Laparoscopy in foals: a survey-based insight in current practice.

Grulke S, Salciccia A*, De la Rebière de Pouyade G**

Clinical Department of Equids, LIEGE University, LIEGE, Belgium.

Minimally invasive surgery (MIS), including laparoscopy, has significantly advanced in recent decades, with a growing number of techniques now routinely performed in adult horses, particularly for urogenital and digestive procedures. Standing flank laparoscopy avoids general anaesthesia and provides access to structures not easily reached via a ventral midline approach (Hackett et al., 2025). However, most of these techniques are not feasible in foals, making laparoscopic procedures in this population far less frequently reported.

In human paediatric surgery, debate about the utility of laparoscopy has shifted over the past 15 years as more data support its advantages - such as reduced wound complications, shorter hospital stays, and faster recovery - despite some slightly higher recurrence rates in certain procedures (e.g., inguinal hernia repair). Large-scale meta-analyses have shown promising results for laparoscopic approaches in children.

Given the lack of equine-specific literature, a survey with ECVS diplomates was conducted (60 respondents). Nearly all respondents perform laparoscopy in adult horses, primarily for ovariectomy and cryptorchidectomy. However, only 22 surgeons reported performing laparoscopic procedures in foals, and then only a few cases per year (typically 3–5). Common procedures included inguinal hernia repair, evaluation or repair of bladder rupture, and umbilical remnant resection. Isolated reports included duodenal stricture and ventral hernia evaluation. Reasons for avoiding laparoscopy in foals included the faster nature of open surgery, the limited number of suitable cases, the small abdomen, low complication rates with open approaches, and cost constraints. Some surgeons also cited the technically challenging procedures as a limiting factor.

Technical Considerations

Laparoscopy in foals is usually performed with the same equipment as for adults, although some authors recommend shorter trocars or 5 mm cannulas. A 30° laparoscope is preferred for optimal visualization of abdominal walls and umbilical structures. Unlike in adult horses, procedures are performed under general anaesthesia with ventral access in dorsal recumbency. In foals under 3–4 weeks of age, the laparoscope is inserted ~5-15 cm cranial

and lateral to the umbilicus to avoid incompletely regressed vessels. Due to the thin abdominal wall, Hasson open technique for trocar placement is recommended.

Anatomical Differences

In very young foals (<15 days), the small intestine is more prominent, and the cecum and colon are underdeveloped. Reverse Trendelenburg positioning improves visualization of the cranial abdomen (e.g., diaphragm, liver, stomach), while Trendelenburg positioning aids in evaluating the bladder, urachus, vaginal rings, and umbilical arteries. Occasionally, a vitelline duct remnant may be observed.

Applications

Umbilical Remnant Resection

The umbilical vein is particularly amenable to laparoscopic dissection and resection, especially when adhesions to the omentum or intestines are present. The use of vessel sealing devices and laparoscopic scissors facilitates safe and effective removal. Extended infected umbilical arteries can be laparoscopically isolated and detached from the bladder, reducing incision size and post-operative swelling in colts. The urachus and arteries may then be excised via a limited open approach.

Inguinal Hernia Repair

Congenital inguinal hernias are typically reducible and non-strangulating. Surgical intervention is warranted for persistent or intermittently incarcerated cases. Laparoscopic closure of the internal inguinal ring can replace traditional inguinal approaches; concurrent castration is advised. Techniques include stapling or intracorporeal suturing. The use of barbed sutures with an automated suturing device (Maurer et al., 2024), reduces procedural complexity.

Bladder Rupture

Laparoscopic evaluation of suspected bladder rupture should only be attempted in stabilized foals with pre-drained abdominal urine. While the repair may be technically demanding and requires advanced laparoscopic skills, barbed sutures facilitate intracorporeal suturing. This approach is especially useful in older foals or adults where bladder exteriorization is difficult.

Digestive Disorders

Due to rapid abdominal distension in foals with intestinal obstruction and the small abdomen, laparoscopy is not typically used in colic cases. Most gastrointestinal procedures (even

gastrojejunostomy, nephrectomy) remain feasible via ventral laparotomy.

Conclusion

Laparoscopy in neonatal and young foals has limited indications, with inguinal hernia repair and umbilical vein resection being the most indicated procedures. Benefits include reduced incision size, less tissue trauma, and potentially improved post-operative comfort. However, these must be weighed against technical challenges, longer surgery times, and risks related to CO_2 insufflation and hypothermia. Advances in suture technology (barbed sutures) may broaden the range of procedures that can be performed laparoscopically, warranting further study and reporting in veterinary literature.

References

1. Hackett, E.S., McOnie, R.C., Buote, N.J., Fubini, S.L., 2025. Current practices in equine minimally invasive soft tissue surgery. Veterinary Surgery 54, 59–67. https://doi.org/10.1111/vsu.14146

2. Maurer, T., McEntee, T.M., O'Brien, T., Coleridge, M., Brünisholz, H.P., Petruccione, I., Koch, C., 2024. Minimally invasive repair of congenital inguinal hernias in nine foals using an automated laparoscopic suturing device and barbed suture. Equine Veterinary Education 36, 296–306. https://doi.org/10.1111/eve.13884