

## Case Report

# Unilateral scrotal enlargement and cryptorchidism in two boars

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## Abstract

Two ~ 10-year, intact male Vietnamese pot-bellied pig crosses were presented for evaluation of unilateral scrotal enlargement of 1 year's duration and historic diagnosis of cryptorchidism. Ultrasonographic examination of the scrotum was performed; tissue within the scrotum had no defining features of a normal testis. Based on physical examination, history, and ultrasonographic findings, testicular neoplasia was the primary differential diagnosis for both boars. Due to financial constraints and animals' age, humane euthanasia was elected. In both boars, histopathologic examination of enlarged testes revealed trabeculae and packets of polygonal cells with eosinophilic to microvacuolated cytoplasm, consistent with Leydig (interstitial) cell tumor. Not largely reported in swine, neoplasia must be considered a differential for any intact male. This case report demonstrated the importance of early castration for males not intended for breeding.

**Keywords:** Vietnamese pot-bellied pig, neoplasia, cryptorchidism, Leydig cell tumor

## Background

Cryptorchidism, the inguinal or intraabdominal retention of 1 or both testes, is more common in swine than cattle or sheep,<sup>1</sup> although testicular neoplasia is rarely reported.<sup>2</sup> We describe left-sided cryptorchidism and neoplastic transformation of the descended testis in 2 cohoused potbellied boars.

## Case presentation

Two ~ 10-year, intact male, Vietnamese pot-bellied pig crosses, weighing 91 and 95 kg, were presented in September 2024 for evaluation of unilateral scrotal enlargement. Both were companion animals that had been raised on the same farm with unknown genetic relation. As piglets, both had been diagnosed with left unilateral cryptorchidism and no significant prior medical history was otherwise reported. Both boars had developed unilateral scrotal enlargement 1 year prior to presentation, with rapid growth noted over the last 5 months. No behavioral changes were appreciated by the owner. Three months prior to referral, a local veterinarian had confirmed that both boars were serologically negative for *Brucella suis* and suid herpesvirus 1 (Pseudorabies virus). The referring veterinarian had performed a fine needle aspirate that failed to establish a definitive diagnosis.

## Case management

On presentation, boars were bright, alert, and responsive, with normal respiratory rates. Due to lack of patient cooperation, the remainder of the physical examination could not be completed. The scrotum of both boars was notably asymmetrically distended with taut skin, prominent vasculature, and firm adherence to an immobile underlying mass that had no discernible testicular or epididymal structures on transcutaneous palpation (Figures 1 and 2). Retained left testes were not palpable within the inguinal regions.

To facilitate ultrasonographic examination of the scrotums using a macro convex variable frequency (3-5 MHz) transducer on a portable ultrasound machine (Sonoscape X5, SonoScape Medical Corp, Centennial, CO), boars were sedated with intramuscular xylazine (0.3 mg/kg). Although the drug was extra label, it was used with owner's consent in compliance with provision of the Animal Medicinal Drug Use Clarification Act of 1994 and 21 CFR 530. Additional restraint was provided with the use of sorting panels to create an enclosed area and then boars were placed in dorsal recumbency. Intrascrotal structures measured ~ 19 cm in diameter, exhibited a heterogeneous and mixed echogenic pattern with minimal cavitation, and had no defining



**Figure 1.** Boar 1: A. Caudal view of unilateral scrotal enlargement; B. Close up view of enlarged scrotum with taut skin and prominent vasculature; and C. Profile view



**Figure 2.** Boar 2: A. Close up caudal view and B. Profile view

features of a normal testis (Figure 3). In both boars the left testis was retained and could not be located ultrasonographically.

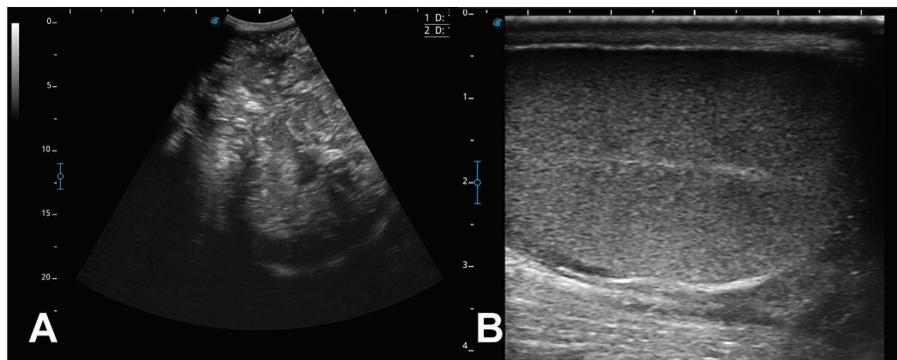
Differential diagnoses for porcine scrotal enlargement include infectious causes of orchitis or epididymitis (e.g. *Brucella suis*),<sup>3</sup> and noninfectious conditions such as inguinal hernia, testicular torsion, trauma,<sup>4</sup> sperm granuloma, spermatocele, hydrocele, scrotal abscesses, hematoma, and neoplasia. Based on history, physical examination, and ultrasonographic findings, testicular neoplasia was the primary differential diagnosis.

