

اقدامات قبل از عمل در بیماران HPV

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- Human Papillomavirus (HPV) is a highly contagious and commonly **sexually transmitted** human pathogen.
- The majority of known HPV genotypes are harmless or considered “**low-risk**” types (e.g. HPV-6 and HPV-11), which primarily cause benign **cutaneous warts and anogenital lesions**.
- Papillomatosis of the **oropharyngeal** and **laryngobronchial** system has also been attributed to infection with low-risk HPV genotypes.



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- **High-risk** genotypes (e.g. HPV-16 and 18) → cervical cancer and other urogenital malignancies in both women and men.
- Despite introduction of vaccines against relevant HPV genotypes, an **increasing** prevalence of **HPV-16-positive oropharyngeal** cancers has been reported over the past decades.



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- Procedures:
 - Laser ablation
 - electrosurgery, e.g. loop electrical excision (LEEP)
 - cryosurgical procedures
- HPV is highly contagious in direct **skin to skin** contact and thus the use of protective **gloves** is generally established amongst healthcare workers



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- Most HPV-associated neoplasms **suitable** for physical ablation are induced by **low risk HPV** genotypes
- Multiple **high- and low** risk HPV genotypes have been shown to **coexist** even in benign neoplasms, particularly in the anogenital region.
- **Even low-risk** HPV-associated lesions bear a risk for the development of **malignancy**.
- This knowledge highlights the importance of prevention in exposed medical staff regardless of HPV genotype.



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- Is airborne transmission of infectious HPV particles during ablation procedures possible and does it lead to an elevated risk for HPV lesions of the upper airways in medical staff?



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Ten studies identified HPV DNA in ablation smoke derived from CO2 laser, electrocoagulation and/or LEEP in vapor samples or filters of a local air exhaustion system.



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- **Three studies** found HPV genotypes of the ablated patient lesions, in the **nasolabial fold and upper airways** of medical staff following CO2, electrocoagulation and/or LEEP ablation.
- In a prospective study, high-risk HPV were found in LEEP generated smoke. HPV caught in exhaust **suction tubes** during the procedure were matching those from the four resected intraepithelial neoplastic cervix (CIN) lesions



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- HPV **DNA load** was increasing with positional **distance** of the smoke evacuation device from the ablation site.
- The authors further identified HPV DNA in the **nasal cavities** of 2 surgeons after LEEP procedure, which again corresponded with HPV genotypes found in the respective ablated tissues; however, this nasal **HPV DNA was not traceable in follow up (3–6 month)**



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- HPV DNA was found in **32% of nasolabial fold** swipes and in **16% of nasal** cytobrush specimens of **gynaecologists** conducting several consequent CO2 laser and electrocoagulation sessions on genital warts.
- **No data** was found on airborne HPV DNA dispersal risk during **cryotherapy**.
- Contamination of cryoguns with HPV is highly dependent on cleaning methods and herpes simplex virus was shown to “survive” up to **12h on cotton-tipped applicators**.



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- Very few studies have documented **infectious potency** of dispersed papillomavirus from **ablation** procedures
- **Bovine** papillomavirus collected from CO2 **laser smoke** during wart treatment in cattle **induced cutaneous fibropapillomas** when reinoculated into skin of calves.
- In a murine model, **surgical smoke** from mouse tail warts ablated with KTP laser was consistently capable of transmitting mouse papillomavirus (MmuPV1) to uninfected mice.



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- Three **case reports** describing four case histories of HPV associated upper airway disease due to surgical smoke exposure.
- In 1990, a 44-year old **surgeon** who had treated rectal lesions and **anogenital condylomas** using a Nd:YAG laser over the course of 3 years, developed **laryngeal papillomatosis** associated with HPV subtypes 6 and 11.
- He had used a surgical mask, gloves and eye protection, but no specific smoke evacuation system.



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- In 2003, a 28 year old **gynaecology nurse**, who had repeatedly assisted in electrocautery and CO2 laser treatments of **anogenital condylomata** without proper protective equipment, developed laryngeal papillomatosis.
- There are two reported cases of HPV-16-positive **oropharyngeal squamous cell cancers** in **gynaecologists**. Both had **over 20 years** of practice in performing physical ablation procedures, particularly CO2 laser and LEEP, in HPV associated lesions of the cervix and vulva. They were male, 53 and 62 year old respectively, and appeared to have no other relevant risk factors for HPV-16 infection.



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- samples from 700 gynecologist (n = 469 exposed to electrosurgical smoke, out of which n = 356 were performing LEEP).
- **More prevalent in nasal epithelia** of staff performing any kind of electrosurgery compared to non-exposed staff.
- **Highest prevalence** rates were found for staff conducting **electrosurgery** for over 15 years (17.33%), followed by 10–15 years (13.21%), 5–10 years (7.22%) and 0–5 years (6.15%).
- **HPV-16** was the **most prevalent** genotype in the nasal swabs of the electrosurgery group (76.19%).
- **No HPV** DNA was detected in the group of positively tested gynecologists still participating in the study **after 24 months**.



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- In a STUDY, only found a higher prevalence of **hand warts** in dermatologists which the authors attributed to insufficient use of preventive equipment.



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- Safety recommendations
 - use, but also correct disposal, of examination gloves, aprons, caps and appropriate (regularly cleaned or disposable) eye protection.
- Closely positioned local **smoke exhaustion systems** and highly efficient filters as well as appropriate room ventilation
- Fortunately, the use of N95 masks and, to some extent, even surgical masks were shown to effectively reduce contamination of nasal epithelia with HPV DNA.

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