The Principles of Surgical Oncology: Surgery and Multimodality Therapy*

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Abstract: Surgery to treat cancer is one of the most common procedures performed in small animal practice. Clinicians should identify potential intraoperative risk factors, such as blood loss and hypotension, and be prepared to address these complications. Of the surgical doses that can be used to resect tumors, wide resections are preferred, although marginal resection is acceptable if the tumor is sensitive to radiation and adjunctive radiation therapy is planned. Other types of surgical procedures used in oncology include preventive, palliative, and second-look procedures, as well as minimally invasive laparoscopy and thoracoscopy to assess treatment efficacy. Depending on the tumor type and metastatic potential and the completeness of excision, adjunctive radiation therapy and chemotherapy should also be considered.

The first surgery provides the best chance for a cure in an animal with a tumor. Therefore, it must be planned carefully to ensure that either the mass is excised completely or the remaining tumor cells can be treated with adjunctive therapy. Surgical planning depends on knowledge of tumor type, clinical stage, and expected biologic behavior.1 If these are not known, then surgery should be planned to encompass all possible eventualities, including intraoperative cytology or frozen-section histopathology.2 There are four levels of aggressiveness (doses) for surgical resection: radical, wide, marginal, and debulking.2 Incompletely excised benign and malignant tumors will recur. Recurrent tumors are often more locally invasive due to altered vascularity and local immune responses, and the destruction of normal tissue planes makes subsequent surgeries more difficult and extensive.3,5

Perioperative Management
Before definitive surgical resection, appropriate diagnostic and staging tests should be conducted to assess whether the animal is a good anesthetic and surgical candidate and to determine the surgical plan and dose. Comorbid conditions, whether related to the primary tumor (e.g., vomiting and dehydration secondary to a gastrointestinal tumor) or unrelated (e.g., renal, hepatic, cardiac disease), increase the risk of surgical morbidity and mortality and may affect the surgical dose and postoperative management.1,3 Chemotherapy, radiation therapy, and surgery can be altered, incorporated, or eliminated on the basis of comorbid conditions.1 For example, neurologic disease is a contraindication to limb amputation; hence, limb-sparing surgery may be preferable for a dog with appendicular osteosarcoma (OSA) and concurrent neurologic disease. For postoperative management, cardiotoxic (e.g., doxorubicin) and nephrotoxic (e.g., cisplatin) chemotherapy agents should not be administered to dogs with preexisting cardiomyopathy or renal disease, respectively.

Anemia
Comorbid conditions are not a contraindication to surgery with appropriate preoperative management to reduce the associated physiologic stresses.3 For instance, anemia is relatively common in animals with cancer, especially those with advanced disease.4 Anemia may be caused by chronic disease, blood loss, or myelophthisis.1 In people, it is associated with poorer survival times and local tumor control rates.4 The administration of blood products has been recommended to improve oxygen-

At a Glance
- Perioperative Management
- Anesthetic Management
- Curative-Intent Surgery
- Intraoperative Management
- Histopathology
- Postoperative Management
- Multimodal Management
- Other Types of Oncologic Surgery

*A companion article, “The Principles of Surgical Oncology: Diagnosis and Staging,” is also available on CompendiumVet.com.