

An Insight: HPV Vaccine for prevention of cervical cancer

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Abstract

Cervical cancer is preventable because of immunization with human papillomavirus (HPV) Vaccine. Uptake of this vaccine remains low in many countries, although the bivalent and quadrivalent HPV vaccines given as a three-dose schedule are effective in the prevention of precancerous lesions of the cervix in women. Simpler immunization schedules including both male and females are available, which might reduce barriers to vaccination. Currently, licensed two prophylactic vaccines against HPV are in use in most of the countries. It can be added to a comprehensive cervical cancer prevention strategy as a primary prevention tool. Currently available HPV vaccines have an excellent safety profile and can be co-administered with other vaccines. Completion of all doses at the specified intervals is recommended. At the same time HPV vaccination does not replace cervical cancer screening. The primary target population for HPV vaccination is girls before initiation of sexual activity.

Keywords: HPV, Human Papilloma virus, Vaccine, cervical cancer

Introduction

Cervical cancer is the fourth most cancer frequently seen in women with an estimated 570,000 new cases in 2018 representing 6.6% of all female cancers. Approximately 311000 women died from cervical cancer; more than 85% of these deaths occurring in low and middle-income countries. Cervical cancer is the second most common cancer in women living in less developed regions with estimated new cases in 2018.

The Advisory committee on Immunization Practices (ACIP) routinely recommends HPV vaccination at the age 11 or 12 years; vaccination can be given starting at the age 9 years. Catch-up vaccination has been recommended since 2006 for

females through age 26 years, and since 2011 for males through age 21 years and certain special populations through age 26 years. In June 2019, ACIP recommended catch-up HPV vaccination for all persons through age 26 years.

In late 2018, the FDA approved the use of vaccine in men and women up to age of 45. However no changes in the guidelines have been made. CDC recommends that all preteen girls and boys aged 11-to-12 years old receive two doses of HPV vaccine at least six months apart to protect against cancers caused by human papillomavirus (HPV) infections.



Fig 1: HPV Immunization

HPV (Human Papillomavirus)

Cervical cancer is caused by Human Papilloma Virus (HPV). HPV is a group of viruses that are extremely common in worldwide. There are more than 100types of

HPV, of which at least 14 are cancer-causing at high-risk type. HPV is mainly transmitted through sexual contact and most people are infected with HPV shortly after the onset of sexual activity. Cervical cancer is caused by sexually

acquired infection with certain types of HPV. Two HPV types (16 and 18) cause 70% of cervical cancers and pre-cancerous lesions. There is evidence of linking HPV with cancers of the anus, vulva, vagina, penis and oropharynx. Comprehensive cervical cancer control includes primary prevention i.e vaccination against HPV. WHO recommended vaccines that protect against HPV 16 and 18 and have been approved for use in many countries?

What is HPV vaccine?

HPV vaccines are vaccines that protect against infection with Human Papilloma Viruses (HPV). HPV is a group of more than 200 related viruses, of which more than 40 are spread through direct sexual contact. among these, two types cause genital warts and about a dozen HPV types can cause certain types of cancer-cervical, anal, or pharyngeal, penile, vulvar, and vaginal.

How do HPV vaccines work?

Like all other immunizations that guard against viral infections, HPV vaccine stimulates the body to produce antibodies that, in future encounters with HPV, bind to the virus and prevent it from infecting cells.

Types of HPV vaccines

HPV immunization can prevent up to 70% of HPV- related cervical cancer as well as 90% of genital warts. The US Food and Drug Administration (FDA) have approved 3 HPV vaccines:

- **Gardasil 9:** Targets HPV types 6, 11, 16 and 18 along with 31,33,45,52,58- among which most of these HPV types cause 90% of cervical cancer cases and most cases of genital warts. Gardasil 9 is the only HPV vaccine currently available in the United States.
- **Cervarix the Bivalent vaccine:** Targeted HPV 16 and 18 only, and was discontinued in the United States in 2016.
- **Gardasil the Quadrivalent HPV vaccine:** Targeted HPV 16 and 18 as well as 6 and 11, which cause most cases of genital warts; the last available doses in the United States expired in May 2017; it has been replaced by Gardasil 9.

The incidence of cervical cancer in the United States dropped 29% among 15-24 yrs olds from 2003-2006 when HPV vaccination first started to 2011-2014.

HPV vaccine dosage recommendations

Along with all vaccination recommendations for HPV vaccination are also developed by The Centers for Disease Control and Preventions (CDC), Advisory Committee on Immunization Practices (ACIP) and Food and Drug Administration (FDA). The current recommendations for HPV vaccination are as follows:

Table 1: Regimen of HPV Immunization

Regimen	2 dose	3 dose	3 dose
Age	9-14yrs	15-26yrs	21-26
Gender	Male & Female	Male & Female	Male
Schedule	0 and Between 6 & 12 Months	0, 1-2 and 6 Months	-

For the primary prevention the HPV vaccine recommendations are

The Advisory Committee on Immunization Practices (ACIP) revised its HPV vaccine schedule in 2016, when it decreased the necessary doses from 3 to 2 for patients under age 15 and addressed the needs of special patient populations.⁷ In late 2018, the FDA approved the use of the vaccine in men and women up to age 45. However, no changes in guidelines have yet been made.

Contraindications for HPV vaccine

- This vaccine is contraindicated in individuals with allergy to the vaccine or yeast because the latter is a component of the vaccine.
- Females who are pregnant or breast feeding should not receive the vaccine.
- The vaccine does not protect against infections that are already present.
- It does not give protection against all types of cervical cancer causing HPV types, females should be screened for cervical cancer

Possible side effects of HPV vaccine

Like any other medicines vaccines can also have side effects. Many people have no side effects at all. Some people report having very mild side effects, like a sore arm from the shot.

The most common side effects of HPV vaccine are usually mild and include: pain, redness or swelling in the arm where shot was given, fever, headache or feeling tired, nausea, muscle or joint pain. On very rare occasion, severe (anaphylactic) allergic reactions may occur after vaccination.

Conclusion/Summary

There has been a paradigm shift in the cervical cancer prevention strategies since the availability of the first vaccine recommended in 2006, there has been significant reduction in HPV infections. HPV vaccination is a paragon providing long lasting protection against HPV infection and HPV disease. The availability of Gardasil 9, makes it possible to protect against 7 cervical cancer causing strains of HPV (Type 6,11,16,18,31,45,52 and 58). Routine recommendations for HPV vaccination of adolescents have not changed. Catch –up HPV vaccination is now recommended for all persons through age 26 years. For adult aged 27 through 45 years, health benefit is minimal; shared clinical decision- making is recommended because some persons who are not adequately vaccinated might benefit.

Conflict of interest statement

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