78.4 ± 9.0
< 70: n (%)	80 (14.0%)	12 (15.6%)	11 (17.7%)	2 (9.1%)	1 (14.3%)	1 (6.7%)	68 (13.8%)
70–79: n (%) ^b	203 (35.6%)	27 (35.1%)	22 (35.5%)	8 (36.4%)	3 (42.9%)	5 (33.3%)	176 (35.7%)
80–89: n (%)	211 (37.0%)	28 (36.4%)	23 (37.1%)	8 (36.4%)	3 (42.9%)	5 (33.3%)	183 (37.1%)
≥ 90: n (%)	76 (13.3%)	10 (13.0%)	6 (9.7%)	4 (18.2%)	0 (0.0%)	4 (26.7%)	66 (13.4%)

Abbreviation: BMI, body mass index. Results are expressed as mean ± s.d., or n (%). Mann–Whitney U-analysis or χ^2 -analysis were used. #P<0.20, *P<0.05, **P<0.01 and ***P<0.001 vs. group with disability-free survival. ^aReference SBP. ^bReference DBP.

Table 2 Baseline characteristics by each quartile of SBP and DBP pressure.

	SBP				Kruskal– Wallis, P-value	DBP				Kruskal– Wallis, P-value
	< 120, n = 49	120–139, n = 288	140–159, n = 190 ^a	≥ 160, n = 43		< 70, n = 80	70–79, n = 203 ^b	80–89, n = 211	≥ 90, n = 76	
Demographics										
Age (years)	73.3 ± 5.6	74.8 ± 6.2*	73.4 ± 5.7	75.4 ± 6.7#	*	75.6 ± 6.4	74.8 ± 6.3	73.8 ± 5.7#	72.5 ± 5.7**	*
Age > 75 years: n (%)	23 (46.9%)	140 (48.6%)#	78 (41.1%)	23 (53.5%)#		43 (53.8%)	100 (49.3%)	93 (44.1%)	28 (36.8%)#	#
Females: n (%)	29 (59.2%)#	168 (58.3%)#	122 (64.2%)	26 (60.5%)		48 (60.0%)	123 (60.6%)	130 (61.6%)	44 (57.9%)	
BMI (kg m ⁻²)	23.9 ± 2.7	23.2 ± 3.2#	23.7 ± 3.3	24.0 ± 3.3	#	23.3 ± 3.6	23.2 ± 3.2	23.8 ± 3.0*	23.9 ± 3.1#	#
Complications										
Past history of stroke: n (%)	4 (8.2%)	17 (5.9%)	8 (4.2%)	2 (4.7%)		2 (2.5%)	7 (3.4%)	19 (9.0%)*	3 (3.9%)	*
Past history of heart disease: n (%)	14 (28.6%)*	58 (20.1%)*	25 (13.2%)	3 (7.0%)	**	22 (27.5%)*	34 (16.7%)	33 (15.6%)	11 (14.5%)	#
Chronic kidney disease: n (%)	23 (45.9%)#	117 (40.6%)#	61 (32.1%)	15 (34.9%)	#	41 (51.3%)*	70 (34.5%)	71 (33.6%)	34 (44.7%)#	*
Diabetes mellitus: n (%)	10 (20.4%)	68 (23.6%)	39 (20.5%)	8 (18.2%)		28 (35.0%)*	49 (24.1%)	40 (19.0%)	8 (10.5%)*	**
Dyslipidemia: n (%)	26 (53.1%)	151 (52.4%)	101 (53.2%)	20 (46.5%)		43 (53.8%)	109 (53.7%)	106 (50.2%)	40 (52.6%)	
Hyperuricemia: n (%)	8 (16.3%)#	33 (11.5%)	18 (9.5%)	9 (20.9%)*	#	7 (8.8%)	26 (12.8%)	23 (10.9%)	12 (15.8%)	
Hypoalbuminemia: n (%)	3 (5.1%)	17 (5.9%)	7 (3.7%)	3 (7.9%)		8 (10.0%)#	9 (4.4%)	11 (5.2%)	2 (2.6%)	#

Abbreviations: BMI, body mass index; DBP, diastolic blood pressure; SBP, systolic blood pressure. Results are expressed as mean ± s.d., or n (%). Mann–Whitney U-analysis or χ^2 -analysis was used. ^aReference SBP. ^bReference DBP. Comparisons of data among classes of SBP and DBP were performed by Kruskal–Wallis test with Bonferroni's correction. #P<0.20, *P<0.05 and **P<0.01.

