

Surgical Management by Standing Laparoscopy and Inguinal Celiotomy Approach of the Cryptorchid Canadian Pony Stallion – Case Report

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Abstract

Laparoscopic surgery has become an accepted method of identification and removal of intra-abdominal testes in the horse. In the veterinary literature there are few reports in which standing laparoscopic cryptorchidectomy could not be performed in stallions, including miniature horse too. This report describes the surgical management of a Canadian pony diagnosed with partial abdominal unilaterally cryptorchidism at which laparoscopic castration has failed and the removal of the retained testicle has been made through inguinal celiotomy. A 4-year-old unilaterally cryptorchid Canadian pony was admitted in the Surgery Clinic of the Faculty of Veterinary Medicine Timișoara for castration. The left testis was in the scrotum, but neither the right testis nor the right epididymis could be located by external palpation of the right inguinal canal. The proposed treatment was laparoscopic cryptorchidectomy with pony standing in stock. With a long-handled forceps inserted into the abdominal cavity, the testis cord was gently grasped and moderate traction was applied without success in bringing the testicle into the abdomen (retained testis). After the failure of laparoscopic cryptorchidectomy but having an exact diagnosis (partial abdominal unilaterally cryptorchidism), we have proceeded to open cryptorchidectomy via inguinal approach with pony anesthetized and positioned in dorsal recumbency. This case report reveals that the major disadvantage of the cryptorchidectomy by flank approach is the inability to remove an inguinally retained testis.

Conclusion: If the location of the testis is unknown, the standing laparoscopic diagnose can be decisive. Cryptorchidectomy via inguinal approach and noninvasive method for identifying and everting the vaginal process by traction of the inguinal extension of the gubernaculum testis are commonly facile procedure, and this report describes, according to our knowledge, that this procedure has been performed for the first time in Romania.

Keywords: *cryptorchidectomy, inguinal celiotomy, laparoscopic, stallion pony*

INTRODUCTION

Cryptorchidism is a term used to describe the congenital condition in which one or both testicles fail to descend into the scrotum (Shira and Genetzky, 1982). The causes of cryptorchidism are not known, but testicular abnormalities have been suggested (Gardner *et al.*, 2016).

Cryptorchid stallions often display the physical and behavioral characteristics of normal stallions. To eliminate masculine characteristics, both testes are routinely entirely removed at cryptorchid

stallions (McKinnon *et al.*, 2011; Rodgerson and Hanson, 1997).

The numerous approaches for cryptorchidectomy that have been used in horses include: inguinal (Adams and Fessler, 2000; Valdez *et al.*, 1979; Walker and Vaughan, 1980), parainguinal (McKinnon *et al.*, 2011), modified parainguinal (Wilson and Reinertson, 1987), suprapubic paramedian (Cox *et al.*, 1978) and paralumbar flank (Swift, 1972). Each procedure has advantages and disadvantages (Adams and Fessler, 2000;

McKinnon *et al.*, 2011; Rodgerson and Hanson, 1997).

Abdominal testes also can be removed by laparoscopic techniques (Davis, 1997; Fischer and Vachon, 1992; Fischer, 1991; Hanrath and Rodgerson, 2002; Hendrickson and Wilson, 1997; Hendrickson, 2008; Ragle *et al.*, 1998; Wilson *et al.*, 1996; Wilson and Madison, 1989).

Laparoscopic surgery has become an accepted method of identification and removal of intra-abdominal testes in the horse. Wilson and Madison (1989) describe the use of laparoscopy to diagnose abdominal retained testes. Fischer (1991) was the first who describe a laparoscopic cryptorchidectomy technique. Since then, numerous laparoscopic cryptorchidectomy techniques have been described, which vary in the positioning of the horse (standing versus dorsal recumbency), anesthetic techniques (Muir *et al.*, 2000), position and number of the portals, and the method used to provide hemostasis of the spermatic cord (Hendrickson, 2012).

