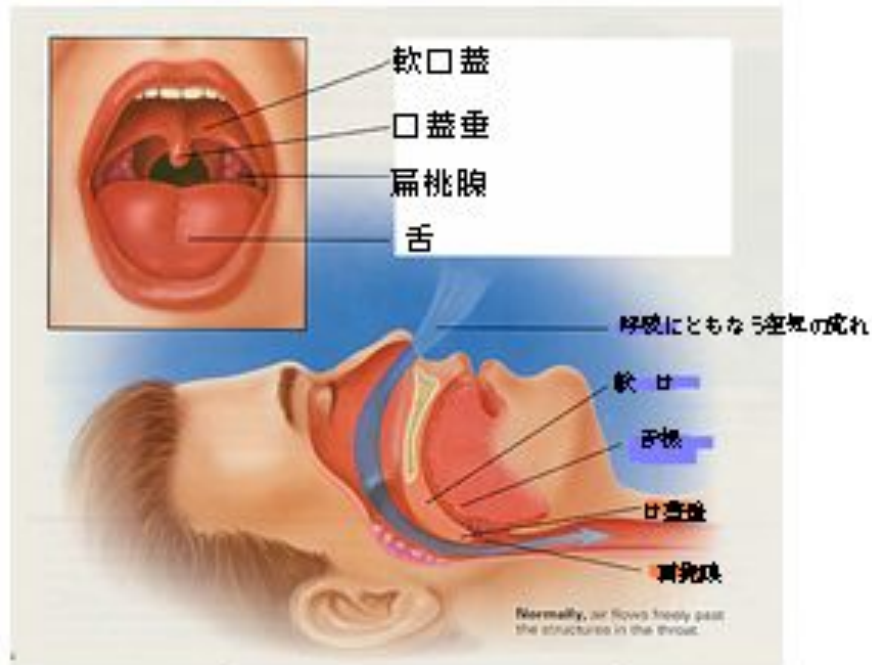


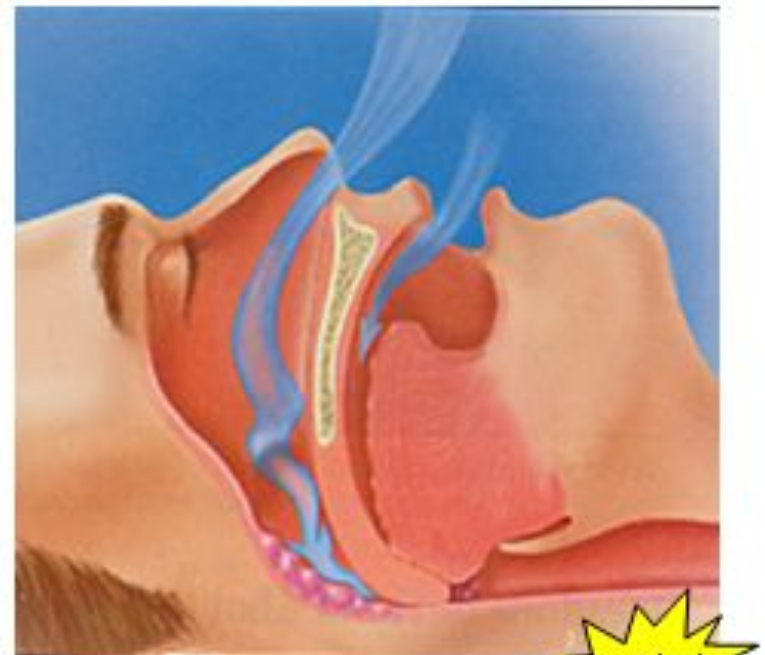
# OSASとは

## Obstructive Sleep Apnea Syndrome

### 閉塞性睡眠時無呼吸症候群

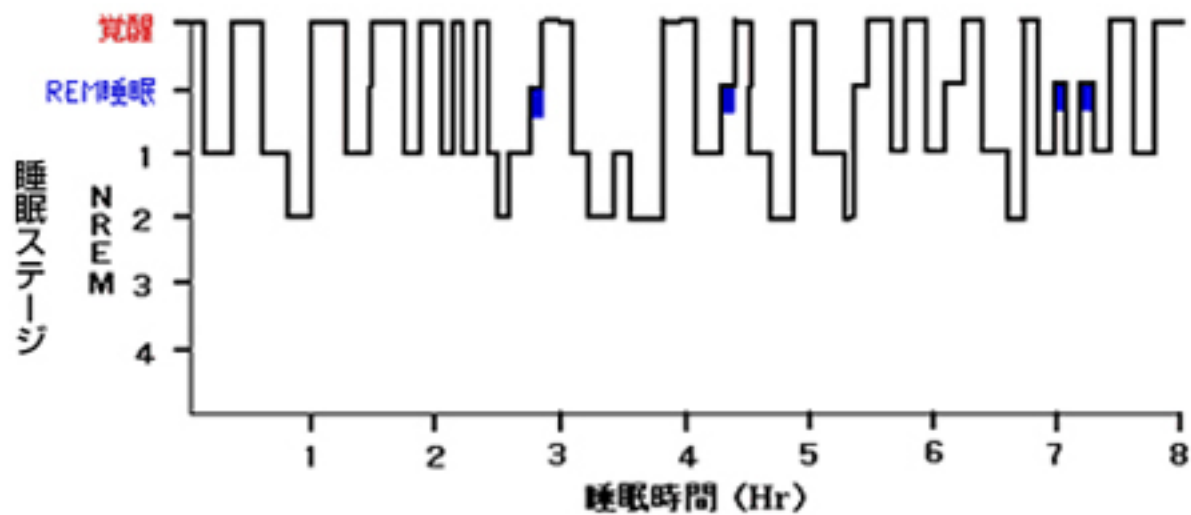
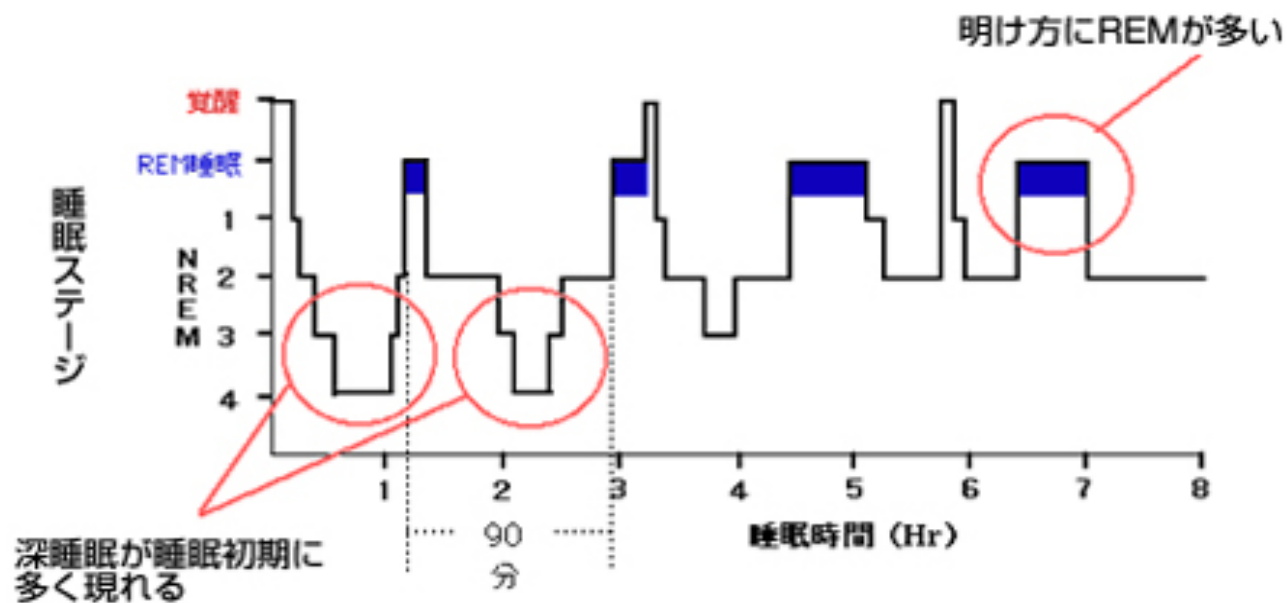


正常な気道



上気道の閉塞

無呼吸

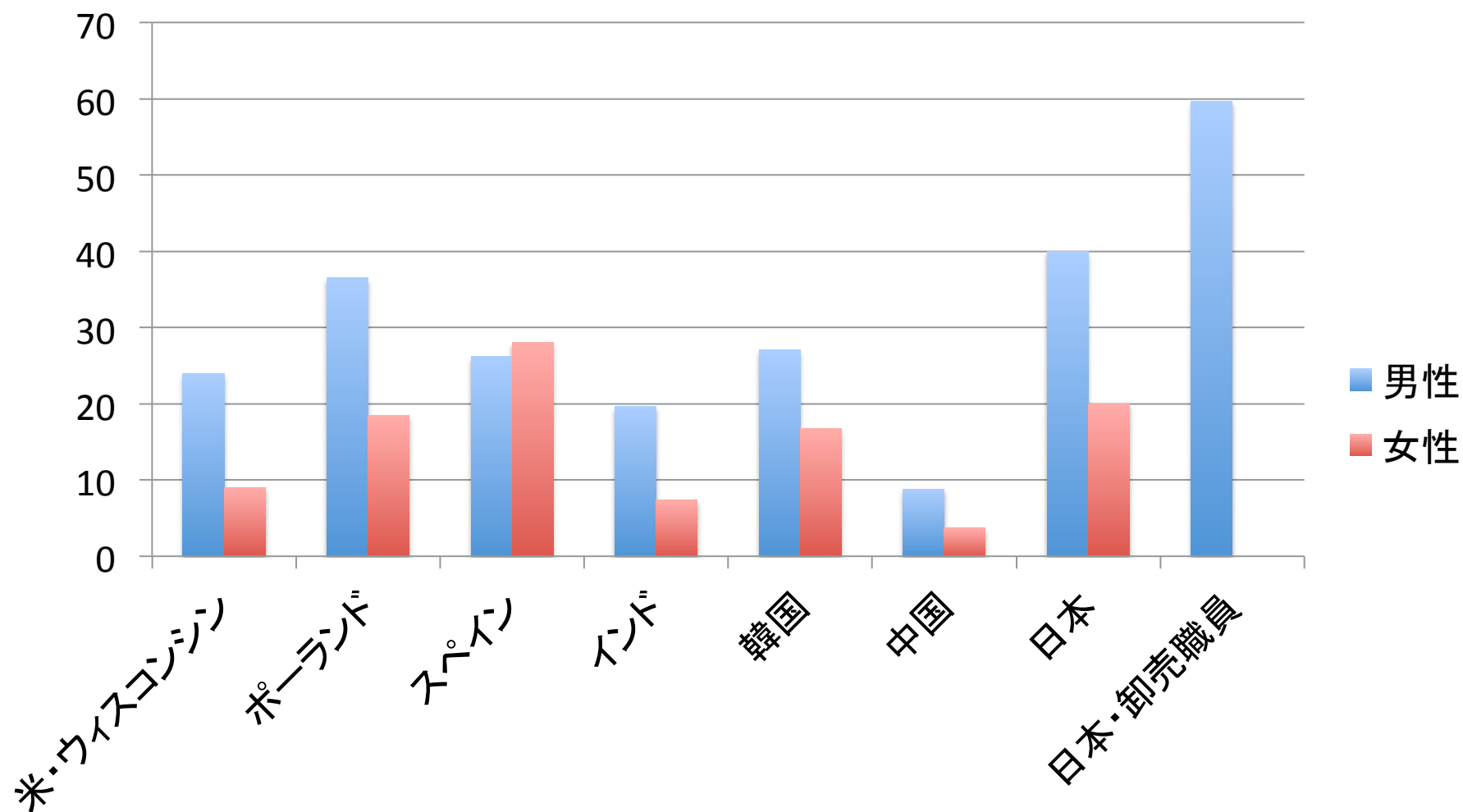


# 睡眠時無呼吸症候群

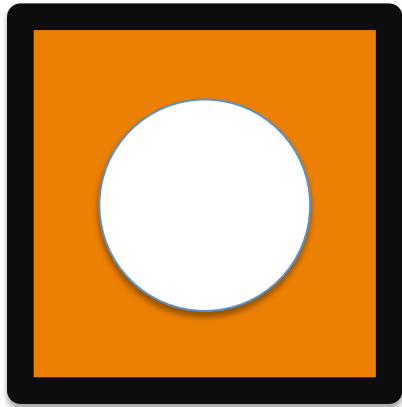
## 特に閉塞性睡眠時無呼吸症候群 (OSAS)

