VETERAN PATIENT CASE STUDY

Oscillometry, the missing piece *in post deployment cardiopulmonary evaluation*

What Is Oscillometry?

Oscillometry (OS) is a technology that measures lung mechanics during tidal breathing and has been shown recently to be a useful adjunct method to detect and monitor subtle lung damages due to respiratory diseases or exposure to air pollution.[1]

Key measurements using OS:

Key Measurement	Description
R5	Resistance to airflow of the whole lung.
R5-19	Resistance heterogeneity of the airways. *IIncreased parameter signals potential small airway dysfunction.*
X5	Elastance of the respiratory system. *Decreased X5 implies increased tissue elastance.*
AX	Increased AX correlates with airspace de-recruitment, ventilation defects, and increased lung stiffness.

The US Department of Veterans Affairs (VA) Post-Deployment Cardiopulmonary Evaluation Network (PDCEN) Evaluation

The PDCEN—a national network of expert VA clinicians and researchers in respiratory health—provides standardized, comprehensive clinical evaluations for veterans with concerns about their post-deployment health, including unexplained shortness of breath or difficulty breathing.[2,3]

FLIP OPEN TO FOLLOW THE PATIENT'S JOURNEY!

PDCEN Referral, and Evaluation

VA Centres → PDCEN Site Coordinator contacts the Veteran in their geographic area to describe the program, confirm interest, and schedule in-person evaluation → Core Clinical Evaluation → In a final review with providers, the Veteran is informed about their conditions, whether conditions are deployment-related, and strategies to improve health

VA=US Department of Veterans Affairs; PDCEN=Post-Deployment Cardiopulmonary Evaluation Network.

Meet Sandra

- 37-year-old female medical assistant
- Deployed 20 years ago to northern Iraq for 12 months

Medical history

- Never smoked
- Exposed to a sulfur mine fire, dust storms, and burn pits during deployment
- Developed progressive dyspnea over the past 15 years

Clinical presentation

- Dyspnea on exertion
- Wheezing
- Chronic nasal congestion
- Difficulty sleeping
- Symptoms started a year after she returned from military deployment
- Unable to exercise, even at low intensity, for the past 5 years, despite being previously active

Treatment history

- Experienced some symptom improvements with:
  - o Albuterol inhaler as needed
  - o Loratadine (10 mg)
  - o Fluticasone nasal spray (50 mcg)
- Occasional use of famotidine for reflux (40 mg)

Physical examination and testing

- Normal bronchovesicular breath sounds without any wheezing or crackles
- Body mass index: 31
- Chest radiograph and spirometry are normal

PDCEN Core Clinical Evaluation Process

Evaluation by pulmonologist (Site Director) and associated VA clinician at nearest PDCEN site.	Sandra was referred to a PDCEN site and underwent a comprehensive multidisciplinary evaluation, including an evaluation by a pulmonologist.
Standardized and internally developed questionnaires to assess symptoms, health, behavioral characteristics, deployment locations, and exposures are obtained electronically.	She responded to standardized questionnaires to assess her symptoms, general health, and deployment history.
1. Complete pulmonary function testing	PFT showed lung volumes and vital capacity within the predicted normal range, mild air trapping, and a low DLCO.
2. Forced oscillometry	Forced oscillometry suggested small airways obstruction.
3. Methacholine challenge	Methacholine challenge testing was normal.
4. Cardiopulmonary exercise testing	CPET demonstrated a peak exercise capacity within the predicted normal range but low breathing reserve.
Paired inspiratory/expiratory high-resolution CT scans of the chest are obtained and quantitatively analyzed.	An HRCT showed air trapping without parenchymal changes.
Echocardiography, polysomnography, upper airway evaluation, mental health screening, and laboratory blood tests are obtained and analyzed.	Otolaryngology evaluation, including laryngoscopy, suggested chronic nonallergic rhinitis.

Conclusion:

- A summary review reported distal airway obstruction consistent with small airways disease and nonallergic rhinitis.
- Both most likely related to deployment given her significant environmental exposures and temporal onset of symptoms.

Treatment:

Sandra is started on intranasal steroids and a combined inhaled corticosteroid/long-acting β-agonist inhaler. She is also referred to pulmonary rehabilitation.

PFT=pulmonary function testing; DLCO=diffusing capacity of the lungs for carbon monoxide; CPET=cardiopulmonary exercise testing; HRCT=high-resolution computed tomography.

Looking for additional information on oscillometry?

Contact us at **info@thorasys.com**

Reference: 1. Lundblad LKA et al. *Can J Respir Crit Care Sleep Med.* 2021;5:54-68. **2.** Davis CW et al. *Fed Pract.* 2022;39(8):337-343. **3.** U.S. Department of Veterans Affairs. War related illness and injury study center. Available at https://www.warrelatedillness.va.gov/WARRELATEDILLNESS/AHBPCE/network.asp. **4.** U.S. Department of Veterans Affairs. Post-Deployment Cardiopulmonary Evaluation Network (PDCEN). Available at https://www.va.gov/maryland-health-care/programs/post-deployment-cardiopulmonary-evaluation-network-pdcen/.

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