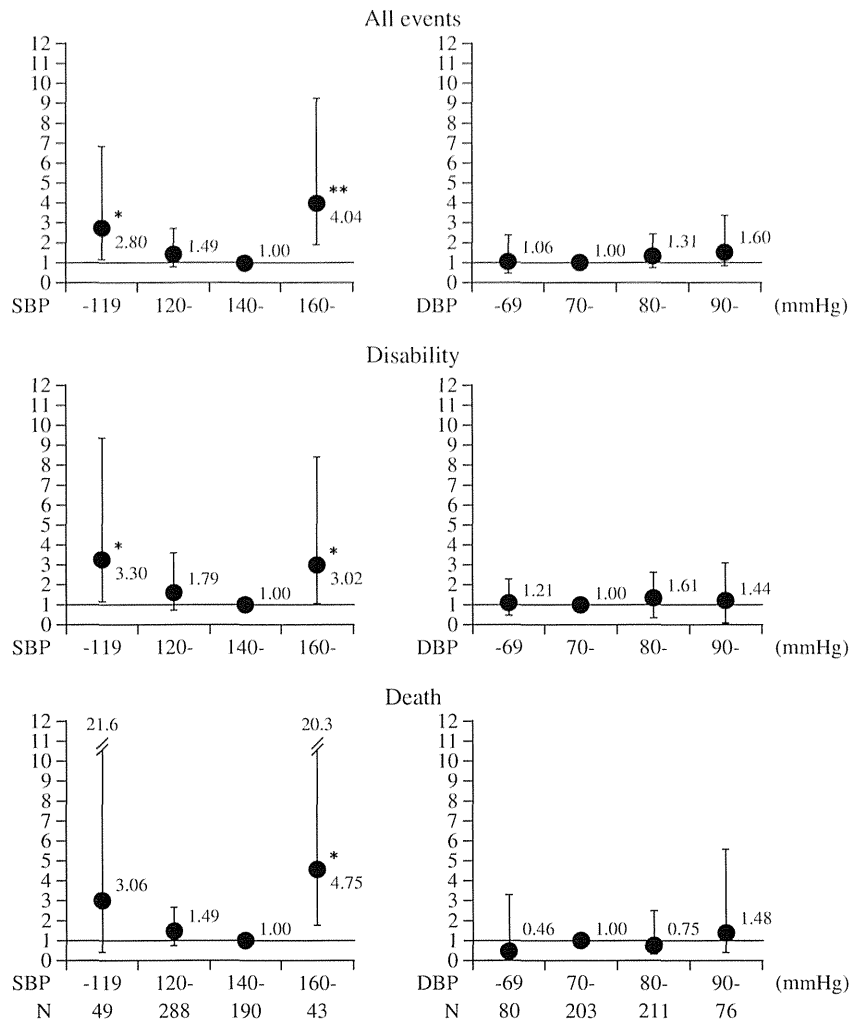


Figure 1 Relationship between baseline blood pressure (BP) and the hazard ratio of incident disability or death. Data are presented with relative risks and 95% confidence intervals with reference to patients with baseline systolic BP (SBP) of 140–159 mm Hg and patients with baseline diastolic BP (DBP) of 70–79 mm Hg. * $P < 0.05$; ** $P < 0.01$.

DISCUSSION

The present study newly revealed an emerging profile of treated hypertension and the discontinuance of disability-free survival in community-dwelling elderly subjects. The advantages of the present study are as follows: Long-Term Care Insurance system certification is based on strictly established, uniform criteria throughout Japan,^{17,18} and the included information enabled a very high follow-up rate in the present study (98.4%). Another advantage was that having information about the causal disease for incident disability enabled clarification of whether the risk of incident disability owing to particular causal diseases was higher in any of the SBP groups.

Practitioner's trial on the efficacy of antihypertensive treatment in elderly patients with hypertension II (PATE-Hypertension-II)⁹ and ONTARGET¹⁰ revealed that elderly patients with higher achieved BP (≥ 160 mm Hg) had significantly higher incidences of CV events. The present study revealed that patients with baseline SBP ≥ 160 mm Hg had a significantly higher risk not only of total death and also for incident disability, compared with the control group (Figure 1). We also observed an association of baseline SBP ≥ 160 mm Hg with an increased risk of incident disability owing to falls/bone fractures (Figure 3). Although the precise reason for the association are not

clear, one of the possible explanations is hypertension-induced development of white matter lesions,²⁹ which increase the risk for incident bone fracture in community-dwelling elderly subjects.³⁰ Moreover, a sub-analysis of Hypertension in the Very Elderly Trial revealed that sufficient reduction of BP in very old patients with SBP ≥ 160 mm Hg was associated with a significant reduction in fracture rate.³¹ The precise mechanism for the association should be clarified in the future.

The present study clearly detected J-curve phenomena for the risk of incident disability or death, as well as for incident disability alone (Figure 1). The J-curve phenomenon appeared in patients aged ≥ 75 years but not in younger patients (Figure 2). The SBP range at the HR nadir of 140–159 mm Hg observed in the present study was somewhat higher than the target BP recommended for elderly patients aged ≥ 75 years by the Japanese treatment guidelines for hypertension, which include both using an intermediate target BP of $< 150/90$ mm Hg and attempting to lower the patient's BP to $< 140/90$ mm Hg if possible.²⁶ However, a lower target BP is not necessarily beneficial in elderly patients.³² Indeed, in many large-scale clinical studies in elderly hypertensive patients aged ≥ 60 years, the mean BP achieved by antihypertensive treatment was 141–152/77–85 mm Hg.^{2–8} Moreover,

