

29 – Lower Gastrointestinal Disease

Speaker: Herbert L. DuPont, MD

2020 INFECTIOUS DISEASE BOARD REVIEW

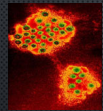
Lower Gastrointestinal Disease

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Disclosures of Financial Relationships with Relevant Commercial Interests

- None

OBJECTIVES



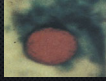
Noroviruses



E. coli



Shigella



Cyclospora

- DESCRIBE CLINICAL CHARACTERISTICS OF VARIOUS FORMS OF ENTERIC INFECTION SYNDROMES AND SEAFOOD-ASSOCIATED ILLNESSES
- OUTLINE METHODS EMPLOYED IN FOODBORNE OUTBREAK INVESTIGATION
- DEFINE THE CURRENT STATUS OF THERAPY OF DYSENTERIC TRAVELERS' DIARRHEA
- EXPLAIN THE IMPORTANT POST-DIARRHEA CHRONIC COMPLICATIONS
- EXPLAIN PRINCIPLES OF WORKUP OF PERSISTENT DIARRHEA

EVALUATION OF CASES OF DIARRHEA KEYS CLINICAL FEATURES SPECIAL SETTINGS

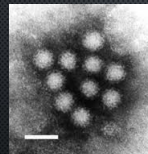
VOMITING AS THE PRIMARY SYMPTOM

- VIRAL GASTROENTERITIS WITH INCUBATION PERIOD: **24 – 48 HOURS**
- FOOD POISONING PERFORMED TOXIN* OF *STAPHYLOCOCCUS AUREUS* OR *BACILLUS CEREUS* WITH INCUBATION PERIOD: **2-7 HOURS**



Clostridium perfringens* food Poisoning preformed toxin causes watery diarrhea without vomiting, incubation period of **8-14 hours

CLINICAL/EPIDEMIOLOGIC CRITERIA FOR DIAGNOSING NOROVIRUS GASTROENTERITIS



Wikipedia

1. NO BACTERIAL CAUSES IDENTIFIED
2. INCUBATION PERIOD **24-48 HOURS**
3. DURATION OF ILLNESS **12-60 HOURS**
4. VOMITING IN **≥ 50%**

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QUESTION #1

WHAT IS NAME OF THESE CRITERIA FOR DIAGNOSING NOROVIRUS INFECTION?

- | | |
|---|------------------------------------|
| A. SMIDT'S SYNDROME | |
| B. KAPLAN CRITERIA | 1. NO BACTERIAL CAUSES IDENTIFIED |
| C. ENTERIC VIRUS CRITERIA | 2. INCUBATION PERIOD 24-48 HOURS |
| D. NON-BACTERIAL GASTROENTERITIS CRITERIA | 3. DURATION OF ILLNESS 12-60 HOURS |
| E. WINTER VOMITING DISEASE CRITERIA | 4. VOMITING IN ≥ 50% |

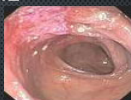
<https://www.cdc.gov/noravirus/trends-outbreaks/responding.html>

INDIVIDUAL CASES KEYS TO ESTABLISH CAUSE

CLINICAL FEATURES
SETTING (EPIDEMIOLOGY)
LABORATORY TESTING

83-YEAR-OLD MAN WITH BLOODY DIARRHEA DEVELOPS RENAL FAILURE

- HE HAS A ONE WEEK HISTORY OF DIARRHEA WITH STOOLS CONTAINING BLOOD; HE UNDERGOES COLONOSCOPY WHICH LOOKS LIKE ISCHEMIC COLITIS
- AS HIS DIARRHEA IMPROVES HIS URINE OUTPUT DECREASES
- SERUM CREATININE IS 9, PLATELET COUNT OF 50,000, HEMATOCRIT 20 AND LDH 1,000.
- STOOL CULTURE ON SORBITOL MACCONKEY AGAR GROWS NO SORBITOL-NEGATIVE *E. COLI* AND STOOL SAMPLE IS POSITIVE FOR SHIGA TOXIN 2 BY EIA
- HE IS TREATED WITH ECULIZUMAB, A HUMANIZED MONOCLONAL ANTIBODY INHIBITS THE TERMINAL SEQUENCE OF COMPLEMENT



Colonoscopy Shows "Ischemic Colitis"



Peripheral Smear Shows Red Cell Fragments

QUESTION #2

WHAT IS THE LIKELY CAUSE OF DYSENTERY AND RENAL FAILURE IN THE ELDERLY MAN?

