POST-OPERATIVE COMPLICATIONS IN THE ONCOLOGY DOG PATIENT

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Summary

Objective: to investigate post-operative complications in the dogs’ oncology patients.

Design: retrospective study of the 211 canines with cancer.

Intervention: curative, palliative, or cytoreductive surgery.

Results: after 211 oncology surgery 17 per cent complications were assessed; wound complication (30.5%), excessive pain (25%), hypothermia (22%), and sinus tachycardia (11%) of the total complications.

Conclusion: common complications registered after the oncology surgeries include wound collection, wound infection, pain, and hypothermia.

Key words: oncology surgery, post-operative complications, dog

After a successful surgery, the real work begins in the recovery of a cancer patient. The prototypical patient may not always be the ideal surgical candidate. The animals may be debilitated due to a poor body condition and nutritional statuses, may have a compromised immune system, exhibit coagulation abnormalities, and have concurrent unrelated disease conditions. In addition, the aggressive surgical resections sometimes necessary to attempt a cure for a cancer patient often complicate their recovery (1, 4).

Anticipating the potential post-operative disasters and proactively intervening prior to a situation deteriorating will allow one to act on a situation rather than react. Aggressive pain management, nutritional supplementation, and basic supportive care, all play a role in the smooth recovery in the cancer patient.

This study was designed to evaluate post-operative complications in the oncology patients.

Materials and methods

The study included two-hundred-eleven dogs with oncology affections (between 2006 and 2008), that were clinically and paraclinical examined and diagnosed at the Department of Small Animal Surgery, Faculty of Veterinary Medicine, University of Agricultural Sciences and Veterinary Medicine of Banat, Timisoara Romania – table 1.

After three types of surgery (curative, palliative, cytoreductive) all patients were monitored in the postoperative period with the following protocol (4, 7).
Basic Supportive Care - most of the cancer patients are high-risk patients, therefore monitoring these patients should be more intense during the first 24-hour post-operative period. Temperature, pulse, and respiratory rates were monitored every hour, until the patient was normothermic.

Table 1

<table>
<thead>
<tr>
<th>Dogs operated for oncology affections</th>
<th>Cancer localization</th>
<th>Tumor stage</th>
<th>Surgery intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
<td>T</td>
<td>N</td>
</tr>
<tr>
<td>Mammary gland</td>
<td>76</td>
<td>12</td>
<td>64</td>
</tr>
<tr>
<td>Visceral</td>
<td>19</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Osseous</td>
<td>33</td>
<td>-</td>
<td>4</td>
</tr>
<tr>
<td>Genital</td>
<td>44</td>
<td>29</td>
<td>4</td>
</tr>
<tr>
<td>Cutis</td>
<td>23</td>
<td>5</td>
<td>12</td>
</tr>
<tr>
<td>Another</td>
<td>16</td>
<td>2</td>
<td>8</td>
</tr>
</tbody>
</table>

Legend

- $T_1$: tumor $< 1$ cm diameter, not invasive
- $T_2$: tumor 1-3 cm diameter, locally invasive
- $T_3$: tumor $> 3$ cm diameter, ulcerated or locally invasive
- $N_0$: no nodal involvement
- $N_1$: local nod firm and enlarged
- $N_2$: $N_1$ and fixed to surrounding tissue
- $N_3$: distant nod involvement
- $M_0$: no evidence of metastasis
- $M_1$: metastasis to one organ system
- $M_2$: metastasis to more that one organ system
- $C$: curative surgery
- $P$: palliative surgery
- $CR$: cytoreductive surgery

For the first 24-48 hours, all post-operative cancer patients were monitored continuously for signs of pain. Commonly used parameters for the objective assessment for pain include tachycardia (> 180 bpm), tachypnea, ptyalism, and mydriasis. Pain can also induce various subjective changes in behavior (vocalization, trembling, anxiousness, aggression) and inappetence.

Standard postoperative care in all cancer patients include crystalloid intravenous fluid therapy until the patient can maintain his/her own hydration status, continuous or intermittent EKG, central venous and blood pressure monitoring, palpation and bladder expression every 4-6 hours or placement of an indwelling closed urine collection system. Particular attention was paid to the cardiopulmonary and urinary systems.

Periodic evaluation of the hematocrit, blood pressure, and oxygen saturation was made. Pulse oximetry was used to assess the degree of hemoglobin saturation and the state of peripheral perfusion, which is an estimate of cardiovascular function. Probe was placed on any nonpigmented mucous membrane. Oxygen supplementations via O2 mask, or nasal insufflation were implemented if the patient was deemed to be hypoxic.

