Epidemiology of respiratory infections- IV

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Whooping cough

- acute infectious disease
- caused by B.pertussis
- onset with mild fever, irritating cough
- characteristic WHOOP with cyanosis and vomiting
- HUNDRED DAY COUGH
- public health problem even in countries with high vaccination coverage
- lethal disease in infants and young unvaccinated children
- increasingly reported in older children, adolescents and adults
- India- 2011- 39091 cases

Epidemiology

- < 5% B. parapertussis
- B. pertussis- occurs in smooth and rough phases, capsulated and non capsulated forms, elaborate an exotoxin and endotoxin
- disease associated with encapsulated phase 1 strain
- 3 major agglutinogens- 1,2 and 3
- source- infects only man, mild, missed and unrecognized cases
- no subclinical or chronic carrier state
- infective material- nasopharyngeal and bronchial secretions, fomites
- most infectious during catarrhal stage

•Secondary attack rate- 90% in unimmunized household contacts

host factors- infants and preschool children, 20-30 months

• highest mortality below 6 months

• sex- incidence and fatality are more in females

• immunity- second attacks in persons with declined immunity.

Environmental factors-

More cases during winter and spring months

greater in lower social classes and with overcrowding.

Mode of transmission- droplet infection and direct contact

Freshly contaminated fomites

Incubation period- 7-14 days

Clinical course

• produces local infection

•Multiplication on surface epithelium of respiratory tract, inflammation, necrosis, secondary bacterial invasion

• three stages

Catarrhal stage- 10 days lacrimation, sneezing, coryza, anorexia

Paroxysmal stage- 2-4 weeks, bursts of rapid consecutive cough, followed by deep high pitched inspiration (whoop), usually followed by vomiting, may be cyanosis and apnoea.

Convalescent stage- 1-2 weeks

•Complications- 5-6% of cases; bronchitis, bronchopneumonia, bronchiectasis.

•Violent paroxysms may precipitate- subconjunctival haemohhrages, epistaxis, haemoptysis, punctate cerebral haemorrhages, may cause convulsions and coma.

Control of whooping cough

• cases- early diagnosis of nasopharyngeal swabs, rapid diagnosis through fluorescent antibody technique

• isolation of case till becomes non infectious

• erythromycin- drug of choice 30-50 mg/kg body weight in 4divided doses for 10 days

• alternatives- ampicillin, tetracycline, septran

• contacts- infants and young children should be kept away from cases

Active immunization

- as combined DPT, DTWP or DTaP vaccine.
- India- 3 doses 0.5 ml I/M, 1 month apart, starting at 6 weeks
- booster at 18-24 months
- only acellular vaccines to older children or adults
- protection 85%
- duration of protection 6-12 years
- All infants including HIV positive should be immunized.
- Untoward reactions- persistent screaming, collapse, local reactions, mild fever, irritability
- rarely- inconsolable screaming, seizures, hypotonic, hypo-responsive episodes, anaphylactic reaction, very rarely

Contraindications

- anaphylactic reaction
- encephalopathy
- personal or strong family history of epilepsy
- convulsions or similar CNS disorders
- any febrile upset until fully recovered**.**

Passive immunization- no evidence of efficacy as yet

Severe acute respiratory syndrome (SARS)

- communicable viral disease
- new strain of coronavirus
- fever, malaise, chills, headache, mayalgia, dizziness, cough, sore throat and running nose
- Some cases rapid deterioration with low oxygen saturation, acute respiratory distress
- death in 10%
- X-ray chest- unilateral patchy shadowing, followed by bilateral generalized with infiltration

Problem statement

Earliest traced in healthcare worker in China in 2002

Rapid spread to Hong Kong, Singapore, Vietnam, Taiwan and Toronto

As of 2003, 8422 cases were reported to WHO from 30 countries with 916 fatalities

Incubation period

2-7 days

Mode of transmission

•Direct or indirect contact of mucous membranes of eyes, nose or mouth with respiratory droplets or fomites

• aerosol generating procedures- endotracheal intubation, bronchoscopy, nebulization treatments, amplify transmission

• virus is shed in stools

• horse shoe bat is natural reservoir

Case- notification of SARS under international health regulation 2005

Individual with laboratory confirmation of infection with SARS coronavirus who either fulfils the clinical case definition or has worked in laboratory handling live SARS- Coronavirus or storing clinical specimens infected with SARS- Coronavirus.

Clinical case definition

1.History of fever or documented fever

AND

2. One or more symptoms of respiratory tract infection (cough, difficulty of breathing, shortness of breath)

AND

3. Radiographic evidence of lung infiltrates consistent with pneumonia or acute respiratory distress syndrome (ARDS) or autopsy findings consistent with pathology of pneumonia or ARDS without an identifiable cause

AND

4. No alternative diagnosis fully explaining the illness.

Diagnostic tests for lab. Confirmation

Reverse transcriptase PCR detecting viral RNA in

1. At least 2 different clinical specimens e.g. nasopharyngeal and stool specimen

OR

2. Same clinical specimen collected on 2 more occasions during the course of illness

OR

3. New extract from original clinical sample tested positive by 2 different assays or repeat RT-PCR on each occasion

OR

4. Virus culture from any clinical specimen

ELIZA and Immunosorbent assay (IFA)

Every single case of SARS must be reported to WHO

• health care workers involved in aerosol generating procedures account for 21% of cases

• maximum virus excretion usually on day 10

• children rarely affected

• international flights associated with transmission from probable cases to passengers or crew

• WHO recommends exit screening during epidemic period.

Complications

Pulmonary decompensation

ARDS in 16%

20-30% require intubation and mechanical ventilation

Treatment

• intensive support

• Ribavirin, Lopinavir, interferon type 1, intravenous immunoglobulin, systemic corticosteroids used during 2003 epidemic but with little efficacy.

Prognosis

• overall mortality 14%.

• age related

• poor prognostic factors- advanced age, chronic hepatitis B treated with Lamivudine, high lactate dehydrogenase, high neutrophil count, diabetes mellitus, acute kidney disease, low CD4, CD8 counts

Prevention

1.Prompt identification of persons with SARS, their movements and contacts

2.Effective isolation of SARS cases in hospitals

3.Appropriate protection of medical staff treating cases

4.Comprehensive identification and isolation of suspected cases

5.Simple hygienic measures like hand washing, use of appropriate and well fitting mask, introduction of infection control measures

6.Exit screening of international travellers

7.Timely and accurate reporting and sharing of information with other authorities and governments