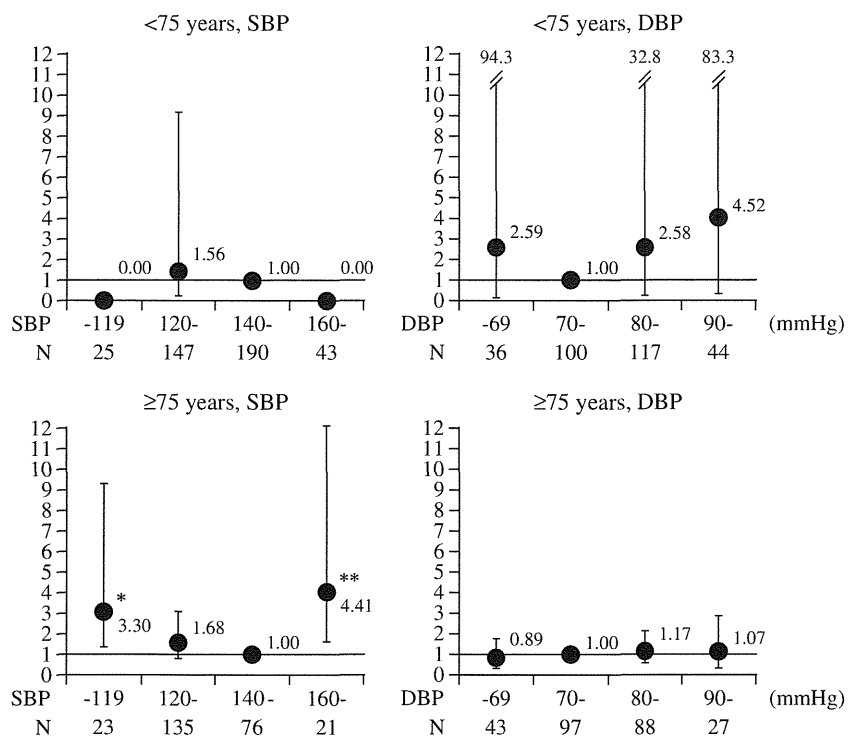


Figure 2 Relationship between baseline blood pressure (BP) and hazard ratio of incident disability or death in patients <75 years or ≥75 years. Keys as in Figure 1.

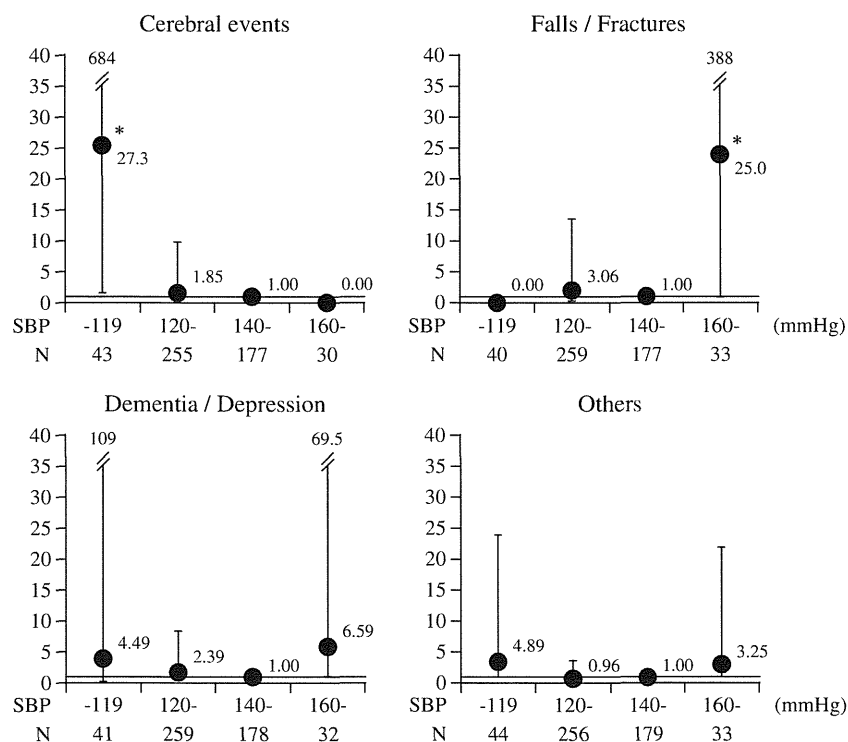


Figure 3 Relationship between baseline systolic blood pressure (SBP) and hazard ratio of incident disability according to the four categories of first causal disease for support/care need on doctor's assessment form. Keys as in Figure 1.

a sub-analysis of Systolic Hypertension in the Elderly Program (SHEP) (mean age 72 years) showed that participants whose in-trial SBP was lower than 160 mm Hg or 150 mm Hg experienced

significant reductions in total stroke incidence compared with those with SBP higher than the respective thresholds, although the reduction of stroke incidence in those with SBP < 140 mm Hg was

not significant compared with that in those with SBP ≥ 140 mm Hg,³³ indicating that reduction of stroke incidence could be achieved most effectively in those with in-trial SBP of 140–159 mm Hg. Furthermore, among the Japanese elderly hypertensive patients (≥ 75 years) in the Japanese Trial to Assess Optimal Systolic Blood Pressure in Elderly Hypertensive Patients (JATOS), which compared the two-year effects of strict treatment to maintain SBP less than 140 mm Hg (group A) with those of mild treatment to maintain SBP between 140 and 160 mm Hg (group B), group B had a lower incidence of CV events compared with group A, although the difference was not significant.³⁴ In addition to these findings, elevated BP (≥ 140 mm Hg) is not necessarily associated with a decreased survival rate in frail elderly subjects because elevated BP was independently associated with a lower risk of death (HR, 0.38) in subjects who could not complete a walk test (6 m), but it was associated with greater risk of mortality compared with subjects without elevated BP (HR, 1.35) among faster walkers (≥ 0.8 m s⁻¹).³⁵ Because the mean age of patients certified with disability in the present study was 80.6 years (Table 1), all of these reports might be compatible to the present observation that patients with SBP of 140–159 mm Hg experienced the lowest risk for events.