- 定義：睡眠中繰り返す部分的あるいは完全な上気道の閉塞が特徴。これにより呼吸努力があるにもかかわらず、無呼吸や低呼吸が起こること。
- OSAS以外に中枢性(CSAS)、混合性(MSAS)、中枢性の仲間のチェーン・ストークス呼吸(CSA)などがある。
- 1970年頃から報告
- はじめは非常にまれな疾患といわれていたが肥満の増加による有病率の上昇、公共交通機関での事故との関連が報じられて注目されている。
- 遅発合併症としての脳、心血管疾患のリスク

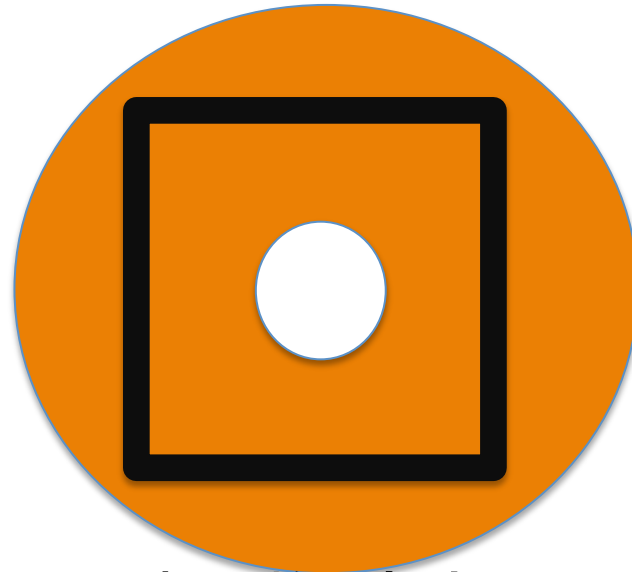
# SASの各国における有病率



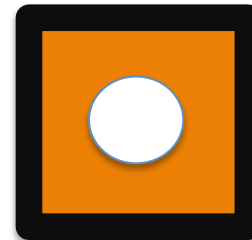
# 体格の違いによる 気道閉塞の起こりやすさ



正常骨格・肥満なし



正常骨格・高度肥満



小柄な骨格・肥満なし

# OSASの診断基準

- A 他の因子で説明できない日中の傾眠
  - B 他の因子で説明できない以下の項目のうち2つ以上の症状の存在
    - 睡眠中の窒息感やあえぎ呼吸
    - 睡眠中の頻回の完全覚醒
    - 熟眠感の欠如
    - 日中の倦怠感
    - 集中力の欠如
  - C 睡眠モニターで睡眠1時間あたり5回以上の閉塞性呼吸異常があること。(無呼吸、低呼吸、呼吸努力に係した覚醒反応)
- AかB、およびCを満たすこと

# Epwors Sleepiness Scale (ESS)

**11点以上はSASの可能性あります**

| 状況                          | 決して<br>眠くならない | まれに<br>眠くなる | 時々<br>眠くなる | 眠くなること<br>が多い |
|-----------------------------|---------------|-------------|------------|---------------|
| 座って読書をしているとき                | 0             | 1           | 2          | 3             |
| テレビを見ているとき                  | 0             | 1           | 2          | 3             |
| 人がたくさんいる場所で<br>座って何もしていないとき | 0             | 1           | 2          | 3             |
| 車に乗せてもらっているとき<br>(1時間くらい)   | 0             | 1           | 2          | 3             |
| 午後横になって休憩しているとき             | 0             | 1           | 2          | 3             |
| 座って誰かと話をしているとき              | 0             | 1           | 2          | 3             |
| 昼食後、静かに座っているとき              | 0             | 1           | 2          | 3             |
| 運転中、渋滞や信号待ちで<br>止まっているとき    | 0             | 1           | 2          | 3             |
| 合計                          | 点             |             |            |               |

Epwors Sleepiness Scale (ESS)

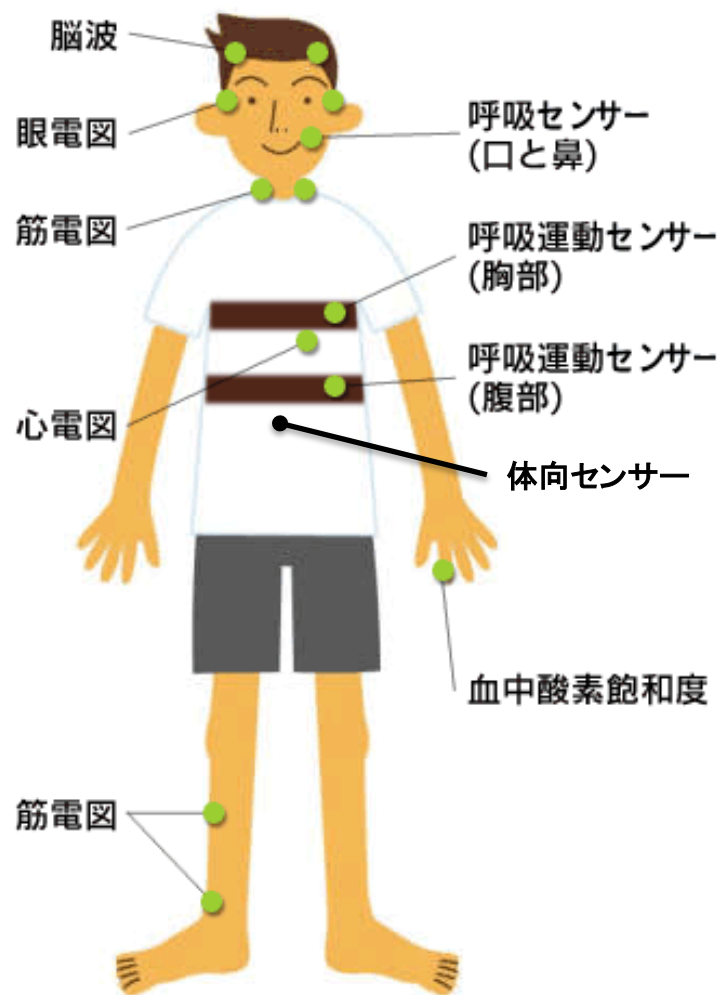
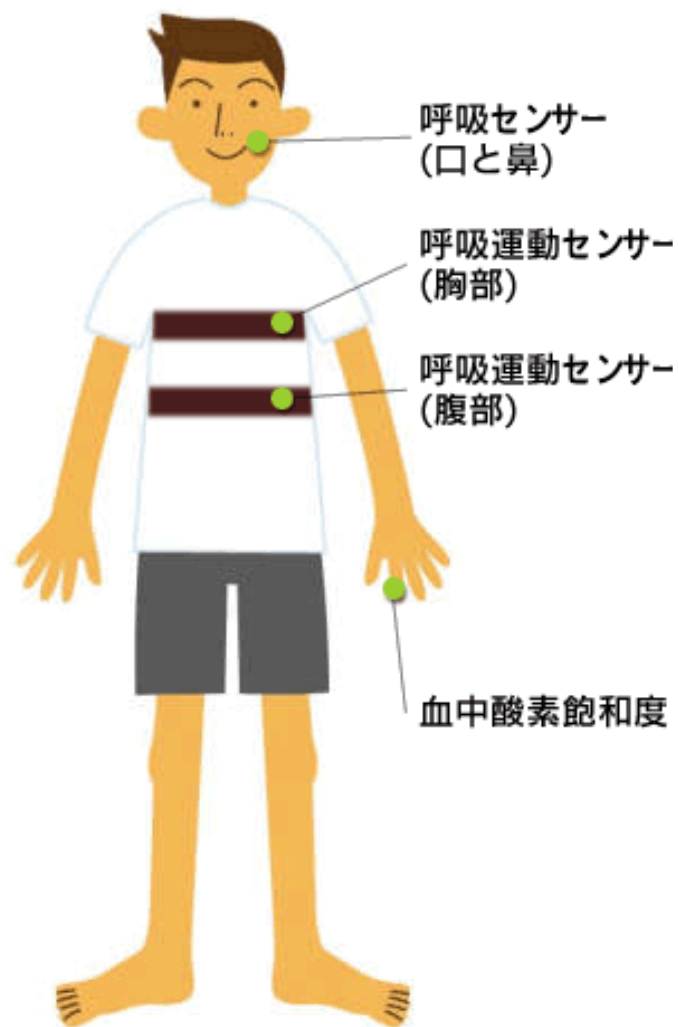
# 眠気の客観的検査

- 睡眠潜時反復検査(MSLT)
- 覚醒維持検査(MWT)

いずれも眠気を誘うような状況(静かな薄暗い部屋におかれる)で眠気がどれぐらいでるかを計測する。

**40 minutes**

# 簡易検査とポリソムノグラフィー (PSG)



# AHIが5を超えると

2000年のNew England Journal of Medicine

PROSPECTIVE STUDY OF THE ASSOCIATION BETWEEN SLEEP-DISORDERED BREATHING AND HYPERTENSION

PAUL E. PEPPARD ら

**TABLE 3.** ADJUSTED ODDS RATIOS FOR HYPERTENSION AT A FOLLOW-UP SLEEP STUDY, ACCORDING TO THE APNEA-HYPOPNEA INDEX AT BASE LINE.\*

