Update in Inpatient Medicine

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ARE WE DOING TOO MUCH?
Osteomyelitis, CAP, Triple Anticoagulation, EVALI: Your 2019 Hospital Medicine Briefing
Oral antibiotics appear safe for osteomyelitis and septic arthritis
Oral versus Intravenous Antibiotics for Bone and Joint Infection

OVIVA Background

• IV antibiotic therapy has been a mainstay for the treatment of osteomyelitis and septic arthritis\(^1\)

• Numerous studies demonstrating efficacy of oral antibiotics for extended duration in pediatric patients\(^2-8\)

• Meta-analysis of adult patients with chronic osteomyelitis showing no advantage of parenteral over oral therapy\(^3\)
OVIVA Study Design

• Multicenter, open-label study, randomized, controlled non-inferiority trial

• Participants: hospitalized adult patients with osteomyelitis or septic arthritis

• Intervention: transition to microbiology-directed oral antibiotic within 7 days of IV therapy and surgery OR within 7 days of IV therapy and surgery not performed

• Exclusions: concomitant infection requiring IV therapy, no suitable oral therapy option, shock
OVIVA Outcomes

• Primary outcome: Treatment failure at 1 year (adjudicated by a blinded committee)
  • Clinical: draining sinus track or pus adjacent to bone/prosthesis
  • Microbiological: pathogenic organism identified from tissue sample
  • Histological: inflammatory infiltrate or microorganisms identified on tissue sample

• Secondary outcomes
  • IV catheter complications
  • Hospital length of stay
  • Clostridium difficile-associated diarrhea
  • Serious adverse events
  • Quality of life
1054 Underwent randomization

527 Were assigned to the intravenous group
458 Received at least 4 wk of their assigned treatment strategy

22 Did not complete follow-up
7 Withdrew from trial
5 Were lost to follow-up
10 Died

527 Were included in the primary intention-to-treat analysis
506 Were included in the modified intention-to-treat population
21 Did not have end-point data

84 Were excluded from per-protocol analysis
15 Were missing end-point data
63 Had <4 wk of assigned strategy for reasons other than possible or probable recurrence
6 Had both missing data and <4 wk of assigned strategy

527 Were assigned to the oral group
478 Received at least 4 wk of their assigned treatment strategy

20 Did not complete follow-up
7 Withdrew from trial
7 Were lost to follow-up
6 Died

527 Were included in the primary intention-to-treat analysis
509 Were included in the modified intention-to-treat population
18 Did not have end-point data

61 Were excluded from per-protocol analysis
13 Were missing end-point data
43 Had <4 wk of assigned strategy for reasons other than possible or probable recurrence
5 Had both missing data and <4 wk of assigned strategy

443 Were included in the per-protocol analysis
466 Were included in the per-protocol analysis
<table>
<thead>
<tr>
<th>Organisms identified — no./total no. (%)</th>
<th>196/500 (39.2)</th>
<th>182/503 (36.2)</th>
<th>378/1003 (37.7)</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Staphylococcus aureus</em></td>
<td>137/500 (27.4)</td>
<td>135/503 (26.8)</td>
<td>272/1003 (27.1)</td>
</tr>
<tr>
<td>Coagulase-negative staphylococcus</td>
<td>72/500 (14.4)</td>
<td>73/503 (14.5)</td>
<td>145/1003 (14.5)</td>
</tr>
<tr>
<td>Streptococcus species</td>
<td>28/500 (5.6)</td>
<td>23/503 (4.6)</td>
<td>51/1003 (5.1)</td>
</tr>
<tr>
<td><em>Pseudomonas</em> species</td>
<td>84/500 (16.8)</td>
<td>84/503 (16.7)</td>
<td>168/1003 (16.7)</td>
</tr>
<tr>
<td>Other gram-negative organisms</td>
<td>77/500 (15.4)</td>
<td>78/503 (15.5)</td>
<td>155/1003 (15.5)</td>
</tr>
</tbody>
</table>
Primary Outcome

