“I can’t run anymore...”

By: Wayne Chou PGY 3
Objectives

- Introduction
- Case Presentation
- Discussion
- Literature review
Case Presentation

- AM 18 y/o F, college freshman
- CC: "Getting sick all the time."
- Full two months in duration
- Part of track and field team in college program
- Decreased ability to complete training program
- Multiple bouts of URIs
- Feeling tired / fatigued most days
Case Presentation

- Previously normal, no complaints
- Was in relatively good health and active
- Increased weekly mileage as part of training program. But currently not training due to illnesses.
- Previous weekly mileage: 60
- Current weekly mileage: 10
Case Presentation

- Fatigue, increased aches when running
- Decreased stamina: Cannot finish runs
- Frequent URI symptoms
- No numbness/tingling
Past Medical History

- Irregular menses
- No surgical history
- Family history
  - Parents are all healthy

Social History
- No smoking/alcohol/drug use
- Currently living in student housing near campus
- Involved in competitive cross country racing
Exam

- 98F; 56 bpm; 12 breath/min; BP = 105/53
- 90 lbs; 5’2"
- General: AOx3, tired, thin
- HEENT: Moist mucosa, PERRL, EOMI, no JVD, oropharynx normal, no LN
- Pulmo: CTAB, no wheezing/rhonchi
- CVS: RRR, no murmurs, no edema
- GI: Abdomen soft, nontender. Normal BS
- MSK: Good range of motion, no point tenderness, no joint tenderness
- Neuro: CN II- XII intact. 2+ reflexes
Causes of Fatigue

- **Female Triad**
  - Menstrual Cycle Disturbance, Eating disorder, Osteoporosis
  - Seen in Elite Athletes in "Lean Sports"
  - Contributes to increased bony problems
  - Body mass may remain the same at cost of physiological process
  - Includes behavioural/social aspect of disease

- **Mononucleosis**
  - Common in this age group
  - Often manifests as fatigue, URI, 50%-70% splenomegaly
  - Some may have jaundice
  - May last from a few weeks to 2-3 months
  - Elispot has 25% false negative; EBV titres/ retesting negatives

Harris, 2011; Javed et al., 2013; Reardon et al., 2010
Causes of Fatigue

- **Endocrine Problems**
  - Includes female hormone imbalances (leads to bony problems)
  - Undiagnosed Diabetes
  - Adrenal insufficiencies

- **Anemia**
  - Often part of dietary problem (iron deficiency)
  - Can be easily diagnosable cause of fatigue
  - Treatable with supplementation and dietary changes.

- **Depression**
  - Potentially a cause of patient’s symptoms
  - Potentially as a symptom of the patient’s problems

Javed et al., 2013; Reardon et al., 2010; Joint Consensus Statement, 2012
Assessment and Plan

- **R/O possible organic disease**
  - Iron Panel
  - Vitamin D Levels
  - CBC
  - CMP
  - Ellispot for EBV / EBV titres
  - CRP
  - Return for regular follow up

- **Treatment**
  - Rest from training
  - Iron supplements and vitamin C
Expected Outcome

- Resting and abstaining from training
- Slowly return to previous capacity
- Regular monitoring and follow up
Actual Outcome

- No abnormalities in lab results
- Continues to have decreased capacity
- Continues to have recurrent URI
- Continues to complain of depressed mood, aches, and fatigue
Overtraining Syndrome

- Definitions
  - An accumulation of training and/or non-training stress resulting in long-term decrement in performance capacity with or without related physiological and psychological signs and symptoms of maladaptation in which restoration of performance make take several weeks or months.

Joint Consensus Statement, 2012
5% - 64% of elite athletes experience OTS at least once in their training

More common in endurance athletes

Positive correlation with skill level

Carfagno et al., 2014
**Terminology**

- **Overreaching**
  - Part of successful sports training
  - Increasing training load to increase performance capacity

- **Functional Overreaching**
  - Training overload produces brief period of decreased capacity
  - Recovery and physiological adaptation occurs
  - Increases base line of functional capacity

- **Nonfunctional Overreaching**
  - Training overload but inadequate recovery
  - Leads to stagnation of performance or prolonged decrease
  - Lasts many weeks
  - Prolonged NFO becomes OTS

