

폐쇄성 수면무호흡증의 병태생리

구 수 권

Pathophysiology of Obstructive Sleep Apnea

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가 . 1970 가 가 (Fig. 1). 가 (Fig. 2). (Pathogenesis of Obstructive Sleep Apnea) activity)가 (hypotonia) 가 (tonic 1-3)

폐쇄성 수면무호흡증의 발생기전 (Pathogenesis of Obstructive Sleep Apnea)

폐쇄성 수면무호흡증의 단계 (Primary Sequence of Obstructive Sleep Apnea)

(oropharynx) (larynx)
(deglutition) (respiration)
가

- 1) the onset of obstructive apnea
- 2) the development of progressive asphyxia during apnea
- 3) termination of the apnea
- 4)

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(pharynx) . 5-7)

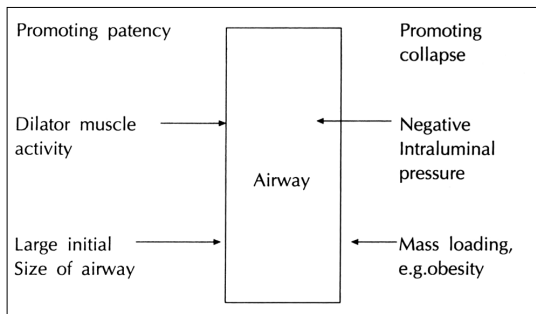


Fig. 1. Control of upper airway patency.

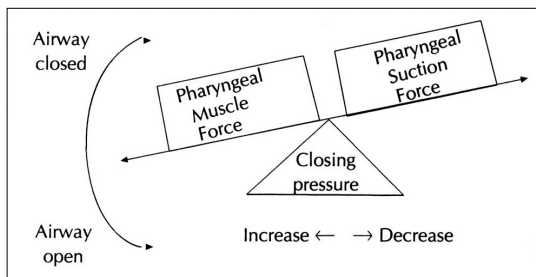


Fig. 2. Balance of forces affecting upper airway caliber during sleep. These forces rotate around a fulcrum, the position of which is dependent on the closing pressure of the upper airway.

(Small size of upper airway)
 가
 가 . 2)3)
 (Upper airway compliance)
 (compliance)
 (dilatator muscle)
 (constrictor muscle)
 (tonic activity)가
 (constrictor muscle)
 가
 (dilatator muscle)

sacle) (tonic activity)
 REM NREM
 REM 1-3)
 . 1) (lung vol -
 ume) (reflex) . 2)
 가 가
 가
 . 3)
 . 4) (chest
 wall muscle) 가 . 5)
 가 가 . 8)

Development of asphyxia during obstructive apnea
 (ventilation)
 (asphyxia)

Maintenance and termination of obstructive apnea
 가
 (expiration)
 (ventilation)
 가
 (end of inspiration)
 가
 (respiratory drive)가
 가 가
 (arousal) (ar -
 (intrathoracic pressure)
 stage 1, 2 stage 3, 4
 REM 가 NREM

Table 1. Maintenance and termination of an obstructive sleep apnea

	Onset of apnea	Maintenance of apnea	Apnea termination point	Post apnea
Upper airway dilator muscle activity	-	-	++	+
Surface forces	-	+	-	-
Respiratory drive	+	++	+++	++
Inspiratory chest wall muscle force	+	++	+++	++
Arousal	-	-	+	+

