INFECTIOUS DISEASES UPDATE

3 MAR 2020

INFECTIOUS DISEASES UPDATE

- C DIFF
- ASIAN LONGHORNED TICK
- Chronic pulmonary aspergillosis
- StrS FOR PEP (SINGLE-TABLET REGIMENS FOR HIV POSTEXPOSURE PROPHYLAXIS)
- Antimicrobial stewardship

INFECTIOUS DISEASES UPDATE

- Due to the ongoing sars-cov-2 outbreak, Other topics have been pre-empted for a discussion of CORONAVIRUSES

CORONAVIRUSES

- FIRST DESCRIBED IN 1965
- NAMED FOR THE CROWNLIKE APPEARANCE OF THE SURFACE PROJECTIONS ON ELECTRON MICROSCOPY

CORONAVIRUSES

- SINGLE-STRANDED RNA
- ENVELOPE WITH GLYCOPROTEIN SURFACE PROJECTIONS

CORONAVIRUSES

- PRIMARILY RESPIRATORY PATHOGENS IN HUMANS
- ALSO A CAUSE OF VIRAL DIARRHEA in humans

CORONAVIRUSES

- CAUSE A WIDE VARIETY OF DISEASES IN ANIMALS (respiratory, enteric, hepatic and neurologic)
- MUTATE FREQUENTLY
- READILY INFECT NEW SPECIES

CORONAVIRUSES

- RESPIRATORY DISEASE IN HUMANS OCCURS MORE OFTEN IN THE WINTER AND SPRING
- CAUSE ABOUT 15% OF COMMON COLDS IN ADULTS
- REINFECTION with some coronaviruses IS COMMON (THERE IS A RAPID DIMINUTION OF ANTIBODY LEVELS AFTER INFECTION)

SARS-COV

- SEVERE ACUTE RESPIRATORY SYNDROME
- BEGAN IN CHINA NOV 2002
- CASE FATALITY RATE 7 – 17%
- CASE FATALITY RATE IN THE CHRONICALLY ILL AND THOSE > 65 YEARS OF AGE UP TO 50%

SARS-COV

- WORLD HEALTH ORGANIZATION CONTROL PROGRAM:
  - ISOLATION OF CASES
  - INFECTION CONTROL PRECAUTIONS (CONTACT, DROPLET, AIRBORNE)
  - QUARANTINE
  - TRAVEL ADVISORIES

SARS-COV

- GLOBAL TRANSMISION CEASED BY JUL 2003

SARS-cov

- ORIGINATED IN HORSESHOE BATS
- INTERMEDIATE HOSTS: PALM CIVET, RACCOON DOG (KEPT IN CAGES AND SLAUGHTERED IN MARKETS)

SARS-COV

- PERSON TO PERSON SPREAD: DROPLET TRANSMISSION, DIRECT CONTACT
- MOST INDIVIDUALS TRANSMITTED TO FEW OTHERS (ESTIMATE: 3)
- "SUPERSPREADING EVENTS" DID OCCUR VIA SMALL PARTICLE AIRBORNE TRANSMISSION

SARS-COV

- SPREAD IN HOSPITALS WAS EFFICIENT
- DROPLET AND CONTACT PRECAUTIONS WERE EFFECTIVE IN SUPPRESSING HOSPITAL TRANSMISSION

MERS-COV

- CAUSED SEVERE RESPIRATORY DISEASE OUTBREAKS IN THE MIDDLE EAST IN 2012

SARS-COV-2

- CLUSTERS OF PATIENTS WITH PNEUMONIA OF UNKNOWN CAUSE THAT WERE EPIDEMIOLOGICALLY LINKED TO A WHOLESALE MARKET WERE REPORTED IN DEC 2019 IN WUHAN, CHINA

SARS-COV-2

- STATISTICS 24 FEB 2020
  75,000 CASES
  - 2.7% MORTALITY

SARS-COV-2

- THE ILLNESS WAS FIRST CALLED "NOVEL CORONAVIRUS-INFECTED PNEUMONIA"
- NOW CALLED COVID 19, CAUSED BY SARS-COV-2
- The other coronaviruses that infect humans are as follows:
  - 229E, oc43, nl63, hku1
  - Typically cause common cold symptoms in immunocompetent individuals