Joint Consensus Statement, 2012
Overtraining Spectrum

Carfagno et al., 2014
**Characteristic Symptoms**

- Sports specific decrease in performance
- Persistent performance decrease
- Pronounced fatigue
- Increased fatigue; ï¬️Heavy Legsï¬️
- Frequent infections / URIs
- Other symptoms
  - insomnia
  - irritability
  - lack of motivation
  - depression
  - lack of concentration
  - appetite changes
  - restlessness
  - increased rate of injuries

Cosca et al, 2007; Purvis et al., 2010; Joint Consensus Statement, 2012; Brooks et al., 2013; Carfagno et al., 2014
Diagnosis

- Diagnosis of Exclusion
  - No biochemical marker or psychological questionnaire has been shown to diagnose OTS exactly
  - Exact etiology of OTS is unclear and is under investigation
  - Many other diseases can present with similar symptoms

- Retrospective Diagnosis
  - Difficult to discern difference between NFO and OTS
  - True difference is duration of symptoms and recovery length
Etiology

- **Cytokine Hypothesis**
  - Chronic local inflammation increases cytokine recruitment
  - Amplifies inflammation response
  - Elevated levels of cytokines causes associated symptoms
  - Especially IL-1B, IL-6, and TNF-a
  - May be measured through increased levels of lymphocytes

- **Hypothalamic Hypothesis**
  - Increased stress chronically causes maladaptive response
  - Cortisol levels are altered and response is inadequate
  - ACTH eventually affected as well
  - Severe cases may lead to Addisonian Adrenal depletion

Armstrong et al., 2002; Joint Consensus Statement, 2012; Brooks et al., 2013; Carfagno et al., 2014
**Etiology**

- **Psychological Pathways**
  - Many symptoms in OTS are similar to Major Depression Disorder
  - Possibly same disease but differ in dysfunction
  - OTS shows dysfunction in sport capacities
  - MDD shows dysfunction in social, mood, and cognitive performance

- **Similarities**
  - Similar in depressed mood, weight loss, insomnia, appetite change, motivation loss, chronic pain, concentration loss, chronic fatigue

- **Differences**
  - OTS has changes in hormone levels, elevated resting heart rate, and other physiologic changes.
  - Also cessation of sports eventually removes OTS

Reardon et al., 2010
Etiology

- Depression Confusion
  - It has been shown OTS can cause depression/depression symptoms
  - Depression may be part of stressors that causes OTS
  - Confounding problem with diagnosis between OTS and Depression
  - Difficult to rule out as well
  - Hard to prevent. Athletes seen as more resistant to MDD
  - Using sport activities to mask depression or to self treat
  - Under-reporting of depression due to stigma within sport culture

Reardon et al., 2010; Joint Consensus Statement, 2012
Prevention

- **Recognition**
  - Important for coaches and physicians to recognize risks
  - Also recognize early signs

- **Training Regimen Changes**
  - Coaches must have adequate rest time with training regimen
  - Keep weekly training logs
  - Keep weekly psychological assessments (ie: POMS)
  - Maintain variety in exercises to prevent monotony
  - Maintain balanced diet

Armstrong et al., 2002; Joint Consensus Statement, 2012; Brooks et al., 2013; Carfagno et al., 2014
Treatment

- **Rest**
  - No definitive treatment for the syndrome
  - Current treatment is prolonged rest from sports
  - Keep balanced diet
  - Maintain regular follow up

- **Exercise**
  - No definitive recommendations
  - Some recommended low level exercise
  - Others recommend no exercise at all

Armstrong et al., 2002; Joint Consensus Statement, 2012; Brooks et al., 2013; Carfagno et al., 2014
Physiological and Psychological Fatigue in Extreme Conditions: Overtraining and Elite Athletes. Purvis D, Gonsalves S, Deuster P. PMRJ 2010 May; (2) 442-450

Overtraining Syndrome in the Athlete; Current Clinical Practice. Carfagno D, Hendrix J. Current Sports Medicine Reports; 2014 January; 13 (1) 45-52

Infectious Disease in Athletes. Harris MD. Current Sports Medicine Reports; 2011 March; 10 (2) 84-89


Overtraining, Exercise, and Adrenal Insufficiency. Brooks KA, Carter JG. J Nov Physiother. 2013 February 16; 3(125)

Common Problems in Endurance Athletes. Cosca DD, Navazio F. AFP, 2007 July 15; 72(2) 237-244


THANK YOU