

BSS International Sleep Medicine Course 2026

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British Sleep Society



UK Multidisciplinary Sleep Professionals



Nederlandse vereniging voor
SLAAP- EN WAAKONDERZOEK
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1. I do not have any potential conflicts to disclose.

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2. I wish to disclose the following potential conflicts of interest:

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Grant/Research Support	
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Financial support	
Other	

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4. This talk presents material that is related to one or more of these potential conflicts, and the following objective references are provided as support for this lecture:

- 1.
- 2.
- 3.

Sleep and Internal Medicine

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Overview

Cardiovascular Disease

Endocrine Disorders

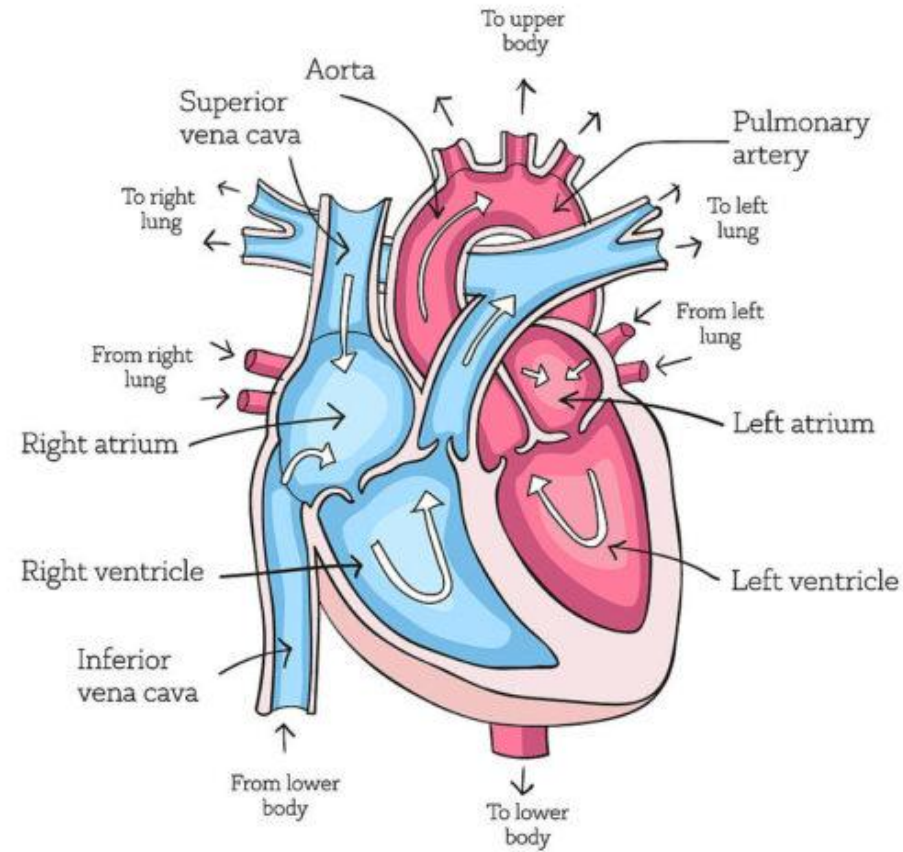
Cancer

Chronic Fatigue and Pain

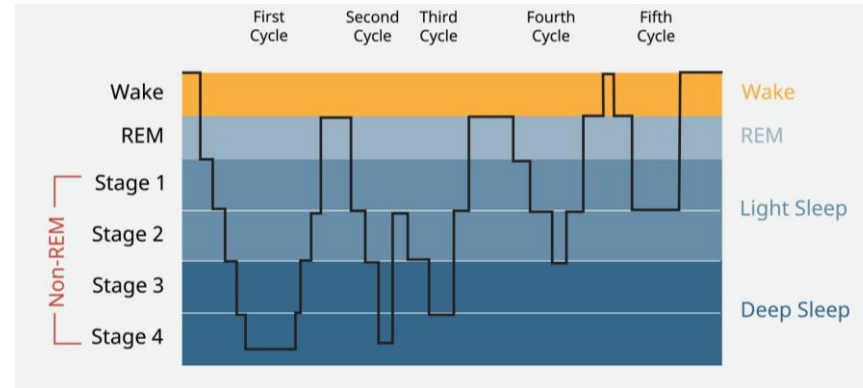
Disorders

Nocturia

Cardiovascular Disease



Sleep and Cardiovascular dynamics



REM

Autonomic and haemodynamically instability
 Phasic REM causes intermittent surges in sympathetic activity, HR, BP - increases LV afterload and myocardial oxygen demand
 REM increases respiratory stress