Difference in the risk of definitive treatment failure (oral group vs. intravenous group) = −1.4 % (90% confidence interval [CI], −4.9 to 2.2; 95% CI, −5.6 to 2.9)
<table>
<thead>
<tr>
<th>Subgroup</th>
<th>Oral Group</th>
<th>Intravenous Group</th>
<th>Risk Difference (90% CI; 95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intention-to-treat population</td>
<td>70.0/527</td>
<td>77.3/527</td>
<td>-1.4 (-4.9 to 2.2; -5.6 to 2.9)</td>
</tr>
<tr>
<td>Modified intention-to-treat population</td>
<td>67/509</td>
<td>74/506</td>
<td>-1.5 (-5.0 to 2.1; -5.7 to 2.8)</td>
</tr>
<tr>
<td>Per-protocol population</td>
<td>61/466</td>
<td>69/443</td>
<td>-2.5 (-6.3 to 1.3; -7.0 to 2.1)</td>
</tr>
<tr>
<td>Worst-case sensitivity analysis</td>
<td>85/527</td>
<td>74/527</td>
<td>2.1 (-1.5 to 5.7; -2.2 to 6.4)</td>
</tr>
</tbody>
</table>
Secondary Endpoints (IV vs. Oral)

• IV catheter complications: 9.4% vs. 1.0%, p < 0.001

• Median hospital length of stay: 14 days vs. 11 days, p <0.001

• *Clostridium difficile*-associated diarrhea: 1.7% vs. 1.0%, p = 0.30

• At least one serious adverse events: 27.7% vs. 26.2%, p = 0.58

• Quality of life: similar with EQ-5D-3L, Oxford Hip Score, lower in Oxford Knee Score
Limitations

• Higher rifampin usage in oral group (31.4% vs. 22.9%)

• Monitoring/surveillance impacts unclear

• Antibiotic regimens not pre-specified

• Open-label design
Take-Aways from OVIVA

• Microbiology-directed oral antibiotic therapy appears non-inferior to IV antibiotic therapy with regard to treatment failure after initial course of IV antibiotic therapy +/- surgery for adult patients with osteomyelitis and septic arthritis

• Oral therapy is associated with reduced catheter-related complications, reduced hospital stay
ATS/IDSA Release Updated CAP Guidelines After Twelve-Year Silence!
Diagnosis and Treatment of Adults with Community-acquired Pneumonia
An Official Clinical Practice Guideline of the American Thoracic Society and Infectious Diseases Society of America


This official clinical practice guideline was approved by the American Thoracic Society May 2019 and the Infectious Diseases Society of America August 2019
ATS/IDSA CAP Guidelines 2019 - Background

• Inpatient/outpatient

• Developments since last update
  • 2016 HAP/VAP guideline
  • Healthcare-associated pneumonia (HCAP)/MDR risk factors
  • Procalcitonin
  • Corticosteroids
  • Pharmacotherapies
Severe CAP

Validated definition includes either one major criterion or three or more minor criteria

**Minor criteria**
- Respiratory rate $\geq 30$ breaths/min
- $\text{PaO}_2/\text{FiO}_2$ ratio $\leq 250$
- Multiorgan infiltrates
- Confusion/disorientation
- Uremia (blood urea nitrogen level $\geq 20$ mg/dl)
- Leukopenia* (white blood cell count $< 4,000$ cells/μl)
- Thrombocytopenia (platelet count $< 100,000/μl$)
- Hypothermia (core temperature $< 36^\circ$C)
- Hypotension requiring aggressive fluid resuscitation

**Major criteria**
- Septic shock with need for vasopressors
- Respiratory failure requiring mechanical ventilation

*Due to infection alone (i.e., not chemotherapy induced).*
CAP Testing

- **Blood, sputum cultures**: obtain in severe CAP; empirically treated for MRSA, *Pseudomonas aeruginosa*; past respiratory tract infection with MRSA, *P. aeruginosa*; hospitalized within 90 days and received IV antibiotic therapy

- **Streptococcus pneumoniae antigen**: obtain in severe CAP

- **Legionella antigen**: obtain in severe CAP and if indicated based on epidemiologic factors

- **Procalcitonin**: treat as CAP if clinically suspected regardless of initial procalcitonin
# CAP Management