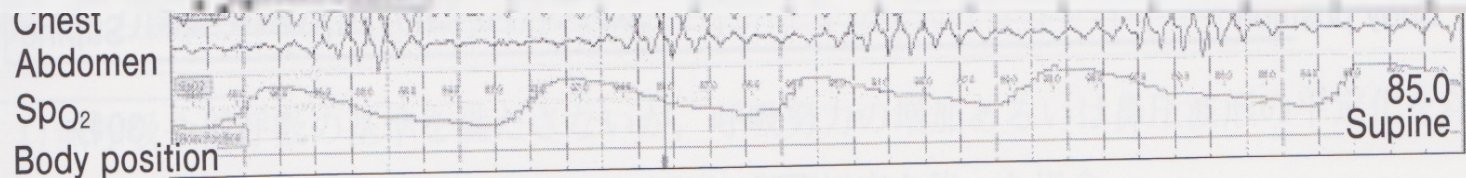
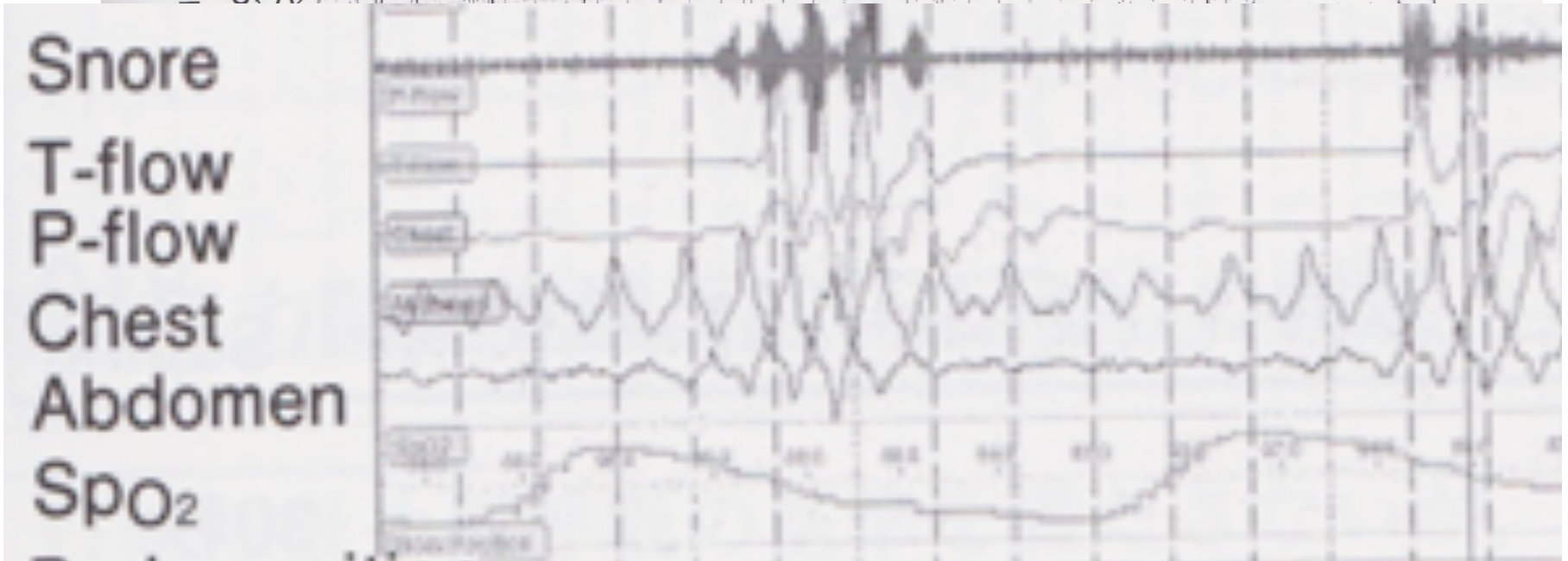
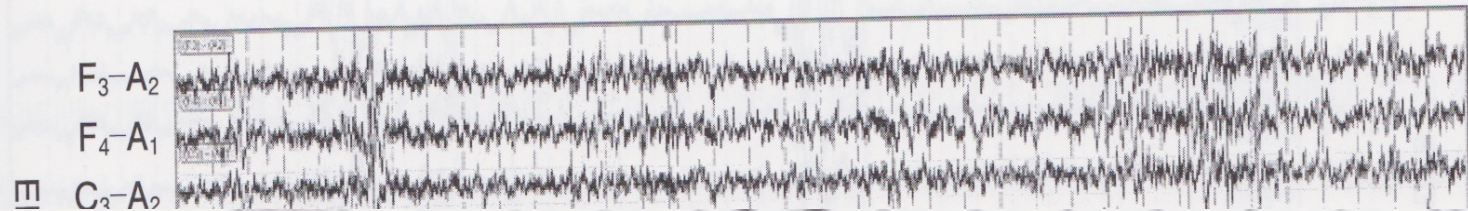
| BASE-LINE<br>APNEA-HYPOPNEA<br>INDEX | ODDS RATIO, ADJUSTED<br>FOR BASE-LINE HYPERTENSION STATUS | ODDS RATIO, ADJUSTED<br>FOR BASE-LINE HYPERTENSION STATUS<br>AND NONMODIFIABLE<br>RISK FACTORS (AGE<br>AND SEX) | ODDS RATIO, ADJUSTED<br>FOR BASE-LINE HYPERTENSION STATUS, NON-<br>MODIFIABLE RISK FAC-<br>TORS, AND HABITUS<br>(BMI AND WAIST AND<br>NECK CIRCUMFERENCE) | ODDS RATIO, ADJUSTED<br>FOR BASE-LINE HYPERTENSION STATUS, NON-<br>MODIFIABLE RISK FAC-<br>TORS, HABITUS, AND<br>WEEKLY ALCOHOL AND<br>CIGARETTE USE |
|--------------------------------------|-----------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| odds ratio (95% confidence interval) |                                                           |                                                                                                                 |                                                                                                                                                           |                                                                                                                                                      |
| 0 events/hr†                         | 1.0                                                       | 1.0                                                                                                             | 1.0                                                                                                                                                       | 1.0                                                                                                                                                  |
| 0.1–4.9 events/hr                    | 1.66 (1.35–2.03)                                          | 1.65 (1.33–2.04)                                                                                                | 1.42 (1.14–1.78)                                                                                                                                          | 1.42 (1.13–1.78)                                                                                                                                     |
| 5.0–14.9 events/hr                   | 2.74 (1.82–4.12)                                          | 2.71 (1.78–4.14)                                                                                                | 2.03 (1.29–3.19)                                                                                                                                          | 2.03 (1.29–3.17)                                                                                                                                     |
| ≥15.0 events/hr                      | 4.54 (2.46–8.36)                                          | 4.47 (2.37–8.43)                                                                                                | 2.89 (1.47–5.69)                                                                                                                                          | 2.89 (1.46–5.64)                                                                                                                                     |
| P for trend‡                         | <0.001                                                    | <0.001                                                                                                          | 0.002                                                                                                                                                     | 0.002                                                                                                                                                |

\*Hypertension was defined as a blood pressure of at least 140/90 mm Hg or the use of antihypertensive medications. Data on 893 follow-up sleep studies from 709 participants were analyzed. The odds ratios and confidence intervals were adjusted for the fact that 184 participants completed two follow-up sleep studies. BMI denotes body-mass index.

†This category served as the reference group.

‡P values are for the linear trend of the logistic-regression coefficients ( $\log_e$  of the odds ratios).