### Outcome

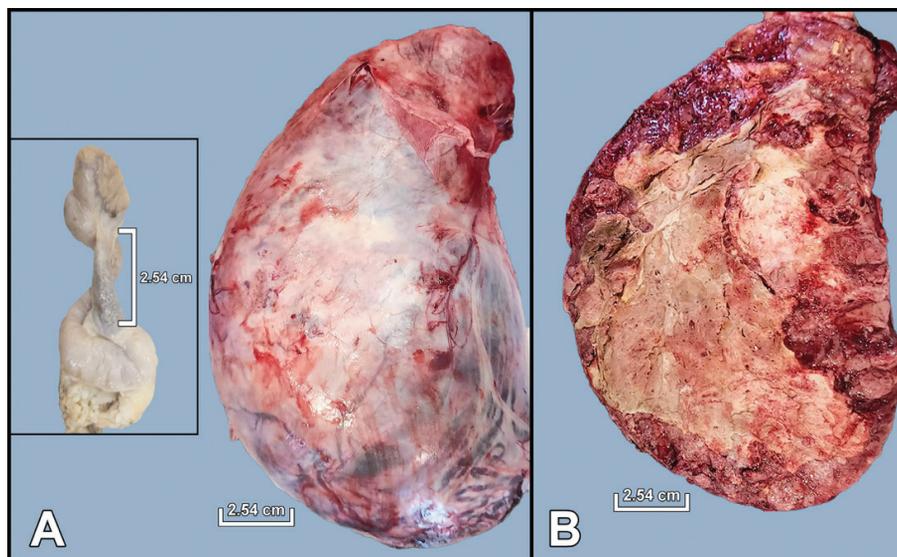
As a therapeutic option, the owner was offered computed tomography-assisted localization of the retained left testis in both boars followed by bilateral surgical castration under general anesthesia. However, due to financial constraints and quality of life concerns without intervention, humane euthanasia was elected.

### Postmortem findings

Following euthanasia, the retained and enlarged testis from each boar was removed and submitted for gross examination and histopathology (Figure 4). The retained left testes of both boars (4.5 and 7.5 cm in length, respectively) were hypoplastic with severe atrophy and obsolescence of the seminiferous tubules histologically (Figure 4). In contrast, the enlarged right testis of each boar measured > 34 cm in length and 19 cm in diameter and weighed 4.2 and 4.5 kg, respectively, was friable, tan, and had a necrotic core comprising 80-90% of the testicular mass, surrounded by sub-capsular red-brown viable tissue. Histologically, native testicular architecture was effaced by sheets, trabeculae, and packets of neoplastic cells separated by fine fibrovascular stroma. Polygonal neoplastic cells consistent with interstitial cells had abundant eosinophilic to finely vacuolated cytoplasm, distinct cell borders, and round nuclei with finely stippled chromatin and 1 or 2 small nucleoli. Scattered cytoplasmic invagination, moderate anisocytosis and anisokaryosis with karyomegaly and binucleation were noted. Mitotic activity was mild to moderate, with



**Figure 3.** Boar 1: A. Sagittal plane ultrasonogram of scrotal mass; note heterogeneous complex echo pattern without obvious characteristics of normal testicular tissue and minimal cavitations (~ 19 cm in diameter). Unrelated animal: B. Sagittal plane ultrasound image of normal testicular parenchyma; note homogenous parenchyma with hyperechoic mediastinum (rete testes) (scale bar on left is in cm)



**Figure 4.** Boar 1: A. Gross image of testis (inset: gross image of retained testis and associated epididymal structure). B. Cross section of testis; note areas of necrosis and loss of normal testicular parenchyma (atrophied area is identified [2.54 cm bars])

1 and 8 mitotic figures per 2.37 mm<sup>2</sup> in respective masses. Necrotic cores were infarcted with vascular thrombosis, coagulative necrosis of neoplastic cells, hemorrhage, fibrinous to fibrinosuppurative exudation, and mineralization (Figure 5). Gross pathological examination did not provide evidence of metastasis; other histologically examined organs were unremarkable.

## Discussion

The presentation of synchronous testicular enlargement in multiple animals would typically prioritize infectious, toxic, or traumatic differential diagnoses.<sup>4</sup> Based on physical examination, history, ultrasonography, and histopathology, unusual concurrent development of right testicular Leydig (interstitial) cell tumor was diagnosed in both boars.

