**VENTRAL MIDLINE APPROACH**

The most common approach applied in equine abdominal surgery is performed through the ventral midline, specifically through the linea alba because it allows exteriorization of 75% of the intestinal tract. The stomach, duodenum, distal ileum, dorsal body and base of the cecum, distal right dorsal colon, transverse colon, and terminal descending colon are the only segments that cannot be exteriorized. The ventral midline approach creates minimal hemorrhage, is easy to perform, can be extended if needed, and contains strong fibrous tissues for closure. After positioning the patient in dorsal recumbency and clipping the hair of the surgical field, an indwelling urinary catheter should be placed in male horses to prevent the possibility of urine contamination during surgery. The penis is carefully snared with a gauze bandage, properly cleaned, and positioned in the prepuce after prior cleaning. The preputial cavity is subsequently sutured closed, allowing only the catheter to exit the suture line. Routine aseptic preparation of the surgical field is the next step. The linea alba extends from the xiphoid process to the prepubic tendon and contains the median fibrous raphe of the external oblique and the transverse abdominal muscle aponeuroses. It consists of dense connective tissue composed of sheets of cross-linked collagen bundles and fibroblasts. The thickness of the linea alba gradually increases from craniad, where it measures about 3 mm, to caudad, where it reaches a thickness of approximately 10 mm.1 The midline incision should be large enough to allow exteriorization of viscera without applying excessive pressure on the intestines, which would increase the risk of iatrogenic tears. The time saved during the procedure and the increased safety of a larger incision more than compensate for the extra time required to close a longer incision. Additionally, a smaller incision will be traumatized more during the manipulations of a surgical procedure than a larger one, which may delay its healing and lead to postoperative infection and herniation, especially after colic surgery. After incising the skin and subcutaneous tissue, the linea alba is incised beginning in the umbilical region where it is the widest and thickest. The incision is subsequently continued craniad to its desired length, avoiding penetration of the rectus abdominus muscle. The latter structure can easily be palpated as a local thickening at the internal side of the ventral abdominal wall. Incisional hemorrhage is only encountered in the skin and the subcutaneous tissues. Although there are different suture patterns that can be used to close the celiotomy, a continuous suture pattern with loops positioned 1.2 to 1.5 cm from the incisional edge of the linea alba provides the most strength. Likewise, various suture materials can be used for incisional closure, but in adult horses I prefer polydioxanone (USP size No. 7, metric size No. 9) or polyglactin 910 (USP size No. 6, metric size No. 8).3 To increase the bursting strength in heavy horses or pregnant mares, two to four single cruciate sutures can be placed 2 to 3 cm from the incisional edge after the continuous suture has been placed. In my experience a full abdominal bandage with an adhesive bandage applied before recovery decreases the strain on the incisional closure and covers the sutures during recovery phase. This reduces the risk of postoperative infections and incisional hernias (personal experience).



**VENTRAL PARAMEDIAN APPROACH**

The ventral paramedian incision, the second most common approach used in colic surgery, is performed 8 to 12 cm lateral to the midline. Some surgeons use this approach for cystotomy, cesarean sections, ovariectomy, cryptorchidectomy, and repair of ruptured bladders in foals. The incision may be performed on either side of the midline through the rectus abdominis muscle. Surgical exposure of the abdominal cavity is not significantly reduced, but the border of the incision is thicker than when it is made in the linea alba. Care must be taken not to injure the superficial and deep epigastric vessels, when encountered. With this approach, hemorrhage is more extensive than with the linea alba incision, but that does not compromise wound healing. The main indication for a ventral paramedian incision is to avoid a previous linea alba incision if there are signs of infection, excessive inflammation, or adhesions. Closure of the paramedian incision involves suturing the fascia of the rectus abdominis sheath. Suturing the muscle does not appear to contribute to the strength of the closure. For bladder surgeries in adult male horses I prefer a combination of a ventral midline and ventral paramedian approach. The skin incision starts caudad just lateral to the prepuce and continues in a slightly curved line around the prepuce to join the midline and continues along that plane craniad. The prepuce is undermined along the fascial plane and reflected to extend the ventral midline incision through the linea alba caudad as needed.

**INGUINAL APPROACH**

The inguinal approach is used in conjunction with a ventral midline incision when performing surgeries on stallions with inguinal or scrotal hernias. The inguinal approach usually does not allow a thorough exploration and decompression of the pre-stenotic and post-stenotic bowel. The inguinal herniorrhaphy is often combined with unilateral castration and closure of the external inguinal ring with USB 2 or 3 (Metric 5 or 6) absorbable suture material in a simple-continuous or simple-interrupted pattern with sutures placed 1.5 cm apart. An abdominal testis can also be removed by a lengthened inguinalincision. Generally, after skin incision over the superficial inguinal ring, blunt dissection through the inguinal soft tissue is performed to prevent damage to the large veins around the inguinal ring. At this point, the gubernaculum can be used to retrieve the testis from the abdomen. If this is not successful, the dissection is carried down to the annulus vaginalis, which is perforated with a finger to enter the abdominal cavity. After bluntly dilating the peritoneal opening, the whole hand can be inserted into the abdomen. Closure of this approach is completed by suturing the superficial inguinal ring, followed by suturing two to three inguinal fascia layers and an intradermal skin suture pattern.

