Canine Osteosarcoma: Part 2

Part 2 of this 2-part series on canine osteosarcoma discusses treatment and follow-up protocols, along with cost and prognosis. Part 1, which appears on page 17 of the July issue, includes patient history and diagnosis of the disease.

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Treatment

Inpatient or Outpatient

- Patients typically require brief hospitalization after amputation or limb salvage surgery.
- Outpatient treatment can be initiated for the remainder of the treatment course, provided no severe adverse effects develop.

Surgical Amputation

- Amputation followed by chemotherapy is the most common surgical combination treatment.
- Large- and giant-breed dogs typically function well after limb amputation.
  - Most owners are pleased with their pets’ mobility and quality of life after surgery.
- Moderate preexisting degenerative joint disease found in most older, large-breed dogs is not a contraindication for amputation.
  - Severe preexisting orthopedic or neurologic conditions may cause poor results; careful preoperative examination is important.
- Complete forequarter amputation is generally recommended for forelimb lesions, as is coxofemoral disarticulation amputation for hindlimb lesions.
  - This level of amputation assures complete removal of local disease and results in an optimal cosmetic and functional outcome.
- For proximal femoral lesions, complete amputation with en bloc acetabulectomy is recommended to obtain proximal soft tissue margins.
- Surgery alone must be considered palliative, as it does not address risk for metastatic disease.

Limb Salvage

- Although most dogs function well following amputation, limb sparing is preferable in dogs with severe preexisting orthopedic or neurologic disease.
- Until recently, only a few reports of limb salvage in dogs have appeared in the literature.
- Limb function has generally been good, and survival has not been adversely affected.
  - However, limb salvage has a much higher complication rate than does amputation.

OSA = osteosarcoma

Experience More

Osteosarcoma is definitively diagnosed by bone biopsy. Watch how to perform this procedure by scanning this page with the Layar App on your smartphone or tablet.
Consultant on Call

- Chemotherapy is required to prolong survival.
- Suitable candidates for limb salvage include dogs with appendicular OSA or those otherwise in good general health.
- Other criteria include absence of pathologic fracture, <360° involvement of soft tissue, and presence of a firm/definable soft tissue mass versus edematous lesion.
- The most suitable cases for limb salvage are dogs with tumors in the distal radius or ulna.
- Current limb salvage procedures require arthrodesis.
- Arthrodesis of the scapulohumeral, coxofemoral, stifle, or tarsal joints following limb sparing generally results in only fair-to-poor function.
  - This has generally prevented surgeons from recommending limb salvage near these joints.
- Limb salvage surgery and aftercare are complicated and expensive.
  - A coordinated team effort among surgical and medical oncologists, radiologists, pathologists, and technical staff is required.
- Described methods of limb salvage include massive allografts, autografts, metal endoprostheses, distraction osteogenesis, and vascularized bone transfer.
  - Each method has unique advantages and limitations.
- Choice of limb-sparing method depends on several factors (eg, owner choice, patient disposition, individual risks).

Medical

Palliative Treatment

- Oral analgesics (eg, NSAIDs, narcotics, amantadine [NMDA receptor antagonist], gabapentin [GABA analogue]) can be prescribed to control pain.
- Response to analgesics can decrease as local disease progresses.
- Palliative radiation therapy can help control pain.
  - Effective at relieving pain and lameness for approximately 3–4 months and typically has no adverse effects
  - Typically administered during 2–4 outpatient sessions with the patient anesthetized or heavily sedated to prevent movement during radiation
  - Palliative radiation therapy does not lower risk for pathologic fracture or extend survival, unless combined with chemotherapy.²
- Amputation may be a palliative treatment in patients with pathologic fracture or marked pain, or when palliative radiation therapy is not available.
  - Amputation can remove the source of pain, but without chemotherapy metastatic disease can occur within 1–3 months following amputation.²
  - Typical expected survival time with palliative analgesic therapy alone is 3 months; median survival time for palliative radiation or amputation (both without chemotherapy) is 5 months.²,³