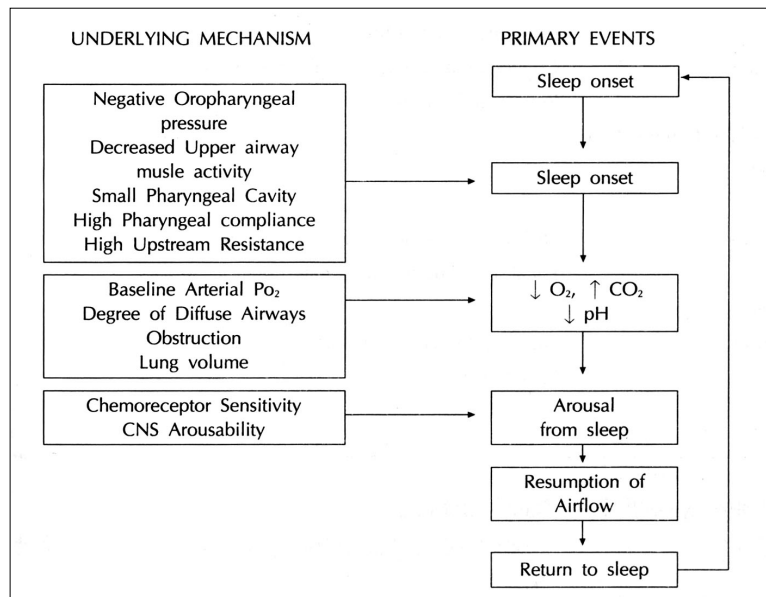


Fig. 3. The primary sequence of events in patients with obstructive sleep apnea, and the pathogenic mechanisms that contribute to these events.

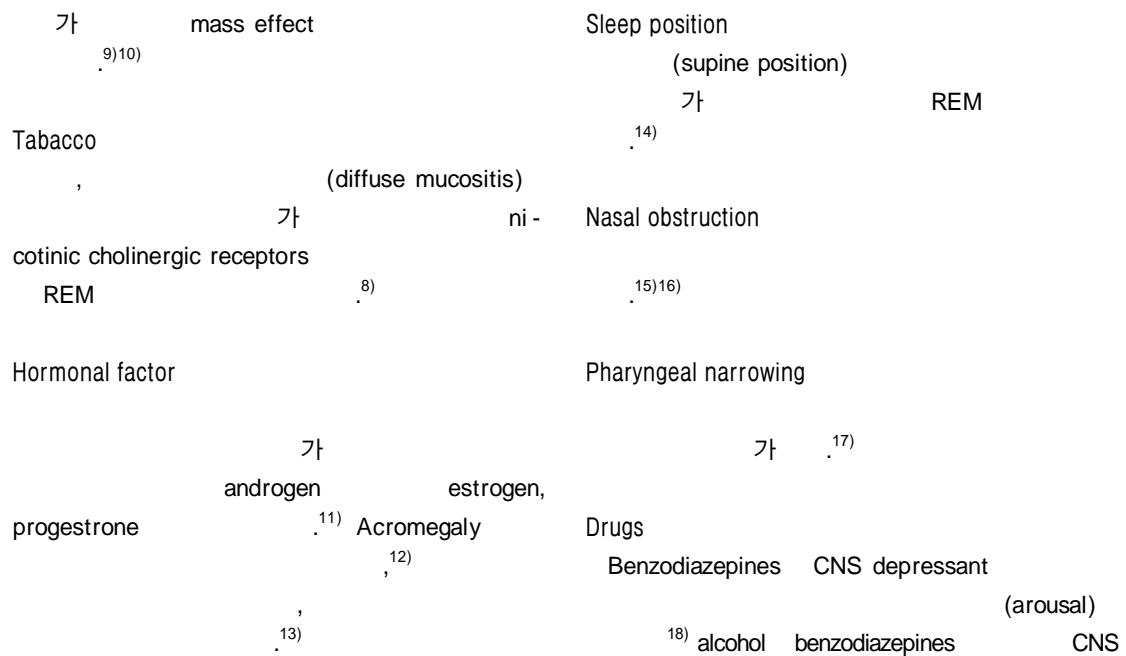
REM (hy - poxia) (hypercapnea) (arousal) 폐쇄성 수면무호흡증의 원인 (Cause of Obstructive Sleep Apnea)

가 chemoreceptor 가 (arousal) 1) (dilatator muscle) 2) (dilatator muscle) 3) (hyperventilation) 가 가 (chest wall muscle tone) 가 가 가 (Table 2).

(dilatator muscle) Obesity and neck muscle hypertrophy (Table 1, Fig. 3). Obesity (fat) 500 3)4)8)

Table 2. Factors predisposing to obstructive sleep apnea

Small upper airway	Obesity Tabacco smoking Hormonal factors Supine position Upper airway lesions Skeletal abnormality	Menopause Acromegaly Hypothyroidism Nose : polyps, rhinitis Pharynx : tonsils and adenoids, cysts and tumors Larynx : congenital webs and cysts Crico-arytenoid arthritis Congenital and traumatic abnormalities Retrognathia
Loss of upper airway	Sleep deprivation and fragmentation	
Dilator muscle activity	Benzodiazepines Alcohol Neurogenic disorders General anesthetic Ventilatory support	Diffuse e.g. poliomyelitis Focal Nasal and negative pressure ventilation, phrenic nerve Pacemaker
Increased chest wall muscle tone		