NREM

Generally reduced cardiovascular workload and is cardiovascularly restorative
 Heart rate, systolic and diastolic BP fall due to reduced sympathetic activity and increased parasympathetic tone
 This reduces cardiac workload and myocardial oxygen demand

Sleep quality and quantity and CVD

Short sleep duration	Increases prevalence and incidence of - Obesity - Diabetes mellitus - Coronary heart disease - Atrial fibrillation and stroke - Greater risk of all-cause mortality
Prolonged sleep duration	Time in bed of >8 or >9 hr/night Associated with increased: - Cardio-cerebrovascular events - Mortality
Irregular Sleep Routine	- May be associated with increased cardiovascular risk, independent of average sleep duration

Sleep and heart failure

Heart failure

- Symptoms: cough, paroxysmal nocturnal dyspnea, orthopnea, nocturia
- Medications used to treat HF can also contribute to poor sleep
- Poor sleep architecture characterized by:
 - Excessive light sleep
 - Insomnia
 - Excessive arousals

Sleep disordered breathing

- OSA is associated with incident HF, particularly in middle aged men
- Underdiagnosed in patients with HF, particularly in those with CSA
- OSA and CSA are common in patients with heart failure – OSA is predominant in those with HFpEF and CSA more common in those with HFrEF

OSA and cardiovascular disease share many risk factors

OSA can act as an additional cardiovascular stressor, accelerating progression towards advanced cardiovascular disease.

