



Medical Committee
The University of Jordan

The Skin and
MUSCULOSKELETAL
System



MICROBIOLOGY

SLIDES

SHEET

LECTURE # 2 (1- virology)

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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

Today we are going to talk about papillomavirus.

Introduction :

Papillomaviruses are found in a huge numbers in animals and humans **as a group from papillomaviridae family** .

They were accompanied with another group which is **POLYOMA** viruses which give rise to:

-**JC virus** , - **BKvirus** ,

Then they were separated , and the one we concern in was called **papillomaviridae family** .

We can find It (papillomavirus) as we said in animals and it's very common disease in humans , indeed , in humans the causative agent (virus) is **human papillomavirus** .which causes infection specific to keratinocytes of the skin or mucus membranes .

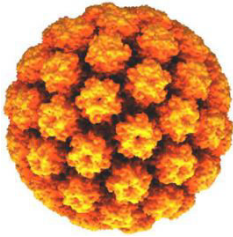
*hallmarks of the disease----→ they cause mucous membranes and skin lesions (tumor like lesions) and **they might be malignant.**

HPV are species specific; means that they are specific for humans and DO NOT infect animals.

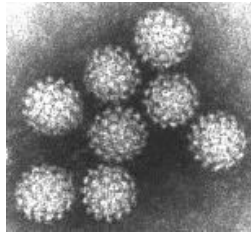
In 1907; warts was discovered to be caused by viruses / filterable agents , they **extract** these lesions نموّات from the infected human , **filtrate** it then **inject** it in another animal and they discovered that the filterable agent wasn't bacteria ! then they revealed that it was virus and discovered it's (virus) types .

So, papillomaviruses are nonenveloped and small viruses ,the diameter of it is around 50nm , contain icosahedral capsid (means that their surface have **pentagonal** خماسي and **hexagonal** سداسي shapes) and that capsid contains ds DNA in a circular form .

Each capsid contains specific types of proteins which give it (virus) specificity.



Cartoon graph



EM graph

Epidemiology :

NOTE : in the slide it's written that there's over 100 types of HPV , but the DR. said that it's over **200** now .

HPV causes many syndromes, one of them is cutaneous warts which is three types , the first one is **common warts** , it's found in the hair of children, common warts account for 70% of the cutaneous warts which is the highest .



Common warts

-Planter warts : found in feet and account for 34% of cutaneous warts and the hosts for them are the adults and adolescents .



-Flat warts : 4% of cutaneous warts found in children .most commonly in the arms , face and forehead



-Genital warts: very common in the west countries and any other place where you can find sexually transmitted diseases **STD** , it's the most common STD in the USA .



-Condyloma accuminata :

Major type of genital warts spread through oral , genital and anal sexual contact found in 1% of the population in those countries (USA and countries with STD) and when we say 1% it's a huge percentage.

How do HPV transmit ?

For Cutaneous warts it's unknown, but it thought to be by close contact with somebody who has the warts, we need also minor trauma so the virus can enter the body , but it's not necessary since a lot of people lived with people who had warts and nothing happened to them !

So, definitely there are other causes. Now the genital warts are definitely caused by sexual contact and the data were taken from many studies which provided that people who are with sexual contact with people who have warts have higher probability to have genital warts .

You might have genital warts if someone has warts in his/her hand and inculcate (to insert something in one's anus) it(hand) in the genital area .

*many of warts can be found in the skin but asymptomatic .

*this virus is associated with tumors , HPV causes cancer!

Not all types cause cancer, there are types can stay even for million years and don't cause cancer.

The numbers that you **should** know are: **16 / 18 / 31/ 45** , those cause **cervical cancer** and that's the important disease which associated with HPV .

If you know that this type of cancer is caused by virus, does it give you a hope in the treatment ?

YES , you can use prevention/protection , but **HOW?**

by giving a **VACCINE** .It took them 20 years to discover a vaccine , but the results were perfect.

HPV can also cause **squamous cell cancer**, mainly :

1-vaginal vulvar 2- anal 3- penile cancer in men

It might be associated with other cancers in **nose, paranasalsinuses , oropharynx** and **esophagus** .

- Cervical cancer is barely seen here in Jordan; because it needs sexual contact and promiscuity (اختلاط) to make circle of transmission .

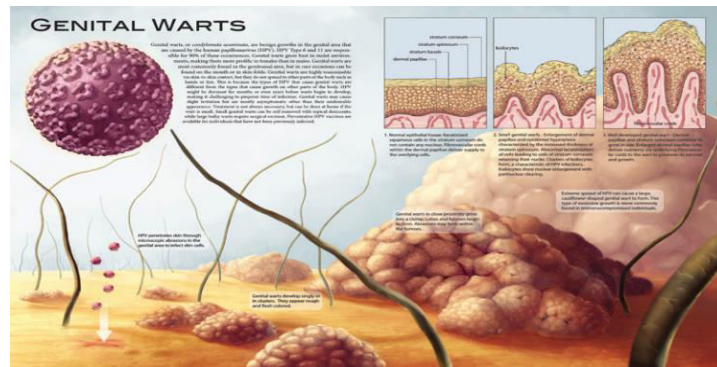
That doesn't mean that each one with HPV will have cancer, so there are other risk factors like :

- Smoking (which is carcinogenic)
- Multiparity (نساء لديهن أكثر من حمل)
- Long term of oral contraceptive
- Cervical inflammation , as if the patient has another STD , mainly **Chlamydia inflammatory disease**, which helps the virus to transform into cancer.
- Immunosuppression ; people with HIV/AIDS mainly
- Genetic ; also the found that certain genes involved in changing into malignancy .

