

## “A Spoonful of Sugar: A Person Centered Approach to Infection Prevention, Detection and Treatment”

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### Objectives

- Explore treatment modalities for infections commonly encountered: antibiotics, antivirals, supportive/adjunct therapies
- Utilize a case study approach to develop a person centered plan for prevention, screening, detection, and treatment.

### Objectives

- Explore common infections experienced by individuals with ID/DD such as urinary tract infection, pneumonia, H. Pylori
- Discuss Challenges in prevention, screening, and treatment of common infections: complex comorbidities, physical and behavioral challenges, other environmental challenges

#### A word about screening for infection

- With any specimen, as “why are we doing this?”
- “Can we obtain what we need to have safely and accurately?”
- “What resources will I need to obtain the specimen?”
- “What will I do with the information once I have it?”
- “What is the benefit to the patient?”
- “What is the risk to the patient by obtaining it?”
- “What is the risk of NOT obtaining the results?”
- “What is the potential BENEFIT of NOT obtaining the results?”
- “Can testing wait? Could we take a ‘watch & wait’ approach? Risk versus benefit?”
- “What is the potential impact to other individuals, staff, and coworkers?”

### Colonization versus acute infection

- |                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>• Colonization:           <ul style="list-style-type: none"> <li>-&gt;usually “systemically” well</li> <li>-&gt;usually causes no ‘acute’ symptoms such as fever, malaise, chills, increased pain, warmth or tenderness</li> <li>-&gt;in most cases well managed by careful monitoring and observation</li> <li>-&gt;usually no need for repeat cultures for monitoring/screening.</li> </ul> </li> </ul> | <ul style="list-style-type: none"> <li>• Acute infection           <ul style="list-style-type: none"> <li>-&gt; often accompanied by an exacerbation of symptoms.</li> <li>-&gt; if a wound, increased pain, warmth, drainage, and/or erythema.</li> <li>-&gt; respiratory-increased cough, change in sputum, fever, chills, malaise, etc.</li> <li>-&gt; urinary-pain on urination, fever, chills, malaise, nausea, vomiting, blood in urine.</li> </ul> </li> </ul> |
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### Urinary Tract Infection

- Relatively uncommon in men, new onset infection or recurrent infection always warrants further investigation
- Constipation/retention/infection cycle needs to be assessed and addressed promptly
- Consider prostatitis in recurrent infection: treatment is different!

## Role of urine culture

- Not routinely recommended unless in the case of: suspicion of complicated infection, atypical symptoms, symptoms indicating pyelonephritis, failure to respond to initial therapy, or recurrent symptoms less than one month after treatment for a previous UTI for which no culture was performed.

## Points to ponder

- Sterile pyuria: may occur in the event of recent antimicrobial use
- Contamination of the urine sample by sterilizing solution
- Contamination of urine by vaginal secretions
- Chronic interstitial nephritis
- Nephrolithiasis
- Uroepithelial tumor
- Painful bladder syndrome/interstitial cystitis
- Intra-abdominal inflammatory process adjacent to the bladder
- Infection with atypical organisms such as chlamydia, ureaplasma urealyticum, or tuberculosis
- tumors

## “true” UTI versus colonization

- Counts >100,000 with one organism typically
- Counts < 100,000 among patients already treated with antimicrobials, among men (in whom contamination is much lesser of a problem), when organisms other than e. coli and proteus are present, including Pseudomonas, Klebsiella, Enterobacter, Serratia, and Moraxella species.

## Who to treat/screen....

Two basic recommendations:

- > pregnant women: screening and treatment for asymptomatic bacteriuria due to risk
- > patients undergoing urological procedures where there is a risk of mucosal bleeding and subsequent development of sepsis

## Who not to treat/screen....

- Nonpregnant, premenopausal women
- Diabetic patients
- Spinal cord injured patients
- Patients with indwelling urinary catheters
- Elderly in the community
- Elderly in health care facilities
- Patients undergoing joint arthroplasty

Points to ponder...why not screen/treat?

- Bacteriuria tends to recur despite treatment
- Asymptomatic bacteriuria is transient, and not a valid predictor of the number of significant infections the patient may develop
- Repeated treatment promotes antibiotic resistance

## E. Coli and Enterococcus

- Most common pathogens in the 'common' UTI
- Common bowel pathogen
- Can also be of concerns with cross contamination, causing infection elsewhere: sputum, g-tube site cultures, drains, etc
- In men, don't overlook the possibility of prostatitis in 'recurrent' UTI in men....