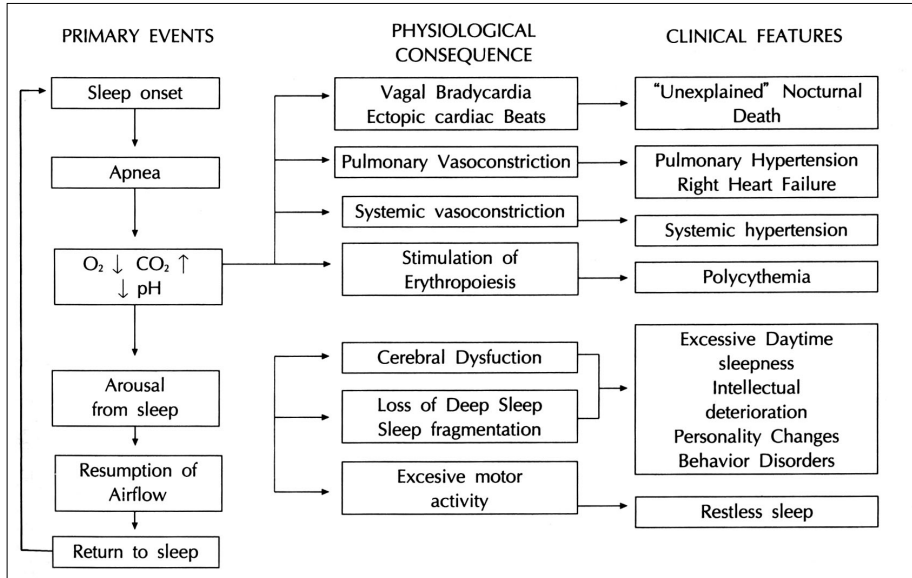


Fig. 4. The physiologic responses and clinical features resulting from obstructive sleep apneas.

depressant
mia)

가 (hypere - 가 가 가
가 .¹⁹⁾ 가 .

Miscellaneous

Down, Marfan, Apert craniofacial
abnormality, poliomyelitis, myotonic dystrophy
neuromuscular conditions,

Heart rate and dysrhythmia

(heart rate)
가 (asphyxia)

8)

가 가

폐쇄성 수면무호흡증의 동반질환
(Sequele of Obstructive Sleep Apnea)

(bradycardia)
(atrial fibrillation), (ventricular tachy -
cardia) (arrhythmia)

REM

(asphyxia)

(arousal)

(Fig. 4).⁴⁾

가 75%

가 가 .⁸⁾²⁰⁾²¹⁾

Systemic blood pressure, left ventricular failure, myocar-
dial infarction and stroke

심혈관계 합병증(Cardiovascular, hemodynamic com-
plication)

(arousal)

가

(asphyxia)

REM

.²²⁾

(pulmonary hypertension)
 23) (stroke), (hypertension), (myocardial infarction)
 3 (st - roke), (hypertension), (myocardial infarction)
 50%
 30%
 25)26)
 (bradycardia) (afterload) 가 (bradycardia)
 20)21)27)
 Pulmonary hypertension, right heart failure and polycythemia
 (pulmonary artery pressure)
 가 (pulmonary artery pressure)
 (pulmonary hypertension) (stroke volume) (right ventricular failure) (right ventricular failure)
 8) (hypoxia), (hypercapnea)
 가 (polycythemia)
 28)
 신경정신적 합병증(Neuropsychiatric complication)
 REM (slow wave)
 (daytime sleepiness),
 29) 가
 30)
 (hypoxia), (hypercapnea)

(morning headache)
 가 31)32)
 기타 합병증(Miscellaneous complication)
 cAMP가 가
 ATP가 adenosine, xanthine purine nucleotides가 가
 가 purine nucleotides (uric acid)
 (uric acid) 가
 33) (intrathoracic pressure)
 (atrium) (atrium)
 ANP(atrial natriuretic peptide)
 가 ANP 가 renal sodium
 34)
 (intrathoracic pressure)
 (arousal) 35)
 가 36)
 맺 음 말
 가 가
 , , , , 가
 가
 중심 단어 :

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