A 23-year-old Paint gelding was brought to the Oklahoma State University Boren Veterinary Medical Teaching Hospital to be euthanatized because of a progressively enlarging mass on the glans penis and enlargement of the prepuce. The normal glans architecture is partially effaced by an exophytic, multinodular mass, and the prepuce is markedly edematous. The lungs have numerous variably sized nodules scattered throughout the parenchyma.

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Pathology in Practice

In cooperation with

Figure 1—Photographs of the glans penis and prepuce (A) and lungs (B) of a horse that was euthanatized because of a progressively enlarging mass on the glans penis and enlargement of the prepuce.
Histopathologic Findings

Histologic examination of sections of the skin of the glans penis revealed a highly invasive neoplasm that was composed of islands of squamous to basaloid epithelium surrounded by abundant fibrous connective tissue. Cells were often connected via prominent intercellular bridges. Individual cells were round to polygonal with variable amounts of eosinophilic cytoplasm that was occasionally keratinized. The number of mitoses varied between individual fields of view, and there was a total of 24 mitotic figures in 10 hpf (magnification, 400X). Areas of coagulative necrosis were scattered throughout the neoplastic tissue, and some areas were infiltrated by lymphocytes and plasma cells. The pelvic lymph nodes, tracheobronchial lymph nodes, and nodules in the lungs and heart were composed of similar neoplastic epithelial cells (Figure 2).

Morphologic Diagnosis

Squamous cell carcinoma of the penis with multifocal metastasis to the regional lymph nodes, lungs, and heart.

Comments

Squamous cell carcinoma is the most common neoplasm of the penis and prepuce in horses; it comprises 67.5% to 85.4% (excluding sarcoids) of genital neoplasms in male horses. Commonly affected sites include the glans penis (17%) and the prepuce (27.6%). The urethra is often secondarily involved (27.6%). Older horses are typically affected; mean age of affected horses ranges from 17 to 19.8 years. In addition to squamous cell carcinoma, differential diagnoses for the lesions in the horse of this report included less commonly reported neoplasms of the equine penis and prepuce such as squamous papilloma, fibrosarcoma, adenocarcinoma, neurofibroma, basal cell carcinoma, and melanoma. Nonneoplastic differential diagnoses included epithelial hyperplasia; cutaneous infection with Habronema spp, Halicephalobus spp, or Draischia megastoma; or coital exanthema (infection with equine herpesvirus 3). For antemortem diagnosis, results of microscopic examination of cutaneous biopsy specimens or possibly aspirate samples of the lesions are useful.

In horses with penile squamous cell carcinoma, common clinical signs include preputial discharge, preputial bleeding, and preputial masses. As illustrated by the horse of this report, many affected horses are not examined by a veterinarian until the neoplasm has extensively invaded surrounding tissues. Some horses may have difficulty urinating, phimosis, and preputial edema; less specific signs include lameness and a lack of stamina.

Metastasis of penile squamous cell carcinoma to regional lymph nodes is not uncommon, and lymph node metastasis is detected in 12% of cases. However, not all enlarged lymph nodes contain neoplastic infiltrates. In a study of 114 horses with penile or preputial tumors, the causes of enlargement of 19 of 28 (68%) lymph nodes were regional inflammation and secondary lymphoid hyperplasia, rather than metastasis.

Distant metastasis to other organs or tissues is less common, and the most frequently reported sites include the lungs and liver. Other reported sites of metastasis include the abdomen and the thoracic vertebral column (without evidence of regional lymph node metastasis). Myocardial metastasis, as detected in the horse of this report, is exceedingly rare. To our knowledge, the only other published report describes myocardial metastasis (ie, nodules in the myocardium that were classified as undifferentiated carcinoma) that was presumed to develop from penile squamous cell carcinoma in a horse. In the horse of this report, metastatic cells had prominent intercellular bridges but only occasional cytoplasmic keratinization, consistent with an immature phenotype. Because most cells were immature, the neoplasm was classified as poorly differentiated. In a study of penile squamous cell carcinoma in horses, neoplasms were graded according to their degree of dif-
ferration. Similar to findings in the horse of this report, results of that study\(^1\) indicated that the rate of metastasis for poorly differentiated neoplasms was higher than that for well-differentiated neoplasms. In addition to the poorly differentiated nature of the neoplasm in the horse of this report, the high mitotic rate and multifocal areas of necrosis were suggestive of increased malignant potential.

The specific cause of the development of genital squamous cell carcinoma is unclear. In horses, it has been hypothesized that smegma may be carcinogenic,\(^12\) although a similar theory has generated controversy in the human medical literature.\(^13,14\) Furthermore, research has failed to determine a viral etiology; papilloma virus particles are present in squamous papillomas but not in squamous cell carcinomas.\(^15\) Ultraviolet irradiation via sun exposure has been suggested as a possible inciting cause because genital squamous cell carcinomas often develop on lightly pigmented areas.\(^16\) However, the role of UV irradiation in development of penile squamous cell carcinoma is unclear, as results of 1 study\(^1\) suggested that light coat color does not predispose horses to developing penile squamous cell carcinoma.

Treatment of penile or preputial squamous cell carcinoma depends on the extent and location of the lesion. Small, superficial masses may be treated by removal of the mass and surrounding tissue. However, larger, more invasive masses may require extensive surgical procedures to remove the affected tissue. Surgical methods include cryosurgery, posthectomy, phallectomy, and en bloc resection.\(^6,17\) Topical chemotherapy with 5-fluorouracil is also effective.\(^18\) In a retrospective study\(^17\) of 77 male horses with squamous cell carcinoma of the external genitalia, surgical treatment was effective in 55.7% of cases; moreover, horses treated with partial phallectomy were more likely to have recurrent neoplasia, compared with horses treated with en bloc resection. In addition, a recently developed technique for penile amputation and sheath ablation with pexy of the urethra to the abdominal wall has been reported to reduce the postoperative complications that are common with en bloc resection and phallectomy.\(^19\)

References