The mono or bipolar electrosurgical devices were successfully used in cryptorchidectomy (Hanrath and Rodgerson, 2002; Hendrickson, 2006; Wilson *et al.*, 1996). Fischer and Vachon (1992) says that the most frequently employed and most cost effective method for laparoscopic intra-abdominal removal of cryptorchid testes is the combined use of an endoscopic ligating loop and monopolar electrosurgery.

So far, in the encountered specialty literature there are few reports in which standing laparoscopic cryptorchidectomy could not be performed in stallions including miniature horse too (McKinnon *et al.*, 2011).

This report describes the surgical management of a Canadian pony diagnosed with partial abdominal unilaterally cryptorchidism at which laparoscopic castration has been failed and the removal of retained testicle has been made through inguinal celiotomy.

MATERIALS AND METHODS

A 4-year-old unilaterally cryptorchid Canadian pony was admitted to the Surgery Clinic of Banat's University of Agricultural Sciences and Veterinary Medicine – Timisoara for castration. The left testis was in the scrotum, but neither the right testis nor the right epididymis could be located by external palpation of the right inguinal canal.

Rectal palpation of the testis and right vaginal ring was not attempted, because the patient was a miniature pony.

The diagnosis stated was complete or partial abdominal unilaterally cryptorchidism according with van der Velden study (1990). The proposed treatment was laparoscopic cryptorchidectomy with pony standing in stock (Davis, 1997; Fischer and Vachon, 1992; Fischer, 1991; Rodgerson and Hanson, 1997).

Preoperative food was withheld for 24 hours to reduce the amount of intestinal contents. This increases surgical visibility and maneuverability, as well as reduces the risk of inadvertent puncture of viscera (Rodgerson and Hanson, 1997). With pony sedated (detomidine - 0.03 mg/kg and butorphanol 0.04 mg/kg; direct infiltration of the paralumbar fossa with lidocaine) and restrained in stocks, the tail is tied and the paralumbar fossa was prepared for surgery in routine fashion and draped.

The trocar-cannula (*Karl Storz – 11mm*), was inserted through the right paralumbar fossa and the abdominal cavity was insufflated with CO₂. The trocar (upon cannula with multifunctional valve) was replaced by the laparoscope (*Karl Storz – Hopkins, oblique 30°/10mm/31cm*) and the caudal portion of the abdomen was examined to identify the retained testis. The vaginal ring was located and the right spermatic cord was identified to penetrate the right profound inguinal ring. Since the deep palpation of the external inguinal ring was not managed by bringing the testicle in the abdomen, a second incision in the flank was performed, 10 cm caudoventral to the laparoscope portal, and the instrument portal was engaged into the abdomen (Figure 1). With a long-handled forceps (*Karl Storz – Clickline Babcock grasping forceps 10mm/43 cm*) inserted into the abdominal cavity, the testis cord was gently grasped and moderate traction was applied, without success in bringing the testicle into the abdomen (retained testis) (Figure 2).

After the failure of laparoscopic cryptorchidectomy, but having an exact diagnosis - partial abdominal right unilaterally cryptorchidism, we have proceeded to open cryptorchidectomy via inguinal approach with pony anesthetized and positioned in dorsal recumbency.

The abdomen was deflated through a laparoscopic cannula. Closure of laparoscopic portals



Fig. 1. – Laparoscopy

was performed in one layer, using monofilament suture materials (Coated Vicryl, Polyglactin 910, 3 Ph. Eur., Ethicon).

Initial anesthesia was supplemented with guaifenesin administered IV for induction, endotracheal intubation was then performed and followed by maintenance with 3% isoflurane in oxygen, in semi-closed respiratory circular system with spontaneous breathing.

An elliptical incision for bursectomy (scrotal excision) was made (Palmer and Passmore, 1987), and the right superficial inguinal ring and left testis have been identified (Figure 3a).