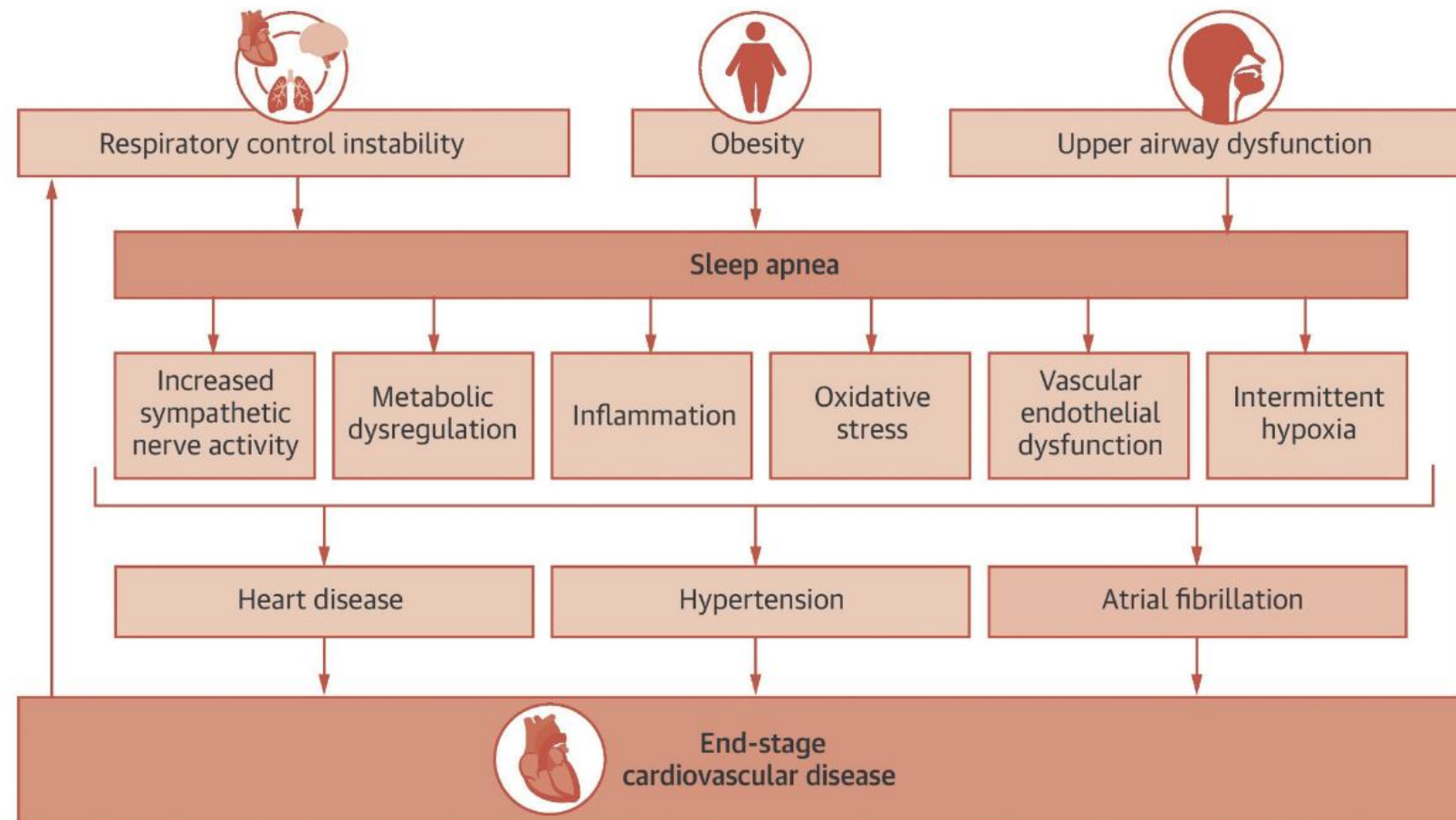


FIGURE 1 Multi-aetiological risk factors of obstructive sleep apnea and its downstream consequences. Modified from Javaheri et al. (2017)

Heart failure and central sleep apnoea

- Patients with HFrEF frequently have both OSA and CSA
- CSA is associated with intermittent arousals, hypoxaemia, and negative swings in intrathoracic/juxta-cardiac pressure.
- In CSA, the negative swings occur at the peak of hyperventilation, and these swings are relatively large, proportional to the severity of congestion of the respiratory system.
- CSA leads to sustained sympathetic overactivity, which has been shown to carry a poor prognosis in HFrEF

Sleep in cardiac transplant patients

Sleep problems are common after heart transplantation

- Poor sleep quality is common among solid-organ transplant recipients
- CSA more common pre-transplant
- Post transplant shift towards OSA, particularly in those who gain the most weight

Sleep and cardiac rhythm disorders

- REM cardiac sympathetic nerve activity surges can cause nocturnal arrhythmias
- CSA can cause repeated hypoxaemia, arousals and sympathetic surges which can promote atrial electrical/structural remodelling and increase the risk of AF
- OSA is considered a cause of atrial fibrillation
- AF can contribute indirectly to CSA through its association with cardiac dysfunction

Does OSA treatment improve CVD outcomes?

Marker	Impact of treatment of OSA with CPAP
Blood pressure	Lowers BP (2-2.5mmHg SBP) Most effective for those with treatment resistant hypertension (4.7-7.2mmHg SBP) and those with good adherence to CPAP
Sympathetic activity	Fewer nocturnal sympathetic surges
Major CVD events	No consistent reduction in RCTs
CVD mortality	Not clearly reduced

OSA treatment improves symptoms and cardiovascular risk factors

Evidence not available that it prevents MIs or CVD deaths

Summary

OSA is common in patients with hypertension, arrhythmias, coronary heart disease, and heart failure.

