بنام خداوند جان و خرد
Measles (Rubeola)

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Measles

• Measles is one of the most highly transmissible contagious human disease usually of childhood.

• Measles virus (MV) belongs to the genus Morbillivirus of the family Paramyxoviridae.

• Wild type measles virus is pathogenic only for primates.
Chemical and Antigenic composition

• Measles virus encodes at least eight structural proteins.

• These have letter names and include the following: F, C, H, L (large), M (matrix), N, P, and V.
Chemical and Antigenic composition

• The **major receptor** for measles virus is the signaling lymphocyte activation molecule (SLAM); CDw150); **wild type virus enters mainly using this receptor.**

• **SLAM** is a membrane glycoprotein that is expressed on **T and B lymphocytes** and antigen – presenting cells which accounts for its lymptropism **and immunosuppressive effects.**
Measles

• Measles is still one of the most common infectious killers of children in the world, especially in developing countries.

• In Iran, during the prevaccine era, 150,000 - 500,000 cases of measles were reported annually with a death rate of 10% to 15%.
Spread of Infection

- The measles virion is very labile; it is sensitive to proteolytic enzymes, strong light, and drying.

- The virus, however, remains infective in droplet form in air for several hours, especially under conditions of low relative humidity.
Spread of Infection

• This latter fact may account for the increased incidence of measles in winters.
Spread of Infection

Measles is spread by direct contact with droplet from respiratory secretions of infected persons and also by airborne route.
Spread of Infection

Measles is most infectious during the late prodromal phase of illness, when cough and coryza are at their peak.

However, the disease is probably contagious from several days before until several days after the onset of rash.
Spread of Infection

• Airborne spread of measles in physician’s offices and in a sport complex has been observed.
Clinical manifestation

• The incubation period of measles is 10 to 14 days; it is often somewhat longer in adults than in children.
Prodromal phase

• Lasting several days begins with malaise, fever, anorexia, conjunctivitis and respiratory symptoms.; such as cough, and coryza and may resemble URI especially in infants and young children.
• Toward the end of the prodromal, just before the appearance of the rash, Koplik spots appear.
• Koplik spots, are pathognomonic for measles.
• First noted by Koplik in 1896.
• They consist of bluish gray specks on a red base.
Measles

• Rash begins 2 - 4 days after the initial symptoms appear.
Measles Rash

• The rash of measles usually begins on the **face** and progresses cephalocaudally to the torso (trunk, chest) and extremities, including **palms and soles**

• Thus assessing the pattern of rash evolution is **essential** to identify measles patients.
Measles Rash

• During the healing phase, the involved areas (except palms and soles) **may desquamate.**
Pathogenesis

- MV was thought to infect by invasion of the respiratory epithelium from which it spreads to the local lymphnode, blood, spleen, lymphatic tissue, lung, thymus, liver, bladder, intestine conjunctiva and skin.

The major infected cell in the blood is the monocytes
Pathogenesis

- Infection of the entire respiratory mucosa accounts for cough and coryza that are classic signs of measles.

- In addition measles may directly cause croup, bronchiolitis, and pneumonia.
Pathogenesis

• It has been postulated that the skin and mucous membrane manifestations of measles actually represent hypersensitivity of the host to virus.

• If hypersensitivity is the actual cause of the rash, however, it is probably mediated by cellular rather than humoral immunity.
Pathogenesis

• Patients with deficiencies in CMI, may develop after an exposure to measles or if measles vaccine is given (Hecht’s pneumonia).
Fig. 5.17 Measles giant cell pneumonia. Extensive ill-defined opacities with air bronchograms. The changes are more marked on the right than the left.
MEASLES GIANT CELL PNEUMONIA
Immunity

• Immunity to measles after an attack of the disease appears to be lifelong, rarely second attacks of measles have been reported after natural infection.

