**Family and Community Medicine Dept**

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**PERTUSSIS (WHOOPING COUGH)**

**Objectives:**

-Define the disease; describe the mode of transmission, epidemiology of the disease.

- Designate diagnosis, complications.

- Enlist Prevention and control measures for (case, contacts and school).

**Pertussis is acute highly infectious disease of children.**

**Causative Organism:** Bordetella Pertussis (Pertussis bacillus).

**Reservoir of Infection:** Man, cases whether typical, or mild not showing the paroxysms, [No Carriers].

The organisms find exit in respiratory discharges.

**Modes of Transmission:**

1-Direct droplet infection; direct case – contact infection is the main mode of spread.

2-Air borne infection, with in short distance of the case.

 3-Using soiled articles & fomites.

In vaccinated populations, bacteria are frequently brought home by an older sibling.

When the source of whooping cough was identified, mothers were responsible for 30-40% of infant infections.

**Incubation period:** Average 9-10days (range 6-20days).

**Infectivity:**

* Untreated Cases: from onset of disease, and for 3 weeks after onset of characteristic paroxysmal coughing, infectivity is highest during the early catarrhal stage.
* Treated Cases: specific antibiotics therapy eliminates infection in about 7 days after starting treatment.

**Clinical Picture:** Pertussis is a local disease of respiratory tract.

* In apparent [atypical] Cases: do not show the typical paroxysms, and so are difficult to diagnose clinically, they are met with partly immune children & young adults.
* Typical untreated Cases: they pass through the following stages:
* **Catarrhal stage:** 1-2 weeks, insidious onset, with slight or no fever; upper respiratory catarrh; rhinitis, sneezing, dry irritating cough & lacrimation. This is the stage of maximum infectivity
* **Paroxysmal stage:**2-4 weeks, paroxysmal attacks of spasmodic coughing.

Can be more frequent at night. Each attack followed by characteristic whoop with expectoration of tenacious clear mucus & vomiting.

Maximum complications occur in this stage.

* **Convalescence:** 1-6 weeks, begins when whooping & vomiting stop, though coughing may persist for some weeks thereafter.

**Treated Cases**: treatment eliminates infection and the case progressively improves in short time.

**Period of Communicability of Pertussis:** Pertussis is highly communicable, as evidenced by secondary attack rates of 80% among susceptible household contacts.

Persons with pertussis are most infectious during the catarrhal period and the first 2 weeks after cough onset (i.e., approximately 21 days).

**Complications:** Arise from increased pressure during attacks of paroxysmal coughing, secondary bacterial infection, & malnutrition.

Complications occur in 5-6% of cases, most frequently in infants aged less than 6 months.

**In infants** —complications from whooping cough are more severe and may include:

* Pneumonia
* Slowed or stopped breathing
* Dehydration or weight loss due to feeding difficulties
* Seizures
* Brain damage

Because infants and toddlers are at greatest risk of complications from whooping cough, they're more likely to need treatment in a hospital. Complications can be life-threatening for infants younger than 6 months old.

**Possible complications of pertussis in older children and adults**Complications in older children and adults are usually much less serious than those in infants and young children.

**May include:**

* Nose bleeds and burst blood vessels in the white of the eye from intense bouts of coughing
* Bruised ribs as a result of intense coughing
* Hernia due to intense coughing
* A swollen face
* Ulcers on the tongue and mouth
* Ear infections such as otitis media

**Fatality:** Severe unmanaged cases, especially in infants & young children, are exposed to high case fatality, caused mainly by bronchopneumonia, enteritis, and cerebral complications, the majority of deaths reported below three years of age.

**Pertussis Mortality:** Death from pertussis occurs rarely but young infants <6 months of age are most at risk.

**Risk factors for mortality**

* Female sex
* BW <2500 grams
* Apgar score <8
* Mother with <12 years of education

In developed countries, lethality of pertussis is very low (<1/ 1000), whereas in developing countries the average mortality is estimated at 3.9 % infants and 1% in children aged 1-4 years.