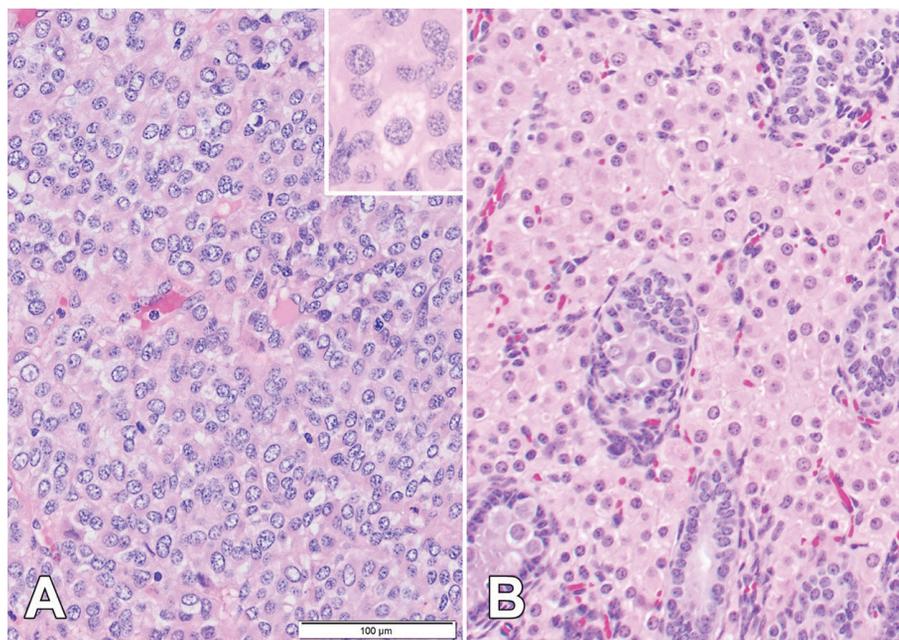
Vietnamese pot-bellied pigs reach puberty as early as 3 months of age, and early castration of nonbreeding boars is recommended to avoid development of aggression, territorial urine marking, sexual behavior, and buildup of malodorous secretions in the preputial diverticulum.<sup>5</sup>

The growing popularity and increasing life span of companion pigs is associated with rising frequency of porcine neoplastic disease presentation to veterinarians, with over-representation of gastrointestinal and uterine smooth muscle transformation.<sup>6</sup> Miniature pigs had uterine neoplastic lesions in 20/32 (62.5%) of which smooth muscle tumors were identified in animals > 5 years,<sup>7</sup> demonstrating the impact of continued hormonal influence. Further research is needed to determine the direct impacts of estrogen and progesterone on neoplastic changes within tissue.<sup>7</sup> Testicular neoplasia in boars is uncommonly reported;

however, pure interstitial cell tumors are rare in this species.<sup>8-12</sup> In a recent review of testicular neoplasia of commercial boars, seminomas were documented as the predominant primary testicular tumor, followed by mixed germ cell-stromal tumors, with no mention of pure interstitial cell tumors.<sup>2</sup>

Cryptorchidism is the retention of 1 or both testes; surgical removal by laparoscopically assisted, paramedian or inguinal approach cryptorchidectomy has been described in multiple species.<sup>13,14</sup> Majority of retained testes were located in the abdomen (94%), and the left testis was most commonly retained (57%).<sup>13</sup> These findings are consistent with the cases presented here. In general, cryptorchid testes are predisposed to neoplastic transformation. In stallions, development of interstitial cell tumors is predominantly associated with cryptorchidism.<sup>14</sup> Interestingly, neoplastic transformation in boars described herein was limited to the descended testis, with no evidence of malignancy in the retained gonads.

Given the unusual contemporaneous development of right-sided interstitial cell tumors in 2 cohoused boars with left-sided cryptorchidism, it is unfortunate that the genetic relation of these animals is unknown. Although environmental exposure to a variety of toxicants has been associated with testicular neoplasia in humans<sup>15,16</sup> and modeled in rodents,<sup>17,18</sup> analogous epidemiological or experimental studies are lacking in pigs. As such, the relative contributions of genetics, environment, and serendipity to this unusual clinical presentation remain undetermined. Neoplasia is documented in swine, although not commonly reported in the male reproductive tract. Increasing popularity of pet pigs necessitates that neoplasia must be considered a differential in any intact male. Additionally, this report demonstrated the importance of client education and the risks with



**Figure 5.** Boar 1. A. Light microscopic image of right testis; note interstitial cell tumor featuring trabeculae and nests of polygonal cells (inset: neoplastic cells with abundant eosinophilic to microvacuolated cytoplasm (hematoxylin and eosin stain; 400 x). B. Light microscopic image of normal interstitial cells in a swine testicle unrelated to these boars (hematoxylin and eosin stain; 400 x)

maintaining intact males when breeding is not the intended purpose.

### Learning points

- Neoplasia is a differential for any change in testicular size
- Leydig cell tumors are not commonly reported in swine
- Early castration of companion swine is recommended to prevent development of neoplasia
- Sedation in swine can assist in diagnostic procedures

### Acknowledgement

Authors thank Kaitlyn Locke, primary fourth year veterinary student, for exceptional patient care and Silas Zee for editing images.

### Conflict of interest

None to declare.

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