<table>
<thead>
<tr>
<th>Standard Regimen</th>
<th>Prior Respiratory Isolation of MRSA</th>
<th>Prior Respiratory Isolation of Pseudomonas aeruginosa</th>
<th>Recent Hospitalization and Parenteral Antibiotics and Locally Validated Risk Factors for MRSA</th>
<th>Recent Hospitalization and Parenteral Antibiotics and Locally Validated Risk Factors for P. aeruginosa</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nonsevere inpatient pneumonia*</td>
<td>β-Lactam + macrolide(^1) or respiratory fluoroquinolone(^3)</td>
<td>Add MRSA coverage(^5) and obtain cultures/nasal PCR to allow deescalation or confirmation of need for continued therapy</td>
<td>Obtain cultures but withhold MRSA coverage unless culture results are positive. If rapid nasal PCR is available, withhold additional empiric therapy against MRSA if rapid testing is negative or add coverage if PCR is positive and obtain cultures</td>
<td>Obtain cultures but initiate coverage for P. aeruginosa only if culture results are positive</td>
</tr>
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<td>Severe inpatient pneumonia*</td>
<td>β-Lactam + macrolide(^1) or β-lactam + fluoroquinolone(^3)</td>
<td>Add MRSA coverage(^5) and obtain cultures/nasal PCR to allow deescalation or confirmation of need for continued therapy</td>
<td>Add MRSA coverage(^5) and obtain cultures to allow deescalation or confirmation of need for continued therapy</td>
<td>Add MRSA coverage(^5) and obtain nasal PCR and cultures to allow deescalation or confirmation of need for continued therapy</td>
</tr>
</tbody>
</table>

\(^1\)Ampicillin + sulbactam 1.5–3 g every 6 hours, cefotaxime 1–2 g every 8 hours, ceftriaxone 1–2 g daily, or ceftaroline 600 mg every 12 hours AND azithromycin 500 mg daily or clarithromycin 500 mg twice daily.

\(^2\)Levofloxacin 750 mg daily or moxifloxacin 400 mg daily.

\(^3\)Per the 2016 ATS/IDSA HAP/VAP guidelines: vancomycin (15 mg/kg every 12 h, adjust based on levels) or linezolid (600 mg every 12 h).

\(^4\)Per the 2016 ATS/IDSA HAP/VAP guidelines: piperacillin-tazobactam (4.5 g every 8 h), cefepime (2 g every 8 h), ceftazidime (2 g every 8 h), imipenem (500 mg every 8 h), meropenem (1 g every 8 h), or aztreonam (2 g every 8 h). Does not include coverage for extended-spectrum β-lactamase-producing Enterobacteriaceae, which should be considered only on the basis of patient or local microbiological data.
<table>
<thead>
<tr>
<th></th>
<th>Recent Hospitalization and Parenteral Antibiotics and Locally Validated Risk Factors for MRSA</th>
<th>Recent Hospitalization and Parenteral Antibiotics and Locally Validated Risk Factors for <em>P. aeruginosa</em></th>
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<td>Add coverage for <em>P. aeruginosa</em>$^{11}$ and obtain cultures to allow deescalation or confirmation of need for continued therapy</td>
</tr>
</tbody>
</table>
CAP Management

• **Empiric MRSA*/Pseudomonas coverage**: treat if
  • Prior identification of MRSA or *P. aeruginosa* in respiratory tract within prior year
  • “Locally validated” risk factors are present in severe CAP
  • Previous hospitalization and parenteral antibiotic exposure within 90 days in severe CAP

• **Healthcare-associated pneumonia**: recommend abandoning the use of the categorization of HCAP to guide antibiotic coverage (strong recommendation, moderate evidence)
CAP Management

• **Inpatient vs. outpatient:** use Pneumonia Severity Index (PSI) as adjunct to judgement over CURB-65 (conditional, low quality)

• **Aspiration pneumonia:** suggest not adding anaerobic coverage routinely for suspected aspiration pneumonia unless lung abscess/empyema suspected (conditional, very low quality)

• **Duration of therapy:** guided by validated measure of stability (resolved vitals, ability to eat, normal mentation) and for no less than 5 days (strong, moderate quality)
CAP Management

• **Corticosteroids:** recommend not using routinely (conditional, moderate quality for non-severe CAP; conditional, low quality for severe CAP)

• **Influenza:**
  • Anti-influenza treatment for + test regardless of duration of symptoms (strong, moderate quality)
  • **Standard antibiotic therapy with evidence of CAP and + influenza** (strong, low quality)
Take Aways from ATS/IDSA CAP Guidelines 2019

• Keep on with my empiric antibiotic choices

• Get those severe CAP criteria down!

• Talk with my hospital epidemiologist about local MRSA, *P. aeruginosa* rates and look at past respiratory culture data

• Avoid routine anaerobic coverage with suspected aspiration

• Add antibiotics to cases of influenza pneumonia

• Stop dreaming HCAP terminology is ever going to come back!