- A. ISCHEMIC BOWEL DISEASE
- B. NON-O157 SHIGATOXIN PRODUCING *E. COLI* (STEC)
- C. O157:H7 STRAIN OF STEC
- D. *SHIGELLA DYSENTERIAE* 1 (SHIGA BACILLUS)
- E. *CAMPYLOBACTER JEJUNI*



QUESTION #3

A PATIENT DEVELOPS NUMBNESS OF LIPS, BURNING AND TINGLING OF HIS EXTREMITIES, AND ABDOMINAL PAIN AND VOMITING 30 MINUTES AFTER A MEAL IN JAMAICA, PROGRESSING TO RESPIRATORY FAILURE.



WHAT IS THE LIKELY DIAGNOSIS?

- A. SCOMBROID
- B. PARALYTIC SHELLFISH POISONING
- C. CIGUATERA
- D. NEUROTOXIC SHELLFISH POISONING
- E. MONOSODIUM GLUTAMATE TOXICITY

QUESTION #4



- A 65-YEAR OLD CHAIRMAN OF MEDICINE AT A MEDICAL SCHOOL WITH 15 DAYS OF DIARRHEA, PASSING 4-8 WATERY STOOLS PER DAY WITHOUT FEVER OR PASSAGE OF BLOODY STOOLS. HE HAS NOT TRAVELED AND HAD AN INITIAL WORKUP FOR DIARRHEA: STANDARD STOOL CULTURE AND AN ORDER FOR PARASITES THAT INCLUDES A SCREEN FOR *GIARDIA*, *CRYPTOSPORIDIUM* AND *ENTAMOEB*A.

WHICH OF THE FOLLOWING IS THE BEST NEXT APPROACH?

- A. COLLECT 3 STOOLS FOR PARASITES BY EIA
- B. COLLECT 3 STOOLS FOR PARASITES BY PCR
- C. PERFORM MULTIPLEX PCR FOR ENTERIC VIRAL, BACTERIAL AND PARASITIC PATHOGENS
- D. ASK THE LABORATORY TO PERFORM ACID-FAST STAINING OF STOOL FOR PARASITES
- E. GIVE THE PATIENT 1,000 MG AZITHROMYCIN IN SINGLE DOSE

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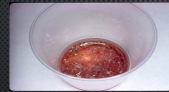
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COMPLICATED CASE OF TRAVELERS' DIARRHEA

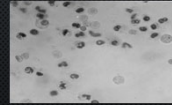


A 35-YEAR OLD WOMAN DEVELOPS DIARRHEA, CRAMPS AND IS PASSING BLOODY STOOLS WITH FEVER WHILE SNORKELING WITH HER FAMILY IN COZUMEL, MEXICO

QUESTION 5



Grossly bloody stool



Many leukocytes of stool microscopically indicate diffuse colonic inflammation

What is the preferred treatment for this patient With dysenteric traveler's diarrhea?

- A. AZITHROMYCIN 1,000 MG
- B. CIPROFLOXACIN 500 MG TWICE DAILY X 3 DAYS
- C. LEVOFLOXACIN 500 MG
- D. RIFAXIMIN 200 MG THREE TIMES/D FOR 3 DAYS
- E. ORAL FLUIDS ONLY

QUESTION 6

She takes three days of ciprofloxacin, a drug she has with her for recurrent urinary tract infection.

Which of the following concerns you the most about this treatment?