Treatment of OSA with CPAP lowers BP

Lack of evidence that therapy with CPAP improves cardiovascular outcomes

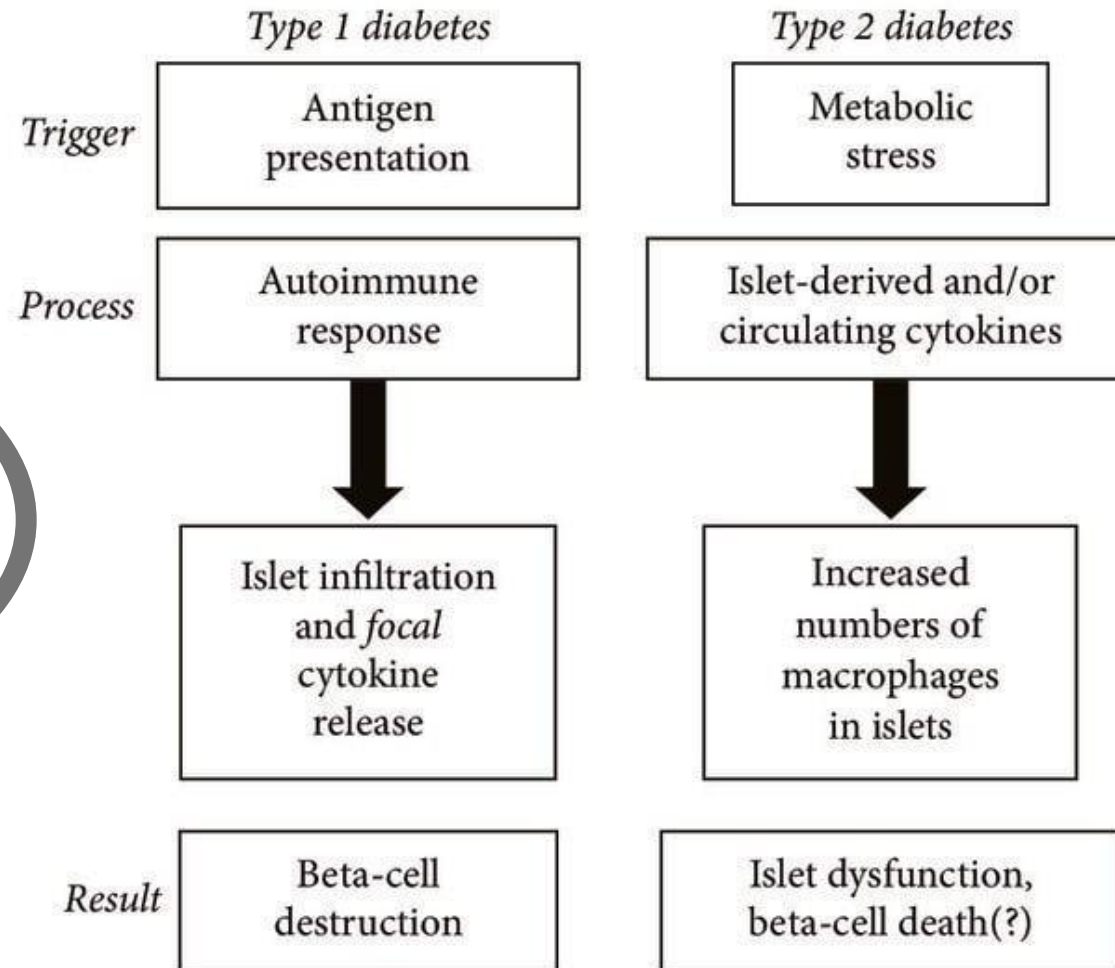
CSA is highly prevalent in patients with HF

Altered sleep duration or quality may be associated with an increased risk of cardiovascular disease.

