

OBSTRUCTIVE SLEEP APNEA (OSA)

- OSA refers to ↓ or absent air flow in the presence of muscular efforts.
- On polysomnography, it can take 3 forms:
Apnea, hypopnea, respiratory effort related arousal (RERA)
- A duration of 10 sec or more is reqd. to show any of these respiratory efforts

APNEA:

- It is defined as a 90% or more reduction in the amplitude of air flow signal as measured by an oral / nasal thermal sensor, whose signal is not linear.

3 types:

- 1) Obstructive apnea event: There is breathing effort during apnea.
- 2) Central apnea event: There is NO breathing effort during apnea.
- 3) Mixed apnea event: The apnea event starts as a central apnea & ends as obstructive apnea

Hypopnea: Hypopnea is a drop of 30% or more in the amplitude of the nasal pressure sensor that lasts for 90% or more of the event & is also with 4% or more drop in spO₂.

Apnea-Hypopnea Index (AHI): No. of apnea & hypopnea events per hour of sleep.

Dis: The term OSA syndrome refers to the combination of AHI of 5 or more & daytime somnolence that is present for 2 or more days/week.

3 Grade: MILD: AHI 5-15

MODERATE: AHI 15-30

SEVERE: AHI ≥ 30

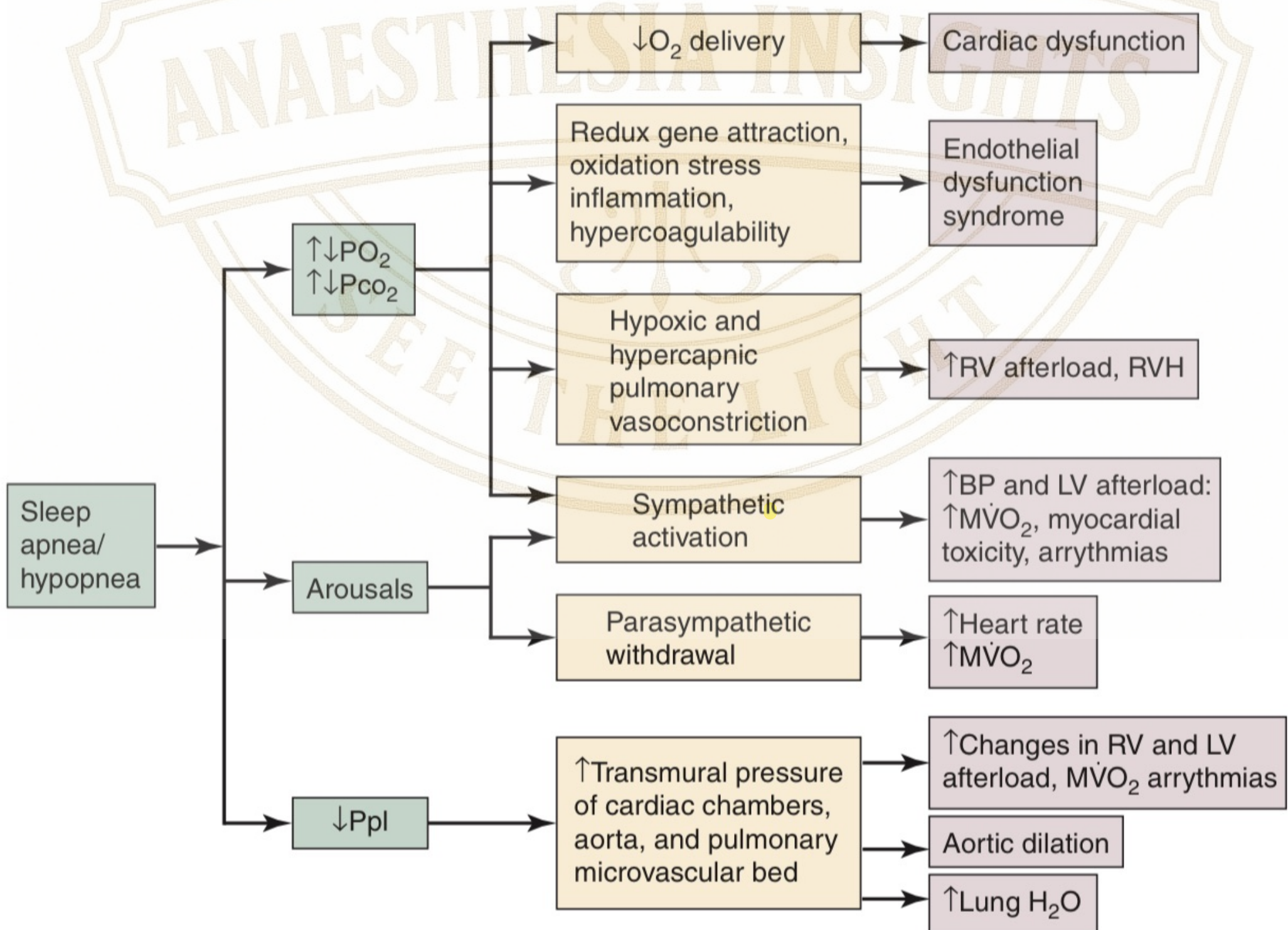
PATHOGENESIS OF OSA:

- Anatomic & functional upper airway obstruction.
- $\downarrow$ respiratory related EEG arousal response.
- Instability of ventilatory response to chemical stimuli.

