AMERICAN COLLEGE OF EMERGENCY PHYSICIANS
SCIENTIFIC ASSEMBLY
1999

Case Studies: Perplexing Infectious Disease Presentations

Each of us has encountered a number of infectious disease cases that just do not fit the classic textbook description. Using a case studies format, examples of perplexing cases will be presented. There will be a discussion of the evaluation, differential diagnosis, and treatment for each case presented. (Participants can submit cases for consideration.)

- Discuss the differential diagnosis based on the cases presented.
- Describe the appropriate diagnostic work-up and management for each case.

TU-82
Tuesday, October 12, 1999
12:30 PM - 1:25 PM
Room # N223
Las Vegas Convention Center

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Research Grants: Ortho McNeil, Pfizer, Bayer
Speaker: Ortho McNeil, Pfizer, Bayer, Roche

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Baffling Bugs: Mysterious Infectious Disease Cases

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Case: 28 y/o male

Presents with 6 day hx nasal congestion, fever dry cough, aches, sinus pain
Previously healthy
No HIV risk factors
T 38.2° Pulse 96 BP 115/70 Resp 16
NAD, clear rhinorrhea, TMs clear, OP clear
Chest clear

Antibiotics for URIs

Survey of 1529 MDs - 20,707 pt. visits
Antibiotics prescribed for:
- 51% of colds
- 52% of URIs
- 66% of bronchitis

12,000,000 Antibiotic Rxs for URI /bronchitis - 21% of all antibiotic prescriptions

Gonzales R, et al. *JAMA* 1997;278:901.

Antibiotics - Patient Expectation

Survey of 113 URI pts. and their MDs in clinic.
65% patients expected Abr prior to visit
Physicians were incorrect or uncertain whether pts. expected Abx 51% of the time
Patient satisfaction not correlated with Rx. but with perception of time spent by MD

(Hamm et al. *J Fam Pract* 1996;43:56)

Cold Preparations

- Decongestants
  –pseudoephedrine, phenylpropanolamine
- *Antihistamines
- . Antitussives/Expectorants
- Vitamin C
- Zinc
- Echinacea

OTC Cold Products

Review of 51 studies 1950-1991: only 27 met minimal methodology criteria
No efficacy of drugs for children < 5
Antihistamines: 4/10 studies showed benefit
Decongestants 4/5 studies showed benefit
Expectorants: 1 study failed to show benefit
Antitussives: No studies adequate to evaluate

Smith MB. Feldman W. *JAMA* 1993: 269: 2258-63.

Case – 28 y/o male returns

1 week after initial ER visit

Persistent fever, increased sinus pain, purulent nasal discharge

T 38.4" Pulse 92 BP 1 10/70 Resp 18

NAD, purulent rhinorrhea, sinus tenderness, TMs clear, OP clear, teeth normal

Chest clear

Sinusitis with Colds

90% of viral URIs have associated sinus disease

"Rhinosinusitis"

One billion cases a year in U.S.

~ 1% seek medical care

Estimated that 0.5-2% get bacterial infection

5-20 million cases a year

~ 10% seek medical care

No simple "gold standard" for diagnosis

Sinusitis – Clinical Features

Usual URI symptoms (rhinorrhea, facial pressure, headache, sneezing)

Fever

Purulent nasal discharge

Pain increased when bending forward

Erythema over sinuses

Maxillary toothache

Poor response to decongestants

Timing!!! - > 7 days after URI

Sinusitis - Bacteriology

Strep. Pneumoniae

H. Influenzae

Anaerobes

M. *Catarrhalis*

Staph. Aureus

Streptococci

Gram-negatives

Sinusitis - Antibiotics

First-line agents:

Amaxicillin

TMP/SMX

Second-line agents

Amox/clav

Azithromycin

2nd/3rd ceph

Clarithromycin

Sinusitis – Ancillary Drugs

Decongestants

Oral preferred over topical

No proven benefit, but makes sense

Intranasal Steroids

No benefit in clinical trials

Antihistamines – 1st generation

? Benefit from anticholinergic effects

Guaifenesin

? benefit

Case – 28 y/o male returns (again!)