• Shy away from procalcitonin
Triple therapy anticoagulation: on its way out?
Antithrombotic Therapy after Acute Coronary Syndrome or PCI in Atrial Fibrillation

Renato D. Lopes, M.D., Ph.D., Gretchen Heizer, M.S., Ronald Aronson, M.D., Amit N. Vora, M.D., M.P.H., Tyler Massaro, Ph.D., Roxana Mehran, M.D., Shaun G. Goodman, M.D., Stephan Windecker, M.D., Harald Darius, M.D., Jia Li, Ph.D., Oleg Averkov, M.D., Ph.D., M. Cecilia Bahit, M.D., et al., for the AUGUSTUS Investigators*
AUGUSTUS Background

- Dual antiplatelet therapy (DAPT) known to reduce stent thrombosis post PCI; anticoagulation (VKA, DOAC) known to reduce stroke risk in atrial fibrillation

- “Triple therapy” with DAPT+VKA has been associated with increased bleeding risk\textsuperscript{10-12}

- Approximately 5-8% of patients undergoing PCI have atrial fibrillation\textsuperscript{13, 14}
AUGUSTUS Study Design

- Prospective, multicenter, two-by-two factorial, randomized controlled trial

- Participants: adult patients with atrial fibrillation and planned use of anticoagulants with ACS or PCI with planned use of P2Y$_{12}$ inhibitor

- Intervention: treatment with apixaban or vitamin K antagonist, and aspirin or placebo concomitant with P2Y$_{12}$ inhibitor

- Exclusions: anticoagulation for other indications (e.g. prosthetic valves), severe renal insufficiency, history of intracranial hemorrhage, recent or planned CABG, coagulopathy or ongoing bleeding
AUGUSTUS Outcomes

• Primary outcome: major or clinically relevant non-major bleeding at 6 months

• Secondary outcomes:
  • Composite death or hospitalization at 6 months
  • Composite death or ischemic events (e.g. stroke, MI, stent thrombosis) at 6 months

• Exploratory outcomes: individual components of secondary outcomes
A  Apixaban vs. Vitamin K Antagonist

4683 Patients were assessed for eligibility

- 69 Were not eligible
- 19 Did not meet inclusion criteria
- 39 Met exclusion criteria
- 11 Had unknown reason

4614 Underwent randomization

- 2306 Were assigned to receive apixaban
  - 547 Had medically managed acute coronary syndrome
  - 873 Had acute coronary syndrome and underwent percutaneous coronary intervention
  - 877 Underwent elective percutaneous coronary intervention
  - 9 Had no data reported

- 2290 Received at least one dose of apixaban
  - 1999 Completed intervention
  - 291 Did not complete intervention

- 2161 Completed trial
  - 129 Did not complete trial
  - 88 Died
  - 6 Were lost to follow-up
  - 29 Withdrew consent
  - 6 Had other reason

B  Aspirin vs. Placebo

4683 Patients were assessed for eligibility

- 69 Were not eligible
- 19 Did not meet inclusion criteria
- 39 Met exclusion criteria
- 11 Had unknown reason

4614 Underwent randomization

- 2307 Were assigned to receive aspirin
  - 547 Had medically managed acute coronary syndrome
  - 841 Had acute coronary syndrome and underwent percutaneous coronary intervention
  - 902 Underwent elective percutaneous coronary intervention
  - 14 Had no data reported

- 2277 Received at least one dose of aspirin
  - 1922 Completed intervention
  - 385 Did not complete intervention

- 2137 Completed trial
  - 140 Did not complete trial
  - 83 Died
  - 7 Were lost to follow-up
  - 46 Withdrew consent
  - 12 Had other reason

