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Cervical cancer: Can the HPV vaccine prevent it?



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Human papillomavirus (HPV) infections are sexually transmitted. Certain types (strains) of human papillomavirus increase the risk of abnormal cell changes in the cervix which can lead to cervical cancer. These viruses are now considered to be the main cause of cervical cancer. The aim of vaccination against these viruses is to prevent infections and thereby prevent cervical cancer.

People who are sexually active have a high risk of infection because HPV viruses are very common and are spread through sexual contact. Most infections go unnoticed, though, and they clear up on their own without any consequences. Although cervical cancer can be caused by certain strains of HPV, HPV infections only rarely lead to the development of malignant (cancerous) tumours. Two strains of the virus, known as HPV 16 and 18, are considered to be a particular risk. It is estimated that they are involved in the development of 70% of all cervical cancers.

There are two different vaccines against HPV. The vaccine called "Cervarix" targets two HPV strains (16 and 18), and the vaccine called "Gardasil" or "Silgard" targets four strains (16 and 18, plus 6 and 11). HPV 6 and 11 can cause genital warts (condylomas). For both vaccines, you need three injections within six months to be properly vaccinated.

Canadian researchers looked at whether fewer abnormal cervical cell changes were found among girls and young women who had been vaccinated against HPV compared to those who had not been vaccinated. They analysed the results of six randomised controlled trials involving a total of more than 40,000 women between 15 and 26 years old. None of the women had had more than six sexual partners in their life at the beginning of the trial.

In most of the trials, one group of participants was given all three HPV vaccine doses, and the other group was given injections of an inactive substance (a placebo). After all three doses had been given, the participants were observed over a period of up to five years. During this time they were supposed to have Pap tests (smear tests) every six to twelve months for the early detection of cervical cancer. Unfortunately, though, the people running the trials lost track of many of the women in the later years of the trial.

This makes the results of the research less reliable.

Still, the Canadian researchers were able to show that the vaccine which targets four HPV strains successfully protected some women against pre-cancerous changes in the cervix caused by HPV 16 or 18. In the scientific studies they looked at, they found that the risk of such changes was generally low anyway. It was only 2-3% in women who had not been vaccinated, compared to 1-2% in those who had. In other words, the vaccine prevented the development of pre-cancerous changes in about 1 out of every 100 women during the time that the trial was carried out. However, the women in the trial did not always have all three injections needed for the vaccine. The results may have been better if they had been fully immunised. It will take some time before we know how much the risk is reduced in the long term. It is assumed that the vaccine works even better in girls and young women who have not been infected with HPV – but researchers disagree about the estimates of possible benefit.

The research also found that genital warts were less common in women who had the vaccine which targets four HPV strains. The data provided by two trials involving about 6,000 women showed that 4% of the women who were not vaccinated had genital warts, compared to only 1% of those who were vaccinated. In other words: vaccinated women were less likely to have genital warts than non-vaccinated women were.

After examining the results of the trials, the researchers concluded that the vaccine was not associated with a significant risk of serious adverse effects. However, this is what was observed during a time period of up to five years only. There is currently no data on longer-term effects. According to CDC – a public health agency in the USA. – the main problems reported are skin reactions at the site of injection, such as pain (in 8 out of 10 people), swelling (in 3 out of 10 people) and redness (in 3 out of 10 people). Fever is also among the more common adverse effects (just over 1 in 10 people). Problems such as indigestion, headaches, tiredness or muscle ache may occur but are less common. In June 2009 the US regulatory authority FDA issued a warning that, as with many vaccines in young people, there is a risk of fainting shortly after having the vaccination. They therefore urge doctors to monitor girls for at least 15 minutes after vaccinating them.

Based on the results of the trials, the Canadian researchers

concluded that, with the help of the HPV vaccine, fewer women are likely to develop cervical cancer. However, the observation period in the trials was only three to five years, and cervical cancer usually develops much more slowly than that. Whether the protective effect lasts longer than five years and whether a booster vaccination will be needed after this time is not known for sure either. There is also not enough information to determine whether one of the two types of vaccine works better than the other. More research is needed to answer these questions. A trial published in 2009 showed that the vaccine which targets only two HPV strains, "Cervarix", is similarly effective at preventing pre-cancerous changes as the vaccine that was tested in the large trials, which targets four HPV strains.

Researchers still do not agree about how much young women can benefit from the HPV vaccine. Some say there is a great benefit, some say there is a small benefit, and others question the vaccine in general. Further research has to be done to be more certain about all these issues.

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Glossary

infection

In medicine, we speak of an infection when a person has caught a germ (an infectious agent). This germ can be a bacterium, a virus, a fungus or a worm. The germ multiplies and then either spreads throughout the body or only attacks one particular organ. As long as there are no signs of a disease, this is called an asymptomatic infection. When the body shows a reaction to the germ in the form of symptoms, this is called a symptomatic infection (an infectious disease). The period between the moment the germs enter the body and the moment the first symptoms of the disease appear, is called the incubation period. It may last a few hours or days, or even many years. An infection does not necessarily have to lead to the onset of a disease.

vaccination

Vaccination involves stimulating the body's production of antibodies to a particular virus or bacteria, so that the person has increased resistance if they are exposed to the real infection. A vaccine aims to launch the body's defence system, without actually causing the disease. Depending on the vaccine, it could take some time after vaccination to develop immunity. With most vaccines, more than one vaccination is needed. Sometimes the immunity from a vaccine lessens over time. That means there are some types of vaccination that need be repeated after a few years to stay active. There are several types of vaccines. Some vaccines are "inactivated" or "killed", which means that even though they are made from a virus, for example, no "live" part of the virus remains. That means the vaccine itself cannot cause infection. Other vaccines are "live attenuated vaccines". This means that the virus has been made so much less infective than the real virus, that it should not be able to cause symptoms.

virus

Viruses are germs that enter living cells (plant, animal or human cells) to multiply. Viruses cause illnesses and diseases such as smallpox, influenza, colds, hepatitis, herpes and AIDS.

Sources

IQWiG health information is based on research in the international literature. We identify the most scientifically reliable knowledge currently available, particularly so-called “systematic reviews”. These summarise and analyse the results of scientific research on the benefits and harms of treatments and other health care interventions. This helps medical professionals and people who are affected by the medical condition to weigh up the pros and cons. You can read more about systematic reviews and why these can provide the most trustworthy evidence about the state of knowledge here (URL: <http://www.gesundheitsinformation.de/evidence-based-medicine.61.en.html>) . The authors of the major systematic reviews on which our information is based are always approached to help us ensure the medical and scientific accuracy of our products.

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The German Institute for Quality and Efficiency in Health Care (IQWiG)

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