Pediatric Vaccines: Before, Now, Then

Essay

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By

Doaa Youssef Abd ElAtey Nasf

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Faculty of medicine

Ain Shams University

Under the supervision of

Dr. Sherein Abd ElFattah

Professor of Pediatrics

Faculty of Medicine- Ain Shams University

Dr. Solaf Mohamed ElSayed

Professor of Medical Genetics

Faculty of Medicine-Ain Shams University

Faculty of Medicine

Ain Shams University

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List of abbreviation:

Abbreviation	
AAP	American Academy of Pediatrics
ACIP	Advisory Committee on Immunization Practices
Ag	Antigen
AIDS	Acquired immune deficiency syndrome
APCs	Antigen presenting cells
BCG	Bacillus Calmette Guerin vaccine
C. Jejuni	Campylobacteria Jejuni
Cag A	Cytotoxin associated gene A
cART	Combination antiretroviral therapy
ccIIV3	Cell culture based trivalent
CDC	Centers for Disease Control and Prevention
CHD	Congenital heart disease
CLD	Chronic lung disease
CLD	Chronic lung disease
CMV	Cytomegalovirus
CMV- IVIG	Cytomegalovirus Immune globulin
CNS	Central nervous sysytm
CRS	Congenital rubella syndrome
CS	Corticosteroid
CSP	Circumsporozoite protein (CSP
CT	Cholera Toxin
CTB	Cholera toxin B subunit
CTL	Cytotoxic T lymphocytes
CVID	Common Variable Immune deficiency
DC	Dendritic cell
DM	Diabetes mellitus
DMARDs	Disease modifying anti rheumatic drugs
DTaP	Diphtheria, tetanus toxoid and acellular pertussis vaccine
DTwP	Diphtheria, tetanus toxoid and whole cell killed pertussis vaccine
E.coli	Eschericheae Coli
EAEC	Enteroaggregative E.Coli (EAEC)
EBV	Epstein Barr virus
EHEC	Enterohaemorrhagic E.Coli (EHEC
EIEC	Enteroinvasive E.Coli (EIEC,
EPEC	Enteropathogenic E.coli

EPI	Expanded program of immunization
ETEC	Enterotoxogenic E.Coli
EV	Ebola virus
FDA	Food and Drug Administration
GA	Gestational age
GAVI	Global Alliance for Vaccines and Immunization
gB	Glycoprotein B
GBS	Guillane Barre syndrome
GC	Gastric cancer
GPEI	Global polio eradication initiative
GU, DU, GC	Gastric ulcer , duodenal ulcer
H. Influenza	Haemophilius Influenza
H.Pylori	Helicobacter Pylori (H. Pylori
HAART	Highly active antiretroviral treatment
HAIG	Hepatitis A Immune globulin
HB	Hepatitis B
HBIG	Hepatitis B immune globulin
HBV	Hepatitis B virus
HCC	Hepatocellular carcinoma
HCV	Hepatitis c virus
HDCV	Human Diploid Cell Vaccine
Hep B	Hepatitis B vaccine
Hib	Haemophilius influenza type b
HIV	Human Immune Deficiency virus
HPV	Human papilloma virus
IBD	Inflammatory bowel disease
ID	Immune deficiency
ID, SC, IM	Intra-dermally , Subcutaneous , Intramuscular
IFNγ	Interferon Gamma
IG	Immune globulin
IIV	Inactivated influenza vaccine
IL2	Interlukine-2
INR	International Normalized Ratio
IPV	Inactivated polio vaccine
ISCOM	Immune-stimulating complexes
ITP	Idiopathic thrombocytopenic purpura
LAIV	live attenuated influenza vaccine
LN	Lymph node
LT	Heat-labile toxin

MALT	Mucosa-associated lymphoid tissue
MCC	Meningococcal conjugated (group c) vaccine
MCV	Meningococcal conjugate vaccines
MHC	Major histocompatibility complex
MMR	Measles, mumps, rubella vaccine
MMRV	Measles, Mumps, Rubella, varicella vaccine
MNT	Maternal &Neonatal Tetanus
MPV	Meningococcal capsular polysaccharide vaccines
MS	Multiple Sclerosis
MTX	Methotraxete
NAB	Neutralizing antibodies
NAP	Neutrophil Activating Protein
NK	Natural killer cell
NR	Nasal route
NTHi	Non-typeable H. influenza
OI	Opportunistic infection
OPV	Oral polio vaccine
OR	Oral route
P. falciparum	Plasmodium. falciparum
PAHO	Pan Americans Health Organization
PCEC	Purified Chick Embryo Cell
PCV	Pneumococcal conjugate vaccine
PPD	Purified protein derivative
PPSV	Pneumococcal capsular polysaccharides vaccine
PRP	Polyibosylribitol phosphate
RA	Rhematoid arthritis
rCTB	Recombinant CTB
RI	Rotary International
RIG	Rabies Immune globulin
RSV	Respiratory Syncytial virus
RSV-IVIG	Respiratory Syncytial Virus immune globulin
RV1	Rotarix vaccine
RV5	Rotateq vaccine
SCID	Severe combined immune deficiency
SIA	Supplementary immunization activities
SIV	Simian (monkey) immune deficiency viruses
SLE	Systemic lupus erythromtous
SmD	Streptomycin Dependent oral vaccine
SOT	Solid organ transplant

