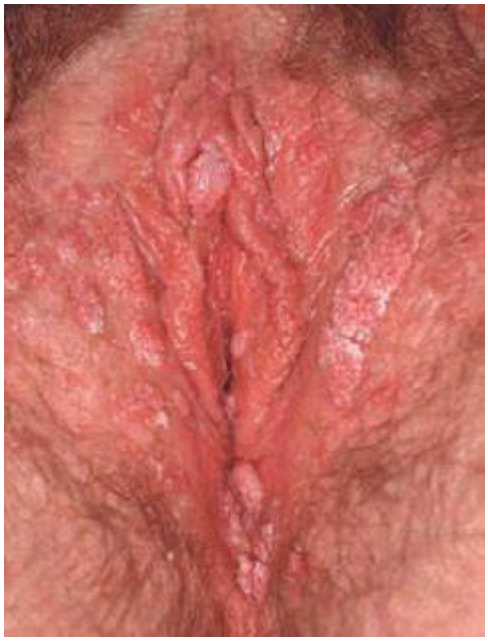

FIGURE 222-1 **Vulvar warts.** *(Downloaded from http://www2a.cdc.gov/stdtraining/ready-to-use/Manuals/HPV/hpv-slides-2013.pdf.)*

are similar in appearance to those in men: dry and keratotic. Vulvar lesions can appear as smooth, sometimes pigmented papules that may coalesce. Vaginal lesions appear as multiple areas of elongated papillae. Biopsy of vulvar or vaginal lesions may reveal malignancy, which is not always reliably identified by clinical examination.

Subclinical cervical HPV infections are common, and the cervix may appear normal on examination. Cervical lesions often appear as papillary proliferations near the transformation zone. Irregular vascular loops are present beneath the surface epithelium. Patients who develop cervical cancer arising from HPV infection may present with a variety of symptoms. Early carcinomas appear eroded and bleed easily. More advanced carcinomas present as ulcerated lesions or as an exophytic cervical mass. Some cervical carcinomas are located in the cervical canal and may be difficult to see. Bleeding, symptoms of a mass lesion in late stages, and metastatic disease that may manifest as bowel or bladder obstruction due to direct extension of the tumor have also been described.

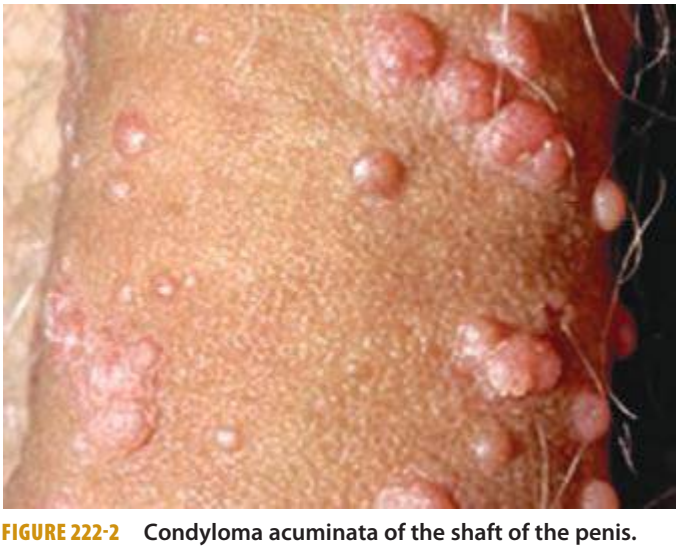

FIGURE 222-2 **Condyloma acuminata of the shaft of the penis.**

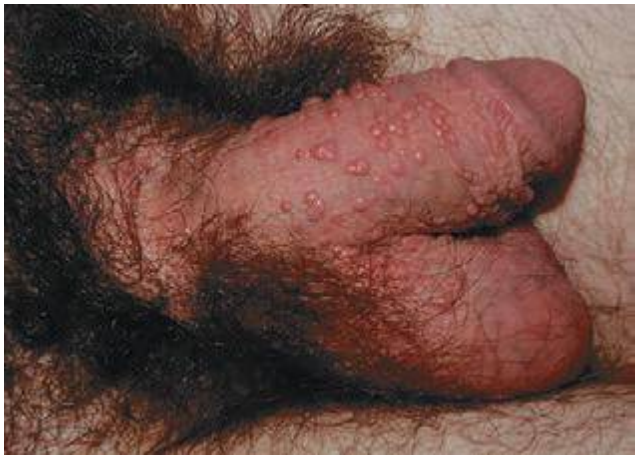

FIGURE 222-3 **Perianal warts.** *(Reprinted from K Wolff, RA Johnson, AP Saavedra: Fitzpatrick's Color Atlas & Synopsis of Clinical Dermatology, 7th ed. New York, McGraw-Hill, 2013.)*

Patients with squamous cell cancer of the anus have more variable presentations. The most common presentations include rectal bleeding and pain or a mass sensation. Of patients who are diagnosed with anal cancer, 20% may present with no specific symptoms at the time of diagnosis; rather, the lesion is found fortuitously.

PREVENTION OF HPV INFECTION: HPV VACCINES

Vaccines effective in preventing HPV infection and HPV-associated disease represent a major development in the last decade. The vaccines use virus-like particles (VLPs) that consist of the HPV L1 major capsid protein. The L1 protein self-assembles into VLPs when expressed in eukaryotic cells (i.e., yeast for the Merck vaccine or insect cells for the GlaxoSmithKline vaccine; see below). These VLPs contain the same epitopes as the HPV virion. However, they do not contain genetic material and cannot transmit infection. The immunogenicity of HPV vaccines relies on the development of conformational neutralizing antibodies to epitopes displayed on viral capsids.

Several large trials have demonstrated the high degree of safety and efficacy of HPV vaccines. The evidence to date has shown high and sustained efficacy against disease caused by those HPV types represented in the vaccines (HPV-6, -11, -16, and -18 in the Merck vaccine and HPV-16 and -18 in the GlaxoSmithKline vaccine). However, no therapeutic effect against active infection or disease has been found for either vaccine.

Bivalent Vaccine (Cervarix) A bivalent L1 VLP vaccine (HPV-16 and -18), marketed under the name Cervarix (GlaxoSmithKline), is administered by IM injection at months 0, 1, and 6. This vaccine was tested in 18,644 women 15–25 years of age who were residing in the United States, South America, Europe, and Asia. The primary endpoints of the study included vaccine efficacy against persistent infections with HPV-16 and -18. Investigators also assessed the vaccine's efficacy against CIN of grade 2 or higher due to HPV-16 and -18 in women who had no evidence of infection with these HPV types at baseline; in these women, vaccine efficacy was 94.9% (95% confidence interval [CI], 87.7 to 98.4) against CIN ≥2 related to HPV-16 or HPV-18, 91.7% (95% CI, 66.6 to 99.1) against CIN ≥3, and 100% (95% CI, –8.6 to 100) against adenocarcinoma in situ.

Adverse events were evaluated in phase 3 trials in a subset of 3077 women who received the bivalent vaccine and 3080 women (controls) who received hepatitis A vaccine. Injection-site adverse events (pain, redness, and swelling) and systemic adverse events (fatigue, headache, and myalgia) were reported more frequently in the HPV vaccine group than in the control group. Serious adverse events (mainly injection-site reactions), new-onset chronic disease, or medically significant conditions occurred in 3.5% of HPV vaccine recipients and in 3.5% of women receiving the control vaccine.