OSA & Chronic Respiratory Diseases :
Multi-directional Effects

Deepak Talwar

MD, DTCD, DNB, DM (Pulmonary & Critical Medicine) FISDA, FCCP (USA), FNCCP

Director & Chair

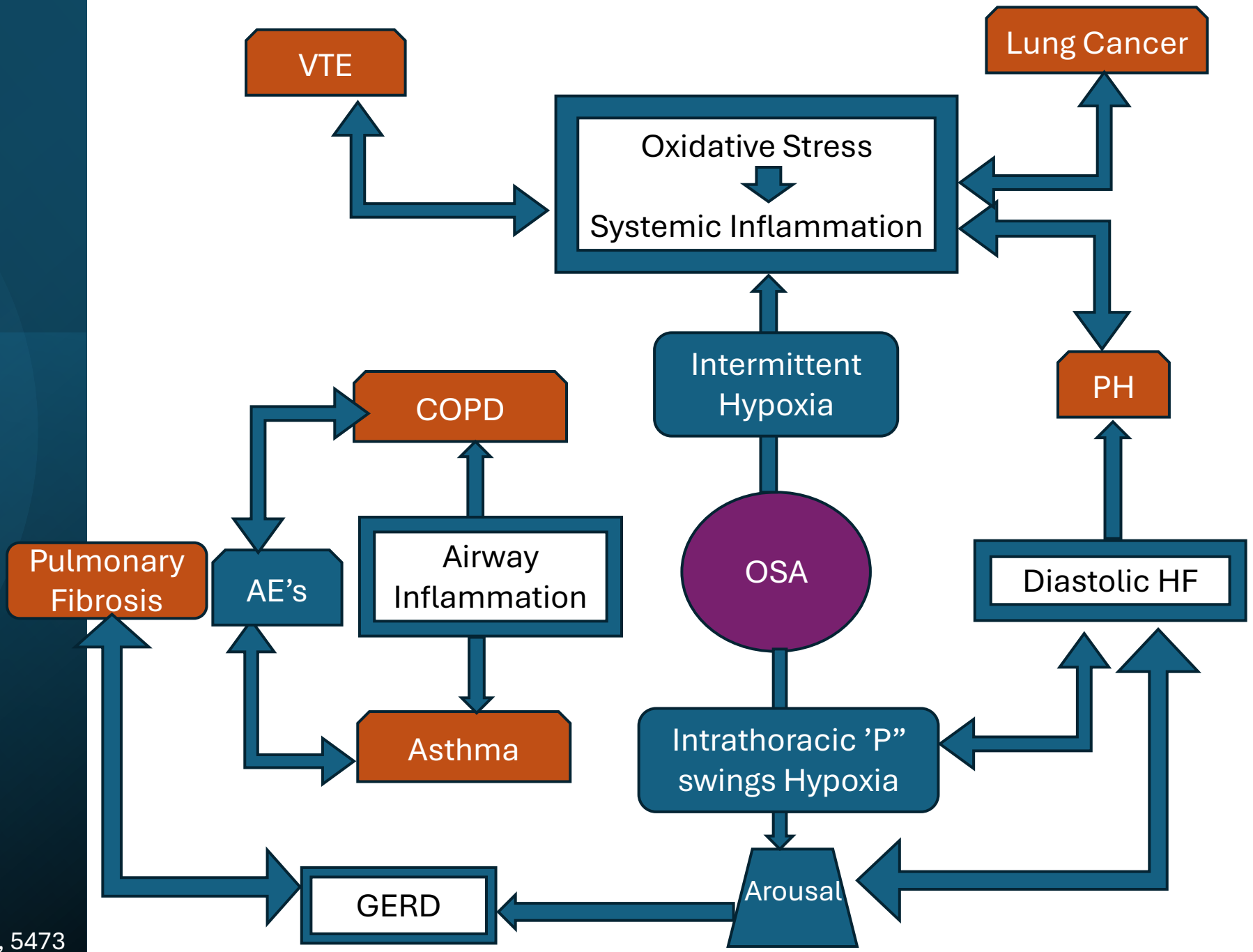
Pulmonary, Sleep, Allergy & Critical Care Medicine

Metro Group of Hospitals, INDIA

Chronic Respiratory Conditions Associated with OSA

- COPD
- Asthma & CRS
- Bronchiectasis
- OHS
- ILD
- PH
- CW & NM disorders
- Refractory Cough
- Sarcoidosis
- Lung cancer

OSA & Chronic Respiratory Diseases Interactions



Int. J. Environ. Res. Public Health 2022, 19, 5473

COPD-OSA Overlap: (OVS) *Impact & Implications*

~ Co-occurrence or Multiplier Effect

Sleep Med. Rev. 2016, 32, 58–68.