Endocrine Diseases



Diabetes



Type 1

Autoimmune reaction
Insulin cells attacked

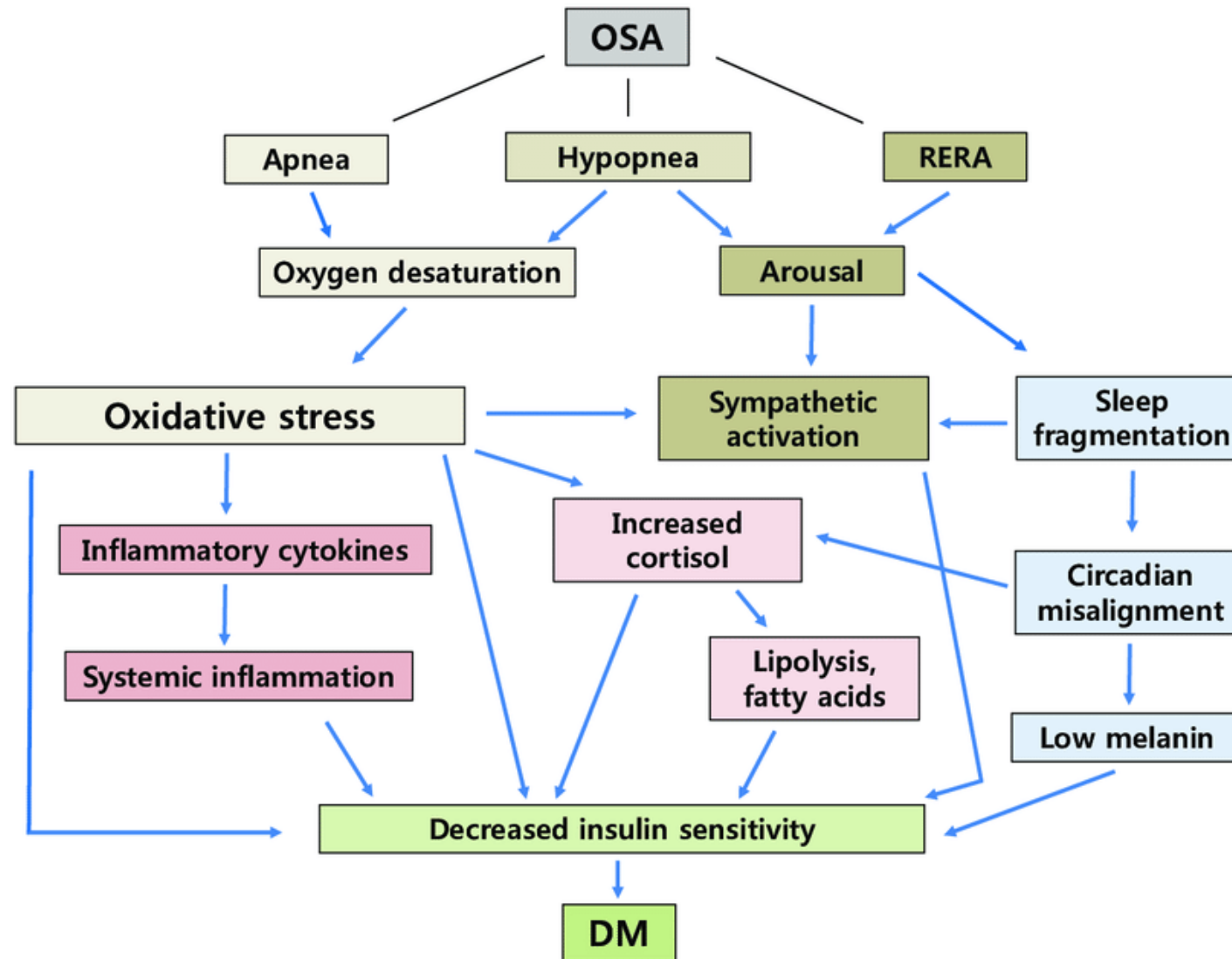
Type 2

Metabolic syndrome
Cells don't respond to insulin

OSA and Type 2 diabetes

- OSA is associated with insulin resistance and increased risk of T2DM
- Relationship particularly strong with obesity
 - 8-29% of individuals with OSA have T2DM
 - AHI >30 confers 31% increase in risk of T2DM over the next 5.6 years

Glycaemic control deteriorates as OSA severity increases



CPAP and Type 2 diabetes

CPAP is associated with trivial reduction of HbA1c (-0.24%), no impact on fasting glucose

Longer term CPAP was associated with improved insulin resistance

CPAP as effective OSA treatment may form part of overall cardiometabolic risk management

Type 1 diabetes

Less well studied!

High prevalence OSA in T1DM, even when not obese

Potential mechanisms:

- Autonomic neuropathy – impaired upper airway muscle control
- Poor sleep and glycaemic instability – bidirectional relationship

CPAP does not improve glycaemic control or diabetic complications in T1DM

Thyroid function

Hypothyroidism associated with OSA

- macroglossia / upper airway soft tissue changes / increased upper airway collapsibility
- associated with obesity which increases OSA risk
- extrinsic compression by goitre

6% patients with OSA had hypothyroidism

8% with subclinical hypothyroidism

No correlation between thyroid hormones and AHI

Treatment has potential to significantly improve OSA severity

Treating OSA may be associated with an improvement in thyroid function

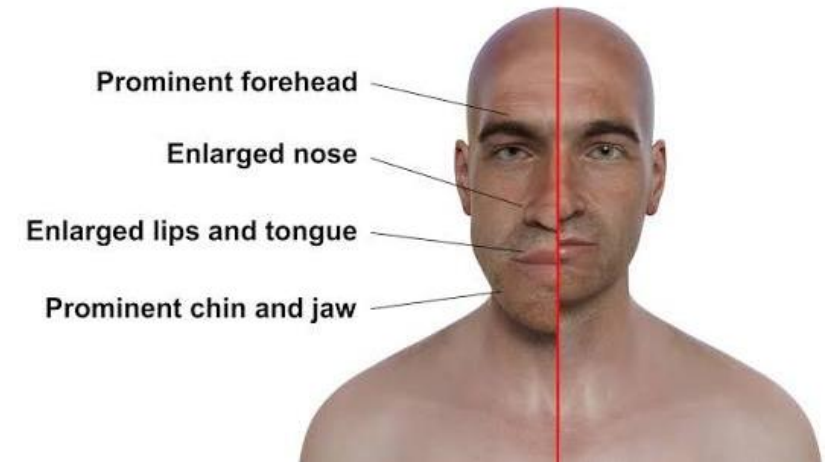
Acromegaly

- elevated growth hormone and IGF-1 levels
- Usually due to pituitary adenoma

Sleep apnoea very prevalent (20-80%)

