

## Immunization



Immunization is one of the most beneficial and cost-effective disease prevention measures. It can be divided into passive immunization by immunoglobulins & active immunization by vaccines and toxoid .

### Passive Immunization

Immune globulins (IG) are antibodies-containing preparations that induce **a transient** protection against an infectious agent.

☒ The major indications of Passive Immunization include:-

1. Immunodeficient patient.
2. Postexposure Px, i.e. persons exposed to infectious agent with no adequate time to develop active immune response to the vaccine of that agent.
3. As part of specific therapy for some infectious diseases.

**Note** /passive immunization act immediately ,but has a short half life .

**Note** /Passive Immunization can occur naturally through transplacental transfer of antibodies during gestation which can provide protection during an infant's first months of life. Breast feeding also give protection through secretory IgA.

**Passive immunity can be divided into the following types:-**

# **IM & IV Immune Globulin:** These are sterile antibody containing solutions, usually derived by cold ethanol fractionation of a large pools of human plasma; these IG contain 15–18% protein, predominantly IgG.

IVIg is used in many conditions including: Replacement therapy for immunodeficiency disorders; Hypogammaglobulinemia; HIV; Px of infection following BM transplantation and Anemia caused by Parvovirus B19....etc.

SE of IVIG are Fever, headache, myalgia, chills, nausea & vomiting; these reactions are mainly due to rapid infusion, so they can be reduced by ↓ rate of infusion. Serious reactions are fortunately rare e.g. anaphylaxis , thromboembolic disorders, aseptic meningitis, and renal insufficiency

# **Specific IG "Hyperimmune globulins":** These are derived from donors with a high titers of antibodies to specific agents e.g. specific IG for HBV, rabies, tetanus, varicella, & CMV.

# **Hyperimmune Animal Antisera:** These are mainly derived from horses e.g. diphtheria antitoxin

# **Monoclonal Antibodies:** These are produced against single antigen; these include: Palivizumab (Ab against RSV), Rituximab (Ab against B-lymphocytes), Omalizumab (in asthma), & others used in certain types of cancer and autoimmune diseases.



I.V. IMMUNOGLOBULIN



Hepatitis B immunoglobulin



Tetanus toxoid

### **Active Immunization (vaccines and toxoids)**

By giving the patient a killed or living attenuated bacteria or viruses (vaccine) ,or inactivated toxin that cause the disease(toxoid) to stimulate the immune system of the body to produce specific antibodies without causing the disease

**Note** /active immunization does not act immediately and its immunity continues for long time or for life

#### **Types of vaccines:-**

1. vaccines containing Live attenuated bacteria e.g. BCG , oral cholera v and oral typhoid v
2. vaccine contain killed bacteria ; e.g. injectable cholera v and injectable typhoid v , pertussis v ,pneumococcal v ,meningococcal vand hib v (hemophyllus influnzae type b v )
- 3.vaccines containing Live attenuated viruses measles , mumps, rubella, varicella, oral polio , oral rotavirus, varicella and influenza vaccine.
- 4 vaccine contain killed viruses eg.hepatitis a v ,hepatitis b v ,rabies v ,polio (injectable)v ,and influenza v (subunit type)

**Toxoids** ; like diaphtheria toxoid and tetanus toxoid.

### **Contraindications & Precautions of Vaccinations:-**

1. Anaphylaxis to the vaccine (or any of its constitution) in the prior dose is an absolute contraindication to that vaccine.

**Note** /patient with hx of allergy to eggs can be given MMR because it contain very small amount of egg protein.

2. Immunodeficiency; patients with Cellular immune deficiency, whether primary "hereditary" or secondary "acquired" should not be given Live attenuated vaccines but can receive all other types of vaccines

3. Patient with severe or moderate (but not mild) acute illness (regardless of fever) should not be vaccinated until recovery.