- Both have heterogenous presentations
- Airway traction in COPD is opposite to airway collapse in OSA – Beneficial ?
- COPD Improving OSA :
  - Emphysema 1/↩ AHI
  - Reverse relationship with Cachexia,
  - Less REM sleep – Protective from OSA
- COPD Worsening OSA :
  - Airway inflammation (smoking related)
  - PH & COPD hypoxia
  - Skeletal muscle weakness
- Higher mortality, Day Hypercapnia & AE's
- PAP improves, QoL, AE's, FEV_1 & PAP, Gas Exchange
- Traditionally OVS pts excluded from trials

COPD-OSA Overlap Syndrome:

Challenges in Diagnosis & Management

- Challenge is suspicion of COPD associated with OSA
- Non-classic OSA in Overlap with COPD :
  - Less daytime sleepy
  - Less Obese
  - Indicators of possible association :
    - More poor QoL
    - More CV events,
    - Frequent COPD- AE
  - Need more sleep related study as sleep quality is affected.
  - Compliance Issues In PAP therapy due to interface and pressure issues
  - Conflicting results in other studies

Physiol. Rep. 2020, 8, e14371.

Impact of OSA & Concomitant Respiratory diseases on Pulmonary HTN & VTE

- OSA alone Is not risk for PH unless associated with respiratory or cardiac disease
- Obesity in OHS or associated with airway diseases and in COPD overlap PAP ↑
- OSA - increased coagulability & less fibrinolytic activity poses 2-4 times higher risk for VTE
- Obesity , age and sedentary life are shared risk factors
- Development of PH is multifactorial in CRD's
- PAP mitigates risk factors for VTE probably

Pulm. Circ. 2015, 5, 220–227.

OSA & Chronic Asthma : *Implications & Consequences*

- Chronic Asthma & OSA : Twice more common bidirectionally
  - Mostly T2 low associated with OSA
  - Associated chronic nasal and sinus allergies predispose to OSA
  - Correct Difficult to Treat asthma before label severe asthma,
  - Association of GERD – Asthma – OSA is multi-directional
  - Uncontrolled asthma - OCS use – Weight gain – OSA – Nocturnal Asthma worsening's
- Asthma related worsening's with associated OSA
- OSA related worsening's of Asthma take 20%more time to resolve
  - ↑Cholinergic tone in Apneic episode – Bronchoconstriction
  - Hypoxia – worsens bronchial reactivity
  - ↑ Thoracic blood volume during apnea – worsens airflow obstruction
  - Obesity in OSA affects asthma control
- PAP improves QoL, symptoms but conflicting data

Am. J. Respir. Crit. Care Med. 2022, 205, 17–35

OSA & Bronchiectasis : *Implications & Consequences*

- Bronchiectasis is twice associated with OSA
- Repeated airway collapse and opening in OSA –↑ inflammation in Brx
- Many shared comorbidities increase symptom burden
- Tracheo-bronchomalacia has high OSA prevalence
- PAP may interfere with mucus clearance, causing more damage

Turk. Thorac. J. 2021, 22, 333–338.

ILD and OSA? : Impact & Challenges

- Disproportionately high prevalence of OSA in ILD, even after BMI and Age adjustments
- Association seen in all ILD's no particular subtype or pattern
- Weight gain with OCS - OSA
- OSA seen in ILD's - 61 % (AHI $\geq$ 5), 1/4th being moderate – severe, mostly undiagnosed
- Bidirectional – ↑ UA collapse due to Fibrotic restriction, OSA causing alveolar injury, GERD
- Worst Sleep and QoL
- PAP : better outcomes trend
- Challenges in PAP : cough, comorbidities, anxiety, interface and pressure related issues, re-titrations needed frequently

Can. J. Respir. Ther. 2018, 54, 35–40.

OSA & Refractory Cough : *Association & Implications*

- Refractory cough is burden on healthcare
- Not much Improvement with available therapies
- PAP therapy reduces cough if associated with OSA
- CMS too improves with PAP
  - ? Less GERD after PAP
  - UA mechanical trauma with repeated UA narrowing in OSA

ERJ Open Res. 2021, 7, 00793–2020.

OSA & OHS: *Implications & Consequences*

- Pure Obesity Induced Hypercapnia - Spiro metric restriction at BMI > 40
- OHS : 10% no OSA and 2/3rd have severe OSA
- Diagnosed missed and delayed – repeated hospitalizations
- Suspect while in ICUs with hypercapnia : 50% have OHS
- UA dysfunction and well as neural derive issues
- VTE as common as hypercapnia causing Icu admissions
- PAP improves mortality as well as readmission
- Opoid hypersensitivity in OHS –Prolonged respiratory depression

J. Respir. Crit. Care Med. 2022, 205, 966–967.

Take Home Messages : OSA & CRD

- Consider downstream effects of OSA on lungs in practice
- OSA overlap can exist with any chronic lung disease, frequently overlooked
- Unified Airways augment OSA effects in Airway
- Fibrotic and obstructive diseases have opposing effects on airways but interaction with OSA remains bidirectional
- PAP addresses OSA related issues and improves upper airway and esophageal function, improving disease control (QoL) in CRD
- PAP improving morbidity and mortality in CRD is promising WIP

Thank You