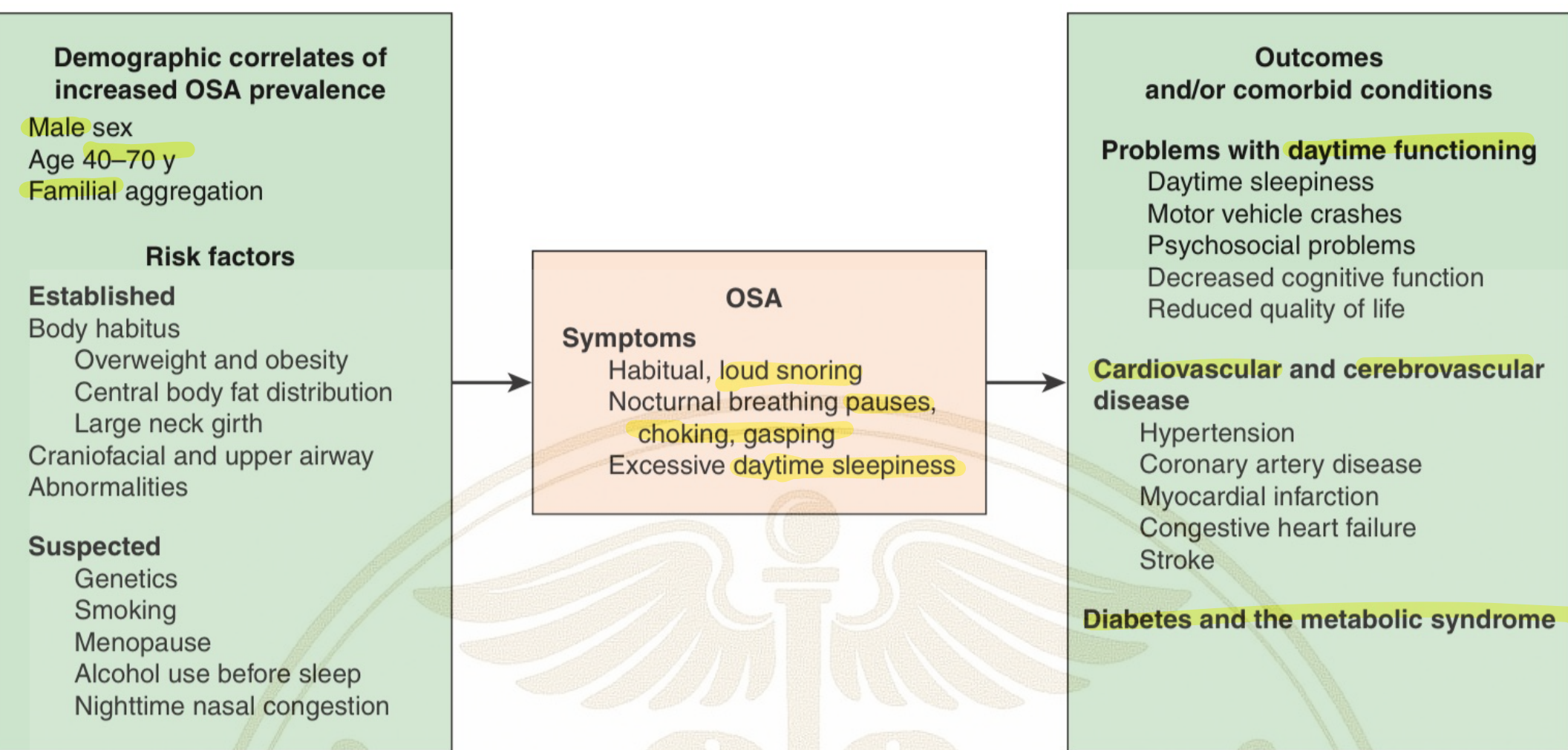
⇒ Apnea episodes are resolved as a result of 3 events:

- (1) ↑ muscular activity @ the upper airway m/s that restore airway patency.
- (2) ↑ muscular activity @ the thoraco abdominal resp. m/s that generate ↑ -ve intrathoracic pressure.
- (3) EEG arousal, which stimulate central resp. centres

CARDIOVASCULAR CONSEQUENCES OF OSA



RISK FACTORS, SYMPTOMS, & SYSTEMIC EFFECTS



TREATMENT:

General Measures:

⇒ ↓ modifiable risk factors: - alcohol consumption
use of sedative meds
cigarette smoking.
Obesity
Nasal obstruction
Tonsil Grade ≥ 3

⇒ Treating comorbid conditions: - • control Htn
• AF

- Hypothyroidism
- Graves d/c
- Acromegaly
- NASH
- PCOS

- CAD
- MI
- CHF
- Stroke
- T2DM

PAP (Positive airway pressure)

GOAL of PAP Titration: To select the lowest airway pressure that eliminates all respiratory events, including apneas, hypopneas, arousals & snoring so that the RDI $\downarrow$ to less than 5/hour with acceptable oxygenation ($SpO_2 \geq 90\%$) & acceptable mask leak level.

[RDI: Resp. distribution Index]

MECHANISM:

- 1) $\uparrow$ pharyngeal transmural pressure (pneumatic splint effect)
- 2) Reducing pharyngeal wall thickness & airway edema.
- 3) $\uparrow$ airway tone by mechanoreceptor stimulation.
- 4) $\uparrow$ end-expiratory lung volume & producing a tracheal tug effect

COMPLICATIONS:

- Mechanical - nasal obstruction or stuffiness
- Facial pressure ulcers
- Skin rash.

Oral appliance Therapy for OSA:

- Mandibular advancement device
- Tongue retaining device

Other devices: Nasal expiratory PAP.

Airway surgical therapy:

- Tracheostomy.
- Maxillomandibular advancement
- Laser assisted uvulopalatoplasty.
- Uvulopalatopharyngoplasty.
- Radio frequency ablation.
- Palatal implants.