## Urine culture and sensitivity

- Ideally collected as a midstream sample of the first voiding of the day
- If collected at the time of clinical evaluation a midstream sample, with or without cleaning of the urethral meatus still likely produces a reasonable sample.
- Optimally: local disinfection with Dakins solution or nonfoaming antiseptic solution, minimizing contact with the mucosa, and discard initial stream (ie: midstream catch)
- Catheterized samples also quite reliable and should be taken at face-value-most sterile

## Pneumonia



## Common Pathogens for Community Acquired Pneumonia

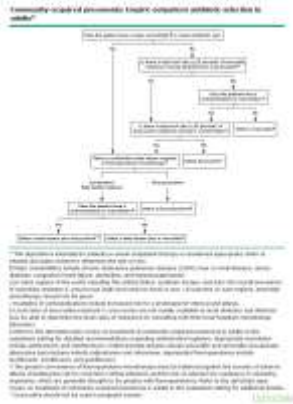
- *S. pneumoniae*
- *M. pneumoniae*
- respiratory viruses (eg, influenza, parainfluenza, respiratory syncytial virus [RSV])
- *Legionella pneumoniae* and *H. influenzae* are less common.

## Common Pathogens for Hospital Acquired Pneumonia

- *S. pneumoniae*
- respiratory viruses (eg, influenza, parainfluenza, RSV, rhinovirus)
- *H. influenzae*
- *M. pneumoniae*
- *Legionella*
- Among patients who require admission to an ICU, *S. pneumoniae* is the most commonly detected pathogen, but *Legionella*, enteric gram-negative bacilli, *S. aureus*, *H. influenzae*, and respiratory viruses are also important.

## Diagnostic testing...

- CBC with differential
- Basic metabolic panel or Comprehensive metabolic panel
- Serum Lactic Acid
- Sputum culture
- Blood gasses
- Chest xray
- EKG
- Chest CT without contrast (possibly with if underlying mass suspected)



## H. Pylori

- Common cause of stomach ulcers and gastric lymphoma
- Symptoms may be nonspecific, and vary among individuals: nausea, vomiting, halitosis, but may be more subtle
- Consider if meal refusals, regurgitation, forced/self-induced vomiting, poor appetite, nighttime awakening, sleeping sitting up, restlessness during meals, drooling, emotional disturbance (frequent crying, mouthing hands, repetitive swallowing, etc)

## Indications for testing..

- Only if the provider intends to tx for positive results
- In patients with gastric MALT lymphoma, active peptic ulcer disease, or past hx of documented peptic ulcer
- Test & treat as proven management strategy for patients < 55 without alarm features (bleeding, anemia, hx gastrointestinal cancer, or previous esophogastric malignancy)
- Choosing which test to use is dependent on risks versus benefits, patient specific

## Conditions associated with H. Pylori Infection...

- Peptic ulcer
- Uncomplicated duodenal ulcers
- Uncomplicated gastric ulcer
- Recently bleeding gastric/duodenal ulcers
- Past hx peptic ulcer
- Long term PPI therapy
- Functional dyspepsia
- Other: chronic NSAID use, immune thrombocytopenia, unexplained iron deficiency anemia, unexplained vitamin B12 deficiency but NOT for asymptomatic family members and close contacts

## H. Pylori..

- Serological studies
- Biopsy (EGD)urease testing (antral biopsy)
- Rapid urease testing (endoscopy)
- Histology (gastric biopsy)
- Brush cytology (gastric)
- Bacterial C&S
- Noninvasive urea breath test
- Serology: Immunoglobulin IgG
- Stool for H. Pylori (antigen assay)
- Rapid stool antigen test
- Other: Salivary assay, urinary assay, 13C urea blood test

## A caution for confirmation of eradication testing..

- Should be considered for any patient with H. Pylori associated ulcer, persistent symptoms, MALT lymphoma, resection of early gastric ulcer
- Should not be performed sooner than 4-6 weeks after tx
- Antibiotics, bismuth, and PPI can cause false positive/negatives-need to be discontinued at least 4 weeks prior to retesting (urea, stool or endoscopy testing)
- Serology is not recommended retesting method for confirmation as may remain positive for months or years after therapy