- A. COLONIZATION BY ESBL-PRODUCING COLIFORMS
- B. ACHILLES TENDON DAMAGE
- C. C. DIFFICILE INFECTION
- D. INSOMNIA AND IRRITABILITY
- E. SHE WILL RUN OUT OF DRUGS FOR FUTURE UTI

POST-ENTERIC INFECTION DISORDER

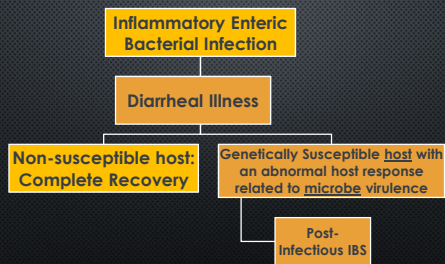
THE PATIENT EXPERIENCES A PROTRACTED COURSE



ABDOMINAL DISCOMFORT AND PAIN & BLOATING ARE NEAR CONSTANT PROBLEMS PRESENT 6 MONTHS LATER – SHE HAS NEVER BECOME WELL, ALTHOUGH THE ILLNESS HAS CHANGED IN CHARACTER FROM DIARRHEA TO ABDOMINAL DISCOMFORT WITH CHANGE IN BOWEL PATTERN (EATING INCREASES PAIN AND DECREASES STOOL FORM)

POST-INFECTIOUS IRRITABLE BOWEL SYNDROME 5-10% AFTER BACTERIAL DIARRHEA

PATHOGENESIS OF POST-INFECTIOUS IBS



POST-ENTERIC INFECTION DISORDER 2

QUESTION 7

Which one of the following represents an antibody-Mediated post- enteric autoimmune complication?

- A. CROHN'S DISEASE
- B. FUNCTIONAL CONSTIPATION
- C. REACTIVE ARTHRITIS
- D. CELIAC DISEASE
- E. WHIPPLE'S DISEASE

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Post-Enteric Infection Disorder 2

- REACTIVE ARTHRITIS AFTER INFECTION BY *SALMONELLA*, *SHIGELLA* OR *YERSINIA* DUE TO AUTOIMMUNE RESPONSES TARGETING EPITOPES COMMON TO PATHOGEN AND JOINT TISSUES



WHAT IS ANOTHER ANTIBODY-MEDIATED POST ENTERIC INFECTION SYNDROME?

POST-ENTERIC INFECTION DISORDER 3

- GUILLAIN-BARRÉ SYNDROME AFTER *CAMPYLOBACTER* INFECTION DUE TO CROSS REACTIVITY BETWEEN ORGANISM AND NEURAL GANGLIOSIDE EPITOPES SEEN IN 1-2/10,000 CASES OF *CAMPYLOBACTERIOSIS*



OUTBREAK INVESTIGATIONS

KEYS
EPIDEMIC CURVE
CLINICAL FEATURES
INCUBATION PERIOD
CASE-CONTROL STUDIES OF CAUSE

QUESTION 8

THREE NON-FAMILY MEMBERS
BEGIN VOMITING 2 HOURS
AFTER EATING AT A LOCAL
ITALIAN RESTAURANT.

WHAT IS THE LIKELY CAUSE?

- A. *SHIGELLA* SPP. FROM RESTAURANT
- B. *STAPHYLOCOCCAL* ENTEROTOXIN FROM RESTAURANT
- C. *CLOSTRIDIUM PERFRINGENS* ENTEROTOXIN FROM RESTAURANT
- D. NOROVIRUS FROM RESTAURANT
- E. FORGET THE RESTAURANT

QUESTION 9

A FOODBORNE OUTBREAK OCCURRED AMONG 100 SCHOOL CHILDREN AND TEACHERS AFTER A SPECIAL LUNCHEON.

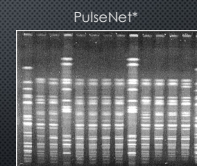
- MEDIAN INCUBATION PERIOD - 28 HOURS
- VOMITING SEEN IN 70%
- DIARRHEA IN 50%
- OBJECTIVE FEVER IN 30%
- RECOVERY OCCURRED IN 12 - 60 HOURS

WHAT IS THE LIKELY CAUSE OF THE OUTBREAK?

