Epidemiology of respiratory infections- III

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- Respiratory tract infection
- Influenza virus A, B and C
- International disease
- Unpredictable behaviour
- Pandemics every 10-15 years
- Antigenic changes
- Influenza A epidemic 2-3 years, 4-7 years influenza B

•**Epidemic begins-** increased febrile respiratory illness in children, followed by same in adults, increased hospitalization, sickness absenteeism in schools and places of work, declines in 3-4 weeks,

•Suddenness, short incubation period, large no. of subclinical cases, high proportion of susceptible population, short immunity, absence of cross immunity

- 3 types- AH1N1, AH3N2 and B viruses
- family orthomyxoviridae
- viral subtypes A, B, C
- A and B involve in epidemics

•Surface antigens- Haemoglutinin H and Nuraminidase N

• unique antigenic variation, sudden complete or major change- shift

• gradual over a period of time- drift

• shift due to genetic recombination causes major epidemic or pandemic

• drift- point mutation

• C-antigenically stable

• **reservoir-** animals and birds, wild, swine, horses, dogs, cats, domestic poultry, wild birds

•**source**- case or subclinical case

• **period of infectivity-** 1-2 days before and 1-2 days after onset of symptoms

Host factors

• all ages, both sexes

• children important link

• **high risk groups-** old people, children under 18 months, diabetes, chronic heart disease, kidney and respiratory illness

Environmental factors- winter, tropical countries- throughout year, overcrowding enhances transmission

Modes of transmission- droplet infection, droplet nuclei

Incubation period- 18-72 hrs

Clinical features- fever, chills, aches, cough, generalized weakness

Complications- acute sinusitis, otitis media, bronchitis, pneumonia, Reye's syndrome

Lab diagnosis- nasopharyngeal secretions, indirect fluorescent antibody technique

Prevention- good ventilation, avoidance of crowded places, sufferers cover their faces, stay at home

WHO recommendations-

Hygiene practices

Vaccines

Killed- inactivated- single inoculation, 2 doses, separated by 3-4 weeks, immunity 6-12 months, revaccination annually

Live attenuated- trivalent, single dose, intranasal spray

Contraindication- severe allergy to chicken eggs, H/O anaphylaxis, Gillian Barre syndrome, less than 6 months of age

Antiviral drugs- Oseltamivir, Zanamivir

Diphtheria

- acute infectious disease caused by corynebacterium diphtheriae.
- three clinical types- anterior nasal, faucial and laryngeal
- skin, conjunctiva, vulva and other body parts may be affected.
- bacilli multiply locally, elaborate exotoxin
- formation of grayish, yellowish membrane- false membrane on tonsils, pharynx and larynx cannot be wiped away
- marked congestion, edema, local tissue destruction
- enlargement of regional lymph nodes
- signs and symptoms of toxemia
- 10% fatality in untreated and 5% in treated

Problem statement

- rare in most developed countries
- India- endemic disease
- declining trend
- due to increasing immunization coverage
- 2011- 4286 cases, 112 deaths
- case fatality rate- 2.61

Epidemiological determinants

Agent- C. diphtheriae, gram positive, non motile

- no invasion power, but produces powerful exotoxin
- 4 types- gravis, mitis, belfanti and intermidius
- gravis infection more severe
- bacteriophage- beta phage carries gene for toxin production
- can affect heart leading to myocarditis or nerves leading to paralysis
- source of infection- case- subclinical to frank clinical
- carrier- common source, can be tempoprary or chronic, nasal or throat

•May last for a month or year or till treated

• incidence- 0.1-5%

• immunization does not prevent carrier state

• infective material- nasopharyngeal secretions, discharges from skin lesions, contaminated fomites and infected dust

• period of infectivity- 14-28 days from onset of disease

Host factors-

• age- 1-5 yrs

• sex- both

•Immunity- acquired immunity through unapparent infections

•Herd immunity over 70% necessary to prevent epidemic spread

Environmental factors-

- all seasons
- winters favors spread

Mode of transmission-

Droplet infection, infected cutaneous lesions, objects like cups, thermometers, toys, pencils contaminated by nasopharyngeal secretions of patients

Portal of entry

- respiratory- commonly
- non respiratory routes- may be skin with cuts, wounds, ulcers, umbilicus in newborn
- occasionally- eye, genitalia or middle ear
- incubation period- 2-6 days, occasionally longer
- **clinical features –**
- pharyngotonsillar, laryngotracheal, nasal
- sore throat, difficulty in swallowing, low grade fever
- mild erythema, localized exhudate, pseudo membrane
- early stages- whitish, wipe off easily then thick, blue white or grey black and adherent.

• attempts to remove the membrane result in bleeding

• **bull necked appearance-** marked edema of submandibular area, anterior portion of neck with lymphadenopathy.

• **laryngotracheal**- fever, hoarseness, croupy cough, prostration, dyspnoea because of obstruction caused by membrane

• distant damage due to toxin- parenchymal degeneration, fatty infiltration, necrosis in heart muscle, liver, kidneys, adrenals, gross hemorrhage sometimes

• difficulty with vision, speech, swallowing or movement of arms or legs, paralysis of soft palate, eye muscles or extremities

• **nasal**- mildest form,

• **cutaneous-** seen in tropical areas.

Control of diphtheria

Cases and carriers

Early detection- active detection in family and school contacts

carrier detection by culture

swabs from nose and throat

Isolation- for at least 14 days in hospital cases, carriers

2 consecutive swabs taken 24 hrs apart should be negative.

Treatment- cases-

Diphtheria antitoxin- IM or IV in doses 20,000 to 1,00,000 units or more

test dose of 0.2 ml subcutaneously

in addition- penicillin or erythromycin for 5-6 days.

Contacts