Banner Clinical Practice for Ambulatory Management of Valley Fever Training Presentation

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Have no conflicts of interest to disclose
What Is Valley Fever?

- Caused by soil fungi
  *Coccidioides immitis*
  *Coccidioides posadasii*
- Other names:
  - Coccidioidomycosis
  - “COCCI”
- Inhalation of one spore causes infection

- Spectrum of disease
  - Sub-Clinical: 60%
  - Self-Limited: 30%
  - Complicated: 10%
- After infection, most persons develop life-long immunity to a second infection
The Valley Fever Corridor: 2/3 of all U.S. disease occurs here
Common “Mild” Self-Limited Valley Fever

Signs and Symptoms, < 1 months from exposure:
– Cough, chest pain, fever, weight loss
– Fatigue
– Bone and joint pains (a.k.a. Desert Rheumatism)
– Skin rashes (painful or intense itching)

Course of illness:
– Weeks to months
– 25% of college students are sick for > 4 months
– 50% of workers lose > 2 weeks
Current Clinical Practice for Valley Fever

Arizona CAP
- ~ 25% - 30% due to Coccidioides
  BUT
- < 15% are tested for Coccidioides

~ 1,000 new AZ medical licenses/year
- 12% received MD in AZ
- 40% no AZ GME

80% didn’t know:
- VF is reportable
- Vaccine does not exist

40% of clinicians are not confident to treat VF
Delay of Valley Fever Diagnosis

BUMC-P
45% of Diagnoses Delayed > 1 month
Delay of Valley Fever Diagnosis

BUMC-T
30% of Diagnoses Delayed > 1 month
What Do Weeks of Delayed Diagnosis Mean?

- Unnecessary anti-bacterial drug use
- Protracted patient anxiety and fear
- Over-utilization CT scans and bronchoscopies, even thoracotomies

Hypothesis: Earlier diagnosis would improve outcomes and reduce cost
Primary Care of Coccidioidomycosis

- Consider the diagnosis
- Order the right tests
- Check for risk factors
- Check for complications
- Initiate management
**Recognition, Evaluation and Management of Coccidioidomycosis (Valley Fever)**

**Just Remember C-O-C-C-I**

**RECOGNITION**

1. **Consider the diagnosis**
   - Respiratory: Previous visit, needs X-ray or antibacterial Rx? 
   - Musc/Skel: More than one week, associated with fever or fatigue. 
   - Rashes: E. nodoosum or E. multiforme

2. **Order the right tests**
   - EIA screen for coccidoidal antibodies with reflex to immunodiffusion and quantitative CF.

3. **Check for Risk Factors**
   - Immunosuppression (HIV, organ recipient, Rheum/GI/Derm response modifier Rx, renal failure). 
   - Diabetes, major cardiac or pulmonary comorbidities, pregnancy

4. **Check for complications evident by physical exam or imaging**
   - Focal ulceration or skin/soft tissue inflammation. 
   - Asymmetric skeletal pain, joint effusions. 
   - Progressive or unusual headache.

**EVALUATION**

- **Syndrome? suggest respiratory? mucositis? rashes?**
- **Endemic Exposure? Yes: Valley Fever Process Completed**
- **Valley Fever Process Completed**

**MANAGEMENT**

1. **Initiate Management, Uncomplicated VF**
   - **Diagnosis**
   - **F/u Visit #1**
   - **F/u Visit #2**
   - **F/u Visit #3**

   **Approximate Timeline for Management (6-12 months from diagnosis)**

   - If diagnosed, refer to specialist (ID or Pulmonary)
   - If CFR or skin test abnormal, repeat cocci CF antibody test, ESR and/or C-reactive protein
   - Repeat PA and Ll chest X-ray (if previous was abnormal)

   **Follow-up visit #1**
   - Interval hx Review of Syst Phys. Exam
   - New Complication?
   - Yes: Repeat PA and Ll chest X-ray
   - No: Schedule follow-up visit #2

   **Follow-up visit #2**
   - Interval hx Review of Syst Phys. Exam
   - New Complication?
   - Yes: Repeat PA and Ll chest X-ray
   - No: Schedule follow-up visit #3