- A. NOROVIRUS
- B. *SHIGELLA SONNEI*
- C. ENTEROTOXIN FROM *STAPHYLOCOCCUS AUREUS*
- D. *CLOSTRIDIUM PERFRINGENS*
- E. *BACILLUS CEREUS*

AN EPIDEMIC OF SHIGA-TOXIN (STX) PRODUCING *E. COLI* (STEC) O157:H7

- ON MAY 19, 2009, THE PULSENET NATIONAL MOLECULAR SUBTYPING NETWORK FOR FOODBORNE DISEASE SURVEILLANCE IDENTIFIED A CLUSTER OF 17 CASES OF *E. COLI* INFECTION FROM 13 STATES WITH IDENTICAL PFGE PATTERN
- CASES OCCURRED BETWEEN MARCH 1 AND JULY 31, 2009



- Developed in 1996, two enzymes cut bacterial DNA, with an electrical
- Current moves DNA according to size showing unique banding patterns

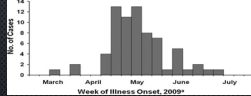
PFGE being combined with WGS

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EPIDEMIC CURVE - CASES BY DAY OF THE EPIDEMIC

Step 1: Outbreak Investigation



- 77 CASES WERE IDENTIFIED FROM 30 STATES WERE IDENTIFIED
- THE MEDIAN AGE WAS 15 YEARS, 71% WERE FEMALES
- 55% WERE HOSPITALIZED, 18% DEVELOPED HUS AND NONE DIED

CASE CONTROL STUDY PERFORMED TO IDENTIFY THE SOURCE

STEP 2: OUTBREAK INVESTIGATION

- CONTROLS WERE FOUND FROM CORRESPONDING HEALTH DEPARTMENTS WITH NON-STEC ENTERIC INFECTION
- CONVENTIONAL STEC RISK FACTORS* WERE NOT FOUND

*Ground beef, raw dairy products, leafy green vegetables, wading pools and animal contact

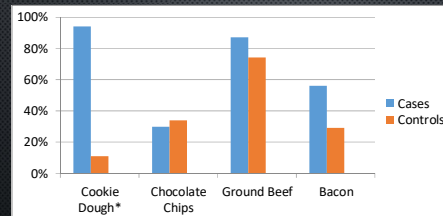
A CASE CONTROL STUDY WAS PERFORMED TO IDENTIFY THE SOURCE

STEP 2: OUTBREAK INVESTIGATION

- OPENED QUESTIONS IN ONE HEALTH REGION FOUND 5/5 ATE READY-TO-BAKE COOKIE DOUGH

A CASE CONTROL STUDY WAS PERFORMED TO IDENTIFY THE SOURCE

STEP 2: OUTBREAK INVESTIGATION



53% of college student reported eating unbaked homemade cookie dough. Byrd-Bredbenner C et al. J Am Diet Assoc 2008;108:549-52.

QUESTION 10

A FOODBORNE OUTBREAK OCCURRED AMONG 100 SCHOOL CHILDREN AND TEACHERS AFTER A SPECIAL LUNCHEON.

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- CLOSTRIDIUM PERFRINGENS
- BACILLUS CEREUS

CONCLUSIONS

1. THE CLINICAL FEATURES AND INCUBATION PERIOD PROVIDE CLUES TO THE CAUSE OF ILLNESS.
2. KNOW HOW TO DIAGNOSE STEC INFECTION (O157 & NON-O157)
3. MOLECULAR CHARACTERIZATION (PULSENET), THE EPIDEMIC CURVE AND CASE CONTROL STUDY ARE KEYS TO FOODBORNE OUTBREAK INVESTIGATION
4. OUTBREAKS REQUIRE PRESENCE OF MULTIPLE NON-FAMILY MEMBERS
5. CONSIDER PHIBS IN PERSONS WITH PERSISTENT ABDOMINAL PAIN AFTER DIARRHEA BOUTS
6. LEARN SEAFOOD SYNDROMES
7. MULTIPLEX PCR WILL HELP DEFINE THE CAUSES OF DIARRHEA AND IS MOST VALUABLE IN WORKUP OF PERSISTENT DIARRHEA