> 2/3 OSA and 1/3 CSA

Treatment of acromegaly may lead to significant improvements in OSA severity



~~Polycystic ovary syndrome~~

Polycystic metabolic ovarian syndrome

Metabolic condition

Symptoms: oligo- or amenorrhoea, polycystic ovaries, clinical or biochemical androgen excess

Women with PMOS have 2-3x increased risk of OSA

May be some impact of androgen excess causing upper airway collapsibility

Summary

Endocrine disorders are common in OSA cohorts, particularly T2D and insulin resistance.

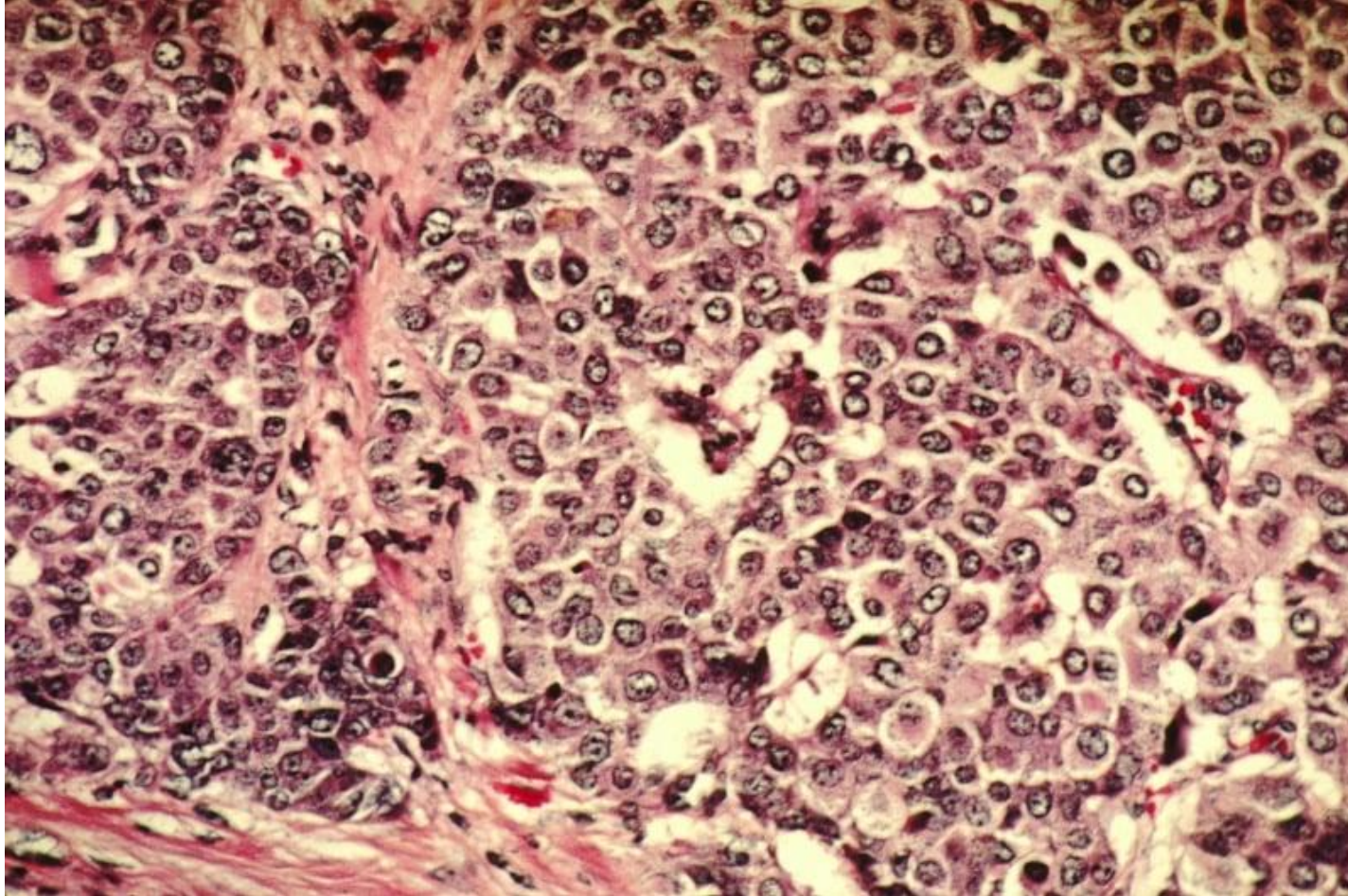
OSA may contribute to the development of T2DM and to impaired glycaemic control