- 2145 Completed trial
  - 134 Did not complete trial
  - 87 Died
  - 8 Were lost to follow-up
  - 30 Withdrew consent
  - 9 Had other reason

n = 4614
<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Apixaban (N=2306)</th>
<th>Vitamin K Antagonist (N=2308)</th>
<th>Aspirin (N=2307)</th>
<th>Aspirin-Matched Placebo (N=2307)</th>
<th>Total (N=4614)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age — yr</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Median</td>
<td>70.4</td>
<td>70.9</td>
<td>70.8</td>
<td>70.6</td>
<td>70.7</td>
</tr>
<tr>
<td>Interquartile range</td>
<td>64.1–77.2</td>
<td>64.3–77.2</td>
<td>64.4–77.3</td>
<td>63.8–77.2</td>
<td>64.2–77.2</td>
</tr>
<tr>
<td>Female sex — no. (%)</td>
<td>670 (29.1)</td>
<td>667 (28.9)</td>
<td>696 (30.2)</td>
<td>641 (27.8)</td>
<td>1337 (29.0)</td>
</tr>
<tr>
<td>CHA₂DS₂-VASc score‡</td>
<td>3.9±1.6</td>
<td>4.0±1.6</td>
<td>3.9±1.6</td>
<td>3.9±1.6</td>
<td>3.9±1.6</td>
</tr>
<tr>
<td>HAS-BLED score†</td>
<td>2.9±1.0</td>
<td>2.9±0.9</td>
<td>2.8±0.9</td>
<td>2.9±1.0</td>
<td>2.9±0.9</td>
</tr>
</tbody>
</table>
A Primary Outcome — Apixaban vs. Vitamin K Antagonist

<table>
<thead>
<tr>
<th>No. at Risk</th>
<th>Vitamin K antagonist</th>
<th>Apixaban</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>2259</td>
<td>2290</td>
</tr>
<tr>
<td>30</td>
<td>1984</td>
<td>2110</td>
</tr>
<tr>
<td>60</td>
<td>1861</td>
<td>2019</td>
</tr>
<tr>
<td>90</td>
<td>1795</td>
<td>1957</td>
</tr>
<tr>
<td>120</td>
<td>1736</td>
<td>1902</td>
</tr>
<tr>
<td>150</td>
<td>1686</td>
<td>1858</td>
</tr>
<tr>
<td>180</td>
<td>1079</td>
<td>1037</td>
</tr>
</tbody>
</table>

Event rate per 100 patient-yr:
- Vitamin K antagonist, 35.8
- Apixaban, 24.7

Hazard ratio for apixaban vs. vitamin K antagonist, 0.69 (95% CI, 0.58–0.81)
P<0.001 (noninferiority)
P<0.001 (superiority)
B Primary Outcome — Aspirin vs. Placebo

Hazard ratio for aspirin vs. placebo, 1.89 (95% CI, 1.59–2.24)
P<0.001

Event rate per 100 patient-yr:
Aspirin, 40.5
Placebo, 21.0

<table>
<thead>
<tr>
<th>Days since Start of Intervention</th>
<th>0</th>
<th>30</th>
<th>60</th>
<th>90</th>
<th>120</th>
<th>150</th>
<th>180</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aspirin</td>
<td>0</td>
<td>2.5</td>
<td>5</td>
<td>10</td>
<td>15</td>
<td>20</td>
<td>100</td>
</tr>
<tr>
<td>Placebo</td>
<td>0</td>
<td>2.1</td>
<td>4.5</td>
<td>9</td>
<td>14</td>
<td>18</td>
<td>100</td>
</tr>
</tbody>
</table>

No. at Risk
Aspirin 2277 2003 1863 1789 1717 1674 962
Placebo 2279 2095 2006 1941 1880 1824 1079
<table>
<thead>
<tr>
<th>Antiplatelet-regimen comparison</th>
<th>Aspirin</th>
<th>Placebo</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISTH major or clinically relevant nonmajor bleeding</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. of patients with event/total no. (%)</td>
<td>367/2277 (16.1)</td>
<td>204/2279 (9.0)</td>
</tr>
<tr>
<td>Event rate per 100 patient-yr</td>
<td>40.5</td>
<td>21.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Death or hospitalization</td>
<td>604/2307 (26.2)</td>
<td>569/2307 (24.7)</td>
</tr>
<tr>
<td>Event rate per 100 patient-yr</td>
<td>65.7</td>
<td>60.6</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Death or ischemic event</td>
<td>149/2307 (6.5)</td>
<td>168/2307 (7.3)</td>
</tr>
<tr>
<td>Event rate per 100 patient-yr</td>
<td>13.9</td>
<td>15.7</td>
</tr>
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</tr>
</tbody>
</table>
Limitations

• Clopidogrel major P2Y$_{12}$ inhibitor (>90%)

• Low time in therapeutic range for warfarin use (59%)

