Case Report

Acquired indirect unilateral chronic reducible scrotal hernia in an Arabian stallion

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Abstract

This case report describes the presentation and surgical management of acquired indirect unilateral chronic reducible scrotal herniation in an 8-year-old Arabian stallion. The horse had a history of moderate unilateral swelling of the scrotum that had been noticed by the owner for 10 months. Upon palpation, the swelling was soft, reducible, painless and not accompanied by an acute abdomen. Ultrasonography, rectal and clinical examination were useful tools for the diagnosis of scrotal hernias in this case. A successful surgical herniorrhaphy was performed with the removal of the testicle at the affected side and the superficial inguinal ring was closed by application of a double-layer polypropylene mesh. The horse has made an unremitting recovery without recurrence or complications reported 18 months after surgery.

Keywords: Arabian horse, Chronic scrotal hernia, Unilateral, Acquired

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Introduction

Inguinal/scrotal herniation is an uncommon equine disease and may be direct or indirect, congenital or acquired. Indirect hernia is the most common form in equines and is characterized by protrusion of abdominal viscera through the vaginal ring into the vaginal process with descent into the inguinal canal and possibly extending into the scrotum (Kovac *et al.,* 2018). Direct hernia is the less common form and exists when the abdominal organs entering the inguinal canal are located outside the vaginal process in the subcutaneous space of the scrotum and prepuce.

An acquired hernia is the most common form of inguinal hernia seen in adult male horses and is usually unilateral, incarcerated (non-reducible) causing strangulation of the bowel accompanied by signs of acute abdominal pain (Huskamp and Kopf 1997). In most cases, the hernia sac contains a small intestine. However, herniation of the large intestine, omentum or urinary bladder has also been reported (Cousty *et al.,* 2010).

In the available veterinary literature, many studies have described the different types of inguinal/scrotal herniation in horses (van der Velden and Stolk 1990; Ragle *et al.,* 2013; Kovac *et al.,* 2018). To the authors' knowledge, this is the first report that describes the presentation and surgical management of an acquired indirect chronic reducible scrotal herniation in a sexually intact Arabian stallion.

Case description

An 8-year-old Arabian stallion was presented to the Veterinary Teaching Hospital, Kafrelsheikh University, Egypt for marked enlargement of the left scrotum (Fig. 1). The owner reported that the swelling was first observed approximately 10 months prior to presentation. The swelling had been persistent with no change in size over time. The referring veterinarian had treated the stallion with flunixin meglumine (1.1mg/kg BW, IV) for 5 successive days as soon as the symptoms appeared, after which the swelling had not improved. The owner reported that the stallion was rested for 6 months and once it had begun to be used in mating, it was unable to mount mares comfortably the due to the physical hindrance of the scrotal swelling.