3 months after initial ER visit
Recurrent episodes of sinusitis
Multiple courses of antibiotics
TMP/SMX, Azithromycin, Amox/clav
Now with fever, facial swelling and pain getting worse after 10 days Amox/clav

Case – 36 ylo woman

Abdominal pain for 5 days, fever for 1 day
Vomited X 2, no diarrhea, no urinary sx
Previously healthy, no prior surgeries
T 38.6° Pulse 106 BP 100/70 Resp 20
Mild distress, HEENT nl, Chest clear
Abdomen – Diffuse tenderness, greatest RLQ + Guarding, no rebound, negative psoas
Pelvic – No discharge, +/- CMT. + R adnexal tend

Case – 36 y/o woman

CBC: WBC 16.4 79%P, 13% L, 6% M
UA: Dip + ket, 3 WBC, 0 RBC
Urine pregnancy test negative

Appendicitis - Presentation

M&-analysis of 10 studies, >4000 pts

Finding	Sens.	Spec. (%)
RLQ pain	61	53
Migration	64	62
Psoas	16	95
Rectal Tend.	41	77
Anorexia	68	36

Appendicitis - CBC

Raftery '76 - (175 pts.)
WBC >10: 92% sens 75% spec
Sasso '70 - (525 pts.)
79% of appy pts had WBC >10
62% had elevated PMN count
96% had one or the other

Appendicitis - CBC

Sensitivity for appendicitis:

	WBC	PMN%	Either
Lau '69	61%		91%
Raftery '76	92%	92%	96%
Sasso '70	79%	62%	96%
Bower '81	07%	92%	96%
Doraiswamy'79	42%	96%	
Lansden '63	64%	60%	

Appendicitis - Ultrasound

Noncompressible appendix
≥ 7 mm diameter
Appendicolith
Periappendiceal fluid
Necrosis - loss of wall continuity

Appendicitis - Ultrasound

Sensitivity	**76% - 96%**
Specificity	85% - 90%
Accuracy	**83% - 96%**

Ultrasound - Other Diagnoses

Ovarian cyst
Ovarian torsion
TOA
Ectopic pregnancy
Cholecystitis
Urorihiasis
Diverticulitis
Intussusception
Ileocecitis
Malignancy
Meckel's diverticulum
Mesenteric adenitis

Ultrasound - Limitations

Operator Dependent
Availability
Indeterminate if poorly visualized
Difficult to exclude appendicitis
Perforation decreases sensitivity
Does not replace repeat exams

Appy: CT vs. UTZ

100 pts., 54 had appendicitis

	CT	UTZ (%)
Sensitivity	96	76
specificity	89	91
Accuracy	94	83
PPV	96	95
NPV	95	76

Discordant results in 20:
CT correct in 17, UTZ correct in 3

Balthazar EJ et al. *Radiology* 1994;190:31

Dog and Cat Bite Infections: Organisms

Cat		Dog	
Pasteurella	78%	*Pasteurella*	54%
strep	52%	*strep*	46%
Staph	33%	Staph	36%
Fusobacterium	30%	*Fusobacterium*	36%
Bacteroides	22%	*Bacteroides*	32%
Porphyromon.	22%	*Porphyromon.*	32%
Prevotella	22%	*Peptostrep.*	23%

Talan DA, *NEJM* 1999;340:85

Pasteurella -Antibiotic susceptibility

What Works

	MIC $_{90}$ (μg/ml)
Pen G	0.006-0.25
Amoxicillin	0.25
Ciprofloxacin	0.008-0.03
Trovafloxacin	0.03
Cefuroxime	0.06
Azithromycin	0.125-0.5

Goldstein EJC *Antimicrob Agents Chemother* 1998;41:391

Pasteurella -Antibiotic susceptibility

What Doesn't Work

	MIC $_{90}$ (μg/ml)
Cephalexin	1-16
Erythromycin	4-a
Clariihromycin	1-4
Dicloxacillin	8-16
Nafcillin	4
Clindamycin	32
Gentamicin	2

Goldstein EJC *Antimicrob Agents Chemother* 1997;41 1552.

