Cervical Cancer
A Guide for Nurses

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Chapter 1

Dysplasia, HPV and cervical cancer

‘In theory, recognition that a pandemic infection is responsible for more than half a million cancer cases each year would attract huge media attention and infection control would become the subject of preventative efforts from the global health agencies. Media attention would likely be particularly acute if the majority of deaths was among women rearing families in the developing world and if the disease were sexually transmitted. A vaccine capable of preventing the disease would be diligently pursued and, once available, promptly distributed for the health and welfare of humankind. Human papilloma virus (HPV) infection fits this scenario; however, HPV has yet to make an impact on either the media or public thinking as outlined in the previous paragraph, even though the link between HPV infection and cervical cancer has been recognised for more than 20 years.’

(Frazer et al. 2006)

Introduction

Our understanding of cervical cancer has increased enormously in recent years, principally through a greater appreciation of the role of the human papilloma virus (HPV). Whilst HPV alone does not cause cervical cancer, it is certainly an extremely important factor. Infection with the virus can trigger a number of cellular changes to the cervix which if left unchecked have the potential to develop into cervical cancer.

This chapter begins with a review of the worldwide incidence of cervical cancer. This is followed by a discussion of the form and function of the normal, healthy cervix and the pathological processes which can occur to disrupt it. The role of HPV in the development of cervical neoplasia is assessed, together with other causative factors. The different stages of pre-cancerous cellular abnormality are outlined, with a description of their cytological and histological grading systems. The final section of the chapter looks at the progression of abnormal cervical cells into carcinoma and describes the main staging system for squamous cell carcinoma of the cervix.

The size of the problem

Cervical cancer is the second most common cancer amongst women worldwide, accounting for more than 273,000 deaths a year – 9% of all female cancer deaths. One in ten female cancers diagnosed worldwide are cancers of the cervix (Ferlay et al. 2004).

The distribution of the disease is not uniform – cervical cancer rates are estimated to vary eight-fold throughout the world, with a seventeen-fold variation in mortality rates
(Ferlay et al. 2004, Sankaranarayanan and Ferlay 2006). This disparity in incidence is principally between developed and developing nations. Globally, cervical cancer accounts for over 2.7 million years of life lost among women between the ages of 25 and 64. When this is broken down by country, 2.4 million years of life lost occur in developing areas, with only 0.3 million in developed countries (Yang et al. 2004).

Within the UK, cervical cancer is the second most common cancer after breast cancer in women under the age of 35, with 625 new cases diagnosed in 2003 (Cancer Research UK 2006). Within Australia 1 in 183 women will develop cervical cancer by the age of 75 (Cancer Council 2006). The incidence and mortality rates of cervical cancer in the UK, USA and Australia are shown in Table 1.1 and some other cervical cancer facts and figures can be found in Box 1.1.

Largely as a result of cervical screening, cervical cancer rates within the developed world are, for the most part, falling. For example, in the UK the mortality rate fell by 60% between 1975 and 2004 (from 7.5 to 2.8 per 100,000 females) (Cancer Research UK 2006). There are a few exceptions to this trend. For reasons which are not really understood the mortality rate for cervical cancer is rising in a number of developed countries such as Spain, Romania and Bulgaria (Cancer Research UK 2006, Office for National Statistics 1999). Where cervical cancer is declining, there has been a concomitant increase in the diagnosis of carcinoma in situ in women under the age of 30 (Quinn et al. 2001). This is also attributable to the success of cervical screening programmes.

### Table 1.1 Incidence and mortality rates from cervical cancer in developed countries (per 100,000 women)

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<th>Mortality</th>
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<td>UK</td>
<td>8.3</td>
<td>3.1</td>
</tr>
<tr>
<td>Australia</td>
<td>6.9</td>
<td>1.7</td>
</tr>
<tr>
<td>USA</td>
<td>7.7</td>
<td>2.3</td>
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Source: www.dep-iarc.fr/GLOBOCAN 2002
Taken from National Health and Medical Research Council (NHMRC) powerpoint presentation) http://www.cancerscreening.gov.au/internet/screening/publishing.nsf/Content/FCB2AB961D5E15BCA2571D80078876F/$File/presentation-june06.pdf (accessed 17/6/07)

### Box 1.1 Cervical cancer statistics

**Cervical cancer statistics: Australia**

Cervical cancer is the thirteenth most common cancer in women in Australia

740 women are diagnosed with cervical cancer each year

270 women die of cervical cancer each year in Australia


**Cervical cancer statistics: UK**

Cervical cancer is the twelfth most common cancer in women in the UK

2800 women are diagnosed with cervical cancer each year

1100 women die of cervical cancer each year in the UK, giving a European age-standardised death rate of 2.8 per 100,000 females and a crude rate of 3.6 per 100,000.

http://info.cancerresearchuk.org/cancerstats/types/cervix/ (accessed 5/7/07)
The healthy cervix

The role of the cervix in a healthy woman is principally concerned with reproduction – it helps to keep the developing foetus in the uterus and has a part to play in the initiation and progression of labour. The mucus produced by the cervix is considered important in female fertility (Moghissi 1972). The cervix is also thought to have a function in the female sexual response (Grimes 1999).

The cervix is cylindrical in shape and lies in the inferior, fibromuscular part of the uterus, accounting for approximately one third of the uterus. The remaining two thirds of the uterus are known as the body or corpus. It is located within the pelvic cavity, posterior to the bladder and anterior to the recto-sigmoid and rectum. It is attached to the bladder by the two vesicouterine ligaments. The tissue lateral to the cervix between the paravesical and pararectal spaces is known as the parametrium. The nerve supply to the cervix is derived from the hypogastric plexus and its blood supply from the internal iliac arteries. Its regional lymph nodes include: the parametrial, external iliac, obturator, hypogastric (internal iliac) and common iliac.

The cervix generally measures about 3–4 cm in length and 2.5 cm in diameter, although its size varies according to age. At its upper boundary, where it meets the corpus of the uterus, there is a narrowing known as the isthmus or internal os. The lower boundary of the cervix is known as the external os and opens into the vagina – indeed, the lower half of the cervix protrudes into the vagina.

Within the cervix itself, the anatomy is subdivided into the endocervix and the exocervix or ectocervix. The endocervix is the name for the upper two thirds of the cervix and the ectocervix the lower two thirds – this is the part that is more easily visualised on colposcopic examination (see Chapter 2).

The ecto and endocervix are lined with two different types of epithelium – the endocervix with columnar glandular epithelium and the ectocervix with squamous epithelium. The squamous and glandular epithelium meet at the squamocolumnar junction (SCJ). The squamocolumnar junction appears as a sharp line with a step due to the difference in the height of the squamous and columnar epithelium.

The cervix undergoes significant changes over a lifetime. Puberty, pregnancy and menopause all serve to alter its structure and location. For example, when a woman reaches puberty the cervix grows and the squamocolumnar junction moves down, exposing the