Three Sleep Disorders common among Cardiovascular Patients and their Implications for Bridging the Gap Between Soma and Psyche

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Figure 3. Multiple chronic conditions among Medicare fee-for-service beneficiaries, 2010

- Depression
- Cancer
- Arthritis
- Hypertension
- Alzheimer's disease
- Hyperlipidemia
- Diabetes
- Osteoporosis
- Asthma
- Ischemic heart disease
- COPD*
- Atrial fibrillation
- Chronic kidney disease
- Stroke
- Heart failure

*chronic obstructive pulmonary disease.

ANS Dysfunction:
Perhaps A Common Final Pathway to Chronic Mental and Physical Diseases?

All major ICSD Sleep Disorders have underlying ANS disturbances
Most mental health disorders involve disruption to neural regulation of the ANS
Many chronic medical diseases have significant autonomic arousal
Non-Restorative Sleep

Problem is with Sleep Quality, not Quantity:

• Patient sleeps 7-8 hours a night (or more)
• Awakens still feeling exhausted
• Feels fatigued and apathetic during the day

Sleep Physiology:

• Chronically overactive stress system
• Unstable sleep pattern; fragmented
• Signs of adrenal fatigue
Chronic Insomnia Disorder (CID)

A complaint of:
- Difficulty falling asleep (>30 min)
- Difficulty staying asleep (30+ awake min)
- TST <6 hours a night with frequent wakes

Duration:
- 3+ Days per week
- >3 months for diagnosis of Chronic Insomnia

Associated with:
- Distress
- Impaired function during the daytime
Obstructive Sleep Apnea: Causal Mechanisms

1. Obstruction of the air passage at night (due to relaxation of muscles in throat and tongue, uvula can vibrate, etc)
2. Increased risk due to age, obesity, ethnic and congenital factors
3. Sleep position can exacerbate AHI
COMMONEST TYPE: OBSTRUCTIVE SLEEP APNEA

WHAT IS SLEEP APNEA?

During sleep apnea, air flow is completely blocked.
# Prevalence of Sleep Conditions

<table>
<thead>
<tr>
<th>Sleep Conditions</th>
<th>SAQ</th>
<th>PSG</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-Restorative Sleep</td>
<td>62%</td>
<td></td>
</tr>
<tr>
<td>Sleep Apnea **</td>
<td>60%</td>
<td>70%</td>
</tr>
<tr>
<td>Insomnia</td>
<td>52%</td>
<td></td>
</tr>
</tbody>
</table>

Any Sleep Condition: 92%

* Sleep Conditions relate to Stress Symptoms

** High OSA Risk group: - only 33% completed SMT
- no change in depression
Risks of Undiagnosed Sleep Apnea

High Blood Pressure difficult to control
Heart Disease & Heart Attack
4x risk of Stroke
Anxiety and Depression
Irregular heart beat
Heart failure
Type 2 Diabetes
Poor control of Diabetes
Glaucoma
Traffic accidents
Poor Job performance
Chronic Insomnia: Medical Consequences

- Hypertension
- Obesity
- Type 2 Diabetes
- Cardiovascular Disease
- Cancer and immune disruption
- Tension headaches
- Mood and anxiety disruption
- GI tract problems
- Neurological symptoms
Insomnia and Stress Hormones


![Graph showing cortisol levels](image)
Insomnia and the Immune System

Figure 5.
24-hr circadian secretory pattern of IL-6 (left) and TNFα (right) in insomniacs (□) and controls (●). The thick black line on the abscissa indicates the sleep recording period. Error bar indicates SE. *P<0.05

Call for CBTi Treatments Targeting ANS Arousal

In insomnia objective sleep measures, EEG activity, physiological findings, HPA axis activity and inflammation markers suggests that it [insomnia] is not a state of sleep loss, but a disorder of hyperarousal present both during the night and the daytime."

“The therapeutic approach in insomnia should be multidimensional reducing the overall emotional and physiological hyperarousal and its underlying factors present throughout the 24-hour sleep-wake period.”

Polyvagal Theory – A Bridge to the Soma-Psyche Bridge

Understand that the Autonomic Nervous System underlies dysfunction of Soma and Psyche and that Polyvagal Theory can contribute novel and effective therapeutic strategies to target this underlying ANS dysfunction:

Neuroception
The Human ANS – 3 Legacy Neural Circuits

Mylenated mammalian vagus (Ventral Vagal Complex) enables social interactions to regulate physiology and promote health, growth and restoration (sleep) by balancing the unmylenated vagus and the SNS.

SNS mobilization of “challenge” and “fight or flight”

Primitive unmylenated vagus activating immobilization behaviors

“Three neural circuits form a phylogenically ordered response hierarchy that regulates behavioral and physiological adaptation to safe, dangerous and life-threatening environments.” - Porges 2005
The Quest for Safety: Emergent Properties of Physiological State

Environment
outside the body
inside the body

Nervous System
Neuroception

Safety
Danger
Life threat

Spontaneously engages others:
- eye contact, facial expression, prosody
  - supports visceral homeostasis

Defensive strategies:
- death feigning/shutdown (immobilization)

Defensive strategies:
- fight/flight behaviors (mobilization)

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Evolution of the Autonomic Nervous System
“The Ultimate Survival Machine”

Stage One: A primitive passive feeding and reproduction system creating a metabolic baseline of operation to manage oxygen and nutrient-rich blood.

Stage Two: A more sophisticated set of responses enabling mobility for feeding, defense and reproduction via limbs & muscles.

Stage Three: A sophisticated set of responses supporting massive cortical development (i.e., enabling maternal bonding (extended protection of vulnerable immature cortex processors) and social cooperation (language and social structures) via facial functions).

Social Engagement occurs via eyes, ears, mouth, voice, touch, facial expression

“Three neural circuits form a phylogenically ordered response hierarchy that regulates behavioral and physiological adaptation to safe, dangerous and life-threatening environments.” - Porges 2005
Introduction to next generation sleep treatments

- Paradigm shift: from sleep loss to restoring Autonomic Nervous System (ANS) balance

Based on recent advances in neuroscience:

- Polyvagal Theory (Porges, 2011)
- The Brain’s Way of Healing -- Neuroplastic change (Doidge, 2015)
A Better You
Self Regulation & Social Engagement

Diaphragmatic Breathing
Personal Control
Body Awareness
Restorative Sleep
Mindfulness Meditation
Guided Imagery
Social Engagement
Brain Training for Resilience
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