• Open-label design

• Generalization to other DOACs
Take Aways from AUGUSTUS

• “Dual therapy” with apixaban + P2Y$_{12}$ inhibitor appears to **decrease risk of bleeding** compared to “triple therapy” with apixaban + ASA + P2Y$_{12}$ inhibitor **without increasing risk of stroke, MI or stent thrombosis**

• Dual therapy appears to **decrease hospitalization rates** and **risk for stroke**
Vaping kills: new respiratory illness from e-cigarette use
Pulmonary Illness Related to E-Cigarette Use in Illinois and Wisconsin — Preliminary Report

Jennifer E. Layden, M.D., Ph.D., Isaac Ghinai, M.B., B.S., Ian Pray, Ph.D., Anne Kimball, M.D., Mark Layer, M.D., Mark Tenforde, M.D., Ph.D., Livia Navon, M.S., Brooke Hoots, Ph.D., Phillip P. Salvatore, Ph.D., Megan Elderbrook, M.P.H., Thomas Haupt, M.S., Jeffrey Kanne, M.D., et al.
EVALI

- E-cigarette, or vaping, product use associated lung injury (EVALI)

- Epidemiology
  - Earliest reported cases 2014\textsuperscript{15}
  - As of Oct 8, 2019, 1,299 reported cases\textsuperscript{16}
  - 76\% of cases involved combination nicotine and tetrahydrocannabinol (THC) or cannabidiol (CBD)
  - E-cigarette use: 20.8\% of U.S. high school students, 3.2\% U.S. adults\textsuperscript{17,18}

- Pathophysiology
• Duration of symptoms prior to presentation: 6 days
• Respiratory symptoms
  • SOB (87%), cough (83%), chest pain (55%)
  • Rhinorrhea, sneezing, congestion typically absent
• Gastrointestinal symptoms
  • Nausea (70%), vomiting (66%), diarrhea (43%), abdominal pain (43%)
• Exam
  • Tachycardia (64%), tachypnea (43%), fever (29-53%), hypoxia (31%)
EVALI Clinical Presentation

• Labs
  • Elevated ESR (93%), leukocytosis (87%), electrolyte abnormality (hypoK, hypoNa – 33%)
  • Bronchoscopy: PMNs (65%), lipid laden macrophages (50%), eos (0%)
  • Lung biopsy: mild and nonspecific inflammation, acute diffuse alveolar damage and foamy macrophages, and interstitial and peribronchiolar granulomatous pneumonitis

• Imaging
  • Abnormal findings (91%), bilateral lung opacities (91%), pleural effusion (10%), pneumothorax (8%),
EVALI Case Definition

• Use of e-cigarette or dabbing during the 90 days before symptom onset
  • AND
• **Pulmonary infiltrate**, such as opacities on plain film chest radiograph or ground-glass opacities on CT
  • AND
• **Absence of pulmonary infection** on initial workup (require negative respiratory viral panel + all other clinically indicated respiratory infectious disease testing)*
  • AND
• No evidence in medical record of **alternative plausible diagnoses**

*Probable case: if infection identified but is believed not the sole cause
EVALI Management

• **Indications for hospital admission:** O2 sat < 95% on RA, in respiratory distress, or have comorbidities that compromise pulmonary reserve

• **Corticosteroids** might be helpful
  • Among 140 cases reported to CDC who received corticosteroids, 82% improved

• Empiric antibiotic, antivirals (influenza) as initially appropriate given overlap of symptoms

• **Follow up**
  • 1-2 weeks post discharge – assess O2 and consider repeat CXR
  • 1-2 months – consider PFTs
Reporting Suspected EVALI

• All suspected cases – report to NM DOH

• Detailed history of substance used, sources, duration and frequency, device used, and how used recommended
Summary

• Consider oral antibiotics for selected cases of OM/septic arthritis

• Add empiric MRSA/\textit{Pseudomonas} coverage for all CAP patients with past isolates within 1 year, severe CAP if validated risk factors or past hospitalization + parenteral antibiotics within 90 days

• Chose regimen of apixaban/clopidogrel for patients with PCI/atrial fibrillation

• Add e-cigarette use to my social histories and maintain high index of suspicion for EVALI
Acknowledgements

• Justin Miller, MD
• Anthony Worsham, MD
• Husayn BinBilal, PA
• Deepti Rao, MD
• Kendall Rogers, MD
• Vicki Gianopoulos Pizanis, RDH, MS, EdD
Thank you!
Articles


Supporting References