Colorectal tumors are frequently encountered in small animal practice and can vary from simple to highly complex depending on their type, location and extent. In dogs the most frequently encountered lesions are adenomatous polyps followed by adenocarcinomas, Much less commonly plasma cell tumors, lymphoma, mast cell tumors and hemangiosarcomas can be seen. In cats the most common tumors are lymphoma and adenocarcinoma. Adenomatous polyps in dogs are well known to be pre-cancerous lesions that have the potential to undergo malignant transformation. Benign neglect of these tumors is therefore not recommended. Once invasion into the lamina propria and submucosa has occurred they are generally termed carcinoma in situ and once the basement membrane has been penetrated they are termed adenocarcinoma and at that stage are much more likely to metastasize.

Most rectal tumors are either diagnosed due to the detection of hematochezia or fecal tenesmus or after a rectal examination has been performed. Less commonly, rectal masses may be evident after prolapsing out of the rectum. Other clinical signs seen in these patients can include dyschezia and weight loss. On rectal examination a palpable mass will be obvious in up to 60% of canine cases. Many epithelial tumors will ulcerate easily and so blood may be evident on rectal examination. Some cases with annular lesions may have a stricture-like area palpable.

Diagnostic evaluation usually includes sampling of the mass by fine needle aspirate or biopsy as well as staging of the patient. Obtaining a sample for biopsy is very simple in those tumors that are located close to the anorectal junction. In these cases mucosal eversion will often yield sufficient access for aspiration, tru-cut biopsy or incisional biopsy. In cases where the lesion is located in the mid to proximal rectum, proctoscopy or colonoscopy may be required to secure a biopsy sample. It should be noted that in up to 30% of cases the results of endoscopic samples collected from colorectal masses do not agree with the histopathological results of definitive resections in one study. Staging of colorectal neoplasia should involve abdominal ultrasound and proctoscopy or colonoscopy to detect further lesions located more cranially within the colon. Ultrasound should detect metastatic spread to colic, hypogastric and medial iliac lymph nodes, liver or other organs. Thoracic radiographs should be performed to look for evidence of metastatic spread to the lungs.

A knowledge of the regional anatomy and physiology is important to maximize success in management of colorectal tumors. In dogs blood supply to the rectum comes mainly from the cranial rectal artery, which is a branch of the caudal mesenteric artery. Every effort should be made to preserve this vessel although this is impossible during resections that involve the mid to cranial aspect of the rectum and very distal colon. In cats there is a greater contribution from the middle and caudal rectal arteries. One of the major potential complications of colorectal resections is the potential for fecal incontinence post-operatively. Two principal mechanisms can lead to fecal incontinence. Extensive damage to the external anal sphincter or the terminal 1.5cm of the rectum can lead to loss of voluntary continence. Loss of reservoir continence is also described and occurs due to loss of fecal storage ability. In a study using mixed breed dogs weighing 19-35kg when 6cm of rectum was resected using a dorsal approach all dogs were fecally incontinent post-operatively. This was not the case when either 0 or 4cm resections were performed. The authors hypothesized that this may be a reservoir issue or possibly a result of damage to the peritoneal reflection within which passes the important reflex arc to the pelvic plexus that provides the innervation to the rectum. It does seem vital that in any rectal resection the terminal 1-1.5cm of distal rectum be preserved in order to preserve continence. This has particular importance with regard to rectal pull-through where preservation of that segment may have a beneficial effect in preserving continence.

The surgical approach to rectal lesions is largely dependant on the location and extent of the mass. A variety of surgical approaches have been used for management of colorectal tumors including the mucosal eversion technique, transanal endoscopic approach, the dorsal perineal approach, the rectal pull-through, combined abdominal-transanal pullthrough and pelvic osteotomy techniques.

Mucosal eversion is the simplest technique and is appropriate for small to moderate lesions (especially those that are pedunculated) in the distal rectum. A series of stay sutures can be used to evert the section of rectum that is of interest. Resection is followed by primary suturing of the defect in the rectal wall. The dorsal perineal approach has been used to gain access to the distal to mid-rectum for resections of modestly-sized lesions. An inverted U-shaped incision is made over the proximal aspect of the rectum. Dissection down onto the rectal wall is followed by resection and anastomosis. Rectal pull-through is classically indicated for lesions of the mid- to distal rectum although lesions more cranial can be resected with this technique if necessary. The technically challenging component of this technique is to find the dissection plane between the rectal wall and the external anal sphincter so that the sphincter is preserved as much as possible. The key, as mentioned, is to preserve the most distal 1-1.5cm of the rectum as this appears to decrease the likelihood of post-operative incontinence. A variation of the rectal pull-through for lesions that extend into the distal colon is to perform a combined abdominal-transanal pull-through. This advanced procedure is complex and involves mobilization of the intra-abdominal component prior to its exteriorization through a perineal approach. Finally the pelvic osteotomy techniques are...
potentially the most invasive and reserved for the most extensive lesions or lesions that are located within the cranial rectum/distal colon that would be difficult to approach from any of the perineal approaches.\textsuperscript{7,8} Two options exist here including a pubic symphysiotomy or a pubic-ischial osteotomy flap. Pubic symphysiotomy is technically less challenging but due to the limited ability to spread the pelvis apart, visualization is often less than ideal. The pubic-ischial osteotomy flap is more technically challenging but may provide much better surgical access to the pelvic rectum. The bone flap elevated using this technique is replaced after the rectal resection is completed and is either sutured or wired back into place.\textsuperscript{8}

Complications after resection of colorectal tumors are commonplace especially with the more extensive lesions and more complex surgical procedures. The rectal pull-through is a relatively high morbidity surgery with complications including rectal bleeding, stricture formation, incisional dehiscence and wound infection as well as incontinence being reported with significant frequency.\textsuperscript{3}

References