What tumoral types? For which behaviour?

- Benign tumour (dog): local disease possibly definitively treated with local resection providing completeness of the surgical margins
  - rectal adenomatous polyp, colo-rectal carcinoma in situ,
  - leiomyoma (extra-mucosal).

Malignant tumour: Will need wide resection for a local cure, might be complicated with metastatic process:

- Colic and Rectal Adenocarcinoma (dog), more frequent in the rectum.
- Caecum leomyosarcoma
- Colic carcinoma (cat) (in this case subtotal colectomy seems to allow a better control than focal resection)
- Round cell tumours (lymphoma, MCT).

SURGICAL ANATOMY AND PHYSIOPATHOLOGY:

Strict upper colic surgery is presenting a limited amount of challenge to the experienced surgeon, the access is performed via a simple midline laparotomy, the exposure is easy, and the base of resection/anastomosis are identical to the rest of the gastro-intestinal tract. One should pay attention to the large intestine blood supply that is markedly different than the supply to the small intestine with one long artery that should be preserve and from which direct perpendicular vasa-recta are supplying segment to the colic wall (by apposition to jejunal arcades). As a rule, colic artery should be preserved unless full colon as to be resected. Tension is also a worry as both ends of the large intestine (ileo-colic valve and rectum) are fixed. In case of tension on the anastomosis site, sacrifice of the ileo-colic valve should be considered to prevent anastomosis leak/stricture.

- The colo-rectal junction and the rectum are more challenging areas:
  - Highly contaminated (mainly anaerobic bacteria)
  - Limited blood supply
  - Limited amount therefore more subject to tension
  - Limited ability for healing and tendency for stricture/dehiscence,
  - Limited access as most of the rectum is contained within the narrow pelvic box
  - Limited mobility due to short mesos
  - Limited tolerance to ablation in term of functional disorder: storage/water resorption (stools consistency,) continence.

Vascularization:

The perforation of the rectal artery in the large intestine wall mark the external junction between the colon and the rectum. This artery is a direct branch of the caudal mesenteric artery. In cat, it is supposed to be the only blood supply of the rectum and should be protected (this is usually the landmark of the end for colic resection). Usual consideration in dogs is that once the rectal artery is ligated, a maximum of rectum should be resected as vascular supply might be not good enough to allow healing process. However personal experience and some case descriptions did show good clinical results despite sacrifice of the cranial rectal artery
Continence and innervation:
Although examination of the whole literature is beyond the scope of the presentation, one should remember that continence is the association of 2 different functions: ability to store stools and ability to close the rectal canal. Storage ability will be lost or highly decreased after rectal resection but with time it might be accommodate by the colon although defecation frequency will increase. The ability of maintaining pressure on the anal canal is a complex process associating sensitive fibres, voluntary and involuntary muscle contraction and associating the pelvic and pudendal nerve. Practically besides keeping nerves intact one should remember that to keep continence the patient should keep intact the last 3 cm od the anal canal and at least 50% of the anal sphincter. This crude rule showed the difficulty of the surgery in small animal patients (especially dog as cats are rarely affected with rectal neoplasia) as 3cm could mean a very different percentage of the rectal length for patients with a range of weight of 2 to 70kg). It also highlights one of the most important challenge brought to the surgeon as he will have to discuss the risks and benefit of a surgery and especially balance between the possibility of a surgical cure (extensive surgery) versus postoperative incontinence and severe deterioration of the patient (and its owner) quality of life.

CLINICAL PRESENTATION and WORKUP
Patients presenting colorectal tumoral disease will present similar clinical presentations:

- blood /mucous on the stools,
- staining when defecating/rectal prolapse,
- misshaped stools,
- constipation.

The disease is frequently very chronic with slow degradation and most patient will present alteration of their general status with weight loss, abdominal dilation, sometimes other non-specific clinical signs such a vomiting or even diarrhea.

Clinical examination must be thorough and digital rectal examination is essential to establish the diagnosis. Especially, to assess mucosal involvement of the process. This could be completed with abdominal palpation and in female transvaginal evaluation.

CT evaluation appears superior to X-ray or ultrasonography as it will document precisely any intra-pelvic disease. The value of endoscopy is variable. Although it allows direct visualization to the mucosa and possibly local biopsy, it is unclear where the examination changed the surgical indication or treatment. Despite early positive reports endoscopic resection of mucosal lesions did not achieved wide spread use in the veterinary practice.

Full blood work is necessary to assess general status as patient might be having severe alteration of their body condition. Special attention will be given to protein level, blood count, clotting profile.

SURGICAL MANAGEMENT
What preparation/what antibiosis:
To prevent spillage and uncontrolled spillage of faecal material, surgery will not be performed within 48 hours following enema or absorption of colic preparation solution. Low residue diet is advised for a few days and manual rectal emptying is advised before surgery. Should trans-anal approach being considered, anal sacs should be empty and irrigated. If the anal lumen is not to be used (trans-anal approach/stapling) then a purse string suture could be performed.

Targeted antibiotherapy (gram negative and anaerobes: potentiated penicillines, 2nd generation cephalosporins, metronidazole) is used for antibioprophylaxy. Post-operative antibiotherapy is not routinely used unless uncontrolled contamination in surgery or long duration procedure.

Preoperative antibiotherapy for 2 or 3 days has been reported.
Return to an early function of the GI should be encouraged postoperatively and feeding strategy should be considered (feeding tube) at the time of the procedure.

**How to improve results:**
- Introduction of mechanical stapling
- Consider the use of video-assisted procedure to help colorectal mobilization, limit tension and address indications for pelvic cavity
- Improve clinical staging through nodal mapping.

**Access:**
The colon is accessed by standard midline laparotomy.

Rectal access is usually possible by 4 different ways:
- Endoluminal with simple mucosal eversion (“pull out”)
- Pelvectomy/symphysial split which allows a limited ventral approach within the pelvic canal. This theoretically satisfying approach is technically challenging, allows seldom visualization and is not without morbidity.
- Dorsal approach,
- Trans-anal approach, “pull through,” which is associated with marked contamination of the surgical site.

These approaches are associated with delicate anastomosis and limited access for suturing. The 2 lateral when performed without abdominal control raised the problem of the tension applied on the intestinal tissue and on its vascular irrigation with possible ischaemia, rupture and possibly life-threatening haemorrhage.

Access is based on the morphology of the mass, its location. The aggressivity of the resection will be dictated by the nature of the tumour. Metric margins for malignant process is usually 2 to 3 cm which in canine patients implies almost total rectal resection. If curative attempt resection is not possible then palliation will have to considered (local/general chemotherapy, intra-arterial chemotherapy, palliative stenting, possibly rectal debulking)

**Corresponding author**

Dr. H. N. Brissot, DeDV, MRCVS, DECVS
Pride Veterinary Centre
Riverside Road
Derby
DE24 8HX
United Kingdom
E-mail: hervebrissot@scarsdalevets.com