OSA is common in patient with T1DM

Hypothyroidism can contribute to the development of OSA

Acromegaly and PMOS are commonly associated with OSA

Cancer



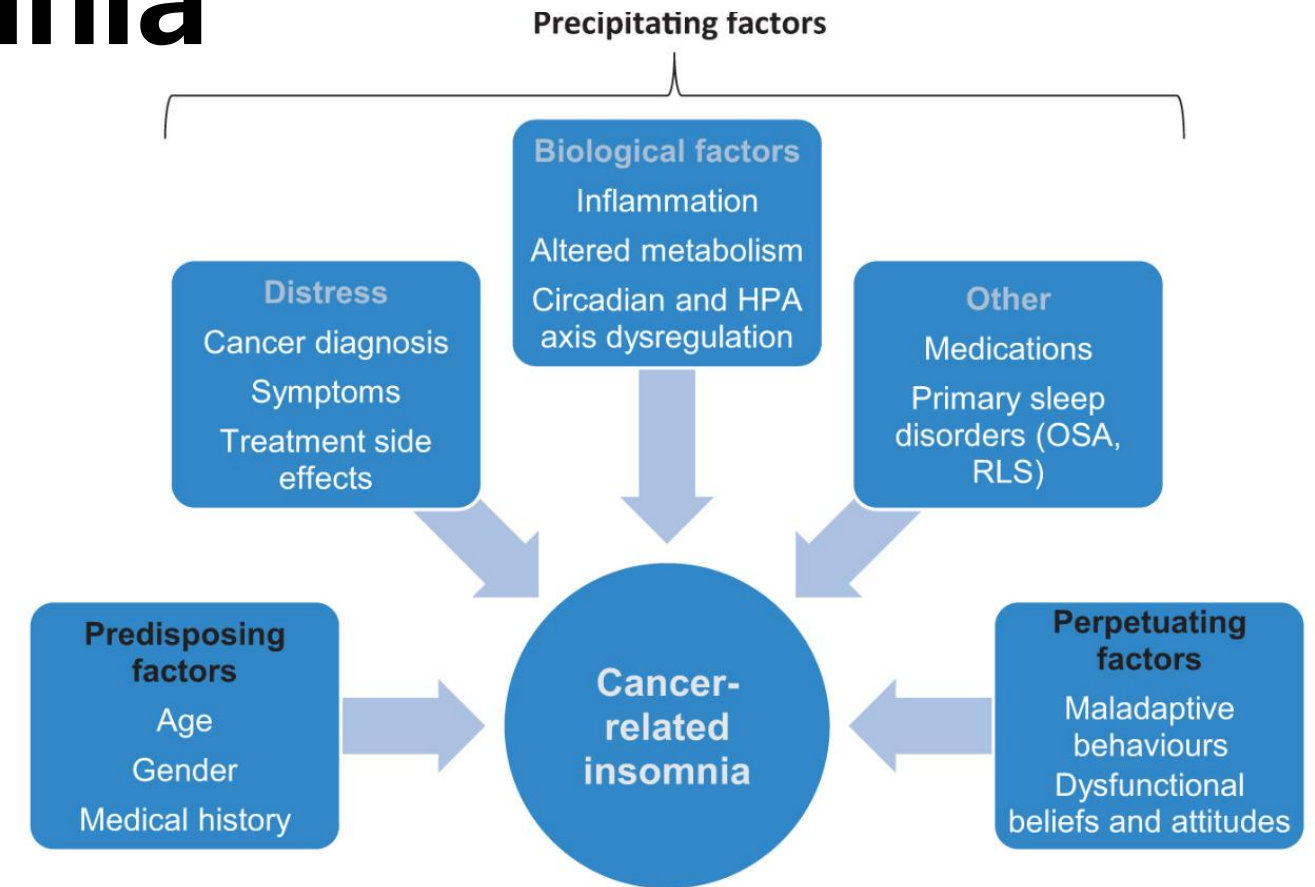
Cancer and insomnia

Common in cancer patients across diagnosis and treatment pathway

Related to psychological and physical stress

Especially linked to breast, gynaecological and lung cancer patients

Results in fatigue, mood disturbances



Complications

Impacts daytime functioning e.g. cognitive (concentration) and psychomotor skills