The right testis was retained in the inguinal canal. The gubernaculum testis was located by careful examination of the superficial inguinal ring's margin (Rodgerson and Hanson, 1997; Searle *et al.*, 1999) (Figure 3a). By gently grasping and retraction of gubernaculum testis (inguinal extension) the vaginal process that was inverted in the inguinal canal was everted into canal, where was exteriorized (Figure 3b). The vaginal sac was identified (Figure 3c) and opened. The proper ligament of the testis was identified, extra-abdominal retracted and classically removed (Figure 3d). The vaginal process, the superficial inguinal ring, and the subcutaneous tissue were closed separately with continuous simple suture (PDS II, Polydioxanone, 2 Ph. Eur., Ethicon). The skin was closed with interrupted sutures. The antibiotics (large broad spectrum, Depocillin, Intervet) and tetanus (Ser Clostetan, Bioveta) prophylaxis were performed postoperatively.

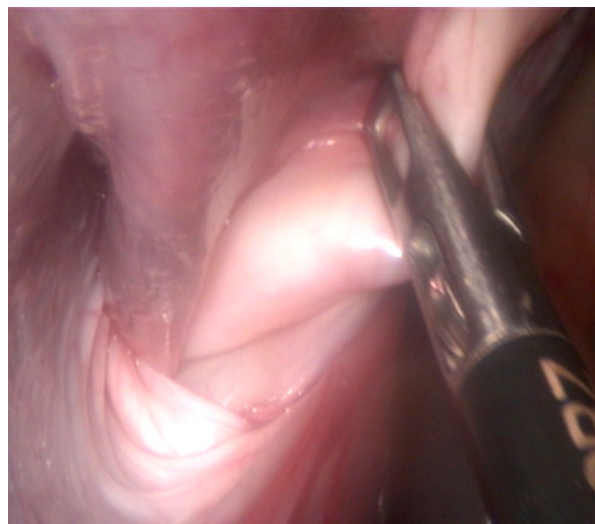


Fig. 2. - The right vaginal ring and spermatic cord

Postoperative diagnosis was revised so partial abdominal unilaterally (right) cryptorchidism with retained testis in the inguinal canal was observed. Cryptorchidism was probably caused by testicular hypoplasia after anterior trauma (Figure 4).

RESULTS AND DISCUSSION

This case report reveals that the major disadvantage of the cryptorchidectomy by flank approach is the inability to remove an inguinally retained testis, conclusion also mentioned in another study (Rodgerson and Hanson, 1997). In a study performed on ten horses with unilaterally or bilaterally retained testes, the authors reached to the conclusion that standing laparoscopic cryptorchidectomy can be performed easily and safely using electrosurgical instrumentation as the sole means of providing hemostasis of the equine mesorchium. (Hanrath and Rodgerson, 2002).

The abandonment of the laparoscopic removal of the cryptorchid testis and the use of open cryptorchidectomy by inguinal approach is explainable, on the one hand by retention of the right testis in the inguinal canal, and on the other hand by arguments of Voermans and al. study (Voermans *et al.*, 2006). These authors consider, after intra-abdominal transection of the spermatic cord, 5.6% of inguinally retained and 3.4% of normally descended testes failed to become completely necrotic, as a result of an alternate blood supply via the cremasteric and/or external pudendal artery. Therefore, laparoscopic castration without orchidectomy