4. Preterm infants can be vaccinated at the same schedule of the full- term infants, except the birth dose of HBV can be deferred for 1 mo after birth if his weight is <2 kg & his mother has HBs Ag –ve.

**Note** /congenital heart disease , asthma, diabetes mellitus ,chronic liver disease ,and chronic renal failure are **strong indications for vaccination** .

**Note** /the anterolateral aspect of the upper thigh provides the largest muscle and is the preferred sites for the intramuscular vaccination for children younger than 1.5 years ,while in older ages the deltoid muscle is the preferred site since it will not affect the ambulation and associated with less pain in the extremity .

**Note** /for oral vaccines ,repeat the oral dose if vomiting occur within 10 minutes of vaccination .

**Note** /live attenuated vaccines as bcg ,measles ,mmr,varicella and herpes zoster vaccines are contraindicated during pregnancy , (Pregnancy must be delayed for 1-2 months after taking any living attenuated vaccine.)

## **Steroids and immunization**

steroid therapy usually does not contraindicate administration of live-virus vaccines when ;

# such therapy is short term (less than 2 weeks);

# low to moderate dose;

# long-term, alternate-day treatment with short-acting preparations;

# maintenance physiologic doses (replacement therapy);

# administered topically (skin or eyes), by aerosol, or by intra-articular, bursal, or tendon injection.

. The immunosuppressive effects of steroid treatment vary, a dose equivalent to either 2 mg/kg per day or a total of 20 mg/day of prednisone as sufficiently immunosuppressive to raise concern about the safety of immunization with live-virus vaccines.

Physicians should wait at least 3 months after discontinuation of therapy before administering a live-virus vaccine to patients who have received high-dose, systemic steroids for greater than or equal to 2 weeks

### **Schedule of commonly used vaccines in Iraq (although may be different in some countries):-**

1. after birth in the delivery room ;hepatitis b vaccine

2. 1<sup>st</sup> week BCG , Oral polio vaccine

3. 2<sup>nd</sup> month ,4<sup>th</sup> month ,6<sup>th</sup> month ;Oral polio ,Oral rotavirus(for diarrhea) ,Hexa vaccine{{DTP+Hib(hemophyllus influenza type b )+Hepatitis b vaccine +IPV (inactivated polio vaccine)}} and pcv (pneumococcal v) .

4. 9<sup>th</sup> month ;measles v+100.000iu vitamin A orally

5. 15<sup>th</sup> month MMR vaccine(measles ,mumps, rubella).

6. 18<sup>th</sup> ;Oral polio v ,(1<sup>st</sup> booster dose)+penta vaccine{DTP +Hib+Hepatitis B}+200.000 iu vitamin A orally .

7. 4<sup>th</sup> -6<sup>th</sup> year ;oral polio (2<sup>nd</sup> booster dose)+penta vaccine(DTP+Hib+ Hepatitis B ) ,MMR vaccine +200.000iu vit A orally .

8. tetanus toxoid for immunization of the pregnant women and females between 15 -45 years to protect against tetanus neonatorum .

**Vaccines that can be given to immunocompromised patients are;**

DTP

Hexa vaccine

Penta vaccine

Ipv(injectable polio vaccine)

Hepatitis B vaccine

Hepatitis A vaccine

HIB vaccine

Tetanus toxoid

Rabies vaccine

Meningococcal vaccine

Pneumococcal vaccine

Influenza vaccine(subunit type)

Typhoid vaccine(killed type)

Cholera vaccine(killed type)

Passive immunization

**Vaccines contraindicated in immunocompromised patient are;**

BCG vaccine

Oral polio vaccine

Measles vaccine

mmr vaccine

yellow fever vaccine

oral rota virus vaccine

oral typhoid vaccine

oral cholera vaccine

living attenuated influenza vaccine

varicella vaccine

# What is Cold chain?

- ❑ Cold Chain is a system of storing and transporting vaccine at the recommended temperature range from the point of manufacture to point of use.



