ECHO Antibiotic Stewardship Program: Potpourri

Charles Krasner, M. D.
UNSOM
Sierra Nevada Veterans Affairs Med Center
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Quick Review - Highlights of the New QFT-Gold Plus Test - first test to give evidence that the patient is not only TB infected, but actually may have a new or active infection

- CD4 cells recognize TB - whether or not disease is active or old
- The TB1 tube tests CD4 activity only - a positive result tells you the patient has been exposed to Tuberculosis - but tells you nothing about Latent vs Active infection
- CD8 cells are only active in new or active infections, and turn off in old or inactive infection (latent TB)
- In TB 2 tube, CD4 cells are now tested with CD8 cells - giving you some idea if this TB infection is actually recent or active. The greater the difference between TB2 and TB1 (reflecting activated CD8 cells), the more likely this is possible.
Mitogen – Positive Control
Low response may indicate inability to generate IFN-γ

Nil – Negative Control
Adjusts for background IFN-γ

TB1 – Primarily detects CD4 T cell response

TB2 – Optimized for detection of CD4 and CD8 T cell responses
A positive Quantiferon test in a patient with latent TB. TB2 tube equal to or slightly > TB1 tube.

<table>
<thead>
<tr>
<th>NAME</th>
<th>VALUE</th>
<th>REFERENCE RANGE</th>
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</thead>
<tbody>
<tr>
<td>Quantiferon Incubation</td>
<td>Incubation performed.</td>
<td></td>
</tr>
<tr>
<td>Quantiferon-TB Gold Plus</td>
<td>Positive A</td>
<td>Negative</td>
</tr>
<tr>
<td>Quantiferon Criteria</td>
<td></td>
<td></td>
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<tr>
<td>The Quantiferon-TB Gold Plus result is determined by subtracting the Nil value from either TB antigen (Ag) tube. The mitogen tube serves as a control for the test.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quantiferon TB1 Ag Value</td>
<td>2.20 (IU/mL)</td>
<td></td>
</tr>
<tr>
<td>Quantiferon TB2 Ag Value</td>
<td>2.60 (IU/mL)</td>
<td></td>
</tr>
<tr>
<td>Quantiferon Nil Value</td>
<td>0.04 (IU/mL)</td>
<td></td>
</tr>
<tr>
<td>Quantiferon Mitogen Value</td>
<td>&gt;10.00 (IU/mL)</td>
<td></td>
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</table>
60 year immigrant with bilateral upper lobe infiltrates and persistent hemoptysis
Patient had 3 negative AFB smears, but due to high suspicion for active disease, Public Health lab did NAAT testing on the sample identifying active Tuberculosis and patient started on TB therapy.
Cohort of 11,748 general medical patients hospitalized at 48 different hospitals for pneumonia or UTI 2015 thru Sept 2017

14 hospitals monitored in- hospital FQ prescribing- this resulted in fewer patients receiving FQ (37%) versus patients in non-monitored hospitals (48%) as well as fewer FQ treatment days (2,300 vs 3,100 days/1,000 patients)

Unfortunately – 2/3 of FQ prescribing occurred AFTER discharge in these patients, and the patients from the FQ monitored hospitals were Twice as likely (15.5% vs 8.4%) to go home on FQs!!!

Conclusion: Hospital based FQ monitoring appears to partially shift FQ prescribing to discharge and attenuates any inpatient benefit. By failing to address antibiotic prescribing at discharge, ASP interventions limit their impact on patient safety.
How to deal with this problem of FQ overprescribing

- Alot of times FQs are used as an alternative in patients with “PCN allergy”. Worthwhile to explore deeper- is this simply a side effect (nausea, diarrhea, etc), is this something the patient was told by Mom occurred as a baby, have they taken meds like Amoxicillin for a dental procedure etc.

