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# Chemotherapy nursing unravelled

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**ABSTRACT:** Chemotherapy is used in practice as a way of treating cancer. With this in mind, it is important that veterinary nurses are made aware of how it affects both the patient and the nursing considerations that run alongside the treatment. This article discusses these subjects. It is vital that the mechanism to prevent exposure of veterinary staff to chemotherapeutic drugs is not compromised and that monitoring of the patient is paramount owing to the effect the treatment has on a number of body systems.

Chemotherapeutic drugs are cytotoxic and are designed to kill living cells. With this in mind, it is important that the veterinary nurse understands some of the ways in which the therapy is dealt with by different organs in the animal's body and the precautions taken to prevent cross-contamination of the drugs. This article, therefore, is going to discuss the different ways in which chemotherapy affects the patient's body and the veterinary nurse's role in caring for patients that are receiving chemotherapy.

## Effects on the body

The most common methods for administration of chemotherapeutic agents are via the oral and intravenous routes. However, some therapies can be given transcutaneously – either directly into the tumours or into the blood supply surrounding them. The aim of chemotherapy is to provide a sufficient dose to have an effect on the tumour, but with minimal effect on the rest of the body.

Chemotherapeutic drugs are distributed to every cell within the body – some cells will absorb the chemotherapy and some will expel it. The most common tissue cells affected by chemotherapy are those which divide rapidly during mitosis – namely the intestines and bone marrow as discussed by Macdonald.<sup>1</sup>

Side effects can occur when the therapy begins. So, for instance, in the intestines these effects can range from a slight inappetence to haemorrhagic gastroenteritis (HGE); which, as with any cause of dehydration, can lead to

electrolyte imbalances and volume disturbances, such as hypovolaemia.

Electrolyte imbalances arising from vomiting or diarrhoea will result in extracellular fluid loss, and in these cases intravenous fluid therapy – as discussed by Larson – will resolve any disturbances and provide support for the kidneys.<sup>2</sup> Lactated Ringer's solution is generally not given as it contains bicarbonate which the kidneys find hard to eliminate when hypovolaemia occurs. Sodium chloride solution is the fluid of choice.

Damage to cells growing within the bone marrow can occur during treatment; this is known as myelosuppression. Bone marrow produces blood cells which are important for normal metabolism and physiological function. The most common cell that has a shortened life expectancy is the neutrophil.

Neutropenia can occur when these white blood cells become sufficiently depleted and are not regenerated. As a patient with a significantly low neutrophil count can become susceptible to infection, it is deemed unsafe to administer the chemotherapy on this occasion.<sup>3</sup> All patients should, therefore, have a haematology sample taken before chemotherapy is administered.

A patient with a potentially compromised immune system could be susceptible to septicaemia. Signs of this, following treatment, typically commence with pyrexia, listlessness and inappetence.<sup>4</sup> The mucous membranes of these patients will be brick red and tacky to the touch.

This can occur seven to 10 days after treatment, so the owner should be monitoring temperature on a daily basis because this allows them to contribute to the patient's care and to feel 'involved' in its treatment.

Client education is important as they need to be aware of their pet's condition and the ways in which its body can react to the treatment. The nurse can play a vital role in this respect.

One way to work with them in a positive manner is to provide them with workbooks so they can log aspects of the animal's condition – including appetite, lethargy and temperature, for example. This encourages owners to communicate with the practice should their pet begin to show signs that give rise to concern; and prompt recognition of problems is essential.

Chemotherapy-induced anaemia may occur owing to a lack of red blood cells being produced by the bone marrow, although it is not always evident.<sup>3</sup> Anaemia is not to be dismissed as it could indicate a haemorrhage or haemolysis. If the anaemia is chronic, then regular checks should be carried out. This may involve the nurse taking blood samples and running manual packed cell volume (PCV) tests to provide a report for the veterinary surgeon.

## Conditions associated with chemotherapy

Sterile haemorrhagic cystitis can occur with patients receiving certain chemotherapy protocols. Owners should be given a urine collection device and some dipsticks to enable them to test for haematuria frequently at home. They should also be advised to monitor for dysuria.<sup>5</sup>

If their pet appears to be suffering from cystitis, they must be advised to contact the surgery immediately so that the vet can rule out other potential causes for cystitis. Ask the owner to bring in their medication and the treatment diary to ensure that the vet is aware if any steroids have been administered recently as they may want to give the patient non-steroidal anti-inflammatory medication.

Other conditions for which monitoring is necessary are nephrotoxicity and cardiotoxicity. Ileus is often seen in cats that receive some chemotherapeutic

treatments, resulting in anorexia which is a common feature in cancer patients. This article does not have the scope to cover these conditions in greater detail.

## Health & safety of the veterinary nurse

Let us begin with *who* can administer the treatment. Only the veterinary surgeon responsible for the patient, a suitably qualified informed nurse who will assist the vet, and the owner, once briefed on the health and safety risks of administering medication, can do this.