**Diagnosis:**

**Clinical:** based on finding the typical paroxysmal attacks of coughing, ending in high pitched inspiratory whoop.

**Laboratory:** Diagnosis of pertussis should only be attempted in patients with symptoms compatible with pertussis, such as prolonged coughing with paroxysms and/ or whooping or choking.

In infants, older vaccinated children, adolescents and adults the clinical course may not be typical, and prolonged coughing may be the only symptom. In these cases, diagnosis of pertussis requires laboratory methods for confirmation.

Direct and indirect diagnostic tests are available.

 Direct tests are real-time polymerase chain reaction (PCR) and culture whereas serological tests measure specific antibodies.

Pertussis can only be recovered in first 3-4 weeks of illness, very hard to culture.

**Susceptibility**

1-Begins at birth, no maternally acquired immunity

2-The highest around school age [ 5-7] years, and almost all become immune by the age of 15 years.

3-Sex; incidence and fatality being more in females than in males.

4-The whooping cough vaccine received as a child in time wears off. This leaves most teenagers and adults susceptible to the infection during an outbreak — and there continue to be regular outbreaks.

Pertussis remains endemic worldwide and tends to be a cyclic disease, peaking every3-5 years.

**Reasons for rising incidence of whooping cough**

* Waning of vaccine- and infection-induced immunity (wanes after 5-10 years)

~ 15 years after active disease

 ~ 5-10 years after vaccination

* Increased recognition and reporting
* Availability of better diagnostic tests
* Use of less potent pertussis vaccines
* Emergence of vaccine-resistant strains

**Prevention:** General preventive measures of respiratory [droplet] infection must be followed, but specific prevention is the effective measures by immunization [active & seroprophylaxis], and chemoprophylaxis.

* **Active Immunization:** By Pertussis vaccine & toxoid.

The main aim of pertussis vaccination is to reduce the risk of severe pertussis in infancy.

* **Immunity against pertussis**Vaccination against pertussis does not give life-long immunity
* Individuals who have had pertussis can become re-infected and spread infection to others
* This spread of infection is important particularly in children too young to be vaccinated

**Pertussis Toxoid:** since the major Pathogenicity of the disease [Pertussis bacillus] is due to secreted exotoxins, Pertussis toxoid was developed from formal- inactivated, a cellular [cell free] toxoid, giving better protection & less reaction than the vaccine. aP (a cellular pertussis).

Pertussis vaccine is killed vaccine, used in form of DPT or DPT, HBV, Hib vaccine for children below 4 years. **old vaccine.**

Vaccination of pregnant women is likely to be the most cost-effective additional strategy for preventing disease in infants too young to be vaccinated and appears to be more effective and favorable than isolating.

Pertussis vaccine **(old)** must not be given to:

* all children over 4 years
* at risk, below 4 years children
* Cases of convulsions; history given by the mother
* History of epilepsy in 1st degree relatives
* Those showing adverse reaction after giving vaccine; further doses should not be given. (give DT).
* **Contraindications to new vaccine**
* A confirmed anaphylactic reaction to a previous dose of diphtheria, tetanus, pertussis or poliomyelitis containing vaccine. A confirmed anaphylactic reaction to any component of the vaccine.
* If the subject has experienced an encephalopathy of unknown etiology, occurring within 7 days following previous vaccination with pertussis- containing vaccine.
* To subjects who have experienced transient thrombocytopenia or neurological complications following an earlier immunization against diphtheria and/or tetanus.
* Pertussis vaccine or DPT must not be given to those having infection, until becoming well.
* **Health Education:** of parents, for basic knowledge of the disease & the protective value and precautions with the vaccination.
* **Seroprophylaxis:** antipertussis immunoglobulin; 2.5 ml IM, can be given to protect susceptible intimate contacts, especially infants & young children. Protective value, however, is not certain. So far, there is no evidence of its efficacy in well-controlled trials, so chemoprophylaxis is preferred.
* **Chemoprophylaxis:** oral erythromycin or clarithromycin can be given in proper dosage, for 5 days after the last contact with the case.
* **If within 3 weeks of exposure**, prophylaxis recommended for all household and close contacts (regardless of age or vaccination status).
* **If 3 weeks have passed since exposure**, still consider prophylaxis for households with high risk contacts:
* Young infants
* Pregnant women
* People who have contact with young infants.