Curative-Intent Treatment

- OSA is rarely cured with chemotherapy alone, but surgery or radiation combined with chemotherapy can markedly prolong survival.
  - The keystone of curative-intent treatment is adjuvant chemotherapy.
  - Chemotherapy can prolong survival time when used in combination with amputation, limb salvage, or certain forms of radiation therapy.
  - Chemotherapy is most effective at delaying the onset of metastatic disease.
  - When used without surgery or radiation, it cannot adequately eliminate the pain and progressive growth of the primary tumor.
  - The most common chemotherapy agents used are carboplatin and doxorubicin, either as single-agent or combination therapy.
  - Dogs can typically tolerate chemo-

Alternative Therapy

- Alternative therapy options have not been proven beneficial in controlling signs or prolonging survival as compared with conventional options.
  - However, an alternative therapy can often be used to complement conventional therapy.
  - Acupuncture, massage, and other wellness therapies are frequently used in combination with conventional treatment.
  - Owners should avoid administering herbs and/or supplements during chemotherapy or after surgery until their use has been discussed with the oncologist or homeopathic veterinarian.
  - Herb–drug and herb–herb interactions have not been extensively studied but have resulted in unexpected toxicities in patients with OSA according to anecdotal evidence.

GABA = gamma-aminobutyric acid, NMDA = N-methyl-D-aspartate, OSA = osteosarcoma, SRT = stereotactic radiotherapy
Activity
- Recommendations for activity after therapy depend on the treatment protocol.
  - With amputation, activity does not need to be restricted once tissues have healed.
  - Other treatments (eg, palliative, limb salvage) may require prolonged activity restrictions for the best outcomes.

Client Education
- It is important to give the client all possible options to make an informed choice (see Alternative Therapy).
  - This includes honest discussion of benefits and disadvantages of curative-intent treatment vs palliative-intent treatment, costs, expected survival times, and possible complications.
- Referral to an oncologist should be offered.

Follow-up
Patient Monitoring
- Dogs require very close follow-up throughout treatment and for 1 year thereafter.
- Typical follow-up after treatment includes monthly rechecks for 3 months, q3mo for 1 year, and q6mo thereafter.
- Complete history and physical examination, thoracic radiography (3 views), CBC, and serum chemistry panel should be performed at each visit.
- Particular attention should be directed to examining the limb (or amputation site) and addressing general lameness issues to detect regrowth of tumor or spread to other bony sites.
- Thoracic radiographs should be examined for evidence of metastatic disease.

Stereotactic Radiotherapy
- Stereotactic radiotherapy (SRT) is a recent development in the treatment of OSA.
- Sometimes referred to as stereotactic radiosurgery, SRT uses specialized radiation treatment units with on-board CT imaging and specialized targeting ability to deliver very high doses of radiation to the tumor while protecting nearby normal structures from harmful doses.
  - This treatment has shown promise in the development of a “nonsurgical limb” salvage technique using radiation to kill the tumor followed by chemotherapy.
  - Complications include fracture and infection of the involved limb.
  - Chemotherapy is still required to achieve the prolonged survival.

Nutritional Aspects
- Many claims have been made about the benefits of specific diets or supplements, but little substantiating objective evidence exists.
- Most oncologists currently recommend choosing a well-balanced, high-quality diet.

In General
Relative Costs
- Curative-intent therapy: $$$$$
- Palliative therapy: $$–$$$$$

Cost Key
$ = up to $100
$$ = $101–$250
$$ = $251–$500
$$$$ = $501–$1000
$$$$ = more than $1000

Prognosis
- With curative-intent treatment, median survival time is 1 year (50% of dogs alive at 12 months) and 10%–30% of dogs alive at 2 years.
  - Patients are usually euthanized because of metastatic disease.
- With palliative treatment, the median survival time is 3–5 months.
  - Patients are usually euthanized for pain related to the primary tumor or pathologic fracture (with analgesia and radiation therapy) or metastatic disease (for palliative amputation).

Future Considerations
- Oncology is a constantly evolving field.
- It is important to consult with a medical oncologist and surgical oncologist before initiating treatment to ensure owners are presented with all available options.
- Treatment modalities can change rapidly as new information becomes available.

See Aids & Resources, back page, for references & suggested reading.