ejpmr, 2018,5(5), 189-191

SJIF Impact Factor 4.897

EUROPEAN JOURNAL OF PHARMACEUTICAL AND MEDICAL RESEARCH

www.ejpmr.com

Review Article

ISSN 2394-3211

EJPMR

A REVIEW ON HUMAN PAPILLOMA VIRUS VACCINE

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Article Received on 04/03/2018 **Article Revised on 24/03/2018** **Article Accepted on 15/04/2018**

INTRODUCTION

Human papillomavirus [HPV] are very common family of viruses that effect epithelial tissue. HPV vaccine protect against a very common sexually transmitted virus called HPV or human papillomavirus. HPV vaccine prevents infection with human papillomavirus (HPV) types that are associated with many cancers. Infection with high-risk HPV types is responsible for most cervical and anal cancers in females. In males, high-risk HPV types are responsible for a large proportion of cancers of the mouth and pharynx, which are increasing in recent years, and of anal and penile cancers. The highest rates of genital HPV infection are found in adults 18–28 years of age. More than 100 HPV types have been identified. The types of HPV most commonly detected in cancers are HPV-16 and HPV-18. In summary, genital HPV infection is common among sexually active populations and causes both benign and malignant neoplasm of the genital tract.

HPV INFECTION CAUSES

- 100% of cervical cancer cases,
- 90% of anal cancer cases
- 40% of cases of cancers of the external genitalia (vulva, vagina and penis).
- at least 12% of oropharyngeal cancer cases
- At least 3% of oral cancer cases.

HPV INFECTION

- Human papillomavirus (HPV) is a common infection that most men and women acquire at some point in their lives.
- There are more than 100 types of HPV, most of which do not cause severe disease.
- Low-risk types of HPV can cause genital warts whereas high-risk types can lead to cancer of the cervix, vagina, anus, and penis. Cervical cancer is the most common by far.
- It is a collection of viruses that cause warts on the hands, feet, and genitals. There are over 200 known genetically different strains of human papillomavirus. Some strains of the virus are responsible for common warts and plantar warts and other strains can infect the inner lining of the cervix.

HPV Transmission

- Infection is very common, women and men will be infected in some times of their life.
- It is sexually transmitted, but penetrative sex is not required for transmission: skin-to-skin genital (e.g., penile-vulvar), contact is the well mode of transfer.

HPV VACCINE

When given to girls and young women prior to sexual debut, vaccines against the two HPV types are 70 percent of cervical cancer cases worldwide—types 16 and 18—it is 92 % effective in preventing persistent HPV infection and 100 % effective in preventing vaccine type-specific cancer lesions. There are two types of HPV vaccine mainly used in the treatment.

1. Gardasil®

- Gardasil® is a quadrivalent vaccine that contains virus-like particles for HPV types 6, 11, 16 and 18.
- Gardasil® is used up to the age of 26 years in men and 45 years in women. Gardasil® is given as a series of three intramuscular injections at 0, 2 and 6 months.
- It is delivered into the deltoid muscle or in the higher anterolateral area of the thigh.

2. Cervarix®

- Cervarix® is the bivalent vaccine that contains virus-like particles for HPV types 16 and 18.
- Cervarix® is not indicated for use in males. Cervarix® is given as a series of three intramuscular injections at 0, 1 and 6 months, delivered into the deltoid muscle.

Mechanism of Action

The antigens for both the vaccines are virus like particles (VLP) derived from the L1 surface protein of the respective types of the virus. The VLPs are non-pathogenic and cannot infect cells, since they do not have viral genome. The vaccines induce high titer of serum immunoglobulin G antibody against respective HPV types, which is secreted in the cervico-vaginal secretion and is also exuded from the micro-abrasions in the epithelium. Presence of the antibodies at the point of viral entry ensures the neutralization of the virus before it gets an opportunity to bind to infect the basal keratinocytes.

