Cervical Cancer: Being Proactive with Preventative Pap Smears

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The average number of cervical cancers occurring in the United States is close to 12,000 new cases each year, with 91% of these cancers being caused by the human papilloma virus (HPV)[1]. The most common symptoms associated with cervical cancer are postcoital bleeding, bleeding between periods, unusual vaginal discharge, and associated pelvic or back pain[2]. Unfortunately, presentation of these symptoms typically occurs at a more advanced stage of the disease. In order to successfully fight cervical cancer, it's vital to catch it early, or take the appropriate measures to prevent it in the first place.

Reducing the Risk of Cervical Cancer

HPV vaccination and regular screenings can significantly lower one's risk for cervical cancer development.

There are multiple strains of HPV, ranging from those that cause warts, to the high-risk strains 16 /18 which are linked to multiple types of cancer, including cervical cancer. The Cervarix and Gardasil vaccines protect against the high-risk strains. The CDC recommends HPV vaccination for females between the ages of 9-26, ideally receiving the vaccine between the ages of 11-12[3]. It's important to educate patients and their parents that the vaccine only works if the person is not already infected with HPV, stressing the importance of vaccination prior to onset of sexual activity[4].

Regular screenings with a Papanicolaou (Pap) smear can help find any abnormalities in the cervix. A Pap smear uses a small brush that gently scrapes the cervix, collecting cells to later view under a microscope and asses for atypical cells. The small brush is shaped so that it can obtain cells from both the external surface of the cervix called the ectocervix, and the beginning of the internal aspect of the cervical canal called the endocervix (see Figure 1). The area where the ectocervix and the endocervix meet is called the transformation zone, as the squamous cells of the endocervix transform into the columnar cells of the ectocervix (also called the squamous-columnar junction). The transformation zone is the area at greatest risk for neoplasia development. The US Preventive Services Task Force advises for screening to begin at 21 years old. If the Pap smear yields a normal result, repeat Pap smears happen on 3-year intervals until 65 years old. There is an option to combine Pap smear testing with a high-risk HPV DNA test, allowing a 5-year interval in-between testing if normal[5].

Figure 1. Pap smear brush, targeting transformation zone of cervix

Pap Smear Results

The Pap smear is a screening test aiming to detect evidence of any cellular dysplasia or precancerous lesions. A satisfactory Pap smear result captures the presence or absence of endocervical or transformation zone components[6]. Results that show no epithelial abnormalities are labeled as "negative for intraepithelial lesion or

malignancy."[7]

If there are epithelial abnormalities, there are different categories pending the degree to which cells stray from normal cytology. Atypical squamous cells of undetermined significance (ASCUS) describes a Pap result that shows cells deviating from normal, but not quite fitting into categories for further squamous intraepithelial lesions (SIL). ASCUS thus denotes risk for SIL, as the changes are deemed to be more than just reactive changes of the cervix[8].

Abnormal results are grouped into low-grade SIL (LSIL) and high-grade SIL (HSIL) based on risk and invasiveness of abnormal cells[9]. Atypical cells and mild dysplasia are categorized as LSIL, whereas moderate and severe dysplasia, as well as carcinoma in situ, fall under the category of HSIL. Evidence has shown that LSIL demarks a current infection with HPV, while HSIL yields viral persistence with risk of progression[10]. An ASC result that cannot exclude HSIL is termed ASC-H.