SARS-COV-2

- PNEUMONIA OF UNKNOWN ETIOLOGY CASE DEFINITION
  - NO PATHOGEN IDENTIFIED
  - FEVER
  - CXR WITH EVIDENCE OF PNEUMONIA
  - LOW OR NORMAL WBC
  - LOW LYMPHOCYTE COUNT
  - NO IMPROVEMENT AFTER 3 – 5 DAYS STANDARD TREATMENT

SARS-COV-2

- AS THE NUMBER OF CASES GREW, TRAVEL HISTORY WAS ADDED TO THE CASE DEFINITION

SARS-COV-2

- 29 JAN 2020 NEJM (early transmission dynamics in wuhan, china)
- PATIENT CHARACTERISTICS (n=425)
  - MEDIAN AGE 59
  - 56% MALE
  - MEAN INCUBATION 5.2 DAYS

SARS-COV-2

- EACH PATIENT SPREAD INFECTION TO APPROXIMATELY 2.2 OTHER PEOPLE (basic reproductive number based on epidemiologic analysis)

SARS-COV-2

SPREAD SEEMS TO OCCUR MOSTLY BY LARGE DROPLETS AND CONTACT

SUPERSPREADING EVENTS HAVE BEEN IMPLICATED

SARS-COV-2

- The impact of an epidemic depends on the following:
  - The number of people with infection
  - The transmissibility of the infection
  - The spectrum of clinical severity

Sars-cov-2

- How transmissible is it?

Sars-cov-2

- An analysis of 14 patients who had visited wuhan, china, studied sars-cov-2 quantitation (nejm 19 feb 2020 - correspondence)
- One of the patients reported no clinical symptoms (he had fever on initial screening but no symptoms)
- The asymptomatic patient had a similar viral load ANALYSIS to that of the symptomatic patients

SARS-COV-2

- HIGHER VIRAL LOADS WERE DETECTED IN THE NOSE RATHER THAN THE THROAT
- THE VIRAL LOAD FINDINGS IN THE ASYMPTOMATIC PATIENT SUGGEST THAT DISEASE TRANSMISSION MAY OCCUR EARLY IN THE COURSE OF INFECTION

SARS-COV-2

- HOW VIRAL LOAD CORRELATES WITH CULTURABLE VIRUS REMAINS TO BE DETERMINED

SARS-COV-2

- PREVENTION AND TREATMENT

THERE IS CURRENTLY NO VACCINE AVAILABLE

SARS-COV-2

- PREVENTION AND TREATMENT - cdc

THE BEST WAY TO PREVENT INFECTION IS TO AVOID BEING EXPOSED TO THE VIRUS

SARS-COV-2

- PREVENTION AND TREATMENT - CDC:
- WASH YOUR HANDS OFTEN WITH SOAP AND WATER
- AVOID TOUCHING YOUR EYES, NOSE AND MOUTH WITH UNWASHED HANDS
- AVOID CLOSE CONTACT WITH PEOPLE WHO ARE SICK
- STAY HOME WHEN YOU ARE SICK
- CLEAN AND DISINFECT FREQUENTLY TOUCHED OBJECTS AND SURFACES

SARS-COV-2

- CORONAVIRUS EVACUEES IN ALABAMA
  - CENTER FOR DOMESTIC PREPAREDNESS (Anniston, al)
  - Located at the former site of fort mcclellan
  - Opened in 1998
  - Currently managed by the federal emergency management agency

Sars-cov-2

- Coronavirus evacuees in Alabama
  - The center for domestic preparedness trains first responders in disaster preparedness and response
  - Fema announced a plan on sat 22 feb to transport an unknown number of patients from the diamond princess (a cruise ship docked in japan) to the Anniston facility