# OSASのPSG

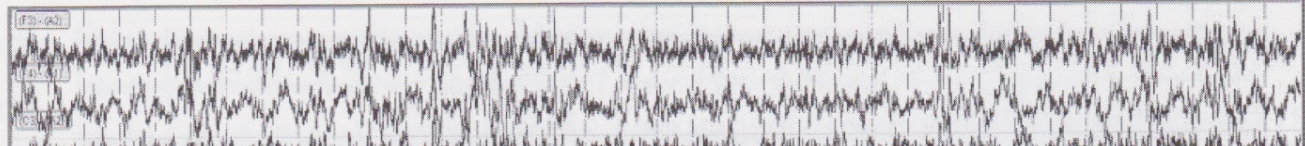


30 秒

# CSASのPSG

F<sub>3</sub>-A<sub>2</sub>

F<sub>4</sub>-A<sub>1</sub>



Snore

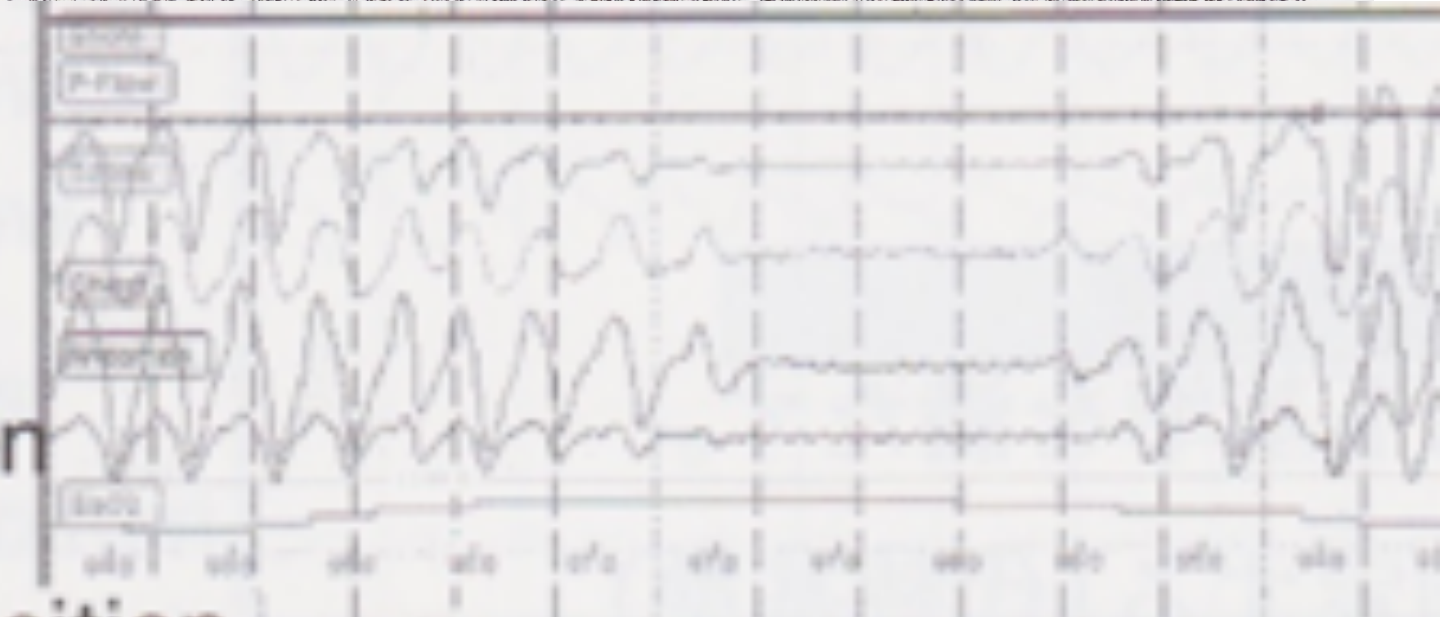
P-flow

T-flow

Chest

Abdomen

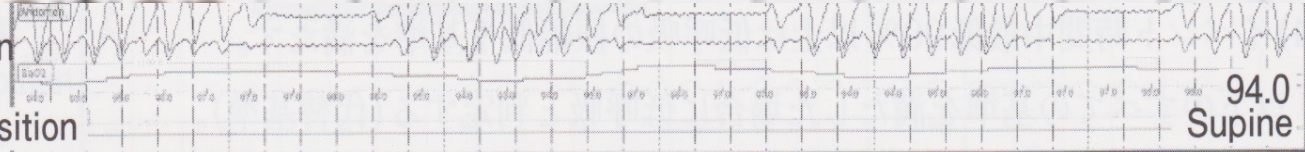
SpO<sub>2</sub>



Chest  
Abdomen

SpO<sub>2</sub>

Body position



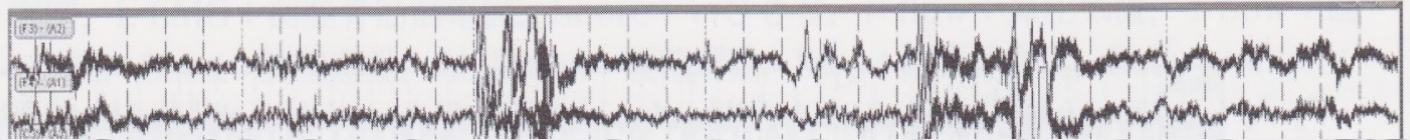
94.0  
Supine

30 秒

# MSAのPSG

F<sub>3</sub>-A<sub>2</sub>

F<sub>4</sub>-A<sub>1</sub>



Snore

P-flow

T-flow

Chest

Abdomen

SpO<sub>2</sub>



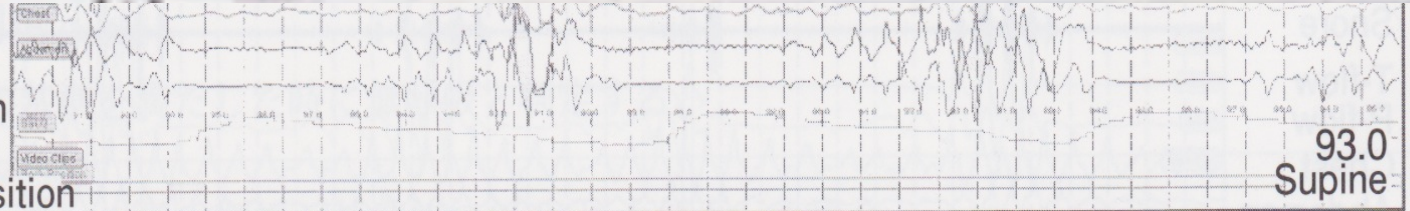
T-flow

Chest

Abdomen

SpO<sub>2</sub>

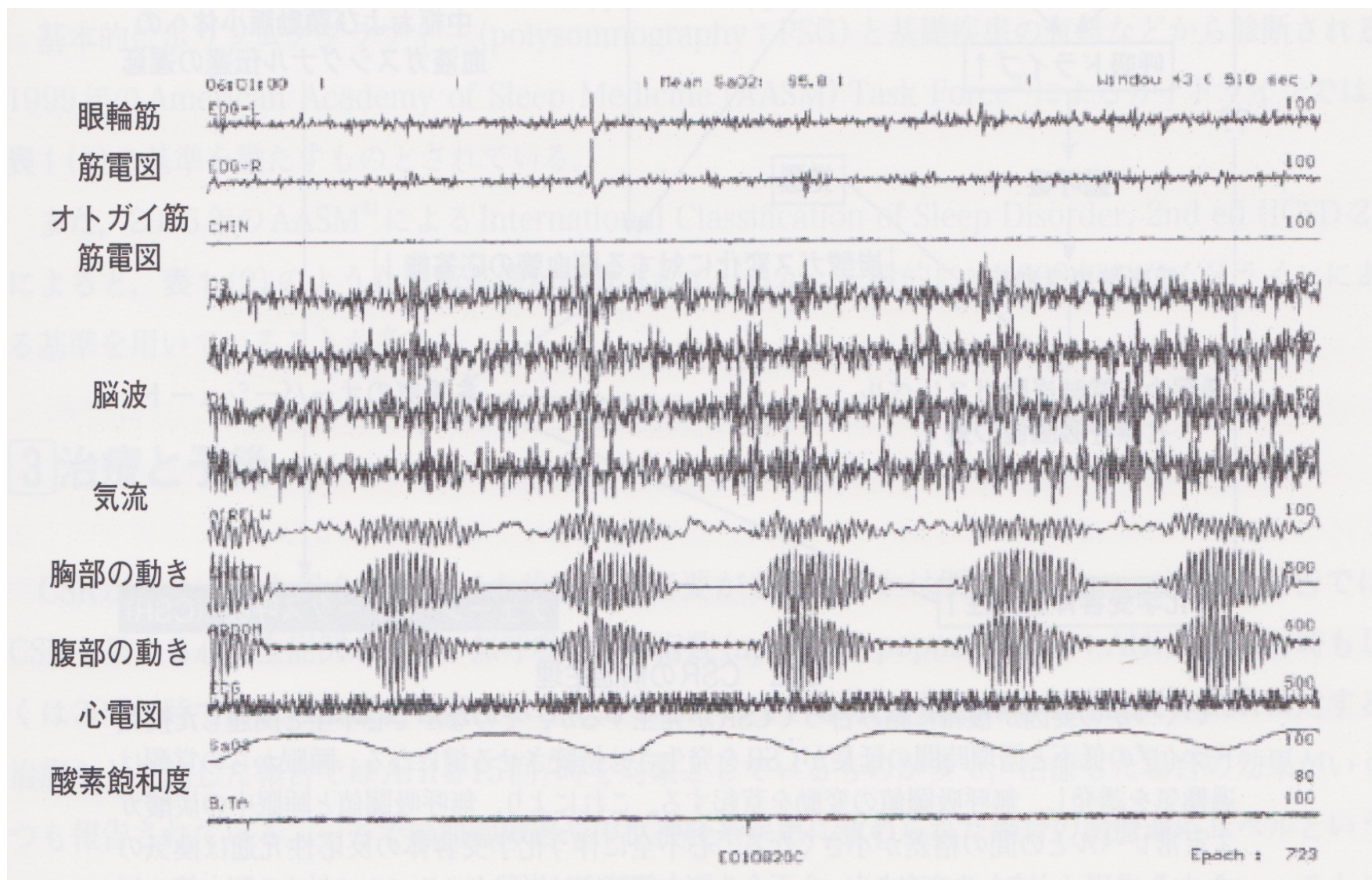
Body position



93.0  
Supine

30秒

# CSAのPSG



# SASで何が困る・何を治したい

- ① 日中の眠気による損失
- ② 後期合併症としての心・脳血管疾患
- ③ 死亡リスク

# CHEST 194 /1/JULY,1988

## Mortality and Apnea Index in Obstructive Sleep Apnea Experience in 385 Male Patients

### *Jiang He,*

**EFFECT OF AI ON MORTALITY  
( UNTREATED , ALL AGES )**

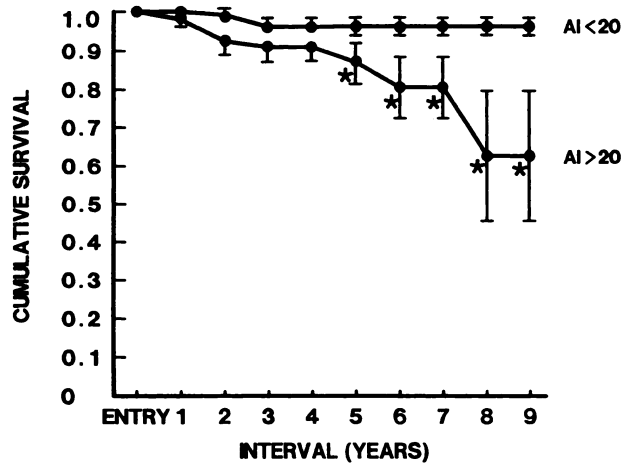


FIGURE 2. Probability of cumulative survival for all untreated patients with an apnea index equal to or less than 20 (*top line*) or exceeding 20 (*bottom line*). \* the difference between the curves at that interval is significant ( $p < .05$ ). Patients with AI exceeding 20 had a greater mortality.

**EFFECT OF TRACH ON MORTALITY  
( AI > 20 , ALL AGES )**

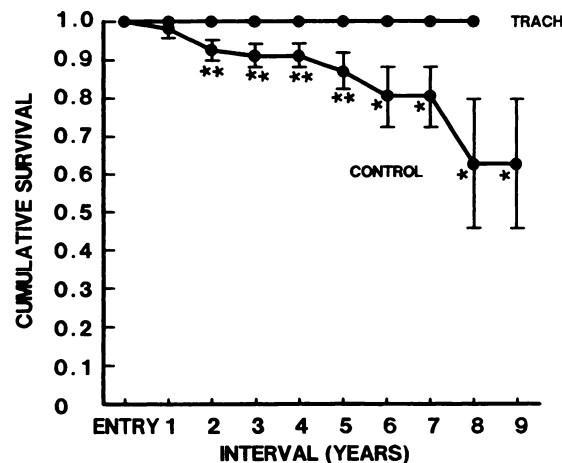


FIGURE 7. Effect of tracheostomy on probability of cumulative survival compared to the untreated group. Curves are different at interval; \* $p < .05$ , \*\* $p < .01$ . None of the patients treated with tracheostomy died. The control group are untreated patients with AI > 20.

**EFFECT OF CPAP ON MORTALITY  
( AI > 20 , ALL AGES )**

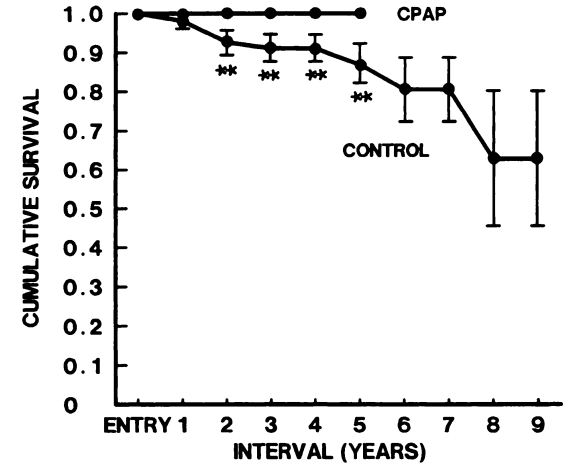


FIGURE 9. Effect of CPAP on probability of cumulative survival compared to the untreated group. Curves are different at interval. \*\* $p < .01$ . None of the CPAP patients died but there were data for only five intervals. The control group are the untreated patients with AI > 20.