Dog and Cat Bite Wound Infections: Empirical Antimicrobials

	Pasteur.	Staph	Anaerobes
Amoxicillin/clav.	+	+	+
Ampicillin/sulbactam	+	+	+
Cefotetan/cefox.	+	+	+
Azithromycin	+	+	+/-
Trovafloxacin	+	+	+
Pen/cephalexin	+	+	+/-
Clindamycin/cipro	+	+	+

Selected Reading

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Baffling Bugs: Mysterious ID Cases

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Case: Double Trouble

4 m/o male with **cough** and vomiting

HPI

- 3 days non-productive cough
- 1 day tactile fever and post-tussive emesis
- No blood or bile in emesis
- No diarrhea
- No travel, ill contacts, hemoptysis

Past Medical History

- Previously-healthy
- Full term, NSVD
- No medications
- No allergies
- No immunizations

Physical Exam

VS -- T 37.2, HR 120, RR 32, Pulse Ox 99%
Gen -- NAD, vomited "yellow stomach contents"
HEENT -- AFOF, TMs and OP normal, MMM
Neck -- supple, no adenopathy
Lungs -- Clear, no retractions

Physical Exam

CV -- RRR without murmur
Abd -- soft, ND/NT, no HSM or mass
GU -- normal circumcised male
Ext -- no cyanosis or edema, CR < 2 secs
Neuro -- awake, alert, interactive, nonfocal
Skin -- no rash

Initial Management

- Dx viral URI
- Post-tussive emesis
- Discharge **home**
- Follow-up PMD within 1 week

The Plot Thickens

- Mom calls PMD due to more vomiting and coughing
- Coughing continuously over the phone
- Returns to ER -- Temp 3X.7. HR 166
- Generni physical exam unchanged
- Rectal exam -- maroon stools. heme +

Lab Testing

WBC 19.100
Diff -- **45% PMN, 10%** Bands. **34%** Lymphs
Hct 36%
PLT 495.000
Chcm-7 normal
UA normal

Hospital Course

- Abdominal **series** -- normal
- BE -- ileocolic intussusception (reduced)
- **NP** swabs **fir** *B. pertussis* **DFA and** culture
- **Admitled for** observation **and** Erythromycin
- Respiratory isolation

Hospital Course

HD 4

- **first** NP **culture** negative
- **D/C home on** p.o. **ERY** x10 days
- Respiratory **isolation** for 5 days **(total)**

7 days **after** D/C

- **NP** swab positive **for** 1 colony *B. pertussis*

Pertussis -- Overview

- Whooping **cough**
- *Bordetella pertussis* -- Gram neg **bacterium**
- **Household attach** rates >90%
- **Olicn unrecognized and unreported**
- **&r** 3 **months** 5 years **(peak** 6-1**I months)**
- Most **arc** not fully **immunized**
- Older children **and adults are** reservoirs

Pathophysiology

- Fimbriae attach to respiratory epithelium
- Toxin production
  - Pertussis toxin
  - Adenylate cyclase toxin
  - Cilio-tracheal toxin
  - Dermonecrotic toxin
- Loss of ciliary function
- Debris and mucous accumulation
- Pneumonia and bronchiectasis

Clinical Presentation

Catarrhal stage

- Follows incubation period 6-20 days
- Lasts I-2 weeks
- Rhinorrhea. lacrimation. mild cough
- Fclet usually <101F

Clinical Presentation

Paroxysmal stage

- Lasts 2-4 weeks
- Paroxysmal cough (5-10)
- Inspiratory "whoop" (not all patients)
- Cyanosis. plethora. diaphoresis, tongue protrusion
- Highest morbidit) and mortality

Clinical Presentation

Convalescent stage

. Lasts I-4 weeks

- Symptoms gradually improve

. Cough may persist up to 6 months

Complications

. Pneumonia most common (14% of admits)

- CNS complications from hypoxia and toxins
- Seizures (3%)
- Encephalitis (1%)
  - » 1/3 fatal
  - » 1/3 serious sequelae
  - » 1/3 no sequelae
- Rectal prolapse, hernia. PTX. hemorrhage

Ancillary Data

- initial diagnosis is clinical
- WBC > 15.000 with lymphocytosis
- Less common age < 6 months
- NP culture on Bordet-Gengou media

Culture Sensitivity

'Time	Sensitivity
Shortly after exposure	67 - 81%
Week 3	25%
Week 4	14%
Week 5	0 %

Other Tests

. DFA -- less sensitive. much less specific
. Antibody titer to virulence factors -- most sensitive
. PCR -- high sensivity and specificity, fast. less available

Bordetella in Adults

Wright. et al. *JAMA* 1995
- 75 ED patients with cough > 2 weeks
- 21% met serologic criteria for pertussis