- Doctors often prescribe another full course on discharge because the agent is changed

- **Most importantly**- All evidence points to short course therapy for most infections allows patients to go home without further antibiotic therapy at discharge
<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Short (d)</th>
<th>Long (d)</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAP</td>
<td>3 or 5</td>
<td>7, 8, or 10</td>
<td>Equal</td>
</tr>
<tr>
<td>HAP</td>
<td>7</td>
<td>10-15</td>
<td>Equal</td>
</tr>
<tr>
<td>VAP</td>
<td>8</td>
<td>15</td>
<td>Equal</td>
</tr>
<tr>
<td>Pyelo</td>
<td>7 or 5</td>
<td>14 or 10</td>
<td>Equal</td>
</tr>
<tr>
<td>Intra-abd</td>
<td>4</td>
<td>10</td>
<td>Equal</td>
</tr>
<tr>
<td>Gram Neg Bacteremia</td>
<td>7</td>
<td>14</td>
<td>Equal</td>
</tr>
<tr>
<td>AECB</td>
<td>≤5</td>
<td>≥7</td>
<td>Equal</td>
</tr>
<tr>
<td>Cellulitis</td>
<td>5-6</td>
<td>10</td>
<td>Equal</td>
</tr>
<tr>
<td>Osteo</td>
<td>42</td>
<td>84</td>
<td>Equal</td>
</tr>
<tr>
<td>Neutropenic Fever</td>
<td>AF x 72 h</td>
<td>+ANC &gt; 500</td>
<td>Equal</td>
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Interesting reminder that Bactrim has excellent activity not only against MRSA/Staph aureus, but also against Strep pyogenes (Group A strep) as well as Strep agalactiae (GBS)- so can be used by itself for both purulent and non-purulent cellulitis.

In contrast, doxycycline (tetracycline) has limited activity against streptococcus species and should NOT be used unless pus is noted (as seen in Staph infections).
Non-purulent versus purulent cellulitis

**Strep cellulitis** – Bactrim
ok, don’t use doxycycline

**Staph cellulitis** – both
doxy or Bactrim o.k.
“Decolonization to Reduce Post-discharge Infection Risk among MRSA carriers”

S.S. Huang et al

NEJM Feb 14, 2019.

- MRSA - most common cause of skin, soft-tissue and procedure related infection
- An estimated 1.8 million patients (5% of inpatients) are discharged yearly colonized with MRSA
- Decolonization in ICU has reduced risk of surgical site infection
- A short 5 day course in outpatients lead to only short-lived clearance in most patients
- This study randomized more than 2000 MRSA carriers at discharge to either education only, versus education plus 6 months of twice monthly chlorhexidine mouth wash, baths or showers, and nasal mupirocin for 5 days. Patient followed for a year
Results of MRSA decolonization protocol versus MRSA education only

- **Education Group**: 98 of 1063 patients developed MRSA infection - 9.2%
- **Decolonization Group**: 67 of 1058 developed MRSA infection – 6.3% (Statistically significant decrease)
- 44% reduction in MRSA infection in those who adhered fully to regimen
- 84.8% of MRSA infections led to hospitalization
- Also saw decrease in other types of infections seen in decolonized group. Number needed to treat to prevent one infection - 30
- Unlike in one time regimens, benefits lasted for months after treatment completion
- Estimated cost to treat per patient - approx. $150 to $200
Estimated up to 1/3 of FMT patients gets systemic antibiotics within first 8 weeks after procedure, disrupting establishment of the donor microbiota

First study- Looked at 349 patients in first 8 weeks after FMT for recurrent CDI.

FMT failure rate with documented CDI reinfection in patients given antibiotics was 27.6% versus 11.3% for those patients not on any antibiotic during this time

Most common Dx was “UTI” (of course), most common prescribed antibiotic ciprofloxacin (duh)

Second study- looked at longer term risks in patients 1 to 2 years after transplant. There is some evidence to suggest oral vanco or probiotics in patients with CDI hx reduce risk of relapse. This study, however, found in patients with FMT these interventions had no benefit (vanco ) or actually increased risk (with probiotics) of CDI developing in patients given antibiotics

Need more data before recommending CDI prophylaxis in post-FMT
Best advice for FMT patients: