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Source: Journal of Wildlife Diseases, 30(2) : 291-294

Published By: Wildlife Disease Association

URL: https://doi.org/10.7589/0090-3558-30.2.291

Journal of Wildlife Diseases, 30(2), 1994, pp. 291–294

Interstitial Cell (Leydig) Tumor in an Eland (*Taurotragus oryx*)

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ABSTRACT: We observed an interstitial cell tumor in an 18-mo-old captive eland bull (*Taurotragus oryx*) in Tel Aviv, Israel. The histological description of the tumor in the eland was similar to that described in cattle; however, the appearance of a moderate amount of lipid vacuoles in the cytoplasm of the neoplastic cells was uncharacteristic for bovine interstitial cell tumors. The eland also had clinical signs of gynecomastia.

Key words: Eland, *Taurotragus oryx*, testis, tumor, interstitial cell tumor, Leydig cell tumor.

Few lesions of the reproductive system have been reported in zoo animals. Schmidt and Hubbard (1987) did not encounter any testicular neoplasms in zoo ruminants. One case of a seminoma in an elk (*Cervus elaphus*) has been reported (Seefeldt and Helfer, 1980). Primary testicular tumors of domestic cattle also are considered to be rare (Ladds and Saunders, 1976; Rao and Reddy, 1987), occurring infrequently in older bulls (Ladds, 1985), while only a few cases of interstitial cell tumors have been reported (Humphrey and Ladds, 1976). We observed a testicular interstitial cell tumor in an 18-mo-old eland bull (*Taurotragus oryx*) from the Tel Aviv Zoological Safari Centre, Tel Aviv, Israel (32°04′N, 38°48′E).

The zoological garden kept about 70 eland (*Taurotragus oryx*) together with other species of antelope on 80 ha of land. A round mass, of about 50 mm diameter, was noted in the left testis of the eland. Despite the swelling, the eland continued to behave normally and maintained a good appetite. In the following months the testis continued to enlarge in size and changed into an oval shape. Signs of feminization characterized by gynecomastia also were present.

Fifteen months after first detecting the growth (January 1991), the eland was immobilized by intramuscular (IM) injection of Immobilon (C-Vet, Suffolk, England) at a dose of 0.5 ml/50 kg body weight; this was reversed with Revivon (C-Vet, Suffolk, England) administered by intramuscular (IM) injection at a dose of 0.5 ml/50 kg body weight at the end of the surgical procedure. The left testis was removed. Post-surgical recovery was uneventful.

The left testis was oval (80 mm diameter), with a smooth surface and a firm consistency. Macroscopically the testicular tissue was replaced by a multinodular mass which on section was multicystic and contained viscous fluid (Fig. 1). Interspersed between the cysts was light gray to dark brown soft tissue.

Tissue samples were fixed in 10% buffered formalin, embedded in paraffin, sectioned at 4 μm and stained with hematoxylin and eosin (H&E). To detect lipid, formalin fixed samples were frozen, sectioned and stained with Oil Red O (ORO) (High, 1977).

Tissue from formalin-fixed material was used for electron microscopic examination. The tissue samples first were placed in 2.5% gluteraldehyde for several hours; post-fixed in osmium tetroxide; dehydrated in graded alcohols and finally embedded in Araldite (Blazers, Germany) (Robinson, 1977a). Ultrathin sections were cut and stained with uranyl acetate and lead citrate (Robinson, 1977b) and examined under a Philips 201 electron microscope (Philips, Eindhoven, Holland).

Based on histologic examination, most testicular parenchyma was replaced by neoplastic tissue. The tumor was composed

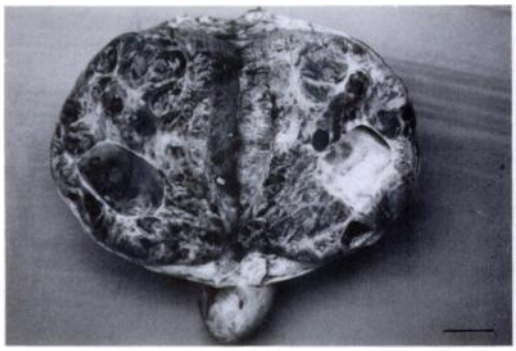

FIGURE 1. Interstitial cell tumor in an eland: Macroscopic appearance of the cut surface of the tumor. Note that the normal tissue has been replaced by multicystic neoplastic tissue. Bar = 10 mm.

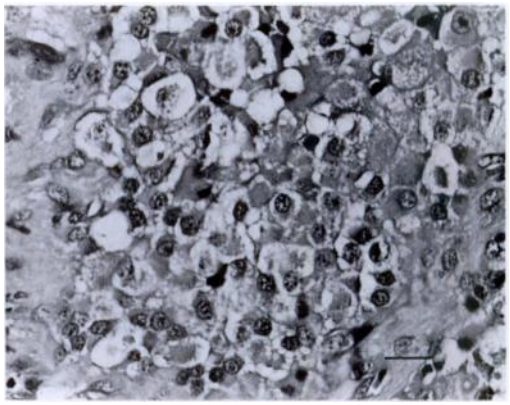

FIGURE 3. Fatty vacuolization in neoplastic cells in the solid area of the eland tumor. H&E, Bar = 10 μm.

of numerous variably-sized, highly cellular areas interspersed by cystic follicular areas (Fig. 2). The tumor itself was well defined, causing compression and atrophy of the adjacent seminiferous tubules.

Neoplastic cells in the solid areas were polyhedral and large, with homogeneous eosinophilic cytoplasm and occasional fine or large vacuoles which were ORO positive (Figs. 2, 3). The nuclei of these cells were large, round, and rarely oval, with coarsely dispersed chromatin and a prominent nucleolus (Fig. 3). Mitotic figures were occasionally seen. Capillaries were seen growing haphazardly between the neoplastic cells.

The cystic-follicular areas were composed of irregular cavities lined by single to multiple layers of columnar epithelium (Fig. 4). The epithelium sometimes formed irregular papillae projecting into the cavities which were filled with a homogeneous proteineous material and occasional erythrocytes. The cells constituting the cystic-follicular areas were smaller in size with an eosinophilic cytoplasm and a higher nuclear-cytoplasmic ratio. More mitotic figures and hyperchromic nuclei were seen as compared to the solid area of the tumor. The follicles were separated by thin fibrous septa with occasional dilated vascular channels.

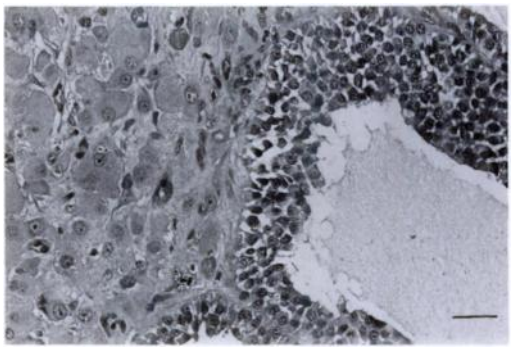

FIGURE 2. Interstitial cell tumor in an eland; note the mixture of solid and cystic-follicular areas. Proteinaceous material is located within the follicular lumen. H&E, Bar = 10 μm.

Large areas of tumor adjacent to the testicular capsule were hemorrhagic and necrotic; these changes were thought to be of traumatic origin. A thick connective tissue band delineated the mass near the necrotic peripheral areas. In several sites, nests of neoplastic tissue penetrated the fibrous collagenous sheets and on into the tunica albuginea. The thick fibrous bundles may represent scar tissue secondary to the ongoing necrosis.

Ultrastructurally, the tumor consisted of sheets of closely packed polygonal cells with large, round-irregular contoured nuclei and abundant cytoplasm. Nuclei had irregularly dispersed, small chromatin clumps, in addition to a rim of heterochromatin under the nuclear membrane.

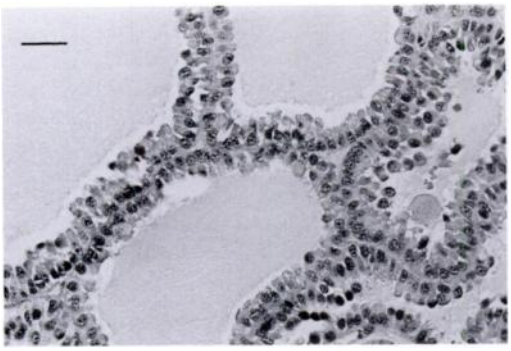

FIGURE 4. Neoplastic cells in the cystic-follicular area of the tumor: Note the proteinacous material within the follicles. H&E, Bar = 10 μm.

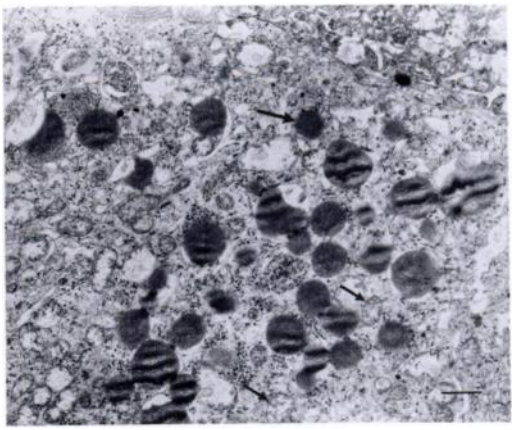

FIGURE 5. Electron micrograph of the eland interstitial cell tumor. Tumor cell cytoplasm from a cell with abundant lipid droplets (large arrow). Note the numerous mitochondria (small arrow) and irregular, somewhat dilated smooth endoplasmic reticulum in the background. Uranyl acetate, lead acetate. Bar = 1 μm.

Numerous focal lipid droplets were identified in some cells (Fig. 5). The cytoplasm contained numerous mitochondria having tubular or tubulovesicular cristae, polyribosomes, and somewhat dilated cisterns which may represent profiles of smooth endoplasmic reticulum.

The macroscopic, microscopic and ultrastructural findings described in the tumor of this eland bull were compatible with a diagnosis of interstitial cell tumor of the testis of the solid adenomatous type (McEntee, 1990; Rao and Reddy, 1987). The paraffin block and slides were deposited in the Archives of the State of Israel, Ministry of Agriculture, Department of Pathology; the archive number is 911162.

This is the first report of an interstitial cell tumor in an eland; that the tumor occurred in a young antelope makes this finding even more unusual. As in most cases described in bulls, the neoplasm appeared to be benign. Signs of feminization were observed in the case presented here, a phenomenon that has been described in dogs but not in bovines (Ladds, 1985). In cattle, the tumor may cause a decline in fertility (Dunn and McEntee, 1964; Ladds, 1985), although this aspect was not investigated in the eland case presented here.

The histologic description of the tumor in the eland was similar to that described in cattle (McEntee, 1990). Bovine interstitial cell tumors, however, usually contain very little intracytoplasmic lipid, whereas in this case a moderate quantity of lipid droplets was present as detected by ORO staining. The ultrastructural features of testicular interstitial cell tumors in feminized mice have been described and include numerous lipid droplets, abundant smooth endoplasmic reticulum, mitochondria with tubulovesicular cristae, and intercellular junctions (Mitsumori et al., 1989). This description is comparable to the cellular details observed in the case of the eland.

Eighteen months after the unilateral orchidectomy the eland continued to be in excellent health. Signs of feminization had disappeared at this stage.

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Received for publication 1 July 1993.