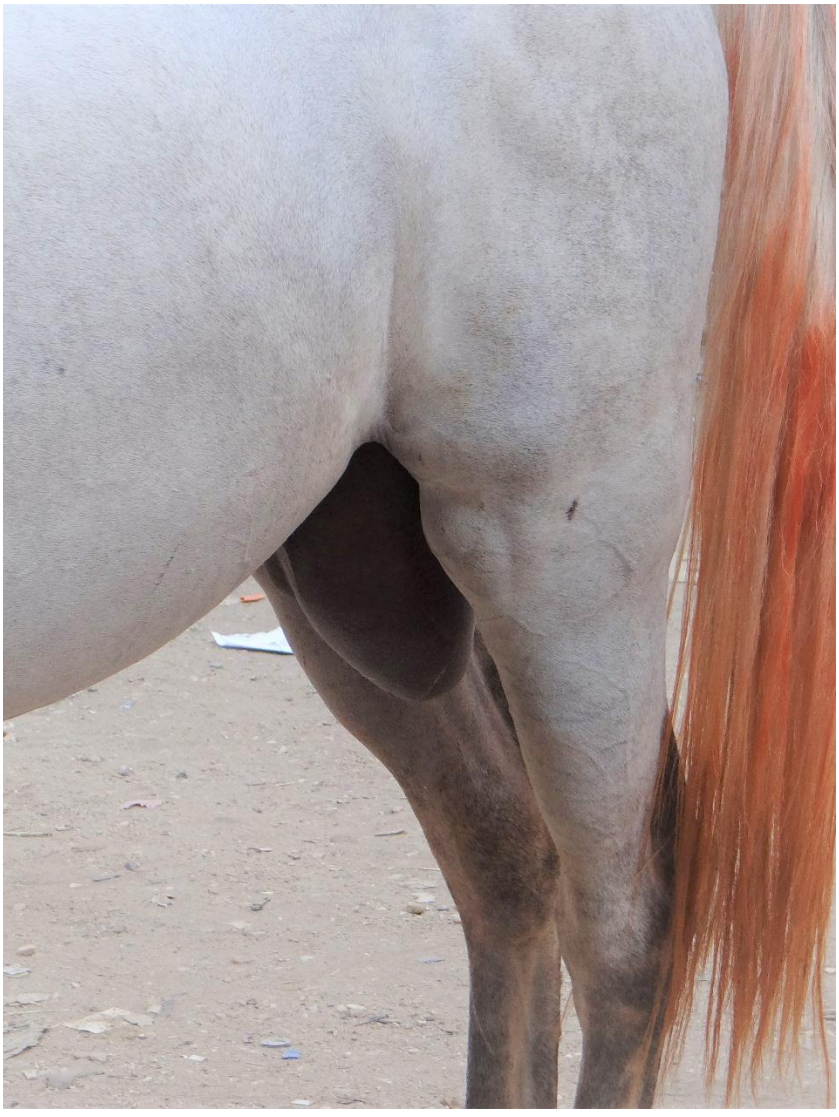

Figure 1 **A** lateral view of the scrotum of an 8-year-old Arabian stallion with an acquired left-sided inguinal/scrotal hernia.

On presentation, the stallion was bright, alert and responsive. The stallion was in fair body condition (body condition score 4). Vital parameters were within normal limits (HR: 30 to36 beats/min, RR: 10 to14 breaths/min, Temp: 37.5° -38°C).

Scrotal palpation revealed a soft, reducible swelling that did not elicit any avoidance behavior consistent with pain during palpation. The left testicle was normal on palpation but moderately smaller than the right one. External palpation of the left inguinal ring accommodated the insertion of more than 5 fingers. It was abnormally enlarged (approximately 14 cm × 7 cm in size).

The swelling was easily reduced in the abdomen by hand pressure. A sensation of ingesta was felt also on scrotal palpation and it was concluded that approximately a 6 cm-diameter loop of intestine was in the left hemiscrotum.

Upon rectal examination of the internal inguinal ring, a small intestinal loop was palpated entering the inguinal canal through the vaginal ring. Moreover, the slit-like opening of the vaginal ring permitted the insertion of 3 fingers on the left side and 2 fingers on the right side.

Scrotal ultrasonography (Fig. 2) showed a dilated motile intestinal loop with homogenous hypoechoic contents and some free fluid content suggestive of hydrocele (vaginocele). The testicle of the affected side was less echogenic than its normal counterpart.