Results and discussions

After the surgery interventions in the 211 dogs, we registered 36 postoperative complications – table 2.
Excessive postoperative pain was registered in 25 per cent of the total postoperative complications; especially after bone removal surgery and/or large radical mammary gland resection. Pain management is a crucial part of managing the veterinary cancer patient (2, 3). Post-operative analgesia was practiced after every surgery. Pain management was implemented prior to the patient's recovery from anesthesia, as pain is easier to prevent than it is to treat. Parenteral opioids, epidurals, and local anesthetic blocks were effectively used either alone or in combination to provide post-operative analgesia, protocol scheme after Dianne Dunning – 2000 - table 3.

**Table 2**

<table>
<thead>
<tr>
<th>Cancer localization</th>
<th>No of surgeries</th>
<th>Surgery intervention</th>
<th>Pain</th>
<th>&lt;T</th>
<th>Hem</th>
<th>ST</th>
<th>WC</th>
<th>WD</th>
<th>WI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mammary gland</td>
<td>76</td>
<td>-</td>
<td>30</td>
<td>4</td>
<td>-</td>
<td>-</td>
<td>4</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>Visceral</td>
<td>19</td>
<td>11</td>
<td>4</td>
<td>-</td>
<td>4</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Osseous</td>
<td>33</td>
<td>16</td>
<td>17</td>
<td>-</td>
<td>5</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td>3</td>
</tr>
<tr>
<td>Genital</td>
<td>44</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Cutis</td>
<td>23</td>
<td>12</td>
<td>-</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Other</td>
<td>16</td>
<td>2</td>
<td>2</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>211</td>
<td>152</td>
<td>23</td>
<td>9</td>
<td>8</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>2</td>
</tr>
</tbody>
</table>

*Legend:* T – hypothermia; Hem – hemorrhage; ST – sinus tachycardia; WC – wound collection (hematoma, seroma); WD – wound dehiscence; WI – wound infection

**Table 3**

<table>
<thead>
<tr>
<th>Drug</th>
<th>Dose</th>
<th>Route</th>
<th>Duration of effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buprenorphine</td>
<td>0.03-0.05 mg/kg</td>
<td>IV, IM or SQ</td>
<td>4-6 hours</td>
</tr>
<tr>
<td>Fentanyl</td>
<td>0.002-0.004 mg/kg</td>
<td>IV – continuous rate infusion</td>
<td>20 min after infusion</td>
</tr>
<tr>
<td>Fentanyl</td>
<td>25-100µg</td>
<td>Transdermal patch</td>
<td>72 hours</td>
</tr>
<tr>
<td>Morphine</td>
<td>0.2-0.8 mg/kg</td>
<td>SQ or IM</td>
<td>4-6 hours</td>
</tr>
<tr>
<td>Morphine</td>
<td>0.1 mg/kg</td>
<td>epidural</td>
<td>24 hours</td>
</tr>
</tbody>
</table>

Nonsteroidal anti-inflammatory and fentanyl patches were implemented for the control of mild-moderate long-term pain. Advantages of appropriate long-term pain management include an improved functional ability and quality of life (2, 3).

Sinus tachycardia is the most common rhythm disturbance in a post-operative patient (11% of the total postoperative complications) and is caused by two primary conditions, pain and hypovolemia (1, 6).

Hypothermic patients (22% of the total postoperative complications) were actively rewarmed in a hot water blanket. Recumbent animals were turned every 2-4 hours to prevent pulmonary atelectasis.

Severe hemorrhage, which can deplete a patient's blood volume and cause cardiovascular collapse, was registered in four cases. Three dogs deceased...
following this complications, because they did not respond to fluid volumes replacement. The coagulation abnormalities were responsible for this situation.

Common complications in the oncologic wound include hematoma/seroma formation, dehiscence, infection, and local recurrence of the cancer (5). Wound complications represent 30.5 per cent of total postoperative complications. Limiting dead space to minimum by decollation, blunt dissection, and closure to suture represent optimum techniques for preventing this complications. Monofilament suture was used within a cancer wound to prevent dehiscence and reduce the adherence of tumor cells and bacteria within the interstices of the suture material.

The risks of infection in the cancer patient are higher than for a normal surgical patient due to the presence of malnutrition and chronic disease, advanced age, and immunologic compromise. We used perioperative antibiotics, which have reduced the risk of surgical wound infection, and we recommend it in any surgery over 60 minutes, according to another study (1).

Conclusions

Common complications in the oncology surgery include wound collection, wound infection, pain, and hypothermia.

Anticipating the potential post-operative complications, following of the aggressive pain management and short time periodic intervals for monitories the basics physical parameters, reduced the risk.

References