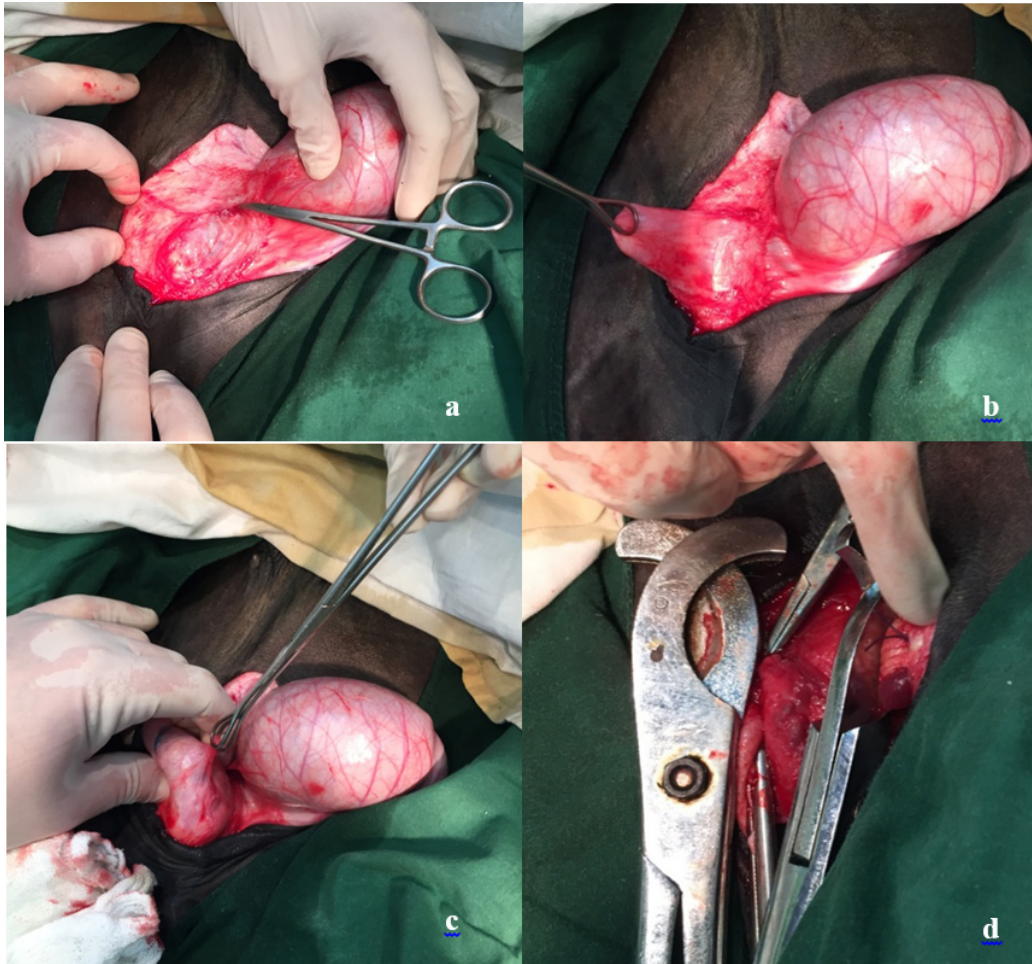


Fig. 3. - Cryptorchidectomy via inguinal approach (a- superficial inguinal ring; b - retracting of gubernaculum testis exposes the vaginal process; c -testis retracted extra-abdominal; d – spermatic cord hemostasis.



Fig. 4. – Testis after removal (* - right hypoplastic testis; ** - left normal testis)

cannot be recommended as a trustworthy method for castration of inguinal cryptorchid stallions (Bergeron *et al.*, 1998; Voermans *et al.*, 2006).

In Cribb *et al.* (2015) opinion, horses undergoing laparoscopic cryptorchidectomy had increased surgical preparation time, increased surgery and anesthesia times, and more postoperative complications, compared with horses undergoing open cryptorchidectomy, therefore laparoscopy may be advantageous for a second attempt at cryptorchidectomy or if the testicle location is unknown prior to surgery.

Using a noninvasive inguinal approach is a consecrated method and widely accepted for inguinal cryptorchidectomy (Adams and Fessler, 2000; Arighi *et al.*, 1988; Moore *et al.*, 1978; Rodgerson and Hanson, 1997; Turner and McIlwraith, 1989; Valdez *et al.*, 1979; Walker and Vaughan, 1980).

Method of eversion into the inguinal canal of the inverted vaginal process into the abdomen, applied in this case report, has been described in the literature (Arighi *et al.*, 1988; Moore *et al.*, 1978; Rodgerson and Hanson, 1997; Turner and McIlwraith, 1989; Valdez *et al.*, 1979). As previously mentioned, according to our knowledge, this report describes the performance of this new technique on stallions for the first time in Romania.

CONCLUSIONS

If the location of the testis is unknown, diagnostic laparoscopy in standing position can be decisive.

Cryptorchidectomy via inguinal approach and noninvasive method for identifying and everting the vaginal process by traction of the inguinal extension of the gubernaculum testis are commonly facile procedures.

Our observations can be included amongst the few reports which states that standing laparoscopic cryptorchidectomy can not be performed in stallions, including miniature stallions.

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