## Challenges in Prevention, Screening, and Treatment



## When to test..(Crowe, S. et al 2015)

- ACG recommendations — The ACG guidelines include the following conclusions [4]:
- ●Testing for *H. pylori* should be performed only if the clinician plans to offer treatment for positive results.
- ●Testing is indicated in patients with gastric MALT lymphoma, active peptic ulcer disease, or a past history of documented peptic ulcer.
- ●The test-and-treat strategy for *H. pylori* (ie, test and treat if positive) is a proven management strategy for patients with uninvestigated dyspepsia who are under the age of 55 years and have no “alarm features” (bleeding, anemia, early satiety, unexplained weight loss, progressive dysphagia, odynophagia, recurrent vomiting, family history of gastrointestinal cancer, previous esophagogastric malignancy).
- ●Deciding which test to use in which situation relies heavily upon whether a patient requires evaluation with upper endoscopy and the strengths, weaknesses, and costs of the individual tests.

## Complex comorbidities

- Advanced age
- Hypertension
- Diabetes (Type I and II)
- Hyperlipidemia
- Hypothyroidism
- Psychiatric disorders
- Malignancies
- Constipation
- Seizure disorders
- Osteoporosis (may be severe)
- Spasticity
- COPD
- Aspiration-both acute and chronic
- Dysphagia
- GERD
- Incontinence

## Physical and behavioral challenges...

- Advanced age
- Very young age
- Positioning issues (specimen collection, radiological studies, etc)
- Anxiety, agitation, depression, psychosis
- Dementia and related disorders

## Environmental challenges..

- Insurance coverage
- Staffing support & coverage
- Staff training- what is needed to accomplish this screening?
- Delegation-who can do the screening or assist with screening
- Staff buy-in: “why can’t you just treat them?”
- Family buy-in: the question of meaningful, purposeful screening versus potentially withholding care

## Exploring Treatment Mc



## At our disposal....

- Antibiotics
- Antivirals
- Supportive/adjunct therapies
- “Watch and wait”
- No treatment (yes that IS a treatment option in some circumstances!)

## Antibiotics...

- Due diligence: use only when needed, with careful consideration for treatment
- Await C&S to start if possible
- Be aware of the need for additional monitoring with certain medications (ACE-I, Coumadin, cardiac medications)
- Renal or hepatic impairment
- Route and delivery method (tabs, caps, liquids, suspensions, IV, IM)
- What may be crushed/not crushed, or thickened
- Timing of other medications

## NATURAL ANTIBIOTICS

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## Antivirals

- Resistance potential, only when necessary
- Risk versus benefit (ie: shortening illness by 1-2 days, etc)
- Renal or hepatic insufficiency
- Side effects may be quite unpleasant (mood changes, diarrhea, nausea, vomiting-> which may lead to increased aspiration risk)
- What's worse- potential to get the illness, versus side effect profile

## Supportive & Adjunct Therapies

- Probiotics (particularly as adjunct to antibiotic therapy)
- Dietary changes: ie: yogurt
- Fluids, rest, and nutrition
- Respiratory treatments: MDI, nebulizer treatments, syrups, elixirs, decongestants, antihistamines
- GI: anti-emetics, PPI, anti-diarrheals
- Antipyretics (Motrin, Aleve, Tylenol)
- Vitamins & supplements
- Antifungals
- Posture, positioning and activity
- Comfort measures: moisturizing for sore noses, treatment for dry lips, warm showers/baths, soft sheets, quiet and 'down time', change damp clothing and sheets, a warm blanket, comfort foods and liquids, and a little extra attention

## Intake and fluid replacement..

- G-tube/j-tube supported individuals require careful consideration: plan for extra fluids for those that are NPO; what IS your plan?
- Individuals with poor PO intake: what is the plan for increased fluid needs, when do you seek additional evaluation and therapy?

### Don't overlook maintenance once stability has been achieved...

- Respiratory treatments: what to continue, when to taper (remember that certain conditions require maintenance therapy and are often overlooked ie: COPD)
- GI: prevention/treatment of GERD, aspiration
- Constipation: diligence, monitoring and maintenance, fluids
- Address underlying comorbidities quickly, and provide for maintenance plan
- Avoid polypharmacy, thorough medication review and adjustment, thoughtful planning, discontinuing, and combining therapies.
- Strategic planning: staff education, monitoring and individual specific prn treatments/medications

### Putting Experience to the Test

Utilize a Case Study Approach to Develop a Person Centered Plan for Prevention, Screening, Detection, and Treatment

