A HEART-SMELTING CASE OF CHEST PAIN AND DYSPNEA

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Case Description

- **CC**: chest tightness and difficulty breathing
- **HPI**: A 48-year old male presented to ED via EMS from work with new chest tightness and dyspnea
  - Breathed in a thick white smoke yesterday in auto parts manufacturing where they melt zinc rods
  - 2-3 minute exposure
- **PMH**: MVA (bicycle vs auto) 4 months before with left sided flail chest which was surgically stabilized.
Physical Exam and Labs

140/84 | 101.2 °F (38.4 °C) | 120 bpm | RR 22 | 92% RA

Exam otherwise normal
Diagnostic Studies

- Stat Troponin 0.00
- D-Dimer 1.0
- ESR - 37
EKG
CT of Chest

1. No pulmonary embolism.
2. New mild to moderate pericardial effusion with surrounding stranding and heterogeneous contents. This may reflect pericarditis. Clinical correlation is recommended.
3. Linear opacities throughout the lungs, mostly in the bases, probably representing scarring/atelectasis.
4. Redemonstrated left-sided rib fractures with fixation plate placement.
Clinical Diagnosis

- Metal Fume Fever with pericarditis secondary to inhalational zinc exposure
Metal Fume Fever

• An occupational disease caused by the inhalation of metal oxides, primarily zinc oxide.
• First described in mid-1800s among brass foundry workers and in the early 1900s in steel welders
• Smelter’s Chills, Zinc Shakes, Monday fever, brass founders’ ague & welder’s ague
• Estimated >1000 cases in the US annually
Metal Fume Fever

- Benign, short-term illness that follows exposure to metal fumes – often zinc oxides
- Symptoms are typically flu-like – fever, chills, cough, dyspnea, malaise
  - Joint pain, cramps, fatigue, vomiting, metallic taste
  - Usually within 4-12 hours of exposure, but not immediate
Pathogenesis

• Study in *Annals* in 1991 - “An experimental human model of metal fume fever”
• ‘examine the pathogenesis… by studying functional, cellular, and biochemical responses after exposure to zinc…’
• Followed lung function and performed BAL after welding exposure
• Demonstrated no changes in pulmonary function and airway reactivity but marked increase in PMNs
• Increased levels of TNF-α, IL-6, and IL-8 have been found in the lungs of exposed individuals – stimulated macrophages?
Diagnosis

- Primarily made by occupational and clinical history
- Patient may report sweet or metallic taste
- Serum, urine, plasma, and skin zinc levels may be elevated
- Leukocytosis not always present
- Chest X-ray, PFTs, and ABGs usually show normal results.
Treatment

- Treatment of MFF is supportive
  - Analgesics, oxygen therapy, and antipyretics
  - Corticosteroids have not been shown to be of any benefit.
- Symptoms usually resolve within 24-48 hours of onset
Hospital Course

• Scheduled albuterol
• PRN oxycodone for pain control.
• Ibuprofen therapy for pericarditis.
• Patient symptoms resolved by the following morning
• Remained afebrile
• Discharged with Ibuprofen for pericarditis
• F/u with PCP
Summary

• Metal Fume Fever is a common occupational hazard among welders and smelters
• Follows exposure to metal oxide fumes
• Presents with flu-like symptoms
• Self-limited illness
• Care is supportive
• Few cases reported with systemic serositis
Clinical Bottom Line

- Early identification of Metal Fume Fever can prevent hospital admission for this time limited syndrome
- High index of clinical suspicion is essential to the diagnosis of MFF
- Thorough history of occupational exposures is key to diagnosis
References


Echocardiography
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