Reduces health-related quality of life

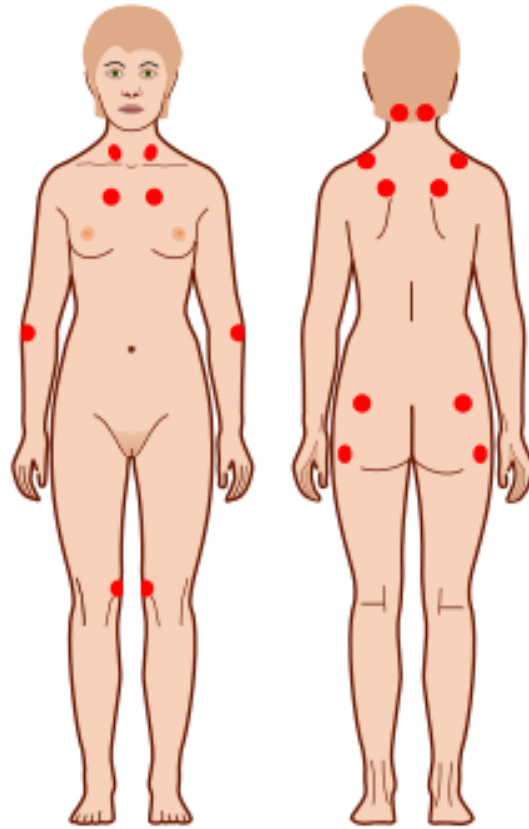
Higher risk of earlier death, disease progression, and poor treatment response

Summary

Insomnia symptoms are prevalent and persistent throughout the cancer pathway

Daytime consequences of sleep deprivation may increase the levels of distress, reduce treatment response, and possibly have a negative impact on survival

Chronic fatigue and pain syndromes



Chronic fatigue

Diagnosis:

- Fatigue for > 6 months with 4 of 8 minor criteria
 - Post-exertional malaise lasting > 24 hr
 - Sore throat
 - Tender cervical or axillary lymph nodes
 - Diffuse muscular pain
 - Multi-joint pain without swelling or redness
 - Headache of a new type, onset, pattern or severity
 - Memory and concentration impairment (often described as “a brain fog”)
 - Unrefreshing sleep

Fibromyalgia Syndrome

Chronic muscular pain disorder

- 4 body quadrants
- At least 3 months
- Number of local tender or trigger points (examination) examination

Recently widespread pain index and symptom severity score (SSS) added

SSS includes sleep disturbances and fatigue

Sleep

Both disorders include sleep disturbance

Subjectively disturbed sleep and primary sleep disorders are highly prevalent in CFS and FMS

CBT-I has been shown to improve sleep quality and to reduce scores of fatigue and pain in these patients

Sleep in Critical Illness



Factors disrupting sleep in ICU

ENDOGENOUS FACTORS

- POOR SLEEP AT HOME
- ANXIETY AND STRESS
- DELIRIUM

EXOGENOUS FACTORS

- NOISE
- LIGHT
- NURSE CARE INTERVENTIONS

MECHANICAL VENTILATION

- INCREASED FRAGMENTATION INDEX
- DECREASED N3 AND REM

SEDATION

- CHANGE IN NEUROPHYSIOLOGICAL STATE E.G. PROPOFOL BLOCKS REM

DRUGS

- ALTER SLEEP ARCHITECTURE
- WITHDRAWAL REACTIONS

Summary

Sleep alteration and disruption is frequently reported

- > It is a major stressor for critically ill patients

Teams caring for patients in ICU should include sleep in their assessments

Sleep and wake EEGs are often atypical in ICU

Total sleep time is frequently reduced, but can be normal

Sleep quality is strongly impaired, severe fragmentation, increased light sleep, reduced deep sleep/REM

Impacted by environmental factors, sedation, and ventilator settings

Neurobehavioral consequences can be severe with difficult weaning from mechanical ventilation.

Treatments is implementing sleep protection strategies

Nocturia



OSA and Nocturia

Nocturia - waking up to pass urine overnight excessively

Nocturnal hypoxia results in ANP release by the body which stimulated renal excretion of sodium and water

Frequent arousals from sleep cause by apnoea make person more aware of sensations including need to void

CPAP can improve nocturia and quality of life of patients

Summary

Cardiovascular
Disease

Endocrine
Disorders

Cancer

Chronic
Fatigue and
Pain Disorders

Nocturia

Questions?