   **Follow-up visit #3**
   - Interval hx Review of Syst Phys. Exam
   - New Complication?
   - Yes: Repeat PA and Ll chest X-ray
   - No: Valley Fever an inactive problem
Consider the diagnosis

Respiratory: Previous visit, needs X-ray or antibacterial Rx?
Musc/Skel: More than one week, associated with fever or fatigue.
Rashes: *E. nodosum* or *E. multiforme*

Clinician reviews chief complaint(s) and medical history, examines patient, and documents findings (HPI, ROS, PE)

1. **Syndrome:** respiratory? musculoskel? rashes?
   - No
   - Yes

2. **Endemic Exposure?** residence or recent travel
   - No
   - Yes

Go to:

2. **Order the right tests**
   - Yes
   - Add Valley Fever to the Differential

Valley Fever Process Completed
In Arizona, Valley Fever is very common. It should be in the differential often.

More frequent between the monsoons and the winter rains.

Syndromes: Always in community and Rheumatism. Rashes.
Order the right tests

EIA screen for coccidioidal antibodies with reflex to immunodiffusion and quantitative CF.

2 Order EIA screen for coccidioidal antibodies

- Test Negative: Illness resolved in 3 weeks
- Test Positive: Valley Fever Process Completed

Go to: 3 & 4 Check for risks and complications
Enzyme Immunoassay (EIA) test

- A positive test is very specific and usually is diagnostic.

- A negative test never rules out Valley Fever. Repeated testing improves diagnostic sensitivity.
Check for Risk Factors

Risk factors present?

No

Go to: 5 Management, Uncomplicated infect.

Yes

Complicated VF: Refer to Specialist (ID or Pulmonary)

Immunosuppression (HIV, organ recipient, Rheum/GI/Derm response modifier Rx, renal failure)
Diabetes, major cardiac or pulmonary comorbidities, pregnancy
Check Risk Factors for

Pulmonary Complications
- Diabetes mellitus
- Cardio-pulmonary or other co-morbidities (Evidence: “common sense”).

Disseminated Infection
- Major and critical
  - Cell immunodeficiency
  - Pregnancy
- Minor and small effect
  - Males > Females
  - Racial background
  - Adults > Children
Check for complications evident by PE exam or imaging
Focal ulceration or inflammation of skin/soft tissue
Asymmetric skeletal pain, joint effusions
Progressive or unusual headache

Risk factors present?

Yes

No

Complications present?

Yes

Go to: Management, Uncomplicated infect.

Complicated VF: Refer to Specialist (ID or Pulmonary)

Go to: Specialist (ID or Pulmonary)
Detecting Focal Lesions in Coccidioidomycosis

- Review of Systems: Pain or discomfort
  - Headache
  - Back pain
  - Joint pain or loss of function
- Physical Examination:
  - Skin lesions
  - Subcutaneous fluctuation
  - Joint effusions
Fibro-cavitary Coccidioidomycosis

Complex

Thin-walled
Widely Disseminated Coccidioidomycosis
Disseminated Coccidioidomycosis
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Disseminated Coccidioidomycosis
Check for Complications

- Most complications are focal
- A review of systems and physical examination will usually detect or exclude the possibility of complications.
- New focal findings warrant either evaluation or referral for Infectious Diseases or Pulmonary consultation.
Primary Care of Coccidioidomycosis

- Consider the diagnosis
- Order Cocci Serologies
- Check for Risk Factors
  - Positive
    - Check for complications
      - Negative
        - Initiate management
      - Positive
        - Specialty Referral
  - Negative
    - Retest
- Repeated evaluations
Management
Low Risk, Simple Early Infection

• Follow-up office visits
• Serial body weights
• Check for new symptoms or signs
• Repeat coccidioidal antibody testing
• Repeat Chest PA and Lateral X-rays
• Most patients do not need therapy
Initiate Management, Uncomplicated VF

New Diagnosis

Serologic newly diagnosed Valley Fever

Risk factors Complications?

No

Schedule follow-up visit #1 2-5 weeks

Yes

Refer to Specialist (ID or Pulmonary)

Yes

Follow-up visit #1 Interval hx Review of Syst Phys. Exam

New Complication?