. Symptoms/lymphocyte count not helpful
- Benign disease in adults

Nenning, et al. *JAMA* 1996
- Incidence in adults similar to PUD

Management

- Antibiotics to eradicate organism
- Onl> ameliorates disease in catarrhal stage
- ERY 50 mg/kg/d X 14 days
- Isolate patients for 5 days after starting ERY
- Alternatives --other macrolides. TMP/SMX
- Household and close contact PEP

Patient Disposition

- Admit age < 6 months and clinical penussis
- Discharge others unless complications

Pearls and Pitfalls

- Easy to miss if not on differential
- Pay attention to immunization status
- Less typical in age < 6 months and adults
- Disease most serious in age < 6 months
- Allxays send culture with antibody tests
- Fever > 101F uncommon

Intussusception -- Overview

- Common abdominal emergency in infants
- Prolapse of intestine into adjacent lumen
- Spontaneous reduction is rare
- Survival rate 99% if timely treatment

Pathophysiology

- Intussusceptum = invaginating portion
- Intussuscipiens = receiving portion
- Lead point proximal to ileocecal valve
- Ileocolic invagination most common

Pathophysiology

- Mesentery dragged with intussusceptum
- Venous return obstructed
- Mucosal edema and bleeding ("currant jelly" stools)
- Arterial occlusion
- Intestinal gangrene and perforation

Etiology

- Male:Female = 2:1
- Ages 3 months 5 years
- 60% age < 1 year
- Peaks incidence spring and fall
- Age < 2 years -- Peyer's patches (<10% pathologic)
- Age > 5 years -- 75% underlying lesion
  Polyp, ileal duplication, lymphoma, inverted Meckel's, HSP hematoma

Rotavirus Vaccine (RRV-TV)

- 9/98 - 7/99: 15 cases of intussusception
- Ages 2-11 months
- 87% after first dose (RotaShield)
- 80% within 1 week of vaccine
- 8/15 required surgical resection
- Lymphoid hyperplasia
- NCKP/Minnesota data suggest causation

MMWR July 1999

Diagnostic Findings

- Classic Triad (20-40%) -- colicky abdominal pain, vomiting, bloody stool
- Abdominal pain -- 50-90%, usually first symptom, 4-5 minute episodes, knees to chest, 10-20 minute rest periods
- vomiting -- 60-90%, often bilious
- Bloody stools -- 20-60%, usually after 12 hours of pain

Other Exam Findings

- Elongated RUQ mass
- Absent bowel sounds in RLQ (Dance's sign)
- May palpate intussusceptum in rectum
- Fever to 103F (may develop)
- May present as lethargy, pallor, AMS

Ancillary Tests

- Labs -- nonspecific
- **Abdominal** films **-- normal** early **in** disease. later **ma) see obstruction.** soft tissue mass. **li-cc** air
- . Barium enema **-- diagnostic and** therapeutic, "cervix-like mass". **"coiled-spring" appeal-once** of distal **ileum** after reduction
- **Alr** enema **-- increasing in** popularity use **depends upon** radiologist's preference

Ultrasound

- Detect intussusception / confirm reduction
- "Target sign"
  - Hypoechoic ring / hyperechoic center
- "Pseudokidney sign"
  - Hypoechoic walls / hyperechoic mucosal layers
- One study of 65 patients
  - Sensitivity 100% (95% CI: 83-100%)
  - Specificity 93% (95% CI: 81-99%)

Bhisitkul DM , et al, *J Peds* 1992

Management

- General -- IV fluids, electrolytes (K+), nasogastric tube
- Surgical consultation
- Barium enema -- success rate 50-90%
- Analgesics prn with BE

Pearls and Pitfalls

. **If no** diarrhea. **no** "gastroenteritis"

- **Vomitin,g** without **diarrhea** age < 1 year **= rectal** exam
- Bilious **vomiting** (yellow/green) **is not** normal **in** young **children**
- **Mo>t** do not have classic **triad** of colicky **pain. vomiting. and blood!** stools

Pearls and Pitfalls

- **Pilticnfs** may appear well between episodes
- BE contraindicated **in** perforation or **shuck**
- Pathologic **lead point** very **common** in older children **(age** > 5 years)
- Consider if recent RRV-TV **and** symptoms

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