Exposure to chemotherapy drugs can occur in many forms. They can be inhaled, ingested or personnel can come into contact with them on their skin or mucous membranes. Acute exposure can lead to dizziness, nausea and cutaneous irritation, whilst chronic exposure can result in carcinogenic effects.<sup>6</sup>

To prevent this exposure the practice has an obligation to adhere to appropriate health and safety measures to ensure that staff are protected. Chemotherapy should be performed in an area with adequate ventilation, low human traffic levels and where eating and drinking does not occur.

Staff working with these patients should be fully informed of potential risks – this includes everyone from the veterinary nurse and the vet to the kennel assistant.

Documentation should be readily available to staff that informs them of the risk of working with such drugs, including the potential spread of contamination and the instructions in case of spillage/contamination.<sup>7</sup> They should also be shown the correct personal protective equipment to be worn – including protective gloves, a gown, goggles and respiratory protective equipment to prevent any inhalation.

Chemotherapy drugs should be prepared in a closed ventilation system as this reduces the risk of spillage, and contamination of staff preparing the drug, as discussed by Fielding and Lacriox.<sup>8</sup> A 'spill kit' should be available and staff should be aware of how to use it. Owners must be instructed that oral chemotherapeutic agents should be handled with gloves at all times.

All people in contact with the patient should be aware that its urine and faeces may contain unchanged chemotherapy metabolites. Therefore, chemotherapy administration gloves or double gloving with latex gloves is acceptable when handling excrement, and this should be double bagged when being disposed of in outdoor waste bins.

All cytotoxic drugs and equipment should be labelled as 'cytotoxic hazard' and the ward or kennel in which the patient is housed should be clearly labelled (**Figure 1**).

▣ **Figure 1.** Labelling the kennel ensures that every staff member is aware that the patient is receiving treatment.



If a staff member is pregnant or immune-compromised, they should be advised not to be involved with the patient.

## Nursing considerations

Tissue necrosis occurs when a chemotherapeutic drug is administered perivascularly. All patients are required to have a cephalic catheter placed and its patency checked before chemotherapy administration. It is best to place the catheter at the time of therapy as the patient may dislodge it when returned to the kennel.

Extravasation may occur on administration of the drug for a number of reasons.<sup>9</sup> The veterinary nurse should interact with – and monitor – the patient to ensure that it is calm and co-operative before administration of the drug. If the patient is not amenable, the veterinary surgeon may decide that it is not in its best interests to treat it at that time.

If extravasation does occur, apply either a cold or warm compress, depending upon the instructions supplied by the relevant drug company. Contact a specialist, who may be your referral oncologist, for advice, bearing in mind that the skin can slough in an area up to three or four centimeters wide and two centimeters in length.

On administration of the chemotherapeutic agent, monitor the patient for signs of initial pain, anaphylaxis and changes to heart rate and rhythm. Once the drug has been administered – usually as an intravenous bolus – and the fluid therapy has finished, the drip bag and giving set should be removed as one unit if possible, and placed in a cytotoxic disposal container, which is normally a yellow bin with a purple lid (Figure 2).

During hospitalisation, compassionate care is essential in nursing these patients. Monitoring pain control is important because quality of life is paramount, and if signs of nausea are observed during the hospital stay, the owner should also be encouraged to monitor for this at home.

Patients with nausea may become anorexic, so tempt them by providing warm aromatic food. A comfortable environment also helps encourage the patient to eat, whilst antiemetic drugs can be administered by the veterinary surgeon. If hand feeding is not tolerated,

tube feeding may be required and the owners should be made aware of this.

Alternatives include appetite stimulants, and it should be remembered that appropriate levels of analgesia have the potential to increase a patient's appetite too. Finally, monitoring levels of fluid intake is critical and prevention/rapid treatment of dehydration should form an integral part of the nursing care plan.

One condition involving nutritional status in these patients is cancer cachexia. If this is not resolved, it can lead ultimately to the death of the patient.

There are three important factors that should be considered when formulating the diet of a cancer patient:

- Carbohydrate metabolism

Malignant cells 'choose' to metabolise glucose for energy and this forms lactate as an end product. It is, therefore, considered beneficial to feed a diet with minimal amounts of simple carbohydrates.<sup>10</sup>

- Protein metabolism

Tumours utilize protein for energy too, which in turn reduces the levels available for normal metabolism by the patient. Providing a diet rich in bioavailable protein, therefore, is a good way to support the patient.<sup>10</sup>

- Lipid metabolism

Omega 3 polyunsaturated fatty acids have been shown to have 'anti-cancer' effects and can be supplemented by feeding fish oil.

Figure 2. An example of a cytotoxic/hazardous waste container.



## Conclusion

The treatment and nursing care of the patient undergoing chemotherapy is a subject area that can be discussed in much greater detail than this article will allow. However, it is important for the veterinary nurse to have an insight into the side effects and actions of chemotherapeutic agents on both the patient's body and their own.

The nursing considerations are highly important, with health and safety paramount when these patients are being treated. Every practice should have a chemotherapy protocol for the veterinary nurse and one for the owners to take home and read. [\[4\]](#)

## References

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## Useful website link

BSAVA Safe use of cytotoxic drugs for treatment of neoplastic disease in companion animals <http://www.bsava.com/Advice/PolicyStatements/SafeuseofCytotoxicDrugs/tabid/496/Default.aspx> (Accessed 23 June 2013)