# CHEST 2011; 140(2) Obstructive Sleep Apnea An Emerging Risk Factor for Atherosclerosis

Luciano F

OSA

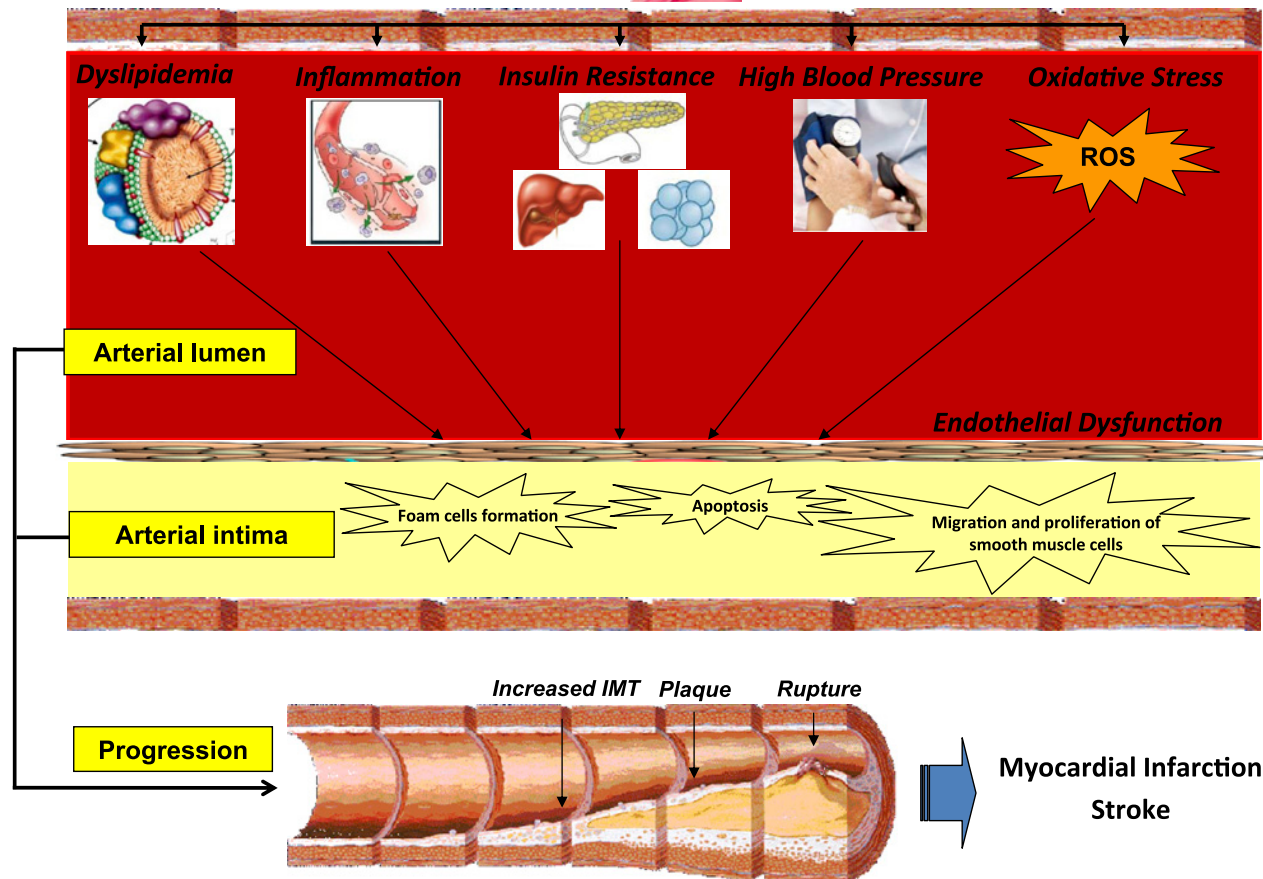
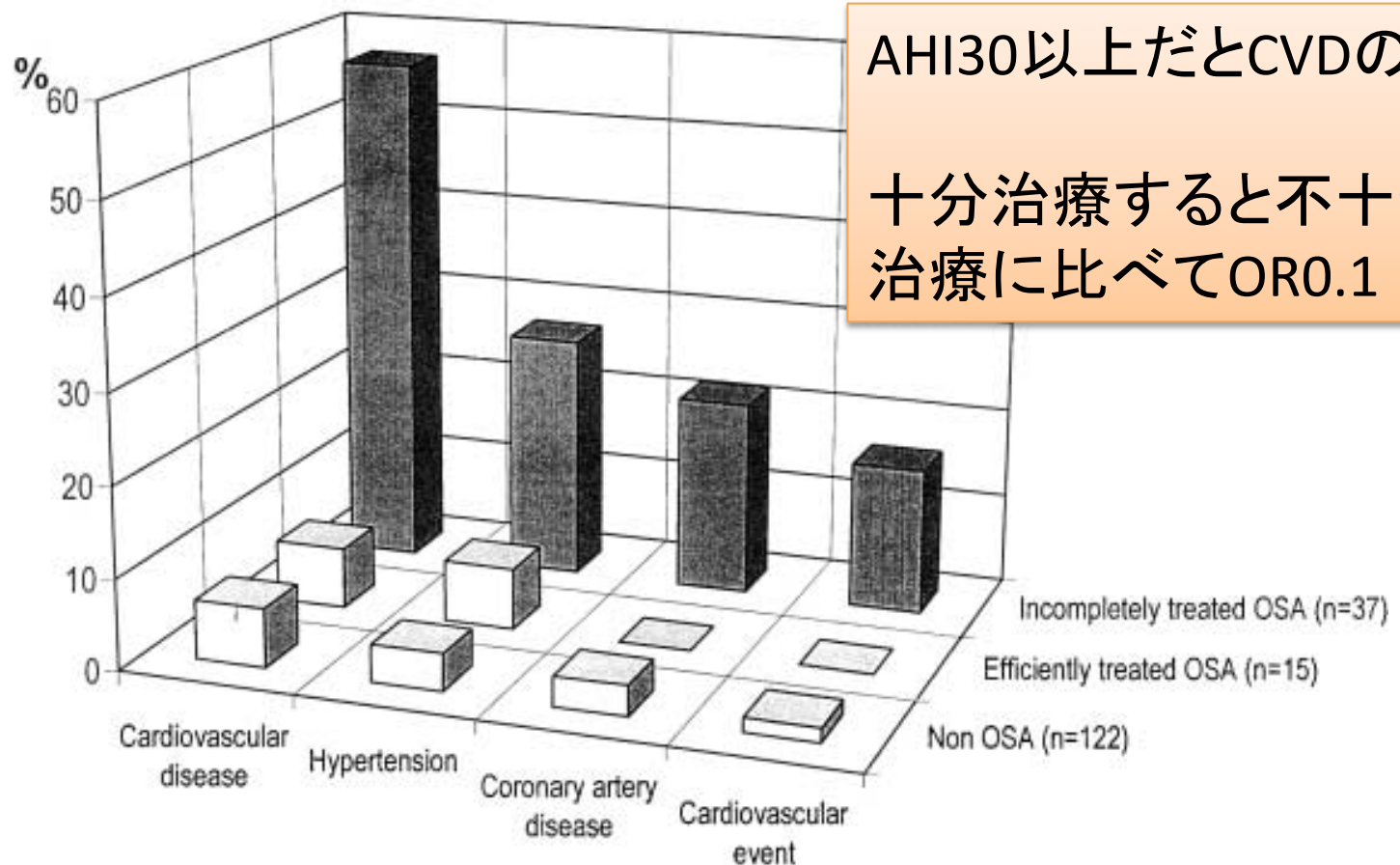


FIGURE 1. Proposed pathways through which OSA may contribute to the development of atherosclerosis. IMT = intima-media thickness; OSA = obstructive sleep apnea; ROS = reactive oxygen species.

AMERICAN JOURNAL OF RESPIRATORY AND CRITICAL CARE  
MEDICINE VOL 166 2002

Increased Incidence of Cardiovascular Disease in Middle-aged Men  
with Obstructive Sleep Apnea A 7-Year Follow-up  
Yüksel Peker



AHI30以上だとCVDのOR4.9

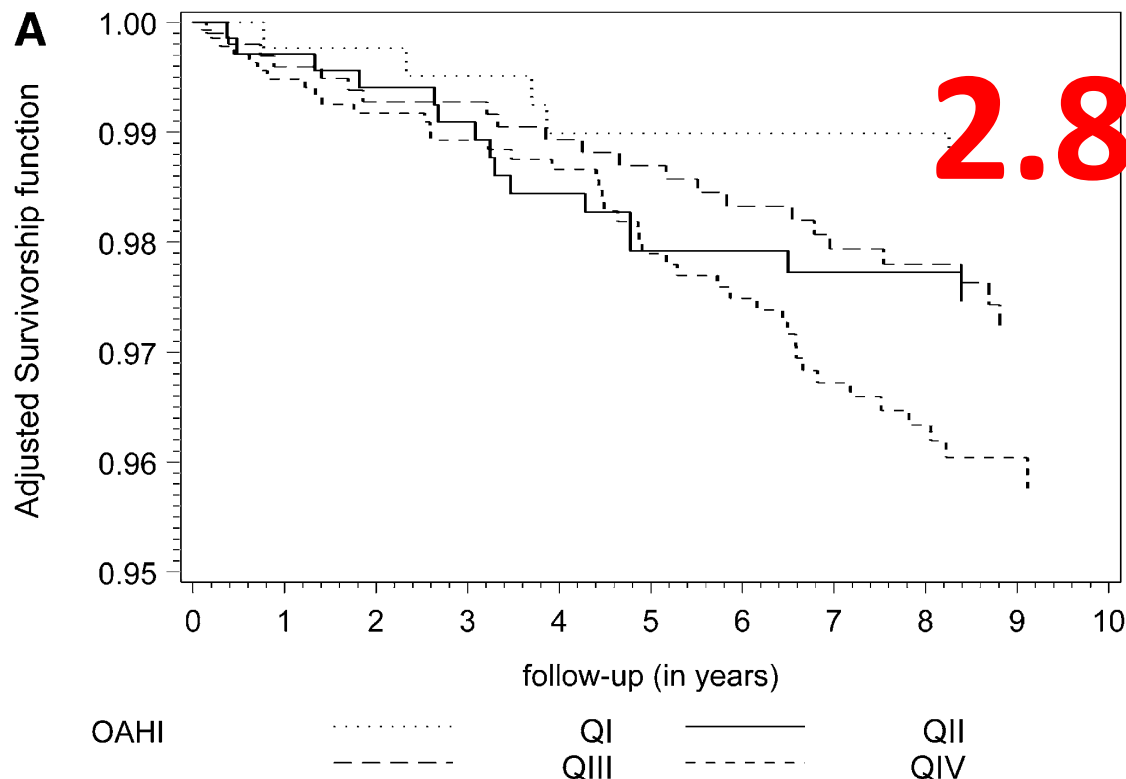
十分治療すると不十分な  
治療に比べてOR0.1

# 脳梗塞

AMERICAN JOURNAL OF RESPIRATORY AND CRITICAL CARE MEDICINE VOL 182 2010

Obstructive Sleep Apnea–Hypopnea and Incident Stroke  
The Sleep Heart Health Study

Susan Redlineら **AHIが19を超える男性**は正常男性に比べて脳梗塞発症リスクが

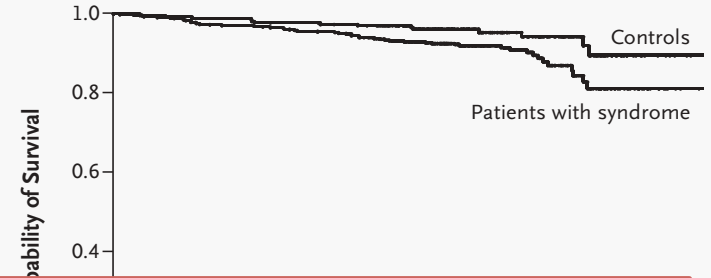
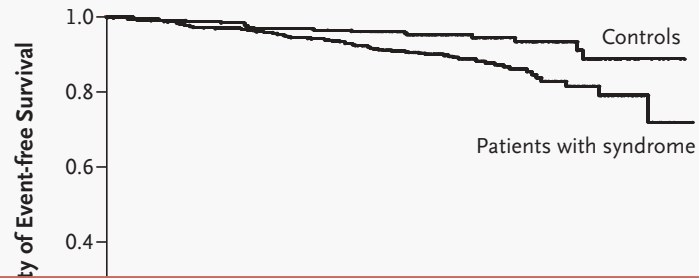


**2.86倍**

# New England Journal of Medicine 2005;353:2034-41.

## Obstructive Sleep Apnea as a Risk Factor for Stroke and Death

H. Klar Yaggiら



**AHIが36を超える重症OSASだと脳卒中・死亡リスクが3.30倍**

| No. at Risk            |     |     |     |     |     |    |   |
|------------------------|-----|-----|-----|-----|-----|----|---|
| Controls               | 325 | 266 | 260 | 227 | 88  | 23 | 1 |
| Patients with syndrome | 697 | 559 | 543 | 452 | 173 | 33 | 3 |

**Figure 1.** Kaplan–Meier Estimates of the Probability of Event-free Survival among Patients with the Obstructive Sleep Apnea Syndrome and Controls.