Sars-cov-2

- Coronavirus evacuees in Alabama
  - By Sunday 23 feb, gov ivey and others announced that the plan to transport evacuees to Alabama had been scuttled
  - The center for domestic preparedness is a training facility, not a quarantine site

Sars-cov-2

- Other Alabama connections

Dr Richard whitley, a virologist at uab, has a grant from the national institutes of health to develop antiviral agents

Sars-cov-2

- One of the promising agents under investigation is remdesivir
  - An adenosine nucleotide analogue prodrug with broad-spectrum activity against several rna viruses
  - The active metabolite interferes with viral rna polymerase

Sars-cov-2

- Based on pre-clinical studies of remdesivir against sars-cov and mers-cov, a randomized, controlled, double-blind trial has been designed to evaluate the efficacy and safety of remdesivir in patients hospitalized with severe sars-cov-2 respiratory disease

Sars-cov-2

- Remdesivir trial
  - 452 participants
  - Start date 6 feb 2020
  - Estimated study completion date 1 may 2020

Sars-cov-2

- Remdesivir trial
  - Rdv 200mg loading dose on day 1, followed by 100mg iv daily doses for 9 days
  - Rdv placebo 200mg loading dose on day 1, followed by 100mg iv daily doses for 9 days

Sars-cov-2

- Remdesivir trial outcome measures
  - Death
  - Icu requiring ecmo and/or invasive mechanical ventilation
  - Icu/hospitalization requiring non-invasive ventilation or high flow oxygen administration
  - Hospitalization requiring supplemental oxygen
  - Hospitalization not requiring supplemental oxygen
  - Hospital discharge

Sars-cov-2

- Remdesivir trial inclusion criteria
  - 18 years and older
  - Rt-pcr confirmed infection with sars-cov-2
  - Lung involvement confirmed with chest imaging
  - Hospitalized with hypoxemia
  - 12 days or fewer since illness onset

Sars-cov-2

- Remdesivir study exclusion criteria
  - Physician decision that trial involvement is not in the patient's best interest
  - Severe liver disease
  - Pregnant or breastfeeding
  - Severe renal impairment or on dialysis
  - Patient will be transferred to a non-study site hospital within 72 hours
  - Receipt of any experimental treatment for sars-cov-2 within 30 days of enrollment

PRECAUTIONS

- STANDARD/UNIVERSAL
- AIRBORNE
- DROPLET
- CONTACT

STANDARD PRECAUTIONS

- EYE, MOUTH, NOSE PROTECTION: FOR ACTIVITY LIKELY TO GENERATE A SPLASH, SPRAY OR AEROSOL
- GOWNS: FOR ACTIVITY LIKELY TO GENERATE A SPLASH OR SPRAY
- GLOVES: FOR CONTACT WITH ANY BODY FLUID, MUCOUS MEMBRANE, OR NONINTACT SKIN
- HAND HYGIENE: BEFORE AND AFTER PATIENT CONTACT

CONTACT PRECAUTIONS

- SINGLE-PATIENT ROOM, DOOR MAY REMAIN OPEN
- DISPOSABLE PATIENT-CARE EQUIPMENT OR DEDICATE TO A SINGLE PATIENT
- GOWNS: FOR ENTERING THE ROOM
- GLOVES: FOR ENTERING THE ROOM

DROPLET PRECAUTIONS

- SINGLE-PATIENT ROOM
- DOOR MAY REMAIN OPEN
- SURGICAL MASK FOR ENTERING THE ROOM
- SURGICAL MASK ON PATIENT FOR TRANSPORT OUT OF THE ROOM

AIRBORNE PRECAUTIONS

- NEGATIVE PRESSURE, SINGLE-PATIENT ROOM WITH AIR EXHAUSTED OUTSIDE OR THROUGH HEPA FILTERS
- DOOR REMAINS CLOSED

AIRBORNE PRECAUTIONS

- N95 OR PORTABLE RESPIRATOR FOR ENTERING THE ROOM
- SURGICAL MASK ON PATIENT FOR TRANSPORT

Infectious diseases update

- questions