PATE-Hypertension³ and PATE-Hypertension II⁹ demonstrated J-curve phenomena for CV morbidity/mortality in elderly patients (≥ 75 years) with a J-curve point for SBP of < 120 mm Hg, similar to that in the present study (Figures 1 and 2). A sub-analysis of ONTARGET also demonstrated a J-curve phenomenon for CV morbidity/mortality in high-risk patients with a mean age of 66 years, with a J-curve point for SBP of < 130 mm Hg.¹⁰ The Japanese Survey for Valsartan In Deployment (J-VALID) also demonstrated a significant systolic J-curve phenomenon, with a J-curve point for SBP of < 120 mm Hg in elderly patients (≥ 75 years).¹¹ J-curve phenomena in these studies were observed for cardiac events but not for stroke. In contrast, a sub-analysis of the International Verapamil SR-Trandolapril Study (INVEST) in patients with hypertension and coronary heart disease also showed J-curve phenomena for the primary endpoint in older age groups (70– < 80 years, ≥ 80 years) with SBP and DBP at the HR nadirs of 140 mm Hg and 70 mm Hg, respectively, for the oldest age group (≥ 80 years).¹⁴ The primary endpoint of INVEST included not only all-cause death and nonfatal myocardial infarction but also nonfatal stroke.¹⁴ This result, as well as those of SHEP,³³ are partly compatible with our study, in which a J-curve phenomenon was observed for incident disability at least partly owing to cerebral events (Figure 3). In contrast, another sub-analysis of SHEP¹² and a sub-analysis of the Systolic Hypertension in Europe in patients with concomitant coronary heart disease¹³ also demonstrated J-curve phenomena for the relationship of achieved DBP with J-curve points of < 60 mm Hg and < 70 mm Hg, respectively. However, there were no differences in HR among the baseline DBP classes in the present study. Nevertheless, the observations in these previous reports, as well as in the present study, indicate the importance of avoiding excessive BP reduction because low BP can often be related to the unexpected manifestation of a J-curve paradox in very elderly hypertensive subjects with underlying chronic debilitating illnesses.³⁶ Indeed, higher incidences of CV events and risk factors for CV were observed in the groups with lower SBP or DBP in the present study (Table 2).

This study had several limitations. First, the analyses performed in the present study could not address the causality of excess BP reduction in the increased risk of disability. The patients with baseline SBP < 120 mm Hg might have originally been at high risk for frailty because SBP is known to decrease in years immediately before

dementia onset in community-dwelling hypertensive elderly subjects.³⁷ The risk of excess BP reduction in very elderly hypertensive patients should be assessed in the future in randomized, controlled trials that compare disability-free survival between hypertensive very elderly patients whose SBP is controlled at higher levels than 120 mm Hg and patients whose SBP is sustained at < 120 mm Hg. Second, in light of the single community model, care must be taken in interpreting the results of the present study, and further evaluation in multi-regional trials is needed. Third, stratified sampling of incident disability or death according to the kinds of antihypertensive drugs used, including renin–angiotensin blockers, is also needed in future studies because the renin–angiotensin system is thought to have a crucial role in aging and/or frailty.³⁸ Finally, because of the small number of normotensives and untreated hypertensives in the present study, precise analysis was statistically limited in these groups and should be examined in the future.

In conclusion, the present study clearly identified J-curve phenomena for the risk of incident disability or death in community-dwelling very elderly patients (≥ 75 years) receiving antihypertensive treatment, indicating that having a low target BP could cause exacerbation of frailty in elderly patients.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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Sleep apnea in the elderly

Masashi Okuro and Shigeto Morimoto

Purpose of review

Sleep apnea syndrome (SAS) in the elderly presents varied clinical symptoms and also has many complications. Moreover, there are many hospital departments related to these symptoms. This article uses literature to provide an outline on SAS observed in the elderly.

Recent findings

SAS sufferers often have complications with so-called lifestyle-related diseases, such as hypertension, hyperlipidemia, diabetes mellitus and metabolic syndrome. These symptoms, along with SAS, recede as a result of continuous positive airway pressure treatment. Some have also reported recession of depression symptoms and delay in deterioration of cognitive functions.

Summary

The elderly tends to develop SAS through coexistence of chronic respiratory organ disorders, increase in upper airway collapse, strokes, cardiovascular diseases, hypertension, diabetes mellitus and other physiological anatomical changes that accompany aging. However, judgment on the severity and effects regarding prognosis by each remedy used in the diagnosis and treatment of SAS in the elderly is still being developed, and it is considered necessary to accumulate more evidence and establish new standards.

Keywords

continuous positive airway pressure, elderly, Epworth sleepiness scale, international classification of sleep disorders 3, sleep apnea syndrome

INTRODUCTION

It is assumed that the elderly tends to develop sleep apnea syndrome (SAS) through coexistence of chronic respiratory organ disorders, increase in upper airway collapse, stroke [1^{*}], cardiovascular diseases [2–5], hypertension [6], diabetes mellitus [7] and so forth as physiological and anatomical changes in concurrence with aging. However, elderly SAS sufferers very seldom visit medical institutes for sleep-disordered breathing, as symptoms are not always apparent due to lower snoring volume, weight loss and fewer consequences of daytime somnolence. Therefore, the diagnosis rate is low and the problem is often overlooked. It is also believed that there are many cases of complications with other sleep disorders.