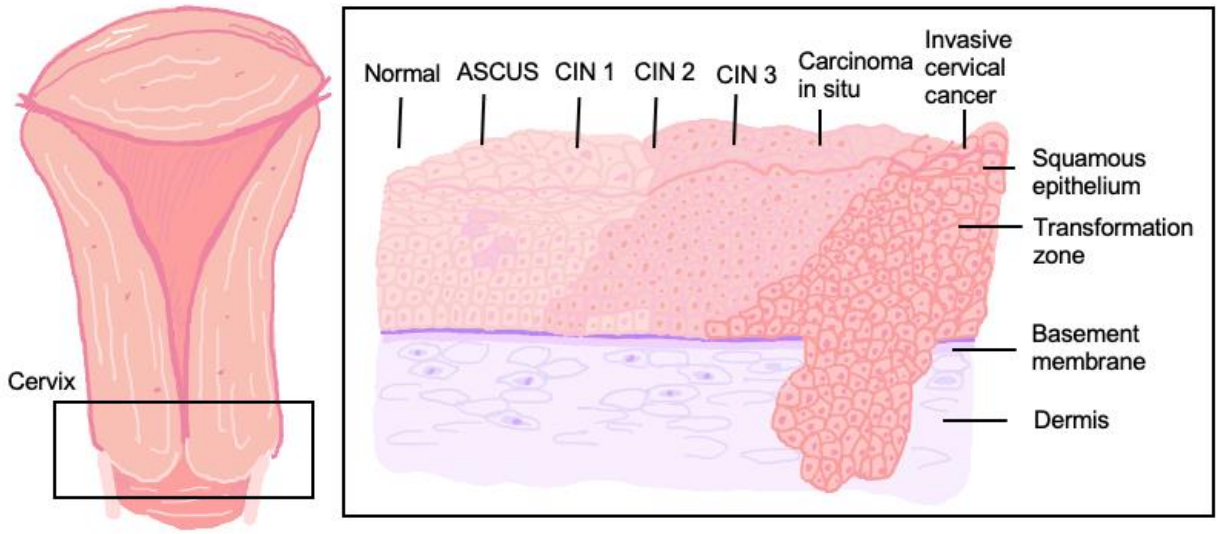

Figure 2. Cervical intraepithelial cells can range from normal with a present transformation zone, to invasive cervical cancer which grows and penetrates the basement membrane. Regular screening with Pap smear and colposcopy as needed can catch cervical dysplasia before it progresses to later stages.

Receiving an Abnormal Pap Result… What Does it Mean?

If a Pap shows abnormal cells, specifically ASCUS, a high-risk HPV test will be conducted. If the HPV test is negative, routine management is to repeat Pap screening in 3 years. If the high-risk HPV test comes back as positive, a colposcopy of the cervix is done[11]. A colposcopy can obtain a small cervical biopsy for close examination of abnormalities. While a Pap is adequate for screening, a colposcopy is the gold standard for diagnosis and next steps.

The results from colposcopy classify varying degrees of cervical intraepithelial neoplasia (CIN), on a scale from the low-grade lesions of CIN 1, to high-grade lesions of CIN 2

and CIN 3[12]. See Figure 2 for a representation of this progression. To note, LSIL is not equivalent to CIN 1 histologically, neither is HSIL equivalent to CIN 2 or 3. Recent data suggests that CIN 1 uncommonly progresses to CIN 2 or 3, at least within the first 24 months[12]. Common practice is to monitor and repeat screening in ASCUS or CIN 1 in 6-12 months, to see if the lesions have regressed or persisted. CIN 2 or CIN 3 lesions are treated a bit more aggressively. Once identified, there are methods to remove them, ranging from cryotherapy, laser ablation, cold-knife conization, and loop electrosurgical excision procedure (LEEP)[12]. Both the LEEP and cone biopsies are beneficial as they are a tool of further diagnosis but can also accurately remove the precancerous or early cancerous areas.

The Important Role of the Immune System

It is completely reasonable to feel overwhelmed and scared upon receiving an abnormal result from a pelvic examination. A study showed that the majority of women have a low level of awareness of HPV and its relation to abnormal Pap results[13]. Further education from health care providers about the result, and what it all means, is extremely important – as well as good emotional contact from the provider. Realizing that most people infected with HPV do not go on to develop cancer can help ease any anxieties a person may have. A prospective study of Brazilian women with LSIL found that more than 90% regressed within 24 months[14]. The immune response plays an important role in clearing most of these infections, but some do persist, which is why we have screening tools in place to catch lesions early before they progress to more invasive stages of disease.

Reducing the Risk of HPV

Although it's comforting to know that our immune system has the ability to clear HPV, it's important to not rely on this, and instead aim to be proactive against the virus through prevention. The high-risk strains of HPV are largely preventable via the vaccine[16], so it's important to receive this prior to becoming sexually active. The CDC also recommends lowering your risk of contracting HPV by using condoms during sex, limiting the number of sexual partners, as well as not smoking[15]. It's been shown that quitting smoking may help the body more effectively get rid of HPV after one does contract it. It's also important to make the necessary lifestyle and dietary changes to bolster one's immune system so that the body can fight off the infection.

Importance of Prevention

Abnormal Pap test results are common. Test abnormalities such as dysplasia or precancerous cells do not always indicate having cervical cancer. The average time course from CIN 3 progressing to invasion is estimated at 10 years, providing many opportunities for these lesions to be detected and more importantly, to be treated[17]. Detecting cervical abnormalities at an early stage is the best-case scenario, as it can be dealt with using minimally invasive measures before cancer develops.

Cervical screening through regular Pap smears, as well as the HPV vaccine, are both incredible tools in the prevention of cervical cancer. When it comes to risk reduction for

cancer development, women should be educated by their healthcare providers that prevention is indeed the best medicine.

Figures drawn by author, Maura Fox, OMS-III

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