Characteristics of HPV Vaccines

Attributes	Quadrivalent	Bivalent
Commercial name	Gardsil/silgard(merk)	Cervarix(Glaxosmithkline)
HPV VLP type in vaccine	6,11,16,18	16,18
Disease protection	Cervical cancer, genital warts	Cervical cancer
Number of dose	3	3
Dosing interval	0,2,6 months	0, 1,6 months
Presentation	1 dose vial	1 and 2 dose vial
Method of administration	Intramuscular injection	Intramuscular injection
Contraindication	Severe allergic reaction to any vaccine component after first dose, or allergy to yeast	Severe allergic reaction to any vaccine component after first dose, or allergy to yeast
Co-administration with other adolescent vaccines	Hepatitis B diphtheria / tetanus/pertussis/poliomyelitis	diphtheria/tetanus/pertussis/ poliomyelitis
Shelf life	36 months at 2-8^{o} C	48 months at 2-8^{o} C for 1 dose vial 36 months at 2-8^{o} C for 2 dose vial

Vaccine Administration and Schedule

The administration of vaccine is recommended by WHO. Both vaccines are administered in a schedule of currently 3 doses within 6 months. The dose for each vaccine is administered intramuscularly using 0.5 mL of liquid suspension. For the quadrivalent vaccine, the second dose is given 2 months after the first dose, and the last (third) is given 6 months after the first dose.

For the bivalent vaccine, the second dose is administered 1 month after the first, and the third dose at 6 months after the initial dose. A minimum interval of 4 weeks between the first and second doses, and a minimum interval between the second and third doses of 12 weeks is recommended for the quadrivalent vaccine.

Contraindication and Precautions to HPV

- The HPV vaccine is contraindicated in individuals who have a severe allergic reaction .
- The HPV vaccines are given by intramuscular administration. Therefore, they should be used with caution in individuals with thrombocytopaenia or any coagulation disorders. This is because bleeding may occur.
- Neither Gardasil® nor Cervarix™, should be administered to individuals with a known history of hypersensitivity to any of the vaccine components.
- Bivalent HPV vaccine in prefilled syringes is contraindicated for persons with anaphylactic latex allergy.
- Pregnancy and lactation

Side Effect Caused By HPV Vaccine

- The most common noted side-effects are local reactions at the injection site, i.e. pain, redness and swelling.
- Local reactions may increase in severity with increasing doses. Systemic side-effects fever, nausea, dizziness, muscle pain and malaise were reported in equal frequency in both the vaccine and placebo recipients.
- Fainting has occurred following administration of the HPV vaccine to adolescent vaccines. Therefore, it is recommended that the vaccine recipient should be seated during its administration and observed for 15 minutes thereafter.
- Although HPV vaccines are recommended in young girls before onset of sexual activity, available data do not indicate any safety concerns if the quadrivalent vaccine is administered while a girl is lactating.

Recommendation for Hpv Vaccine

- HPV vaccine (Cervarix™ or Gardasil®) is recommended for females between 9 and 13 years of age (NACI Recommendation Grade A).
- HPV vaccine (Cervarix™ or Gardasil®) is recommended for females between 14 and 26 years of age who have had previous Pap abnormalities, including cervical cancer and EGW (NACI Recommendation Grade B).
- HPV vaccine (HPV2 or HPV4) is not recommended in females <9 years of age (NACI Recommendation Grade I).
- HPV4(Gardasil®) is recommended in males between 9 and 26 years of age for the prevention of anal intraepithelial neoplasia (AIN) grades 1, 2, and 3, anal cancer, and anogenital warts (NACI Recommendation Grade A).
- HPV4 (Gardasil®) is recommended in males who have sex with males (MSM) ≥9 years of age (NACI Recommendation Grade A).
- Cervarix™ is not recommended in males at this time (NACI Recommendation Grade I).
- Cervarix™ and Gardasil® are not recommended for use in pregnancy (NACI Recommendation Grade I).
- Cervarix™ and Gardasil® can be administered simultaneously with other adolescent vaccines (NACI Recommendation Grade A).

CONCLUSION

Human papillomavirus (HPV) can cause a variety of infections in humans. Infections that give rise to the most concern are the sexually transmitted types, which can lead to genital cancers and ano-genital warts. New HPV vaccines create opportunities to greatly reduce cancer rates. As HPV vaccines are introduced, adaptation of prevention and screening programs may become possible because of declines in disease incidence due to

vaccination. Given that HPV vaccines and delivery costs likely will be higher than for routinely recommended infant vaccines, innovative methods will be needed to finance HPV vaccine introduction. HPV vaccination is safe and immunogenic in HIV-infected individuals. There are no contraindications to vaccinating HIV-infected persons with HPV vaccine. HPV Vaccine is a better measure for the treatment of preventing Human Papilomavirus infections.

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