No

Repeat PA and lat. Chest X-ray (if previous was abnormal)

Schedule follow-up visit #2 2-3 months

Yes

F/U #1 2-5 weeks
F/U #2
2-3 months

Follow-up visit #2
Interval hx
Review of Syst
Phys. Exam

New Complication?
Yes
Refer to Specialist
(ID or Pulmonary)

No
Repeat cocci CF
antibody test, ESR
and/or C- reactive
protein

Schedule follow-up visit #3
3-8 months

F/U #3
3-8 months

Follow-up visit #3
Interval hx
Review of Syst
Phys. Exam

New Complication?
Yes
Repeat PA and lat.
Chest X-ray
(check for residual
nodule)

No
Valley Fever an
inactive problem
Management
Low Risk, Simple Early Infection

• Follow-up office visits for one year
  2-3 weeks  ROS; Exam; Chest X-ray
  2-3 months  ROS; Exam; serology
  3-8 months  ROS; Exam; Chest X-ray
Follow-up Chest X-rays
What to order?

Purposes:

– Identify if infiltrate cavitates.
– Determine if there is a residual nodule (could be confused with cancer in later years)

In most patients, these objectives can be accomplished with simple PA and lateral X-rays; CT scans are usually not needed.
Primary Coccidioidal Pneumonia
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Primary Coccidioidal Pneumonia
Peripheral Coccidioidal nodule
As patients improve, titers generally decrease.
The decrease typically occurs over several months, occasionally even slower.
If titers increase, re-evaluate for possible complications.
Titers are a marker, not a disease.
Primary coccidioidal pneumonia diagnosed serologically in an otherwise healthy active person.

Over several weeks, weight returns to normal, fever resolves and pulmonary symptoms gone. ESR becomes normal. CF low or neg.

However, patient complains of profound inability to carry out normal activities.

How should this be managed?
Potential Causes of Fatigue

• In some, striking deficit in O$_2$ utilization (VO$_2$ peak $<$10% of predicted)*
• Physical deconditioning because of decreased activity.
• Lack of experience by the patient with subacute or chronic disability.
• Patient with excessive expectations of own performance.
Management Strategies for fatigue

• Exclude objective evidence of tissue destruction or focal lesions.

• Patient Education
  Prolonged fatigue common and resolves
  No evidence of permanent damage
  Deconditioning and unrealistic expectations

• Patient Actions
  Keep a journal
  Refer patient to Physical Therapist for reconditioning

• Antifungal drugs? May or May Not be Helpful
2016 Infectious Diseases Society of America (IDSA) Clinical Practice Guideline for the Treatment of Coccidioidomycosis

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“It should be emphasized that no randomized trials exist to assess whether antifungal treatment either shortens the illness of early uncomplicated coccidioidal infections or prevents later complications.”
Median days to $\geq 50\%$ decline in total clinical score

\[ P = 0.899 \]
Outcome of Subjects
(> 1 month follow-up)

- 50 not treated
  - Median follow-up: 3.1 years
  - All without complications
- 51 treated
  - Median follow-up: 2.9 years
  - 38 off-therapy and without complications
  - 5 remained on treatment
  - 8 had relapses
    - 5 with pulmonary disease
    - 3 with extrapulmonary dissemination
    - Relapses occurred up to 2 years after stopping treatment

Ampel et al. CID 2009
The Valley Fever Tool Kit

Support Resources
- Process Flow pocket guide.
- Wall posters and patient educational brochures
- Nurse Navigator referral support? (proposed)
- EMR alerts? (only if wanted by the clinicians)

Training Resources
- Webinar Overview
- Primary Care Tutorial
- Powerpoint presentation online
- CME presentations at individual clinical practices.
Metrics to Track Implementation

# of EIA serologies ordered
% of EIA tests that are positive
# of new ICD10 diagnoses of Valley Fever
# of antibacterial Rx are written before Valley Fever diagnosis
% of new Valley Fever patients are referred for Infectious Diseases or Pulmonary consultation
Banner Health and the UA Valley Fever Center for Excellence are changing the way Arizona clinicians recognize and manage patients with Valley Fever.

Central to this change will be the expanded role of primary care clinicians in earlier diagnosis and management of uncomplicated Valley Fever.
New Banner Clinical Practice for Ambulatory Management of Valley Fever
Thank-You

For more information:
http://vfce.arizona.edu/toolkit