**Control**

Control measures are taken for:

* Cases
* Contacts
* School

**1- Control of Cases:**

* Reporting to local health authority.
* Isolation at home; practically difficult to fulfill, since the majority of cases are mild, with no or slight fever, they usually move in the community and go to school, and so spread infection to exposed susceptible children.

---- Infants younger than 6 months generally require hospitalization. Approximately half of babies less than 1 year old who get pertussis need treatment in the hospital.

----- Cases should be removed from the presence of young infants, especially non-immunized infants, until the patients have received at least 5 days of a minimum 14 days course of antibiotics.

---- Suspected cases who do not receive AB should be isolated for 3 weeks.

----- Concurrent disinfection of respiratory discharges; & any soiled objects, and terminal cleaning & airing of the room.

* **Treatment:** Primary role of treatment is to accelerate clearance of organisms and limit transmission

-Treat as late as 3 weeks after cough onset if age >1 year

-Treat as late as 6 weeks after cough onset if age <1 year

-Treatment during catarrhal or early paroxysmal stage may modify duration and severity of illness

Otherwise treatment generally does not affect clinical course.

* The antibiotic erythromycin or azithromycin is a front-line treatment.

Newer macrolides are frequently recommended due to lower rates of side effects.

* Trimethoprim- sulfamethoxazole may be used in those with allergies to first line agents or in infants who have a risk of pyloric stenosis from macrolides.

* Effective treatments of the cough associated with this condition have not yet been developed.
* **Proper feeding**
* **Release:** pupils can return to school; with proper chemotherapy [ one week after starting AB], with no, or not sure of chemotherapy [ 3weeks after onset of whooping stage, and satisfactory general condition].

**2- Control of Contacts:**

 **Protection of contacts:** passive immunization is not effective, and the initiation of active immunization to protect against recent exposure is also not effective.

Inadequately immunized household contacts less than 7 years of age should be excluded from day care center for 21 days after last exposure or until cases & contacts receive 5 days course of AB.

Close contacts under 7 years who not received 4doses of pertussis vaccine or have not receive a dose within 3years should be given a dose as soon as after exposure as possible.

A 7 days course of erythromycin or clarithromycin for household & other close contacts, regardless of immunization status and age is recommended.

**Control of Pertussis in School:** when case appear in school:

* Isolation of cases, and return to school according to case management.
* Segregation of susceptible family contacts for 2 wks.
* Surveillance of susceptible school contacts for 2wk, to exclude any; once respiratory catarrh appears.
* Surveillance of all school children until no more cases appear [ case finding]
* Chemoprophylaxis of susceptible family & school contacts.

**SCHEDUALE of ACTIVE IMMUNIZATION in IRAQ (CHILDREN)up date**

|  |  |
| --- | --- |
| Age &dose | Vaccine |
| After birth (1st week | BCG, OPV (0 dose), HBV (within 24hr) |
| 2 Months1st dose | [DaPT, Hib, HBV, IPV] & Rota virus & OPV(السداسي)+Pneumococcal |
| 4Months 2nd dose | [DaPT, Hib, HBV, IPV] & Rota virus &OPV +Pneumococcal |
| 6Months 3rd dose  | [DaPT, Hib, HBV, IPV] & Rota virus &OPV +Pneumococcal |
| 9Months | Measles vaccine + vit A (100.000 IU) |
| 15 Months {1st dose}  | MMR |
| 18 Months | الخماسي [ DaPT, Hi b, HBV], OPV {1ST booster dose} + vit A (200.000IU) |
| 4- 6 Years  |  ) الرباعيDaPT, Hib), OPV (2N D booster dose), MMR (2nd dose) + vit A (200.000IU) |