Pathogenesis (HOW) :

What happens in pathogenesis ?

First of all, we expose to the virus from skin or mucous membranes ,then it enters to the inside (it should reach the inner layers of skin/mucous) then we need in average 3-4 months incubation period and it could be as long as years to develop the disease .

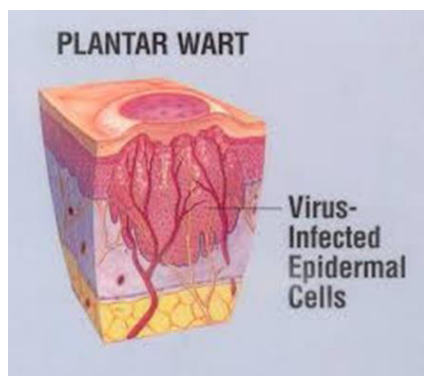


This picture present the pathology of HPV:

You can see hyperkeratosis (over growth of keratin layers) الطبقة الداكنة من الجلد also you can see something called “**acanthosis**” which is actually epidermal hyperplasia that means thickening of the skin and the epidermis become layers stacked above each other and that cause the appearance of the wart ثللول .



the manifestation in planter warts in the foot is different , it doesn't cause over growth above the skin , since we keep walking on our feet that growth will be pused to the inside not elevated above the skin this actually causes pain .



Actually the infection is limited to the basal layer of the stratified squamous epithelial (stratum basalis) because it is the only replicative layer of the epidermis and the virus need this layer to inject it's genetic material into the DNA of these cells and once it reach the outer layer of the skin the virus will start multiplying and cause warts, usually the virus don't multiply well in this layer so it's genetic material remain in this layer and as these cells multiply and the formed keratinocytes will be pushed upward to the skin then the virus will start multiplying and cause warts .

The quantity of the virus increase as you go up with the epidermal layers.

You can also see blood vessels.

★ Let's move to cutaneous warts , we said that we have 3 types of it : common, planter and flat/plate warts.

First, we'll talk about deep planter, it appears in foot of adults and adolescents, it's a raised bundles of soft keratotic fibers.

NOTE :

Warts are called sometimes corn, and you have to differentiate while diagnosing between those warts and **CALLUS**

Callus

Thickened area of the skin caused from repetitive pressure , friction on the skin and not caused from HPV-infection usually happen from wearing uncomfortable shoes (high heels) or something , it's actually a protective response from the skin .

Warts

Not necessarily on the area of pressure , rather it's due to the entrance of the virus

It's hard to differentiate between Callus and Warts in the clinic the only way to differentiate between them is by **removing the outer layer of the skin / keratin** then we look for the red dots which represent blood vessels (punctate bleeding vessels) which **only** found in the warts caused by HPV and by that we can differentiate between them .

Planter warts have a size between 2mm-1cm in diameter and they are PAINFUL.



Common warts

***remember that we are talking about the cutaneous ones.**

It's well demarcated .

NOTE→the picture in the slide doesn't represent the common warts , it represent **mosaic warts**.

Common warts mainly appear in hands and fingers

- Hyperkeratotic papules , you can see a lot of protuberances نتونات
- Found where you can find large numbers of keratin like:
 - dorsum of hand
 - between fingers
 - around nails
- It's about 1cm in diameter



MOSAIC WARTS :

Type of tightly clustered plantar warts .So if many warts come together it will cause this lesion .



Plate warts:

“sometimes it can deceive you “

- Flat in shape
- Found in children mainly on the face and neck .
- Can be found as multiple warts
- Slightly elevated papules in face ,neck and hands and it disappear by itself.

How to diagnose warts?

- 1) Clinically : if you see it , you'll know it
- 2) Biopsy : very useful ;
 - to rule out استبعاد invasive cancer when we talk about genital warts or even the mucosa when these warts come up in esophagus or mouth
 - to get DNA and know the type of the virus.
 - we can also do staining if we know the number of the virus so you know even if it will cause cancer or not.

TREATMENT:

No highly effective treatment , sometimes it disappear by itself after 1-2 years and it will come back as the virus still in the body , so how to treat it?

We can decrease clinical manifestation and in the best cases we can eradicate it but usually we decrease it .

-in some cases we give **SALICYLIC ACID** , the response of it has been studied and it was 75% effective , it's a keratolytic substance , you put it on the lesion and peel it تقشير , within two months it might disappear .

-**cryotherapy** :we freeze the liquid nitrogen

-**laser**

Prevention:

- Avoid contact with lesions on the skin
- Swimming pool is an excellent place to get warts, so you have to wear protective equipment.
- Regarding to genital warts, condoms الواقعي الذكري is very effective to prevent it
- And regarding to cervical cancer, there's something called **pap smear** مسحة من عنق الرحم to study it under the microscope and see if there's any changes that are consistent with cancer .

Of course there are stages for neoplasia , doctors advise the patient to get treatment or that she/he has a cancer (this is not that significant information !)

Pap smear should be done once every year for sexually active women to detect HPV.

There's very effective vaccine for HPV , it has been in the pharmacies for 4 years, it's trade name is "**Gardasil**" ,it provides protection for 4 strains/ types :

6 / 11/ 16 /18 two of them cause malignancy(16/18) and two cause genital warts .



This vaccine is given to the ages between 11-26 , it's better to give it earlier for Americans people ,as their sexual life starts at the age of 15 years .

Actually the aim of it is to give protection against cervical cancer, it's really bad and has high mortality rates.

We give it on 3 stages :-

0-2-6 months.

That's it for today's lecture, good luck everyone



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