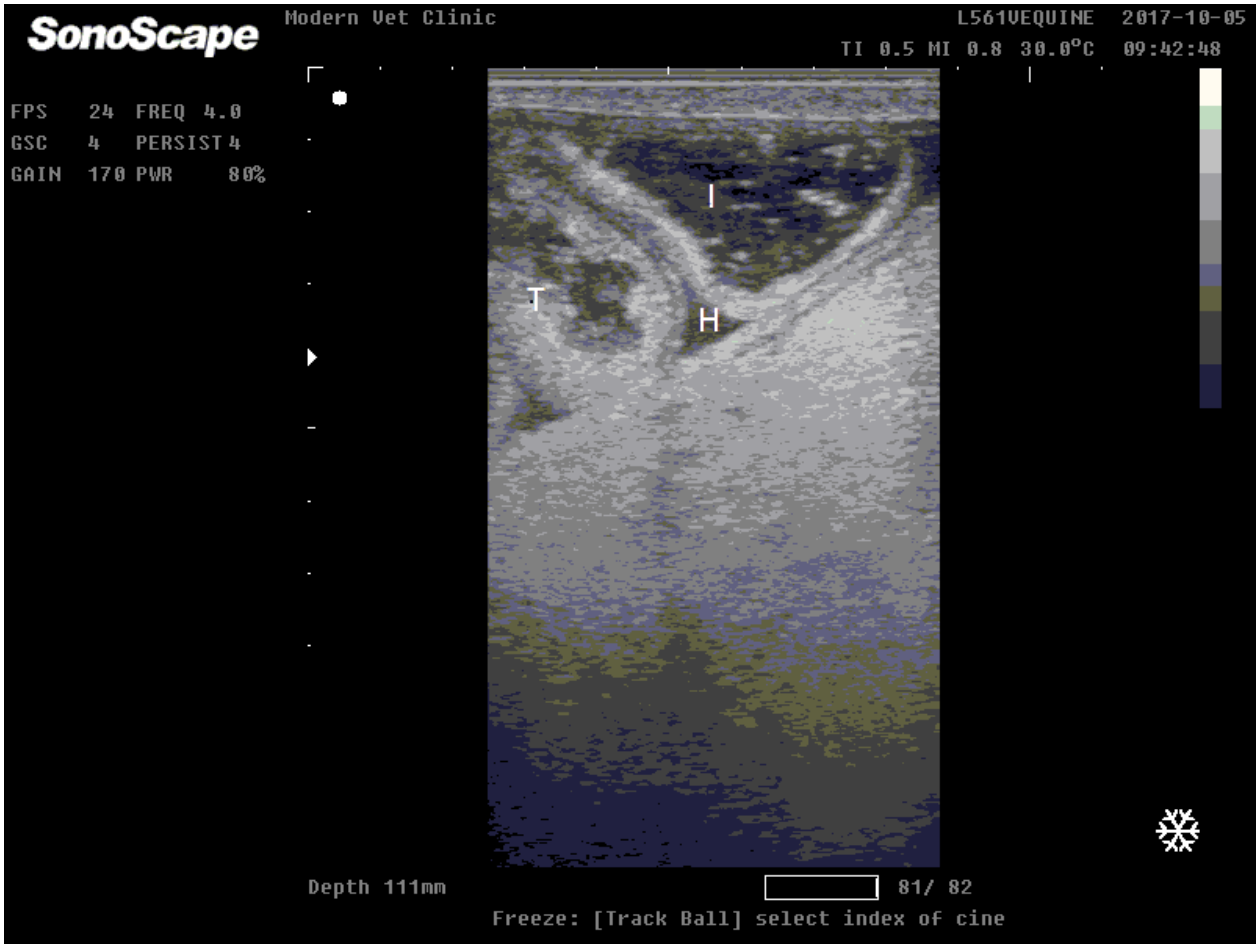

Figure 2 An ultrasonographic image of the scrotal herniation using a 7 MHZ linear transcutaneous ultrasound transducer placed longitudinally over the swelling shows a dilated small intestinal loop (I) with a hyperechoic wall that surrounds homogenous hypoechoic contents. The testicle (T) is less echogenic than its normal counterpart. Anechoic fluid (H) is present within the vaginal cavity (slight hydrocele)

Based on the history, clinical signs, rectal palpation and ultrasonography, the swelling was diagnosed as an indirect unilateral reducible (non-incarcerated) scrotal hernia. The swelling induced disfigurement, hence at the owner's request it was surgically repaired.

The horse underwent inguinal herniorrhaphy under total intravenous anesthesia in dorsal recumbency. Before herniorrhaphy, the stallion was administered intravenously with 22,000 IU/kg body weight sodium penicillin (Penicillin G sodium; Sandoz), 6.6 mg/kg gentamicin sulphate (Garamycin; Schering-Plough) and 1.1mg/kg flunixin meglumine (Finadyne; Schering-Plough Animal Health). The horse was sedated using 0.04 mg/kg romifidine (Sedivet; Boehringer-Ingelheim) and 0.03 mg/kg butorphanol (Torbugesic; Zoetis), both administered intravenously. Anesthesia was induced with an intravenous bolus of 0.04 mg/kg diazepam (Valium, Roche) and 2.2 mg/kg ketamine (Ketaset, Zoetis) given intravenously and maintained with a mixed solution of romifidine (0.06 mg/ml) and ketamine(2mg/ml) in 500 ml of 15% guaifenesine (Myolaxin, Vetoquinol), infused at a rate of 1.5 ml/kg/hr.

The horse was placed in dorsal recumbency and the inguinal area was clipped and aseptically prepared for surgery. A 12 cm long incision was made from the cranial edge of the superficial inguinal ring to the distal aspect of the scrotum through the skin, subcutaneous tissue and scrotal fascia. After carefully dissecting the vaginal sac with its contents from the scrotum, the parietal vaginal tunic was incised carefully to expose the herniated small intestine contained within. The herniated intestine was gently replaced by digital pressure into the abdomen through the vaginal ring. The testicle on the affected side was then drawn outside the vaginal cavity. The spermatic cord and vaginal sac were removed after crushing, ligation using 5 metric polyglactin 910 (Vicryl, Johnson and Johnson) and transection of the vaginal sac and spermatic cord by applying an emasculator approximately 2 cm distal to the ligature. The superficial inguinal ring was closed by the application of double-layer polypropylene mesh (Prolene, Johnson, and Johnson) (Fig. 3). The mesh was sutured to the superficial inguinal ring using pre-placed 4 metric polyglactin 910 (Vicryl, Johnson and Johnson) in a simple interrupted pattern. These sutures were placed 1.5 cm from the edge of the superficial inguinal ring. The skin was closed with 3 metric polyamides (Supramid, B. Braun) in a simple interrupted pattern (Fig. 4).

