

Cryptorchidectomy in Horses: Techniques and Challenges

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Keywords: cryptorchidism, equine surgery, laparoscopy, testicular retention, cryptorchidectomy

1. Introduction

Cryptorchidism is the most common sexual disorder in horses, with a reported prevalence of 2–12%¹. Normally, the testes descend into the scrotum between 30 days pre-partum and 10 days post-partum, guided by the gubernaculum². The failure of testicular descent is multifactorial, potentially involving improper gubernacular function, insufficient regression of the cranial suspensory ligament, or abnormal testicular development.

Retained testes may be located in the inguinal canal, the abdominal cavity, or partially within both ("partial abdominal")—where the epididymis lies in the inguinal canal while the testis remains intra-abdominal. In a retrospective study of 350 horses, 75% of left-sided cryptorchids were abdominal, while 58% of right-sided cases were inguinal, giving rise to the acronym "LARI" (Left Abdominal, Right Inguinal)³. Bilateral retention occurred in 14% of cases, with 60% of these being abdominal³.

2. Diagnosis of Retained Testes

Pre-operative localisation of the retained testis is important for surgical planning. Physical examination, including deep scrotal and inguinal palpation, remains an important first step, although inguinal structures can be misleading—particularly in partial abdominal cases. Transrectal palpation of the inguinal rings can be highly diagnostic (up to 90% accuracy), but clinician experience is key⁴.

Ultrasound is a valuable tool, although its accuracy varies widely depending on technique and operator experience. Transabdominal ultrasound has reported sensitivities ranging from 43.5% to 97.8%, while transrectal ultrasound reached 100% accuracy in a small study^{5,6}. Hormonal testing (e.g. anti-Müllerian hormone, testosterone) may be used when previous castration is reported but stallion-like behaviour persists.

3. Cryptorchidectomy Techniques

Cryptorchidectomy can be performed via traditional open surgical methods or minimally invasive laparoscopic approaches. Technique selection is influenced by testis location, equipment availability, and surgeon preference.

3.1 Conventional Surgery

Open cryptorchidectomy is typically performed under general anaesthesia with the horse in dorsal recumbency. Tilting the hindquarters slightly can aid exposure of the inguinal canal. A direct inguinal or single scrotal incision allows dissection down to the external inguinal ring. Blunt dissection and retraction expose the inguinal extension of the gubernaculum teste, traction exposes the vaginal process, the process is opened, the epididymis is grasped and the testis exteriorised.

In most cases, the narrow vaginal process—not the vaginal ring—is the main impediment to testicular exteriorisation. This can be gently opened using Metzenbaum scissors. The testis is then ligated and excised. Although ideal, closure of the vaginal process is technically difficult. The external inguinal ring, subcutis, and skin are sutured in three layers.

If the inguinal approach fails, a parainguinal abdominal incision may be used to access intra-abdominal testes. Many surgeons also prefer this as the sole approach, because the internal and external inguinal rings remain undisturbed. A 4-cm incision is made in the aponeurosis of the external abdominal oblique muscle, located approximately 1 to 2 cm medial and parallel to the superficial inguinal ring. An incision just large enough to allow insertion of two fingers will usually suffice, with the teste generally located sweeping one's fingers caudolateral to the incision. The incision can be extended to allow insertion of a hand if necessary. Closure of the external abdominal oblique is much easier than closure of the inguinal ring.

3.2 Laparoscopic Surgery

Laparoscopic cryptorchidectomy has been performed since the 1990s and is now well-established⁶. It can be done under general anaesthesia or in the standing horse. Advantages include small incisions, improved haemostasis, and reduced inguinal disruption. Surgeons commonly advise a shorter convalescence period for horses that have undergone laparoscopy, and there is no disruption to the inguinal rings. However, it requires specialised equipment, fasting for 15–24 hours, and—under general anaesthesia—longer surgery times and potentially more post-operative complications⁷.

In dorsally recumbent laparoscopic cryptorchidectomy, the horse is secured in Trendelenburg position with positive pressure ventilation. A three-portal technique is used: the scope is introduced via an umbilical portal, with two instrument portals placed approximately 10–15 cm axial and cranial to the external inguinal rings. Electrosurgical devices (e.g. Ligasure[®]) provide reliable haemostasis⁸. The testis is removed through the umbilical portal or an enlarged instrument portal.

Standing laparoscopy avoids general anaesthesia and provides excellent visualisation of the spermatic cord and ontogenetic path. The flank is approached with a scope portal placed dorsal to the internal abdominal oblique, equidistant from the tuber coxae and last rib. Two instrument portals are placed ~10 cm apart in a linear fashion ventrally. After ligation and transection, the testis is extracted via an enlarged portal.

Two interesting variations on the standing laparoscopic technique have been developed, highlighting differences in personal preference surrounding this procedure and potential for

a very minimally invasive approach. Rijkenhuizen and Hast⁹ performed bilateral ligation of the spermatic cords, left the retained teste *in situ*, transected the spermatic cord of the descended teste intra-abdominally then performed open standing castration. In contrast, Gialletti et al.¹⁰ removed the retained teste, and transected the spermatic cord and mesorchium of the descended teste and left it *in situ*. In their case series, 1/48 failed with the teste retaining blood supply, and this was attributed a technical error with incomplete transection of the mesorchium, rather than vascularisation from the cremaster or external pudendal artery¹¹.

3.3 Choosing the Right Approach

The choice of surgical method depends on testis location, the horse's temperament, available facilities, and the surgeon's experience. Laparoscopy offers several benefits but is not always feasible. Open surgery remains effective and widely practiced, particularly when resources are more limited.

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