• Similarly, after measles vaccination, immunity is of many years’ duration and probably lifelong in most persons.
Immunity

• Antibody formation
• Cellular immunity
Special Consideration

- Modified Measles
- Atypical Measles
- Immunocompromised patients
- Pregnant Women and their Offspring
- Persons with Tuberculosis
- Occurrence in Adults
Immunocompromized patients

• Severe measles may occur in those with compromised or deficient cellular immunity.

* Malignant diseases
* Transplantation
* HIV/AIDS
• Oncology patients:
  - CFR 70%
  - No rash 40%
  - Pneumonitis 58%
HIV/AIDS

- CFR 40%
- No rash 27%
- Pneumonitis 82%
• A chronic form of encephalitis resembling SSPE, often with concomitant pneumonia has been reported in those with deficient cellular immunity.
Modified Measles

• An extremely mild form of measles has been observed in persons with some degree of passive immunity to virus.

* Babies younger than 1 year who have passively acquired maternal antibody to measles virus.

* Susceptible persons who received immune globulin after an exposure to measles.
Modified Measles

- The symptoms of modified measles are variable, and certain classic symptoms, such as the prodromal period, conjunctivitis, Koplik spots, and rash may be absent.
- The incubation period may be prolonged.
CLINICAL MANIFESTATION

3. Atypical measles syndrome:

- Recipients of killed measles virus vaccine, who later come in contact with wild-type measles virus.
- Distinguished by high fever, severe headache, severe abdominal pain, often with vomiting, myalgias, respiratory symptoms, pneumonia with pleural effusion

Exanthem:

- First appears on the palms, wrists, soles, and ankles, and progresses in a centripetal direction.
- Maculopapular ➔ vesicular ➔ purpuric or hemorrhagic.
- Koplik spots rarely appear
Pregnant women

- Measles in contrast to rubella, is not known to cause congenital anomalies of the fetus.

- However, measles in pregnancy has been associated with spontaneous abortion and premature delivery.

- Measles can be severe in pregnancy.
Offspring

• Measles in the Offspring of mothers with measles ranges from mild → severe.

• It is therefore recommended that infants born to women with active measles be passively immunized with immune globulin at birth.
Tuberculosis

- It has long been though that tuberculosis is aggravated in persons who contract natural measles because of a depression of CMI.
Adults

- When it occurs in adults, it is often a more severe illness.
Adults

- In a series of 3220 young adult military recruits with measles between 1976 to 1979,
  - About 3% developed pneumonia requiring hospitalization.
  - Bacterial superinfection of the respiratory tract occurred in 30% and 17% had evidence of bronchopneumonia.
Adults

• 31% had laboratory evidence of hepatitis
• 29% had otitis media
• 25% had sinusitis.
Diagnosis

• Classic measles with cough, coryza, conjunctivitis, Koplik spots, and a Maculopapular rash is easily diagnosed clinically.
Laboratory Diagnosis

• Striking leukopenia (perhaps related to the infection and death of leukocytes.)
Laboratory Diagnosis

- Virus isolation
- Identification of measles antigen or RNA in infected tissues
- Demonstration of a significant serologic response to MV
Virus isolation

• Is technically difficult, and facilities for isolation are not always available.
  - Fatal pneumonia
  - Patients with immunodeficiency, in whom an antibody response may be minimal.
Rapid diagnosis

• Immunofluorescent examination of cells from nasal exudates or from urinary sediment for the presence of measles antigen.
• A sensitive RT- PCR amplification method to demonstrate measles virus RNA is available.
Serologic response

• A **fourfold or greater increase** in measles antibody titer in acute and convalescent serum specimens is considered **diagnostic** for measles.
SSPE

• May be diagnosed by the demonstration of high measles antibody titers in serum and CSF in the presence of a compatible illness.
Serologic tests

- Neutralization: requires propagation of the virus in vitro, is technically difficult and infrequently used.
Serologic tests

• Complement fixation: lacks sensitivity and is rarely used.
Serologic tests

• ELISA: is sensitive and simple to perform and is now widely used.

