Objectives

- Understand the role of exercise intensity in immune function
- Discuss diagnosis and management of common infectious diseases in athletes
  - URI
  - Pharyngitis
  - Mononucleosis
  - Skin Infections
  - HIV
- Identify which infected athletes may and may not participate in athletics

Infections in Athletes

- 98% of college athletes suffered 1 or more illnesses during 2 months in the winter
- 50% of athlete visits to sports medicine
  - URI (30-40%)
  - Chest infection
  - Viral syndrome
  - Gastroenteritis
  - Asthma/allergy
  - Skin problems
  - fatigue
- URI was the #1 diagnosis during the London Olympics
Fever & Exercise

- Every 1 degree increase >37 C
  - O2 consumption increases by 13%
  - Increases dehydration
- Decreased
  - Coordination/concentration
  - Endurance
  - Strength

Infection and Fever

- Cytokine-mediated response
- Negative nitrogen balance
- Protein degradation in muscle
- Muscle function decreases
- Decreased cognition
- Decreased pulmonary perfusion
- Increased fluid loss
- May be associated with myocarditis

The J Hypothesis

![Diagram showing the J Hypothesis with exercise intensity and outcomes vs. amount of exercise.](Diagram)
Immune Response to Exercise

• Immediate
  – Increased # of leukocytes
  – Decreased
    • Leukocyte function
    • CD4/CD8
    • Secretory immunity IgA
    • Antibody concentrations
    • NK cell function

• Chronic
  – Improved Immunity
    • Moderate exercise
  – Decreased immunity
    • Intense exercise
    • Decreased glutamine
    • Chronic immunosuppression with inadequate recovery between exercise bouts

The Open Window Theory

• Short lived suppression of immune function following acute endurance exercise
  – This may account for increased URI infections in elite endurance athletes

URI: “It’s just a Virus”

• >50% of acute illnesses
• Average 1-6 / year
• Numerous viruses/strains (>200)
  – Rhinovirus: fall/winter
  – Coronavirus: winter
  – Adenovirus: all year
  – Enterovirus: summer/fall
URI Treatment: Athletes

• Same as non-athletes with some caution
• Symptomatic care
• Decongestants can be a problem
  – Gymnastics, diving, pole vaulting, etc.
  – Ephedrine ban: NCAA, USADA & WADA
• Antihistamines can cause sedation

RTP: Neck Check

• Symptoms “neck of above”
  – 10 minutes of half intensity exercise
  – If not worse, practice as tolerated
• Symptoms “below the neck” or systemic
  – Rest until improved from these symptoms
  – RTP 1-2 days of moderate exercise per day of rest

Pharyngitis

• Viral
  – EBV
• Bacterial
  – Group A strep
  – Mycoplasma
  – Other (GC)
• Centor Criteria
  – May not work well in some training room/event coverage settings
Pharyngitis: Treatment

- **Viral**
  - Symptomatic care

- **Bacterial**
  - No practice while febrile
  - No class/practice until 24 hours of antibiotics

- Empiric antibiotics reduce the proportion of people with symptoms at 3 days post treatment and NNT = 6
  - Consider before competition?

Mononucleosis

- **Epidemiology**
  - Most common age 15-24

- **Diagnosis**
  - Symptoms: sore throat, fever, fatigue
  - Physical exam: pharyngitis, lymphadenopathy, splenomegaly
  - Monospot
  - Also consider EBV titers

- Increased risk of splenomegaly and rupture with physical activity
- Important cause of fatigue with exertion for some

Mono: Splenomegaly

- 50%-100% of infected patients
  - 100% in a prospective ultrasound study
- Peaks at week 2-3
- Physical exam has poor sensitivity
- Imaging is unreliable without a baseline
- Splenic Rupture: 0.1%-0.2%
  - Almost all in the first 3 weeks of the illness
  - 50% were non-traumatic
Other complications

- Neurologic
  - GBS
  - Meningitis
- Hematologic
  - DIC
  - Aplastic anemia
- Psychiatric
- Respiratory
  - Tonsilar enlargement
- Cardiac
- GI
- Renal
  - HUS
- Ophthalmologic
- GU
- Rheumatologic
- Derm
- Infectious

Return to Play: Mono

- Day 1-20 from onset of symptoms
  - No physical activity
  - Even non-contact
- Day 21-28
  - Gradual return to non-contact activity if feeling well
  - Individualized based on clinical progress

Mono RTP AMSSM Consensus

- When is it safe to return to contact activity?
  - "The appropriate time for safe return to contact play is unclear, although, given the risk of splenic rupture, a time from of at least 3 weeks is commonly recommended. Return can occur only after the athlete has no remaining clinical symptoms, is afebrile, and has a normal energy level. The risk for splenic rupture likely decreases as more time passes, allowing for individualized RTP decisions depending on the athlete, sport, and other factors. SOR C."

AMSSM Consensus Statement, published CJSM 2008
Influenza

- Epidemiology
  - Annual rates usually 5-20% in the general population
  - 2 day incubation period
  - Infectious 1 day before symptoms develop
- Vaccination
  - High risk athletes
  - Competitive season during flu season
  - International travel
- Complications
  - Pneumonia
  - Chronic disease exacerbation
- Anti-viral treatment if identified early enough
  - Consider team exposure

Skin Infections: NCAA guidelines

- Bacterial
  - No new lesions for 48h
  - >72 h of antibiotics completed
  - No moist, exudative or draining lesions
  - Active bacterial infections should not be covered to allow participation if these criteria are not met

Skin Infections: Herpes Return to Play

- Primary Infection
  - No systemic symptoms
  - No new lesions x3d
  - All lesions crusted
  - On oral meds >120 hours (5 days)
  - Crusts covered
- Recurrent Infection
  - Ulcers dry, covered by firm adherent crust
  - On oral meds for >120 hours
  - Crusts covered
Skin Infections: Tinea Return to Play

- >72 hours topical treatment
- Disqualify if extensive lesions
- Cover lesions with OpSite & tape after washing with Ketoconazole shampoo and applying antifungal cream

MRSA

- Diagnosis
  - Increasingly community acquired
  - Cellulitis, folliculitis, furuncles, abscesses
- Spread directly person-to-person through injured skin
- Suspect
  - Infections resistant to initial antibiotics
  - "spider bite" but no insect seen
- Treatment
  - Culture all abscesses before treating
  - SMX-TMP, Doxycycline, Clindamycin
- Prevention

MRSA: Prevention

- No participation until lesions are crusted
- Protect exposed skin if in a high-risk sport
- Properly clean & protect injured skin
- Proper general hygiene
- HAND WASHING!
- Don’t share equipment
- Report infections
HIV & Athletes

- In general, the decision to allow an HIV + athlete to participate in athletics should be made on the basis of the individual's health status.
- If the athlete is asymptomatic and does not have significant immune deficiency, then the presence of an HIV infection itself should not exclude them from participation.

References