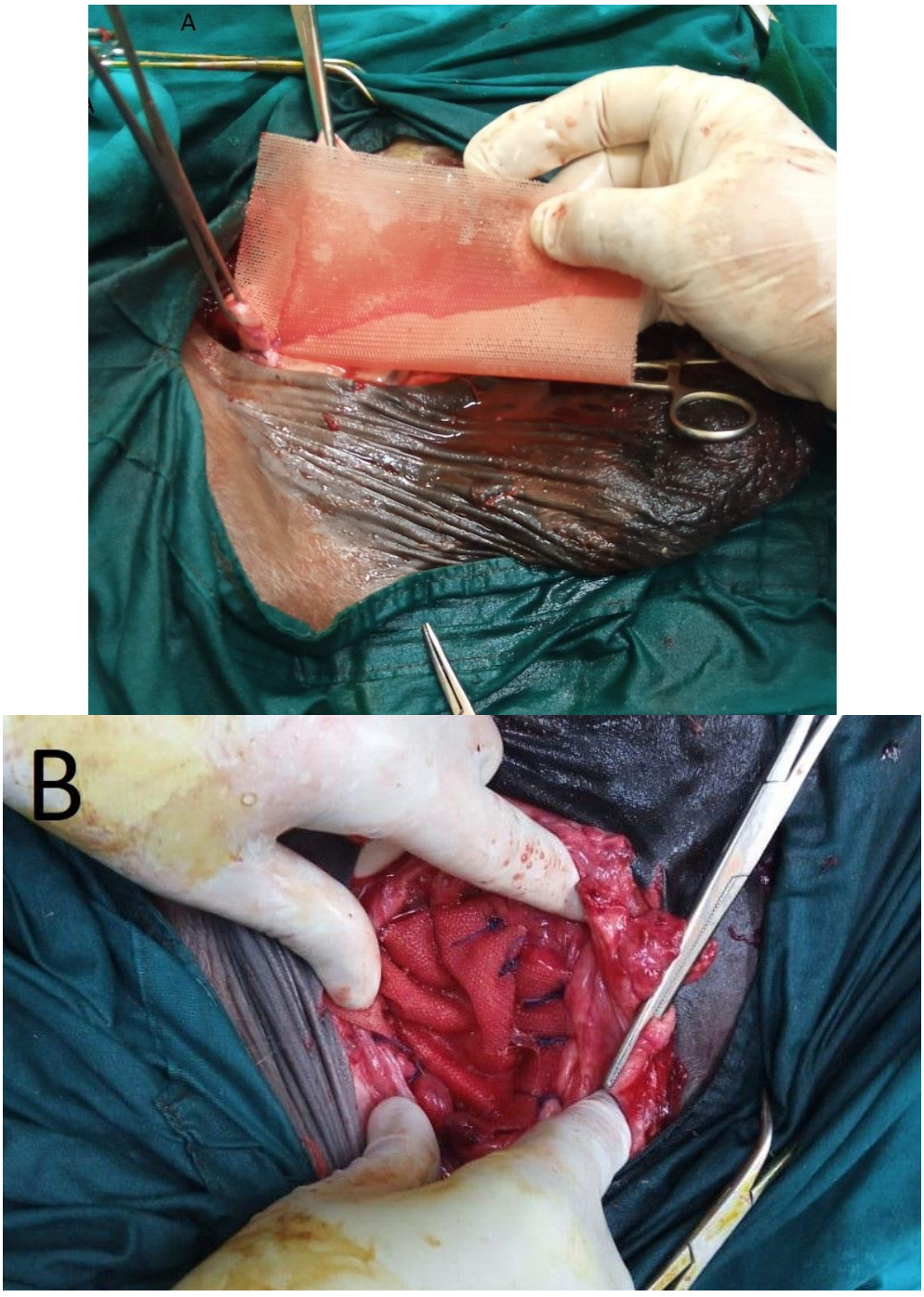

Figure 3 **A&B** Mesh herniorrhaphy technique, shows the Polypropylene mesh after tightening of the sutures**.**

Figure 4 Postoperative appearances of the inguinal area after correction of the hernia. Suturing of the skin with a vertical mattress pattern.

After surgery, the stallion was monitored intensively and given intramuscularly1,500 IU of antitetanic serum (Tetanus antitoxin, Pasteur Lab.). The antimicrobial cover, sodium penicillin (22,000 IU/kg IV q 6 h) and gentamicin sulphate (6.6 mg/kg IV q 24 h) were continued for 7 successive days. Flunixin meglumine (1.1mg/kg IV q 24 h) was continued for 5 successive days. The horse was offered a soft diet in the first week after surgery and kept in 3 days of box rest followed by seven days of hand walking twice daily.

