Suture material & pattern selection

**Suture material and pattern selection for intestinal surgery**

Both absorbable and non-absorbable suture materials have been used successfully for anastomosis. The braided nonabsorbable suture materials such as silk or Dacron may harbor bacteria create granulomatous inflammatory reaction or draining suture sinus. Monofilament non-absorbable sutures such as Nylon and polypropylene are safe in contaminated environments. However polypropylene has been associated with foreign body adherence in one case series.

Absorbable suture materials are usually used since the GI tract heals very rapidly and suture tensile strength is only needed for 2-3weeks. Absorbable suture materials reported in the literature include chromic gut, polyglycolic acid (Dexon), polygalactin 910 (Vicryl), polydioxanone (PDS) and polyglyconate (Maxon) and poliglecaprone (Monocryl). Of these, surgical gut is not recommended for anastomosis because it is rapidly broken down by collagenase. Polygalactin 910 and polyglycolic acid are multifilament derivations of glycolic acid which retain good tensile strength for up to 28 days. Both sutures have good knot tying and handling characteristics with the exception of significant tissue drag. Vicryl is commonly used for intestinal anastomosis in Europe with good published success.

Polydioxanone (PDS) and polyglyconate (Maxon) are polyester monofilament suture materials which are also absorbed by hydrolysis and therefore are unaffected by contaminat- ed environment. They maintain up to 40% of their original tensile strength after 3 weeks. Many surgeons are starting to use shorter acting monofilaments such as Monocryl or Biosyn for intestinal anastomosis. They have similar handling properties to PDS but its tensile strength are resorbed by within 10-21 days. The newer “Plus” sutures are impregnated with the antibacterial agent Tryclosan. Their efficacy in reducing infection in contaminated dermal wounds may foster an increased use in intestinal anastomosis.

Suture size, needle type and number of sutures are also important factors to consider. For cats, I use 4-0 suture on an RB1 needle. Usually 16-20 sutures are needed to complete the anastomosis. For small dogs I typically also use 4-0 suture on an RB1 needle whereas for larger dogs 3-0 suture on an SH needle is used and 20-24 sutures are needed to complete

the anastomosis. After transection, the wound edges are trimmed to remove averted mucosa and suturing is begun at the mesenteric border. Sutures are then placed on the anti-mesenteric border, then at the 3 and 9 o’clock position before filling in the gaps.

I personally use a continuous suture pattern rather than interrupted pattern with the first suture being placed at the mesenteric border and the second at the antimesenteric border. **Figure 5:** with a continuous pattern the first suture is tied at the mesenteric border and the second at the antimesenteric border. On one side the pattern is

advanced from mesenteric to antimesenteric and on the opposite side from antimesenteric to mesenteric. The suture line is then tied to the remaining tag at the original knot to complete the anastomosis.

A rapid alterative to sutured anastomosis is the use of an Auto Suture 35 skin stapler with stainless skin staples (United States Surgical Corp., Norwalk, CT). After triangulating the intestine with three stay sutures, the skin stapler is used to place staples every 2-3 mm around the perimeter of the wound. These closures are more rapidly done than hand sewn anastomosis and have similar bursting strengths but mucosal eversion may occur between staples.

The GIA and TA auto staplers lay a double row of staples for security and when used in combination create a functional “end to end anastomosis”. The GIA portion of the anastomosis is inverted whereas the TA portion of the anastomosis is averted. Recent studies have shown that leakage rates are similar to hand sewn techniques but auto stapler usage significantly reduces surgical time.

Small intestinal resection is limited to 70% of its length in adult dogs and 80% in puppies. Beyond that short bowel syndrome with malabsorption, maldigestion and chronic diarrhea will result.

All anastomosis should be covered with a vascularized omental flap which is tacked in place. Omentum is useful in 1) restoring blood supply to a devascularized area, 2) facilitating lymphatic drainage, and 3) minimizing mucosal leakage and secondary peritonitis. The role of omentum is significant when one considers that in one study 90% mortality rates were seen with intestinal anastomoses after omental resection was performed in dogs. Free omental flaps are not as effective as pedicle omental flaps and may in fact lead to anastomosis failure.

After the anastomosis has been completed, the mesenteric defect is closed with a simple continuous pattern taking care not to include the mesenteric vessels within the sutures. The anastomosis is then covered with a pedicle of greater omentum. The omentum is critical to the successful healing of the intestinal wounds especially in patients with peritonitis. In one study, 9 of 10 dogs with experimentally induced peritonitis died after intestinal anastomosis whereas 10 out of 10 dogs survived when the omentum remained.

Serosal patching utilizes the antimesenteric surface of the small bowel to cover or buttress an adjacent area of questionable tissue viability or an area that cannot be reliably sutured. Jejunum is commonly used because its freely movable mesentery allows it to be mobile. The serosal patch provides mechanical stability and will help to induce and localize a fibrin seal over the questionable area.