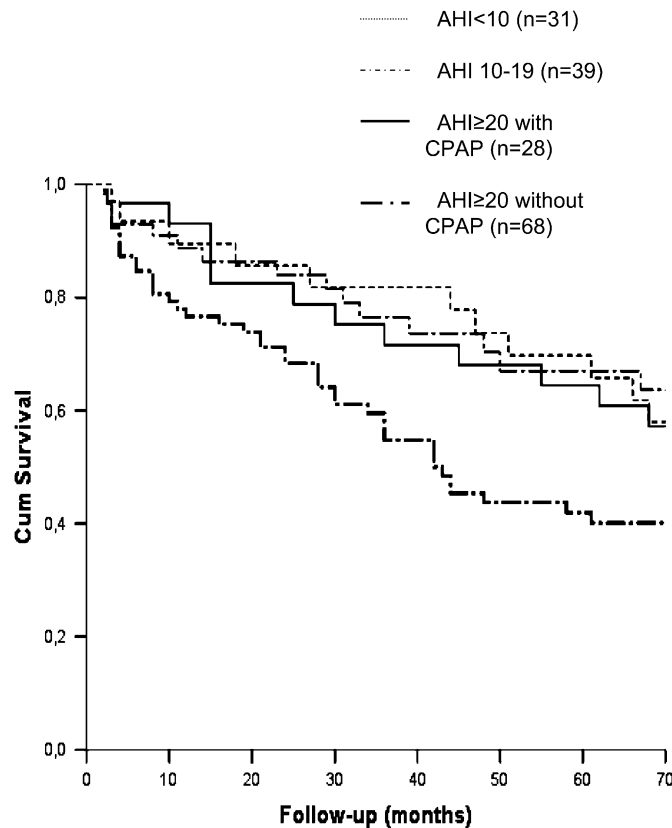
| No. at Risk            |     |     |     |     |     |    |   |
|------------------------|-----|-----|-----|-----|-----|----|---|
| Controls               | 325 | 266 | 262 | 228 | 89  | 23 | 1 |
| Patients with syndrome | 697 | 562 | 552 | 465 | 179 | 33 | 3 |

**Figure 2.** Kaplan–Meier Estimates of the Probability of Overall Survival among Patients with the Obstructive Sleep Apnea Syndrome and Controls.

**Table 3.** Trend Analysis for the Relationship between Increased Severity of the Obstructive Sleep Apnea Syndrome and the Composite Outcome of Stroke or Death from Any Cause (N=1022).\*

| Severity of Syndrome     | Stroke or Death |                 | Mean Follow-up Period | Hazard Ratio (95% CI) |
|--------------------------|-----------------|-----------------|-----------------------|-----------------------|
|                          | No. of Events   | No. of Patients |                       |                       |
|                          |                 |                 | yr                    |                       |
| AHI ≤3 (reference score) | 13              | 271             | 3.08                  | 1.00                  |
| AHI 4–12                 | 21              | 258             | 3.06                  | 1.75 (0.88–3.49)      |
| AHI 13–36                | 20              | 243             | 3.09                  | 1.74 (0.87–3.51)      |
| AHI >36                  | 34              | 250             | 2.78                  | 3.30 (1.74–6.26)      |

# 脳梗塞発症後に対するCPAPの効果



**Figure 2.** Accumulated survival curve for study groups of patients with stroke, by apnea-hypopnea index (AHI) cutoff point and continuous airway pressure (CPAP) tolerance. The group of patients with stroke with an AHI of 20 or greater and poor tolerance of CPAP showed more mortality than the rest of the patients after 5 years of follow-up. Cum = cumulative.

AMERICAN JOURNAL OF RESPIRATORY AND  
CRITICAL CARE MEDICINE VOL 180 2009

Continuous Positive Airway Pressure  
Treatment Reduces Mortality in Patients with  
Ischemic Stroke and Obstructive Sleep Apnea A  
5-Year Follow-up Study

Miguel Ángel Martínez-García

HR 2.69

95%CI (1.32-5.61)

# SASに起因するといわれている事件・事故

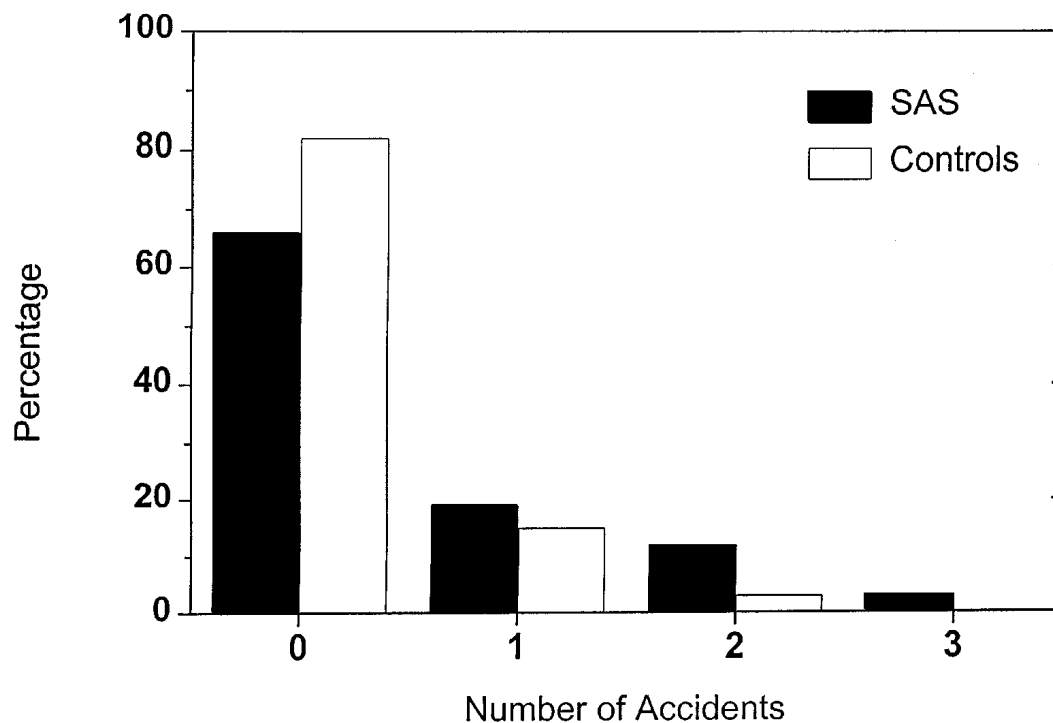
- 1993年に「Wake up America」をスローガンにしたアメリカ睡眠学会報告
  - 1979年スリーマイル島原発事故
  - 1986年スペースシャトル爆発事故
  - 1989年アラスカ沖タンカー座礁
- 日本では2003年2月26日に
  - 山陽新幹線ひかり126号の運転士(33歳)が運転席で居眠りし、26km走行して岡山駅で緊急停車

# 交通事故

AMERICAN JOURNAL OF RESPIRATORY AND CRITICAL CARE MEDICINE VOL 158 1998

## Automobile Accidents in Patients with Sleep Apnea Syndrome An Epidemiological and Mechanistic Study

FERRAN BARBE



**Figure 1.** Distribution of number of accidents for control subjects and patients.

# OSASに対するCPAP治療の 交通事故リスク減少効果

AMERICAN JOURNAL OF RESPIRATORY AND CRITICAL CARE MEDICINE VOL 161 2000  
**Treatment with Nasal CPAP Decreases Automobile Accidents in Patients with Sleep Apnea**  
**LARRY FINDLEY**

## **AUTO ACCIDENT RATES IN PATIENTS USING CPAP AND UNTREATED PATIENTS**

|                                  | Patients Using CPAP | Untreated Patients |
|----------------------------------|---------------------|--------------------|
| n                                | 36                  | 14                 |
| No. of accidents                 |                     |                    |
| before diagnosis                 | 5                   | 2                  |
| No. of accidents after diagnosis | 0 <sup>†</sup>      | 2                  |
| Accident rate* before diagnosis  | 0.07                | 0.07               |
| Accident rate after diagnosis    | 0 <sup>†</sup>      | 0.07               |

\* Accidents/driver/year.

† Significant reduction with CPAP ( $p < 0.03$ ).