• False positive and false negative results may occur.

• IgM persists for as long as 1 month.
Therapy

• Supportive therapy, such as antipyretics and fluid as indicated.
• Bacterial superinfection should be promptly treated with appropriate antimicrobials.
Vitamin A

• 200,000 IU administered orally, once daily for two days, has been reported to decrease the severity of measles. Especially in those with vitamin A deficiency.

• Vitamin A pearls: 25000, 50000 U.
Prevention

- Passive Immunization
- Active Immunization
Passive immunization

• Rare occasions when passive immunization against measles with immune globulin must be used.
Passive immunization

- Children with malignant disease (particularly if they are receiving chemotherapy, radiotherapy, or both) and children with significant deficit in CMI including HIV/AIDS.

- Babies younger than 1 year
Passive immunization

• To be effective, passive immunization must be given within 6 days after an exposure.
Passive immunization

- For a healthy infant: 0.25 ml/kg, IM
- For immunocompromized: 0.5 ml/kg (with maximum 15ml.)
Vaccination

• 12 months : MMR
• 18 months : MMR
Vaccination

• Active immunization against measles was developed in the early 1960s.
• Killed vaccine was withdrawn from the market. (atypical measles).
• The first marketed live measles vaccine was the Edmonston B strain.
Edmonston strain

• This vaccine was associated with a fairly high incidence of moderately severe side reactions, such as rash and fever and it was therefore often administered along with a dose of immune globulin.
• Subsequently, more attenuated vaccines were developed from the Edmonston strain.

• Edmonston: AIK- HDC
HIV infection

• It is currently recommended that children with known asymptomatic HIV infection receive measles vaccine.

• Serious hypersensitivity reactions to measles vaccine in persons allergic to egg protein have been reported.
Recovery from measles is the rule, but serious complications of the respiratory tract and CNS may occur.
Measles in Iran

- After the establishment of Expanded Program on Immunization (EPI) in 1984, vaccination rates for the first and second
Should we consider another Booster Dose of Measles Vaccine?

- 241 medical students
- 98 (40.7%) positive titer
- 39 (16.2%) borderline titer
- 104 (43.1%) negative antibody titer
6th International Congress of Dermatology, Isfahan, May 2001

• بررسی 300 مورد بیمار با تب و راش پوست

• بعد از داروها ~ 25%

• سرخک ~ 22%
من حتماً واکسن می‌زنم، تو چطور؟

واکسیناسیون سراسری حذف سرخک و سرخجه مادرزادی

گروه سنی ۵تا ۲۵ سال • ۱۵ آذر لغایت ۱۰ دیماه ۱۳۸۲
رایگان در تمام مراکز بهداشتی، درمانی و بیمارستان‌ها

 وزارت بهداشت، درمان و آموزش پزشکی • وزارت آموزش و پرورش • نیروی ملی پیشگیری و درمان بیماری‌های قلبی و میاه • سازمان جهانی بهداشت • سازمان سیاست‌های جهانی بهداشت • سازمان سلامت جهانی • سازمان دانش‌های بهداشتی • سازمان بهداشت کودکان و نوجوان • سازمان بهداشت جهانی • سازمان بهداشت جهانی• سازمان بهداشت جهانی

پایگاه اطلاع رسانی سلایم‌پرداز
www.salamatiran.org
• In a cross-sectional survey on a group of adults 20-30 years old (30 male and 30 female)
• All of them received MR vaccination
• 100% women, 96% men had positive protective Measles titer.
• بیماری سرخک از دیدگاه نحوه گزارش‌دهی در تقسیمات سازمان جهانی بهداشت در گروه A قرار دارد.