ST	Shiga toxin
STa	Heat-stable type Ib toxin
STI	Sexually transmitted infections
TB	Tuberculosis
Th cell	T helper cell
TIG	Tetanus Immune globulin
TLR	Toll like receptor
TST	Tuberculin Skin Test
TT	Tetanus toxoid
UK	United Kingdom
UNICF	United Nations Children's Fund
UNPF	United Nations Population Fund
UPEC	Uropathogenic Escherichia coli *(*UPEC)
US	United State
UTI	Urinary Tract Infections
Vac A	Vacuolating cytotoxin A
Var-IG	Varicella Immune globulin
VDPVs	Vaccine-derived polioviruses
VI	Vaginal immunization
VLP	Virus-like particles
WHA	World Health Assembly
WHO	World Health organization
Wk	Week
WNV	West Nile Virus

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Introduction

Vaccines are defined as immunogenic preparations of a pathogen that evoke an Immune response without causing disease. While attenuation and inactivation of pathogens are conventional approaches, and are still used, modern vaccines also exploit recent developments in immunology, genomic, bioinformatics, and structural and protein chemistry **(Morrow & Sheikh, 2012).**

Vaccination is basically used as a form of immunoprophylaxis, such that the administration of the vaccine, even a long times prior to exposure to the Wild-type infectious agent, providingprotection. In view of the short life span of the effectors T and B cells, Immunological memory appears to be aprime requisite of a vaccine. Immunologic memory must be relied on to provide long-lasting, even life time protection**(Kurstak, 2013).**

Scientists take many approaches to design vaccines against microbe, these choices are typically based on fundamental information about microbe, such as how it infects cells and how immune system respond to it , such as (live attenuated vaccine ,inactive vaccine ,subunit vaccine ,toxoid vaccine , conjugate vaccine, DNA vaccine, recombinant vaccine) **(National Institute of Allergy and Infectious disease, 2012).**

Although ,the effectiveness of vaccines for the prevention and control of human disease ,They have side effects such as (fever, pain….,) and also some contraindications like

sever allergy to previous vaccine dose(**Zuckerman & jong, 2010).**

In most countries,the Expanded Program on Immunization (EPI) was Established by the World Health Organization (WHO) in 1974 to provide protection against Six vaccine-preventable diseases through routine infant immunization: tuberculosis, poliomyelitis, diphtheria, tetanus, pertussis, measles. Since then, many new vaccines have become available, Most of the new or underused vaccine include Haemophilus Influenza type b (HIb) vaccine pneumococcal conjugate vaccine(PCV), Rotavirus vaccine (RVV), Rubella-containing vaccine are intended to be included in the routine childhood Immunization Schedule. Other New or underused vaccine such as Cholera, Human Papillomavirus (HPV) vaccine, meningococcal vaccine, yellow fever vaccine and typhoid vaccine are intended for old or at risk population**(CDC, 2014).**

Aim of work

To review different types of vaccines in pediatric age group including indications, contraindication, different schedule & programs of giving vaccine and recent developed ones.

History of Vaccination

Birth of vaccination returns to 7th century as the Indian monks tried to immunize themselves through drinking snake venom. The first immunization was through inoculation with smallpox, a way was used in ancient India, Arabia and China. This way of immunization occurred by collecting pus from a case with mild form of smallpox virus infection and inoculating the sample to a healthy human which later would result in a minor infection. Inoculation hereafter referred to as variolation. Variolation came to Europe at the beginning of the 18th century, when the English aristocrat Lady Montague inoculated her 4years daughter by smallpox. Physicians became expert in the practice, and set up special inoculation infirmaries to support and care for those who became ill after inoculation. Variolation was subsequently adopted in England and spread from there throughout Western Europe **(Ploktin et al., 2012).**

In May 1796, the British physician Edward Jenner found a young dairymaid, Sarah Nelms, who had fresh cowpox lesions on her hands and arms. On May 14, 1796, using matter from Nelms' lesions, he inoculated an 8-year-old boy, James Phipps. Subsequently, the boy developed mild fever and discomfort in the axillae. Nine days after the procedure he felt cold and had lost his appetite but on the next day he was much better. In July 1796, Jenner inoculated the boy again, this time with matter from a fresh smallpox lesion. No disease developed, and Jenner concluded that protection was complete. Pondering this, Jenner concluded that cowpox not only protected against

smallpox but also could be transmitted from one person to another as a deliberate mechanism of protection. On June 21st 1798, Jenner published his fulfillment about the effects and causes of Variolae Vaccinae, a disease discovered in some England's countries and is known as Cow Pox. In 1800, Jenner stayed in educating physicians about vaccination with Variolae Vaccinae or Cow Pox and within years the nature of vaccination begun to spread rapidly to the European continent and to the US **(Smith, 2011).**

Table 1: Difference between Inoculation & Vaccination

	Inoculation	**Vaccination**
Procedure	They are the same with some differences in the practices for each.	
Protection	They are the same level of protection.	
Safety	Patients may accept the natural disease and die after inoculation.	No die after vaccination.
Side effects	High degree of fever, pain, abscess	Mild degree of fever, pain.
Risk of community	People become infectious, may spread infection to the society.	No this risk found.
Chance of complication	Risk of natural infection complication like blindness, disfiguration.	No risk of complication.

(Lahariya, 2014).

The late nineteenth century was distinguished by Pasteur's achievements that made him the father of vaccines after creating the first laboratory vaccine. Louis Pasteur (1822–1895), a French chemist and microbiologist, was the first to propose the "Germ Theory" of disease in