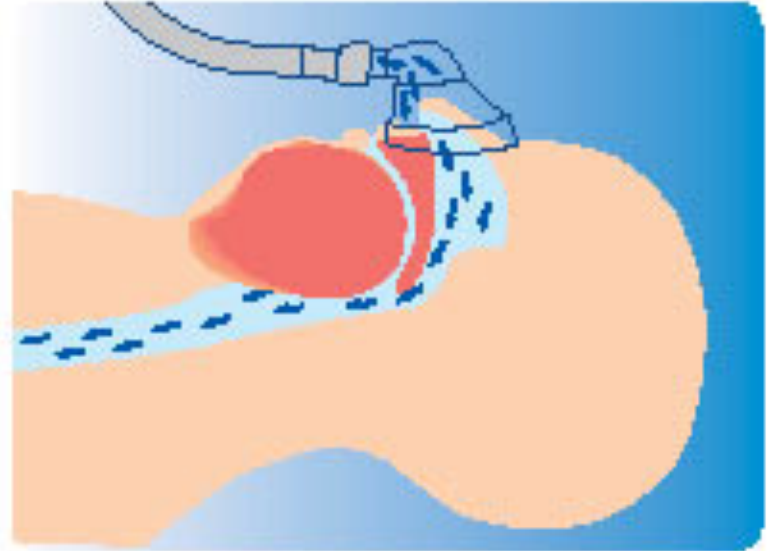
# 治療法

- 減量
- 生活習慣の改善
- CPAP
- マウスピース
- 手術



# CPAP

## Continuous Positive Airway Pressure



# CPAP適応基準

- ①～③すべて満たす
  - ① PSGでAHIが20以上
  - ② 日中の傾眠、起床時の頭痛などの強い自覚症状がある
  - ③ PSG上でSASが原因の睡眠の分断、深睡眠の減少が認められる
- 簡易検査でAHI40以上で上記②をみたす

**LONG-TERM CARDIOVASCULAR OUTCOMES IN MEN  
WITH OBSTRUCTIVE SLEEP APNOEA-HYPOPNOEA  
WITH OR WITHOUT TREATMENT  
WITH  
CONTINUOUS POSITIVE AIRWAY PRESSURE:  
AN OBSERVATION STUDY**

Jose M Marin,Santiago J Carrizo,Eugenio Vicente,Alvar G N Agusti

The Lancet  
Vol 365: 1046-53  
March 19, 2005

## 背景

- 閉塞性睡眠時無呼吸/低呼吸は  
心血管障害の有病率や死亡率、交通事故の  
発生などに関連がある。
  - ・ **Mortality and apnea index in obstructive sleep apnea:**  
Chest 1988;94:9-14 He J, Krygwe MH et al
  - ・ **Sleep disordered breathing and cardiovascular disease**  
Am J Respir Crit Care Med 2001;163:19-25  
Shahar E, Whitney CW, Redline S, et al などなど...
- 心血管疾患のリスクとしての影響、CPAPによる治療効果については不明確であった。

# 方 法

- 2施設、コホート研究
- 1992年1月1日から1994年12月31日の3年間
- スペインのMiguel Servet大学病院とSon Dureta大学病院の呼吸器科の睡眠ユニットに紹介された患者1387人
  - CPAPでの治療群 372人
  - 重症群 235人
  - 軽症・中等症群 403人
  - いびき単独群 377人
- コントロール群は1991～1992年に行われたZaragoza Sleep Apnoea Prevalence Studyのデータベースにある264人

# 患者背景

|                         | Healthy men<br>(n=264) | Snorers<br>(n=377) | Untreated mild-moderate<br>OSAHS (n=403) | Untreated severe<br>OSAHS (n=235) | OSAHS treated with<br>CPAP (n=372) |
|-------------------------|------------------------|--------------------|------------------------------------------|-----------------------------------|------------------------------------|
| 年齢                      | 49.6 (8.1)             | 49.9 (9.1)         | 50.3 (8.1)                               | 49.9 (7.2)                        | 49.9 (8.5)                         |
| BMI(kg/m <sup>2</sup> ) | 29.8 (4.4)             | 26.1 (3.6)*        | 27.5 (4.4)*                              | 30.3 (4.2)                        | 30.7 (4.4)†                        |
| 高血圧(%)                  | 14.8                   | 17.7               | 24.8‡                                    | 34.9*                             | 35.1*                              |
| 糖尿病(%)                  | 6.1                    | 7.5                | 8.5                                      | 9.9                               | 11.3†                              |
| 脂質障害(%)                 | 6.8                    | 7.2                | 7.4                                      | 7.7                               | 7.9                                |
| 喫煙率(%)                  | 22.9                   | 23.1               | 24.3                                     | 25.1                              | 25.2                               |
| 飲酒率(%)                  | 27.7                   | 28.2               | 28.3                                     | 29.1                              | 29.2                               |
| 心血管疾患(%)                | 2.6                    | 3.4                | 5.2                                      | 8.2†                              | 8.5‡                               |
| 総コレステロール(mmol/L)        | 6.41 (0.28)            | 6.44 (0.09)        | 6.45 (0.13)†                             | 6.47 (0.31)†                      | 6.46 (0.17)†                       |
| 中性脂肪(mmol/L)            | 1.31 (0.09)            | 1.31 (0.05)        | 1.32 (0.03)                              | 1.32 (0.11)                       | 1.32 (0.03)                        |
| 収縮期血圧(mmHg)             | 121.3 (1.8)            | 121.7 (0.8)§       | 122.7 (0.6)*                             | 124.7 (1.7)*                      | 124.8 (1.1)*                       |
| 拡張期血圧(mmHg)             | 75.3 (1.1)             | 75.4 (0.5)         | 76.1 (0.4)*                              | 78.8 (1.4)*                       | 78.9 (0.7)*                        |
| 血糖値(mmol/L)             | 5.33 (0.12)            | 5.34 (0.05)        | 5.36 (0.08)§                             | 5.38 (0.05)*                      | 5.39 (0.03)*                       |
| AHI                     | 1.2 (0.3)              | 3.5 (0.8)          | 18.2 (3.5)*                              | 43.3 (5.7)*                       | 42.4 (4.9)*                        |

OSAHS=obstructive sleep apnoea-hypopnoea syndrome; CPAP=continuous positive airway pressure. Data are mean (SD). \*p<0.0001 versus healthy men; †p<0.05, ‡p<0.01, §p<0.001.

Table 1: Baseline characteristics of participants

# 患者背景

|                         | Healthy men<br>(n=264) | Snorers<br>(n=377) | Untreated mild-moderate<br>OSAHS (n=403) | Untreated severe<br>OSAHS (n=235) | OSAHS treated with<br>CPAP (n=372) |
|-------------------------|------------------------|--------------------|------------------------------------------|-----------------------------------|------------------------------------|
| 年齢                      | 49.6 (8.1)             | 49.9 (9.1)         | 50.3 (8.1)                               | 49.9 (7.2)                        | 49.9 (8.5)                         |
| BMI(kg/m <sup>2</sup> ) | 29.8 (4.4)             | 26.1 (3.6)*        | 27.5 (4.4)*                              | 30.3 (4.2)                        | 30.7 (4.4)†                        |
| 高血圧(%)                  | 14.8                   | 17.7               | 24.8‡                                    | 34.9*                             | 35.1*                              |
| 糖尿病(%)                  | 6.1                    | 7.5                | 8.5                                      | 9.9                               | 11.3†                              |
| 脂質障害(%)                 | 6.8                    | 7.2                | 7.4                                      | 7.7                               | 7.9                                |
| 喫煙率(%)                  | 22.9                   | 23.1               | 24.3                                     | 25.1                              | 25.2                               |
| 飲酒率(%)                  | 27.7                   | 28.2               | 28.3                                     | 29.1                              | 29.2                               |
| 心血管疾患(%)                | 2.6                    | 3.4                | 5.2                                      | 8.2†                              | 8.5‡                               |
| 総コレステロール(mmol/L)        | 6.41 (0.28)            | 6.44 (0.09)        | 6.45 (0.13)†                             | 6.47 (0.31)†                      | 6.46 (0.17)†                       |
| 中性脂肪(mmol/L)            | 1.31 (0.09)            | 1.31 (0.05)        | 1.32 (0.03)                              | 1.32 (0.11)                       | 1.32 (0.03)                        |
| 収縮期血圧(mmHg)             | 121.3 (1.8)            | 121.7 (0.8)§       | 122.7 (0.6)*                             | 124.7 (1.7)*                      | 124.8 (1.1)*                       |
| 拡張期血圧(mmHg)             | 75.3 (1.1)             | 75.4 (0.5)         | 76.1 (0.4)*                              | 78.8 (1.4)*                       | 78.9 (0.7)*                        |
| 血糖値(mmol/L)             | 5.33 (0.12)            | 5.34 (0.05)        | 5.36 (0.08)§                             | 5.38 (0.05)*                      | 5.39 (0.03)*                       |
| AHI                     | 1.2 (0.3)              | 3.5 (0.8)          | 18.2 (3.5)*                              | 43.3 (5.7)*                       | 42.4 (4.9)*                        |

OSAHS=obstructive sleep apnoea-hypopnoea syndrome; CPAP=continuous positive airway pressure. Data are mean (SD). \*p<0.0001 versus healthy men; †p<0.05, ‡p<0.01, §p<0.001.

Table 1: Baseline characteristics of participants

# 結 果

健常者

CPAP無し

CPAP有り

Healthy men  
(n=264)

Simple  
snorers  
(n=377)

Untreated mild-  
moderate OSAH  
(n=403)

Untreated  
severe OSAH  
(n=235)

OSAH treated  
with CPAP  
(n=372)

## Non-fatal cardiovascular events

Number of events

12

22

36

50

24

Events per 100 person years

0.45

0.58

0.89

2.13\*

0.64

## Cardiovascular death

Number of events

8

13

22

25

13

Events per 100 person years

0.3

0.34

0.55

1.06†

0.35

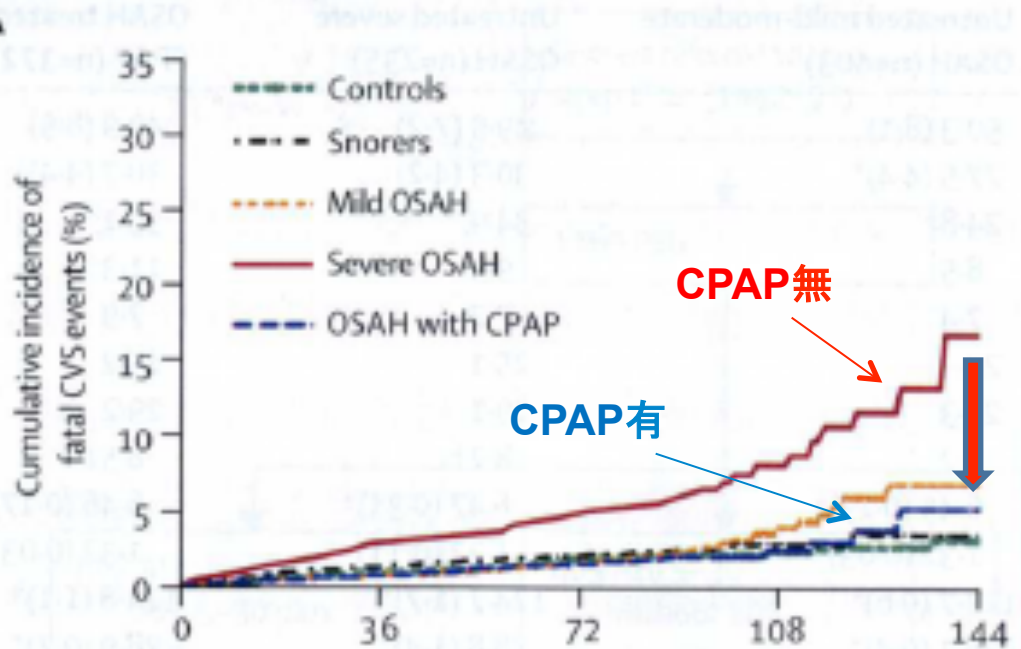
OSAH=obstructive sleep apnoea-hypopnoea syndrome; CPAP=continuous positive airway pressure. \*p<0.0001 versus healthy men; †p=0.0012.