### Case Study #1-Male, DOB 1936

- |                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                |
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| <ul style="list-style-type: none"> <li>• Profound MR</li> <li>• Seizure disorder</li> <li>• Hx CVA 1989&amp;2007 w/ right hemiparesis</li> <li>• Dysphagia</li> <li>• s/p g-tube placement</li> <li>• HTN</li> <li>• Cardiomegaly</li> <li>• Mitral valve prolapse w/regurgitation</li> <li>• Anemia</li> <li>• Recurrent UTI</li> </ul> | <ul style="list-style-type: none"> <li>• BPH</li> <li>• Hx esophageal ulcers</li> <li>• Esophagitis, gastric erosions</li> <li>• DJD of the knees</li> <li>• Allergic rhinitis</li> <li>• Osteoporosis</li> <li>• PVD</li> <li>• Constipation w/ hx ileus, melanosis coli</li> <li>• Hx sigmoid polyp and tubular adenoma</li> <li>• Hx fx right hip with pinning</li> <li>• Fatty liver disease</li> <li>• Hx lap chole March 2004</li> </ul> |
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### Medications....

- |                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                     |
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| <ul style="list-style-type: none"> <li>• Altace</li> <li>• Carafate</li> <li>• Claritin</li> <li>• Clonidine</li> <li>• Colace</li> <li>• Dilantin</li> <li>• Duoneb</li> <li>• Duragesic patch</li> <li>• Florastor</li> <li>• Hytrin</li> <li>• Miralax</li> <li>• Nexium</li> </ul> | <ul style="list-style-type: none"> <li>• Norco prn</li> <li>• Oscal D</li> <li>• Phenobarbitol</li> <li>• ProMod liquid</li> <li>• Reglan</li> <li>• Remeron</li> <li>• Vitamin D Liquid</li> </ul> |
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### Staff report...

- |                                                                                                                                                                                                                                                                                          |                                                                                                                                   |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>• Increasing meal refusals</li> <li>• Increased night awakening w/ refusal to go back to bed</li> <li>• Screaming and wandering</li> <li>• Intermittent vomiting after meals (random)</li> <li>• Bad breath-staff requesting mouthwash</li> </ul> | <ul style="list-style-type: none"> <li>• Lost 5 lbs in past 3 weeks</li> <li>• Pale</li> <li>• Tired</li> <li>• Sleepy</li> </ul> |
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### Evaluation and treatment plan?

- What might our differential dx be?
- What exams/tests might you want to ask the provider to order & why?
- What treatment might you want to initiate now and why?
- What future treatment might you need to initiate and why?
- Is a 'watch and wait' approach appropriate? Why or why not?

## Top Diagnoses to Consider?

- GERD, esophagitis, erosions, ulcers
- H. Pylori
- Dental issues/abcess
- Pneumonia
- UTI
- Dehydration

## Records/documentation to request?

- BM chart
- Sleep/wake chart
- Medication list
- Med refusals?
- Intake studies
- Recent labs
- Last GI consult
- Recent med changes: changes, additions, deletions, dose changes
- Last dental
- Pain assessment and plan

## What tests to consider & why?

- CBC with diff (possibly anemia panel)
- CMP
- Amylase, lipase, direct bili, CPK
- H. Pylori
- Stools for OB x 3
- Other?

## Med changes in the meantime during workup?

- Increase Nexium to BID
- Increase Carafate to TID or QID
- Reglan..temporary increase? Or d/c
- Add Zantac or Pepcid?
- D/C colace, address Miralax dose?

## Final Diagnosis?

CBC revealed H&H 8.6/25.9, WBC normal, stools for OB +

H. Pylori stool +

Patient was referred to GI for EGD

- GERD
- Gastric Ulcer
- Esophageal Erosions
- Positive for H. Pylori Infection

## Case Study #2: Female, born 1974

- Profound MR
- Recurrent UTI
- Constipation
- Dysmenorrhea
- Hx amenorrhea
- Hx right ovarian cyst
- Obesity
- Recurrent dermatitis
- Neurogenic bladder with reflux
- Lichen simplex chronicus
- Dysphagia
- Cardiomegaly
- Hx subclavian thrombosis
- GERD
- seizure disorder
- Osteoporosis
- hyperlipidemia
- Hx gastritis
- Allergic rhinitis
- Short esophagus
- dysmotility



## Medications...

- Chewable MVI
- Cymbalta
- Dulcolax
- Kepra
- Miralax
- Motrin prn
- Carafate
- Zyrtec
- Mylicon
- Oscal D
- Prilosec
- Senna
- Tramadol
- Trazadone
- Zantac