SAS was proposed by Professor Guilleminault [8], in 1976, who established its treatment system under diagnosis with polysomnogram (PSG). Although it is classified into obstructive, central and combined, SAS usually refers to obstructive SAS (OSAS), which has the highest occurrence. OSAS often happens to people who snore loudly, and the disease conditions include effort to breathe during apnea, which occurs in concurrence with sleep, as well as paradoxical movements in the thorax and

abdominal wall. OSAS often occurs in people with narrowed upper airways due to obesity, and people with small, narrow chins. SAS is diagnosed when air current through the nose and mouth stops for 10 s or longer at a time (respiratory arrest) at a frequency of five or more times an hour [9]. Severity is indicated by apnea–hypopnea index on the basis of apnea count per hour. When breathing stops, SAS sufferers have difficulty breathing, become oxygen deficient and have their sleep interrupted many times during the night. However, the person himself or herself is often not aware of their state, and the subjective symptoms are usually excessive sleepiness and fatigue during the day. Frequent interruptions caused by an oxygen deficiency result in poor quality sleep, which impacts upon the sufferers' work efficiency due to reduced memory and

Department of Geriatric Medicine, Kanazawa Medical University, Ishikawa, Japan

Correspondence to Masashi Okuro, Department of Geriatric Medicine, Kanazawa Medical University, 1–1 Daigaku, Uchinadamachi, Kahokugun, Ishikawa Prefecture, Japan 920–0293. Tel: +81 76 286 2211 x6512; fax: +81 76 286 6053; e-mail: okuro@kanazawa-med.ac.jp

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KEY POINTS

- The elderly tend to develop SAS because of complications with the physiological and anatomical changes that accompany aging.
- SAS presents various different clinical symptoms. There are also many hospital departments that are related to these symptoms.
- An effective treatment method for SAS is nasal CPAP therapy.
- Judgment on the severity and effects of each remedy regarding prognosis in diagnosis and treatment of SAS in the elderly has not been fully established, and both the accumulation of evidence and establishment of new standards are necessary.

concentration skills accompanying hypersomnia and tiredness during the day. Such a state may result in the sufferer falling asleep at the wheel or causing serious accidents through the mistaken operation of a machine. Those who are attacked by hypersomnia during the day should suspect sleep disorders, such as SAS, and actively seek the help of a specialist. SAS also presents various different clinical symptoms relating to many hospital departments.

This article uses literature to provide an outline on SAS in the elderly.

PATHOLOGY

It is known that the frequency of SAS increases in concurrence with aging [10–12]. According to a sleep heart health study (SHHS) in the United States, 46% or more had apnea–hypopnea index 5 or higher in a sample of 6132 adults. Fifty-five percent of this sample was 65 years or older [13].

As people age, deterioration in upper airway muscle activities, pharynx dilator reflex and lung capacity, as well as extension in upper airway length, etc. has been observed. In particular, the pharynx lower and upper airway extends as people age. These airways tend to close up to accompany physiological reduction in lung capacity. It is assumed that changes in upper airway resistance and increased nocturnal awakening increase the instability of respiratory control. It is also possible that edentulous jaw and so forth are also involved in stricture of the upper airway [14].

DIAGNOSIS

Subjective symptoms include discomfort or headache upon awakening, snoring, night sweat, nocturia, erectile dysfunction and sleepiness during the day.

In diagnosis, sleep conditions, sleepiness during the day and so forth are important and family members should also be interviewed in addition to the sufferer during history taking. As a method to evaluate the subjective symptoms for sleepiness, Epworth sleepiness scale is used, and it is considered that sleepiness is severe if the total score of the evaluation items is 11 or higher (Table 1) [15].

As there are no standards or guidelines regarding the diagnosis and treatment of SAS in the elderly, the fact is that the guidelines for general adults are being applied at present. In November 2012, the judgment rules for PSG tests by the American Academy of Sleep Medicine were revised, and it was decided that the Japanese Society of Sleep Research would also conform to the judgment rules of the American Academy of Sleep Medicine as shown in Table 2 in judgment of sleep, apnea and so forth [16,17,18*,19].

The diagnostic criteria for obstructive sleep apnea (OSA) in adults by International Classification of

Table 1. Epworth sleepiness scale

Situation	0	1	2	3
Sitting and reading	0	1	2	3
Watching television	0	1	2	3
Sitting inactive in a public place (theater or meeting)	0	1	2	3
As a passenger in a car for an hour without a break	0	1	2	3
Lying down to rest in the afternoon	0	1	2	3
Sitting and talking to someone	0	1	2	3
Sitting quietly after lunch (with no alcohol)	0	1	2	3
In a car, while stopped in traffic	0	1	2	3

Adapted from [15].

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Table 2. Judgment rules for through-the-night polysomnogram by the American Academy of Sleep Medicine (version 2) [16]

Apnea shall be diagnosed when all of the following standards are satisfied with thermistor:

- When the maximum amplitude for temperature sensor decreases by 90% or larger from the standard value, the event duration shall be at least 10 s or longer,
- At least 90% of the events shall satisfy the apnea amplitude standard.

Hypopnea shall be diagnosed when all of the following standards are satisfied in check with a pressure sensor (1, 2+3a, 4a or 1, 2+3b, 4b):

1. The duration of hypopnea is at least 10 s.
2. At least 90% satisfy the amplitude deterioration standard for hypopnea during the event duration.
<Alternative standard>
 - 3a. Nose pressure signal (or another alternative hypopnea sensor) amplitude decreases by 30% or larger from the standard.
 - 4a. Deterioration of 4% or larger from the oxygen saturation before the event.
<Recommended standard>
 - 3b. Nose pressure signal (or another alternative hypopnea sensor) amplitude decreases by 30% or larger from the standard.
 - 4b. Deterioration of 3% or larger from the oxygen saturation before the event or arousal concurs.