Table 2: Incidence of cardiovascular events during the 10-year follow-up in healthy men, snorers, and patients untreated and treated for OSAH

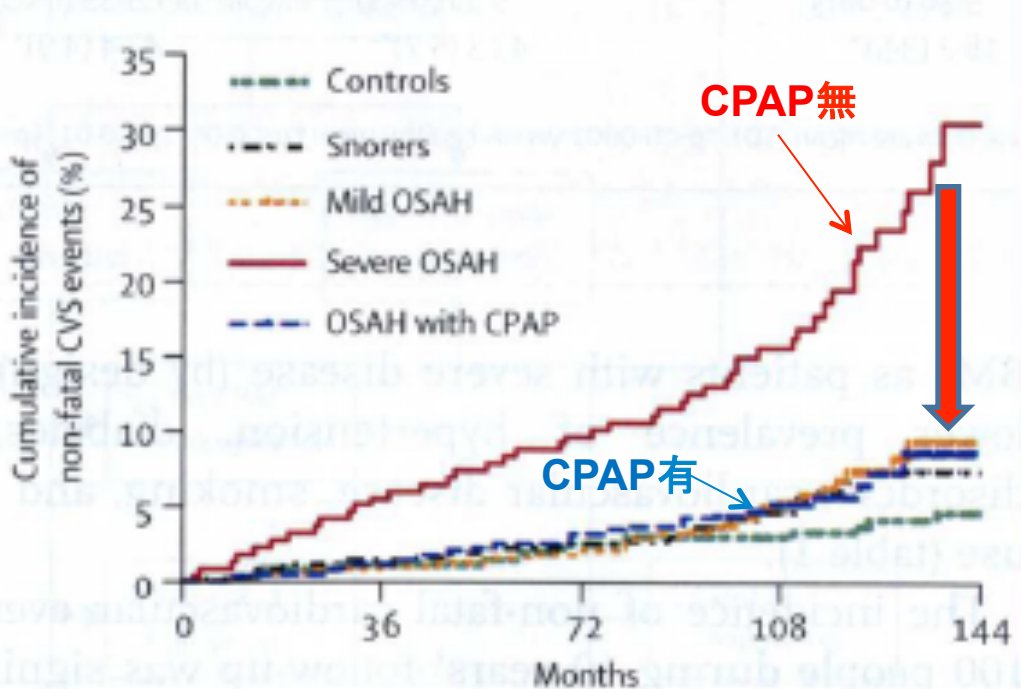
CPAP導入群では心血管イベント発生率が著明に低下

# 結果

致死的な  
心血管イベント



致死的でない  
心血管イベント



# オッズ比

## 致死的事件

|          | Unadjusted odds ratio (95% CI) | p       | Part adjusted odds ratio (95% CI) | p      | Fully adjusted odds ratio (95% CI) | p     |
|----------|--------------------------------|---------|-----------------------------------|--------|------------------------------------|-------|
| 年齢       | 1.09 (1.06-1.11)               | <0.0001 | 1.09 (1.05-1.11)                  | 0.0005 | 1.09 (1.04-1.12)                   | 0.001 |
| いびきのみ    | 1.04 (0.51-1.34)               | 0.61    | 1.03 (0.41-1.46)                  | 0.74   | 1.03 (0.31-1.84)                   | 0.88  |
| 中等症以下    | 1.19 (0.74-1.89)               | 0.09    | 1.16 (0.55-2.11)                  | 0.59   | 1.15 (0.34-2.69)                   | 0.71  |
| 重症(無治療)  | 3.98 (1.74-6.13)               | 0.003   | 3.02 (1.44-7.33)                  | 0.015  | 2.87 (1.17-7.51)                   | 0.025 |
| 重症(CPAP) | 1.06 (0.55-1.91)               | 0.45    | 1.05 (0.45-2.09)                  | 0.65   | 1.05 (0.39-2.21)                   | 0.74  |
| 心血管疾患    | 3.66 (1.98-4.07)               | <0.0001 |                                   |        | 2.54 (1.31-4.99)                   | 0.005 |

## 非致死的事件

|          | Unadjusted odds ratio (95% CI) | p       | Part adjusted odds ratio (95% CI) | p      | Fully adjusted odds ratio (95% CI) | p     |
|----------|--------------------------------|---------|-----------------------------------|--------|------------------------------------|-------|
| 年齢       | 1.11 (1.07-1.14)               | <0.0001 | 1.09 (1.06-1.13)                  | 0.0008 | 1.09 (1.05-1.13)                   | 0.001 |
| いびきのみ    | 1.52 (0.88-2.11)               | 0.12    | 1.23 (0.71-2.86)                  | 0.25   | 1.32 (0.64-3.01)                   | 0.38  |
| 中等症以下    | 1.77 (0.91-2.76)               | 0.07    | 1.62 (0.65-3.01)                  | 0.19   | 1.57 (0.62-3.16)                   | 0.22  |
| 重症(無治療)  | 5.65 (1.92-6.52)               | <0.001  | 3.32 (1.24-7.41)                  | 0.005  | 3.17 (1.12-7.52)                   | 0.001 |
| 重症(CPAP) | 1.44 (0.61-2.80)               | 0.24    | 1.42 (0.53-3.29)                  | 0.28   | 1.42 (0.52-3.40)                   | 0.29  |
| 心血管疾患    | 2.68 (1.13-2.57)               | <0.0001 |                                   |        | 1.77 (1.03-3.09)                   | 0.02  |
| 高血圧      | 1.83 (1.24-5.52)               | 0.003   |                                   |        | 1.57 (1.04-4.09)                   | 0.04  |
| 喫煙       | 1.97 (1.42-6.71)               | 0.002   | 1.62 (1.06-6.12)                  | 0.02   | 1.51 (1.02-5.88)                   | 0.04  |

# Discussion

- CPAPによる治療は重症OSAHS患者における心血管リスクを著明に減少させることが分かった。
- 中等症以下の群と健常者群では有意な差が認められなかったが、サンプルサイズを更に拡大し、期間を延長すれば有意な差が認められる可能性がある。
- AHI以外に酸素飽和度の低下や、時間当たりの覚醒回数なども指標にすることができるかもしれない。
- いびき単独群では心血管リスクは上昇しない。
- 女性には当てはまらない可能性がある。

## 結 語

- 男性において、未治療の重症OSAHIは致死的・非致死的に関わらず、心血管疾患の発症を増加させる。
- OSAHIの重症度と心血管リスクには相関がある。
- CPAPは著明に心血管リスクを減少させる。
- いびきのみでは心血管リスクにはならない。

# 心血管疾患リスク

AMERICAN JOURNAL OF RESPIRATORY AND  
CRITICAL CARE MEDICINE VOL 176 2007

Continuous Positive Airway Pressure Treatment  
of Mild to Moderate Obstructive Sleep Apnea  
Reduces Cardiovascular Risk

Nikolaus Jら

治療群364人、対照群85人

10年目のevent free survival 治療群80.3% 対照群51.8%  $P < 0.001$

治療によるリスクリダクション28.5% NNT3.5人 治療後のHR0.36(0.21-0.62  $P < 0.001$ )

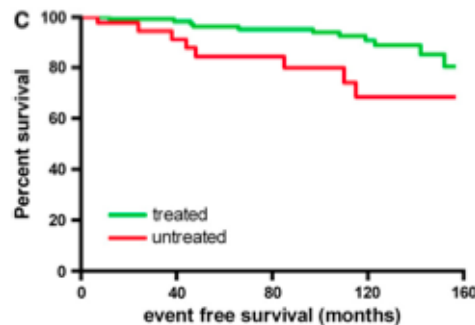
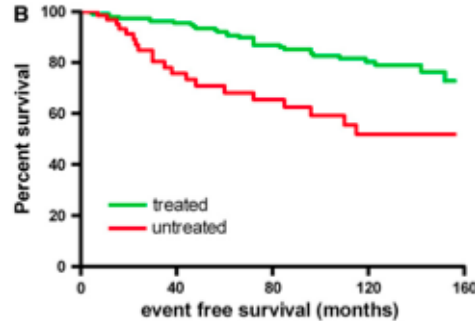
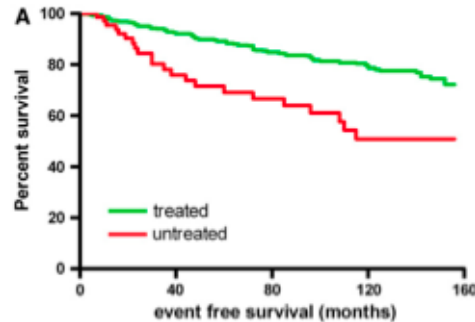


TABLE 4. UNADJUSTED AND ADJUSTED HAZARD RATIO (95% CONFIDENCE INTERVAL) FOR CARDIOVASCULAR EVENTS (FINAL MODEL, COX REGRESSION)

|               | Hazard Ratio                     | Adjusted for Age, Gender, and BMI* | Additionally Adjusted for Cardiovascular Risk Factors† | Additionally Adjusted for Cardiovascular Disease‡ | Additionally Adjusted for COPD   | Additionally Adjusted for Malignant Disorders | Additionally Adjusted for Malignant Disorders (Only Mild-Moderate OSA) |
|---------------|----------------------------------|------------------------------------|--------------------------------------------------------|---------------------------------------------------|----------------------------------|-----------------------------------------------|------------------------------------------------------------------------|
| OSA treatment | 0.36<br>(0.22–0.59) <sup>§</sup> | 0.39<br>(0.24–0.66) <sup>§</sup>   | 0.37<br>(0.22–0.62) <sup>§</sup>                       | 0.34<br>(0.20–0.58) <sup>§</sup>                  | 0.36<br>(0.20–0.61) <sup>§</sup> | 0.36<br>(0.21–0.62) <sup>§</sup>              | 0.36<br>(0.21–0.62) <sup>§</sup>                                       |

Definition of abbreviations: BMI = body mass index ( $\text{kg}/\text{m}^2$ ); COPD = chronic obstructive pulmonary disease; OSA = obstructive sleep apnea; t90 = percentage of the night spent with oxygen saturation below 90%.

\* Age and BMI were used as linear terms.

† Cardiovascular risk factors included presence of hypercholesterolemia, hypertension, diabetes mellitus, and nicotine use.

‡ Cardiovascular disease included coronary artery disease, peripheral artery disease, and stroke.

<sup>§</sup>  $P < 0.01$ .

Figure 2. Kaplan-Meier estimates of the probability of event-free survival in (A) treated versus untreated patients with obstructive sleep apnea (OSA), (B) treated versus untreated patients with mild-moderate OSA, and (C) treated versus untreated patients with mild-moderate OSA without preexisting cardiovascular disease.

# CPAPの問題点

- きちんと使用しないと効果が出ない。
- 毎日4時間以上。
- マスクの圧迫感、皮膚トラブル
- エアリーク
- 乾燥する、結露する
- 毎月1回の定期健診が必要

# 患者さんの自己負担

- 毎月最低1回受診が必要
- CPAPなら3割負担で約5000円の窓口負担
- ASVだと3割負担で約26000円の窓口負担

**正直結構きつい**

# 最後に

- 疑わしかったらまず検査を受けましょう
- 目が悪ければめがね、血圧が高ければ降圧薬、睡眠時無呼吸があるならCPAP
- 昼間の眠気を改善するだけでなく、将来の心、脳血管障害を予防するためにCPAP