• گزارش‌دهی موارد مشکوک به بیماری الزامی است و بايد با سریع‌ترین راه‌های ممکن نظر تلفن صورت پذیرد.
برنامه عملیاتی منطقه‌های مدیترانه شرقی جهت حذف سر خک

• تعريف حذف: نبود موارد سر خک بومی در یک دوره ۱۲ ماهه یا بیشتر با وجود سیستم مراقبتي مناسب.
برنامه عملیاتی منطقه مدیرانه شرقي جهت حذف سر خک

اگر در یک کانون تجمعی (مدرسه، اداره، پادگان و ...) یک مورد قطعی گزارش شود و علائمی از گردش ویروس در مدت سه هفته پس از شروع بیماری نفر اول وجود داشته باشد یا باید تهیه افراد 9 ماه تا 12 سال آن کانون بدون توجه به سابقه واکسناسیون واکسنی شوند.

به منظور پیشگیری در موارد تماس، از واکسن استفاده M, MR, MMR می‌گردد.
هدف حذف سرخک در منطقه مدیتران شرقي

• گزارش 80 درصد موارد مشکوک سرخک در طی هفت روز پس از بثورات جلدي.

• مورد بررسی قرار گرفتن 80 درصد از موارد مشکوک در طی 48 ساعت از زمان گزارش.

• در بيش از 80 درصد موارد مشکوک نمونه خون جمع آوري گردد.

• در بيش از 80%موارد منبع آلودگي تعیین گردد.
هدف حذف سرخک در منطقه مدیتران شرقي

• بیش از ۸۰٪ طغیان های مشکوک بررسی شوند.

• در بیش از ۸۰٪ موارد مشکوک نمونه خون مناسب تهیه شود.

• در بیش از ۸۰٪ موارد نتایج آزمایشگاهی در طی ۷ روز اعلام گردید.
هدف های مرتبط با سرخک در منطقه و کشور

- کاهش مرگ و میر تا ۹۵ درصد نسبت به سال ۲۰۰۰

- حذف سرخک تا سال ۲۰۱۵
Measles and Rubella Elimination Goals by WHO Region

Americas, Europe, E. Mediterranean, W. Pacific, Africa have measles elimination goals
Americas and Europe have rubella elimination goals

SEAR: 95% Measles Mortality Reduction by 2015
مواد گزارش شده سرطان در جهان در سال ۱۹۶۹ ۱۳۹ موارد مورد گزارش
مواد مرگ موارد ۱۲۰۰۰
پوشش واکسیناسیون درصد ۸۶ درصد
پوشش واکسیناسیون
۶۶ کشورها به پوشش بالای ۹۰ درصد اند
Incidence per 100,000

Incidence

MCV1 Coverage

MCV2 Coverage

EPI begins

Sub-national campaign

Nationwide campaign

Year

حضور مداوم ویروس (موارد بومی یا وارد) در طی ۱۲ ماه و بیشتر در یک منطقه جغرافیایی
مواد گزارش شده در ۲۰۱۳

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کل منطقه عمرو
توزیع جغرافیایی موارد تایید شده آزمایشگاهی سرخک

سال ۲۰۱۰ میلادی

۲۵۹ مورد

سال ۲۰۱۱ میلادی

۱۸ مورد

سال ۲۰۱۲ میلادی

۲۳۰ مورد

سال ۲۰۱۳ میلادی

۱۱۹ مورد
روند گزارش تعداد موارد مشکوک و تایید شده شرکت سال‌های ۲۰۰۷ تا ۲۰۱۳ لغویت
نظام مراقبت در برنامه حذف متمرکز است بر:

1 - کشف سريع تمامي موارد
2 - اثبات آزمایشگاهي موارد
3 - شناخت منبع موارد
توجه مورد قابل گزارش

هر فردی که دارای

بثورات

با به‌عنوان ماهک لوپاپولار (نه وزیکو لار) و

پا

یا

هر فردی که پرسنل بهداشتی مظنون به عفونت سرخک و یا سرخجه شود

با هدف جنف و انتقال ویروس سرخک و سرخجه
وضعیت سرخک قطعی در کشور و استان اصفهان

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