## Symptoms...

- Increasing lethargy over 5 days
- Increasing daytime sleepiness
- Vomited x 2 in past 24 hours
- Decreased fluid intake
- Intermittent confusion
- Poor appetite
- Irritability

## Diagnoses to consider?

- Urinary tract infection
- Pneumonia
- Dehydration
- Toxic medication levels
- GERD/esophagitis/ulcers
- Constipation/retention/UTI cycle

## What might you like to review?

- Bowel tracking sheets
- Med lists
- Labs
- Recent trips?
- Change in meds: dose, additions, deletions, decreases, route or form (liquid/tabs)
- Last neuro
- GI notes

## Diagnostics?

- CBC with diff
- CMP
- Amylase, lipase, direct bili
- Serum lactate, ammonia
- Urine dip, culture
- CXR
- EKG
- BNP/Pro BNP

## Med changes to consider?

- MVI: do we need it?
- Increase Miralax?
- Motrin: how much is she using, taking with food?
- Senna: d/c if adjustments in Miralax?
- Tramadol use?
- Address ammonia levels if elevated

## Evaluation and treatment plan?

- What might our differential dx be?
- What exams/tests might you want to ask the provider to order & why?
- What treatment might you want to initiate now and why?
- What future treatment might you need to initiate and why?
- Is a 'watch and wait' approach appropriate? Why or why not?

## Final Diagnosis...

- WBC WNL, BMP with BUN 32, creatinin 1.41, culture positive for >100,000 e. coli
- Urinary tract infection with emerging sepsis
  - dehydration

## Case Study #3: female, DOB 1933

- |                                                            |                       |
|------------------------------------------------------------|-----------------------|
| • Profound MR                                              | • Barretts Esophagus  |
| • Osteoporosis                                             | • COPD                |
| • Dyslipidemia                                             | • Recurrent pneumonia |
| • PVD                                                      | • Lewy Body Dementia  |
| • Irregular heartbeat with 1 <sup>st</sup> degree AV block | • Gastroparesis       |
| • Syncope                                                  | • Hx GI bleed         |
| • Dyspepsia                                                | • Esophagitis         |
| • Raynauds Disease                                         | • Hypokalemia         |
| • Hx ileus                                                 | • Mild pulmonary HTN  |
|                                                            | • CAD with MI 2006    |

## Medications...

- |                       |                     |
|-----------------------|---------------------|
| • Albuterol prn       | • KCL liquid        |
| • ASA                 | • Lasix             |
| • Beneprotein         | • Magnesium Citrate |
| • Calcium Carbonate   | • Milk of Mag prn   |
| • Carafate            | • Motrin prn        |
| • Colace              | • Nitropatch 0.4    |
| • Dulcolax supp prn   | • Prevacid Solutab  |
| • Erythromycin liquid | • Prolia q 6 mo     |
| • Fleets prn          | • Reglan            |
| • Flovent             | • Zestril           |
| • Duoneb prn          | • Vitamin D         |
|                       | • Utymax            |

## Symptoms reported..

- |                                                          |                                                                |
|----------------------------------------------------------|----------------------------------------------------------------|
| • Vomited x 2 overnight, approximately one week ago      | • Refusal to attend day program x 2 days                       |
| • Temp associated with vomiting x 24 hours, now afebrile | • Refused breakfast and all liquids this morning.              |
| • Intermittent meal refusals x 5 days                    | • Appears confused with daily ADLS and activities this morning |
| • Increased fatigue                                      |                                                                |
| • Daytime sleepiness x 2 days                            |                                                                |

## Differential diagnoses?

- Pneumonia
- Urinary tract infection
- Dehydration
- Constipation
- Toxic medication levels
- Other?

## Review of documentation?

- Bowel tracking records
- Meal documentation
- Intake studies
- Vital sign logs
- Sleep/wake charts
- Medications: changes, additions, deletions, change in dose, etc
- Recent illness, hospitalizations
- Labs, recent xrays

## Diagnostics?

- CBC with diff
- CMP
- Amylase, lipase, direct bili
- Serum lactate
- BNP/ Pro BNP
- CXR
- EKG
- Other?

## Final Diagnosis...

WBC 18, BUN 25/creatinine 1.31, serum lactate elevated, CXR reveals RML consolidation, EKG WNL, BNP, pro BNP WNL

- Pneumonia
- Dehydration

## Questions?

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## Resources....

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