Sleep Disorders 3rd edition [20] are shown in Table 3. Breathing events are checked by through-the-night PSG tests implemented by medical institutes specializing in sleep, as well as simple tests by nonspecialist medical institutes, and SAS is diagnosed when there are five or more breathing events per hour, if the sufferer has symptoms or an underlying disease, and when there are 15 or more breathing events per hour, if the sufferer is free of symptoms or underlying diseases.

METHOD OF TREATMENT

Although there is no remedy that completely cures SAS, the first selection, which is the most effective remedy, is nasal continuous positive airway pressure (CPAP) therapy. The treatment system for this method tries to remove apnea by continuously running air from a mask attached to the nose during sleep and applying pressure so that the airway is expanded and obstruction is prevented [21,22,23].

Table 3. Diagnostic criteria for obstructive sleep apnea in adults (International Classification of Sleep Disorders-3) [20]

(A and B) or C satisfies the criteria.

A. The presence of one or more of the following:

1. The patient complains of sleepiness, nonrestorative sleep, fatigue or insomnia symptoms.
2. The patient wakes with breath holding, gasping or choking.
3. The bed partner or other observer reports habitual snoring, breathing interruptions or both during the patient's sleep.
4. The patient has been diagnosed with hypertension, a mood disorder, cognitive dysfunction, coronary artery disease, stroke, congestive heart failure, arterial fibrillation or type II diabetes mellitus.

B. Polysomnography or OCST^a demonstrates:

1. Five or more predominantly obstructive respiratory events^b (obstructive and mixed apneas, hypopneas or RERAs^c) per hour of sleep during a PSG or per hour of monitoring (OCST)^a.
- OR

C. PSG or OCST^a demonstrates:

1. Fifteen or more predominantly obstructive respiratory events (apneas, hypopneas, or RERAs)^c per hour of sleep during a PSG or per hour of monitoring (OCST)^a.

OCST, out-of-center sleep testing; PSG, polysomnography; RERAs, respiratory effort-related arousal.

^aOCST commonly underestimates the number of obstructive respiratory events per hour as compared with polysomnography because actual sleep time, as determined primarily by electroencephalography, is often not recorded.

The term respiratory event index may be used to denote event frequency on the basis of monitoring time rather than total sleep time.

^bRespiratory events defined according to the most recent version of the American Academy of Sleep Medicine Manual for the Scoring of Sleep and Associated Events.

^cRERAs and hypopnea events on the basis of arousals from sleep cannot be scored using OCST because arousals by electroencephalography criteria cannot be identified.

When a nose mask is used without problem, effects are most apparent on sufferers with severe subjective symptoms, such as sleepiness during the day, headaches in the morning and nocturia. There have also been reports on improvement in hypertension and heart failure that are considered to be complications related to SAS [24].

Although the general remedy for OSA is CPAP, there are a notable number of sufferers who are unable to tolerate CPAP. Upper airway stimulation therapy for OSA is a method that involves sending electric stimulation pulse to the hypoglossal nerve using a stimulation lead wire from a device implanted in the chest, in an attempt to prevent airway collapse during breathing and maintain airway persistence. Breathing is monitored using another detection lead wire connected to intercostal muscle. According to a study examining the clinical safety and effectiveness of upper airway stimulation therapy, the existence of alternative choices for sufferers who cannot tolerate CPAP can be anticipated [25].

Dental equipment (mouthpiece) is used for other sufferers, including sufferers with snore-type or light SAS and sufferers who cannot continue CPAP therapy because of discomfort. The mouthpiece is prepared by a dentist to suit each individual sufferer so that the lower jaw and tongue are pushed forward during sleep. In addition, some sufferers undergo a surgery called uvulopalatopharyngoplasty to expand the upper airway [26,27].

However, it is important that SAS sufferers also improve their ongoing daily lifestyle. SAS sufferers often have complications with the so-called lifestyle-related diseases, such as hypertension, hyperlipemia, diabetes and metabolic syndrome, and are in need of losing weight [28,29]. However, slender SAS sufferers whose cause of SAS is considered to be the shape of the face or jaw will not benefit from weight loss. It is also necessary to quit smoking as smoking causes inflammation of laryngopharynx and worsens SAS. Avoiding drinking, overwork and use of tranquilizers that worsen the condition, as well as sleeping on one's side are also effective in preventing the tongue root from sagging.

COMPLICATIONS AND PROGNOSIS

The significance of SAS treatment in the elderly has been a daily clinical problem. A prospective observational study on the elderly revealed that people with severe apnea, who did not receive CPAP therapy, had higher possibilities of death by cardiovascular disorders compared with people without apnea. The study results by Martínez-García *et al.* [30] indicated a possibility that the risks of death by

cardiovascular disorders can be reduced in the elderly with snoring and sleep apnea by introducing a proper sleep test and CPAP therapy.

The connection between SAS and hypertension [31], cerebral infarction, heart diseases and sudden deaths is being revealed by many study reports [32]. There is a report in which CPAP therapy was conducted on sufferers with both SAS and refractory hypertension for 3 months and a significant decrease in diastolic pressure and nocturnal blood pressure was observed. In a daily diagnosis and treatment, blood pressure may decrease in refractory hypertension sufferers by not only increasing the depressor drug, but also by considering the existence of comorbid disorders, such as sleep apnea, that may affect the blood pressure and by providing the corresponding treatment [33].

There are also reports in which it was directly shown in human cardiac insufficiency sufferers that OSAS with upper airway obstruction reduced cardiac output. Although the cardiac output decreased by 6.8% on average during apnea in obstructive pattern, it increased by 2.6% on average in the central pattern. In addition, an examination of which sufferers decrease in cardiac output occurred through multivariate analysis on apnea with obstructive pattern indicated that there were cases with reduced left ventricular ejection fraction, cases with long periods of apnea and cases with reduced oxygen concentration due to apnea. It is considered that this study result indicates the significance of sleep apnea combined with heart failure and that it is a meaningful study that indicated which sufferers should start and continue positive pressure therapy [34].

In past reports, relevance between SAS and cerebrovascular diseases had been observed in men, but there were no studies that targeted women alone. A report by Campos-Rodriguez *et al.* [35] revealed that there was relevance between SAS and brain infarction or coronary artery diseases, which reduce the life activity in women, and indicated the significance in screening and treatment of sleep apnea in women.

The American Heart Association and the American Stroke Association revised their stroke recurrence prevention guidelines in sufferers with a history of stroke and transient ischemic attack. The stroke recurrence prevention guidelines emphasized the importance of blood pressure and lipid management and also mentioned the usefulness of intervention in lifestyle. On the basis of the facts that the disease rate for SAS is high in sufferers with ischemic stroke or transient ischemic attack, and that there is evidence the outcome is improved in the general population by treatment on SAS, a new proposal was

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made on sleep apnea that sleep test can be considered for these sufferers (class IIb, evidence level B) [36^{***}].

Aspiration often arises as an issue for the elderly. In addition to high risks of aspiration of expectoration into airways or lungs during sleep, it had been indicated that the possibility of pneumonia was higher due to the effects of sleep disorder on the immune system. An observational study using the national insurance database examined the relevance between sleep apnea and risks of pneumonia. The results indicate increased risks for adult sufferers of SAS compared with people without SAS symptoms. A comparison of risks for pneumonia after adjustment of various factors related to pneumonia risk showed a 19% increase in pneumonia risk in the SAS group compared with the control group (hazard ratio after adjustment 1.19, 95% confidence interval 1.08–1.30). In addition, increase in risk was larger in sufferers using CPAP with the value 1.32 (same as above, 1.12–1.55), whereas the hazard ratio for sufferers who were intolerant of CPAP was 1.15 (same as above, 1.04–1.27) [37].

There is a report that claims depression receded in 60% of sufferers when CPAP therapy was conducted for disorders other than cerebrovascular disorders. This indicates that SAS can be a cause of depression. In addition, improvement in depression symptoms is not observed in cases in which sleepiness during the day continues even after CPAP therapy. That is, it can be a clinical symptom that the depression is not caused by SAS. Although this study was purely observational, the results of CPAP intervention tests with a good design are anticipated in order to indicate clearer relevance between SAS and depression symptoms [38].

Improvement in blood pressure, subcutaneous fat and metabolic syndrome was observed in a 3-month period of CPAP therapy for SAS. This result indicates the possibility that sleep apnea itself could be a cause of hypertension, subcutaneous fat and metabolic syndrome. Although the study result by Sharma *et al.* [39] does not apply to all sufferers of sleep apnea, it is considered necessary for clinical doctors to apply a multilateral approach on sufferers with hypertension and metabolic syndrome in addition to drug treatment with depressors, statin and so forth with consideration of snoring and apnea at night.

OSAS is said to be related to dementia. It was indicated that repeated apnea at night in the elderly entailed the risk of reducing cognitive functions. It was also reported that OSAS delayed the deterioration in cognitive functions of sufferers with light-to-medium cases of Alzheimer disease. It is indicated that the continuous treatment of SAS in the elderly

is necessary. On the basis of these research results, it is also considered necessary that general diagnosis and treatment should be provided while keeping in mind the existence of SAS as a primary method for prevention of dementia in the elderly [40–42,43^{***}].

CONCLUSION

Although the frequency of SAS increases as the person ages, there are also many areas for which the conclusion discussed above has not been reached. In addition, insomnia is observed with high frequency in the elderly as an age-related change. Although it is considered that they often visit psychiatry departments for nocturnal awakening and poor quality sleep, SAS symptoms may worsen with an increase in frequency of breathing events, such as apnea and hypopnea, and extension of their duration due to breathing adjustment function deterioration during sleep caused by central nervous system depression effect, as well as muscular relaxation effect of the drugs on groups of muscles related to airways and breathing, if sleeping drugs are prescribed readily without special consideration of SAS. As a result, they may fall into a vicious cycle of intensified insomnia and function impairment during the day. Determination of the severity and prognosis of each therapy is still insufficient regarding diagnosis and treatment of SAS in the elderly, and the accumulation of evidence and establishment of new standards are considered necessary.

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Conflicts of interest

There are no conflicts of interest.