Follow-up information was collected by telephone contact with the owner for 18 months following discharge and neither complications nor recurrence were recorded. No abnormality of the scrotum was noted by the owner and the stallion has been successfully used for breeding.

Discussion

Acquired inguinal/scrotal hernia is considered an important lesion in equines and is considered the second most frequent type after umbilical hernia diagnosed in these animals. In the horse, every acquired inguinal or scrotal hernia is a serious life-threatening emergency condition. The herniated intestine often becomes incarcerated or strangulated, resulting in acute colic pain (Huskamp and Kopf, 1997; Mezerová *et al.*, 2003). Few published reports have described the clinical presentations and treatments in horses with a reducible scrotal hernia (Ragle *et al.*, 2013). Therefore, the goal of the present case report was to describe the presentation and surgical management of acquired indirect unilateral reducible scrotal hernia for the first time in a sexually intact Arabian stallion.

The anatomical feature of the inguinal canal is responsible for the development and incarceration of the inguinal hernia in horses. Herniated intestine strangulation is caused by the vaginal ring constriction of the bowel (Schumacher and Perkins, 2010). Interestingly, the reported case here showed an acquired unilateral chronic non-incarcerated scrotal hernia in which the scrotal swelling was reducible, painless and not accompanied by an acute abdomen. This observation may be probably attributed to the abnormally wide diameter of both the inguinal canal and the vaginal ring in the present case; our hypothesis was supported by the rectal palpation findings which showed that all vaginal rings of the affected sides were wider than the normal sides.

In geldings, inguinal herniation in the majority of cases occurs immediately after castration due to the large space created in the inguinal canal following the abrupt removal of a part of the spermatic cord that favors the herniation of abdominal viscera. Hernias that are not related to castration are extremely rare (van der Velden, 1990). A right-sided nonstrangulating inguinal hernia was previously recorded in a 4-year-old castrated Arabian horse (Ragle *et al.*, 2013) and, to the best of our knowledge, this is the first report describing a left-sided acquired indirect chronic reducible scrotal hernia in a sexually intact Arabian stallion.

Differential diagnoses between scrotal or inguinal swelling include hematocele, hydrocele, torsion of the spermatic cord, varicocele and testicular enlargement

(Schumacher and Perkins, 2010). Palpation of the scrotum and transcutaneous scrotal ultrasonography was sufficient to confirm the diagnosis of acquired scrotal hernia in this stallion. Also, the ultrasonographic examination of the inguinal region was easily performed in the standing position after sedation of the case.

In equine practice, every acquired inguinal hernia in horses needs immediate attention and should be treated as an emergency case due to the herniated intestine typically becoming entrapped and strangulated. Several treatment options have been cited (Mezerová *et al.,* 2003; Schumacher and Perkins, 2010). The reduction of the inguinal incarcerated intestine by external manual manipulation or rectal traction has been reported but is difficult and rarely successful. In our case, due to the large size of the superficial external inguinal ring (more than 5 fingers), it was difficult to appose its edges. Therefore, a double-layer polypropylene mesh was used to close the defect after the reduction of the herniated intestine. The benefits of using polypropylene mesh is that it provides strength and helps to reduce the risk of recurrence and minimize the recovery time. Despite these advantages, human studies have shown that hernia meshes are more likely to cause post-surgery complications than traditional suture repair. The most common complications related to hernia repair with surgical mesh are chronic pain, infection, adhesion, hernia recurrence, mesh migration, mesh disintegration, mesh shrinkage or contraction, mesh rejection, mesh erosion and bowel obstruction or perforation (Gavlin *et al.,* 2020).

Recently, various minimally invasive laparoscopic methods and approaches for the closure of the deep inguinal ring have been developed (Ragle *et al.,* 2013; Rossignol *et al.,* 2014; Spagnolo *et al.,* 2016). Due to the inguinal canal anatomy, occlusion of the superficial inguinal has the potential for recurrence of acquired strangulated inguinal herniation. Therefore, closure of the deep internal ring is considered the best method to prevent the intestine from herniating through the vaginal ring and inguinal herniation recurring. Unfortunately, laparoscopy was not available in our case report.

In conclusion, acquired indirect scrotal herniation in Arabian horses may be a chronic reducible type that does not require prompt intervention as an emergency situation. Surgical herniorrhaphy with the closure of the superficial inguinal ring by application of double-layer polypropylene mesh was a successful method for resolving this problem in the present case.

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