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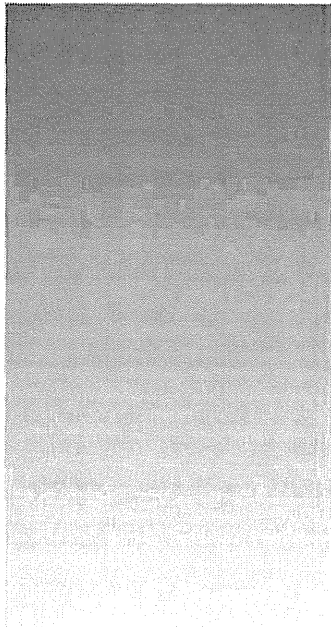
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臨床各科
差分解説

- 新知見のエッセンスをピックアップ!
- 知識の更新・アップデートのために!



差分【さぶん・patch】

一旦完成したプログラムの一部を修正すること。また、修正を行うために変更点(差分情報)のみを抜き出して列挙したファイル。「パッチファイル」「差分ファイル」などとも呼ばれる。バグ(不具合)の修正や、小規模なバージョンアップなどを行う際に、ソフトウェア全体を入れ替えるのは効率的でないため、修正点だけを抜き出してパッチ作成し、これを既存のソフトに組み込むことで修正を行う。
(IT用語事典 e-Words より引用)

■ 内科：高血圧

JSH 2014の変更点：75歳以上の高齢者の降圧目標150/90mmHg

高齢者高血圧の降圧目標はJSH 2009¹⁾では140/90mmHg未満であり、75歳以上の後期高齢者では150/90mmHg未満を中間目標とされた。

70～84歳の高齢収縮期高血圧患者3079例を対象としたわが国のVALISH試験²⁾では、収縮期血圧140mmHg未満の厳格管理群と140～150mmHgの緩徐管理群の間で心血管イベントに有意差を認めなかった。VALISH試験²⁾も、特に後期高齢者では150/90mmHg未満の降圧はすべきとのこれまでの見解を支持している。

英国NICE/BHS³⁾のガイドラインでもHYVET⁴⁾の結果から80歳以上の高齢者高血圧の治療の必要性を示し、150/90mmHgを降圧目標としている。米国JNC-8⁵⁾では60歳以上で150/90mmHg未満としている。高齢者高血圧の降圧目標は欧米でも再評価され、特にわが国のエビデンスを基盤としたJSH 2009¹⁾の考え方が取り入れられたと言える。以上の背景から、JSH 2014では後期高齢者の降圧目標が150/90mmHg未満に設定された。

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【解説】

永井道明, * 荻尾七臣 自治医科大学循環器内科学
* 教授

■ 麻酔科

進化するビデオ喉頭鏡

気管挿管は気道を確保するために必須の手技である。全身麻酔時の気道確保や人工呼吸器を装着する患者の気道確保、心肺蘇生時の気道確保など、医療現場では気管挿管を実施する機会は多い。

気管挿管の手技は喉頭鏡を用いて実施される。喉頭鏡にはマッキントッシュタイプのもが多く使われているが、声門の確認が容易でない症例に遭遇することも稀ではない。そのような挿管困難症例への対処として、これまでは盲目的に挿管したり、ファイバースコープを用いて挿管したりすることが多かった。

最近ビデオ喉頭鏡が登場し、声門の視認性が向上し気管挿管の安全性が格段に向上している¹⁾。代表的なビデオ喉頭鏡に、エアウェイスコープ(AWS)[®]やマックグラス(McGRATH[™] MAC)がある。ビデオ喉頭鏡は、喉頭鏡の先端に小型カメラと光源を装着し、口腔内の様子や挿入具合を小さなスクリーンに映し出して画面で観察しながら挿入できるようになっており、カメラを通して間接的に声門を確認できる。気管チューブが声門を通過する様子も視認できるため、食道への挿管も防止できる。

ビデオ喉頭鏡は、挿管困難が予想される患者、肥満患者、口の小さな患者、頸部伸展に制限がある患者、頸髄損傷が疑われる患者などに有用である²⁾。しかし、ビデオ喉頭鏡が決して万全というわけではなく、ビデオ喉頭鏡が気管挿管の安全性を保証しているわけではない。

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【解説】

外 須美夫 九州大学麻酔・蘇生学教授

■ 加齢医学

認知症診療高齢者の急増

2013年6月に厚生労働省長寿科学研究(朝田班)において、認知症高齢者の心理検査を含む厳密な調査が日本各地のモデル地区で行われ、高齢者の15%、推計462万人が認知症に罹患していることが報告された¹⁾。軽度認知機能障害(MCI)も14%、推計400万人以上に上ることが明らかとなり、また年齢による有病率は85歳以上で1/3以上、95歳以上では8割以上に上り、長生きをすれば誰もが認知症になるリスクが存在することが明らかとなった。今後、診断困難な例には地域で行える簡易スクリーニング方法(DASC-20)が採用され、ケアプランテキストの整備とともにモデル事業が開始される予定である。

認知症予防の観点からは、幼少時から生涯にわたる知的活動が高い場合、晩年の認知機能低下が遅いという、後方視的縦断病理学的研究が発表されている²⁾。これは年齢、性、老人斑、神経原線維変化、ラクナ梗塞、レビー小体で補正した結果であり、同一程度の病理的背景では「知的予備能」を高めることで認知症発症を遅らせることが可能であるという報告である。

認知症の中核症状とBPSDのそれぞれに有効な短期集中リハビリテーション³⁾を介入させることで、早期の在宅への退院を促す方向性が、2014年度の診療報酬改定にも盛り込まれた。

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【解説】

入谷 敦, *森本茂人 金沢医科大学高齢医学科 *教授