



Veterinary Specialists

Electrochemotherapy: a targeted local cancer treatment

Electrochemotherapy is an advanced, minimally invasive cancer treatment designed to improve local tumour control while limiting systemic side effects. It combines a chemotherapeutic drug, most commonly bleomycin, with precisely delivered electrical pulses applied directly to the tumour tissue.

The key principle behind the treatment is “enhanced drug delivery.” Under normal conditions, bleomycin has limited ability to enter cancer cells. However, when short, controlled electrical pulses are applied to the tumour, the cell membranes become temporarily more permeable. This process, known as reversible electroporation, allows significantly higher concentrations of the drug to penetrate the tumour cells and remain active where they are needed most.

As a result, electrochemotherapy achieves a strong local anti-tumour effect while keeping systemic exposure extremely low. This means the treatment is both highly targeted and generally very well tolerated.

In addition to its clinical use in oncology, the same technology platform can also be used for gene delivery and experimental immunotherapy applications, although these remain largely within research settings.

Why consider electrochemotherapy?

Electrochemotherapy is increasingly used in both referral and specialist oncology settings because it fills an important therapeutic gap between surgery, radiotherapy, and systemic chemotherapy.

It is particularly valuable in situations where:

- Surgery alone is not possible due to tumour location or extension
- Complete surgical excision cannot be achieved
- Owners wish to avoid or delay more invasive procedures
- Tumours are located in anatomically sensitive areas
- Additional local control is needed following surgery

One of its most important advantages is its ability to treat areas that are difficult to manage surgically or where repeated surgery would carry significant functional or cosmetic consequences.

Common treatment sites include the nasal planum, oral cavity, periocular region, distal limbs, eyelid, footpads, and perianal area, regions where tissue preservation is especially important.





Tumours commonly treated

Although electrochemotherapy is a relatively modern technique, a growing body of clinical evidence supports its use in both dogs and cats across a wide range of tumour types.

Reported indications include:

- Mast cell tumours
- Cutaneous and oral melanoma
- Squamous cell carcinoma (oral and cutaneous)
- Soft tissue sarcomas
- Plasma cell tumours
- Perianal tumours
- Apocrine gland anal sac adenocarcinoma

Across these tumour types, published studies have demonstrated encouraging local response rates and good overall tolerability, making it a valuable option within a multimodal cancer management.

How the procedure is performed

Treatment planning is tailored individually, based on tumour type, size, depth, and anatomical location, as well as the patient's general health status and any concurrent conditions.

Electrochemotherapy can be used in different clinical scenarios:

1. Intra-operative electrochemotherapy

Performed at the time of tumour removal, this approach targets the surgical bed and surrounding margins. It is particularly useful for infiltrative tumours where microscopic disease may remain despite careful excision, helping to reduce the risk of local recurrence.



2. Post-operative (adjuvant) electrochemotherapy

More commonly, treatment is delivered following surgery. In this setting, the therapy is directed at the surgical scar or residual tumour tissue, providing additional local control when complete excision is uncertain.

3. Primary treatment for non-resectable tumours

In selected cases where surgery is not feasible or would be excessively mutilating, electrochemotherapy can be used as a stand-alone local treatment.

What happens on the day of treatment?

The procedure is carried out under general anaesthesia to ensure patient comfort and precise application of the therapy.

Once the patient is anaesthetised:

- The treatment area is clipped and aseptically prepared
- Bleomycin is administered either intravenously or directly into the tumour
- A short waiting period allows the drug to distribute within the tissue
- Fine electrodes are then positioned across the tumour and/or surgical site
- A series of controlled electrical pulses are delivered over a few minutes

These pulses are carefully calibrated according to tumour size, depth, and location, ensuring uniform treatment of the affected tissue while preserving surrounding healthy structures.

After completion, the patient recovers from anaesthesia and is usually discharged the same day, once fully awake and stable.

Treatment protocols

In most cases, electrochemotherapy is delivered as a course of **one to two sessions**, typically spaced **2–4 weeks apart**. The exact protocol is adapted depending on tumour response and clinical assessment.

Some patients may require only a single treatment, while others—particularly those with more extensive or infiltrative disease—may benefit from additional sessions.

This flexibility is one of the strengths of the technique, allowing treatment to be tailored rather than fixed.

Aftercare and recovery

One of the key advantages of electrochemotherapy is its relatively gentle recovery profile compared with more invasive oncological procedures.



Most patients:

- Go home the same day or within a few hours
- Require only simple supportive care
- Receive a short course of anti-inflammatory medication
- May be prescribed topical wound care depending on the lesion

Over the following **2–4 weeks**, the treated area typically undergoes visible changes as the tumour tissue gradually regresses. Mild swelling, inflammation, or superficial crusting can be expected as part of the normal response.

A protective collar is strongly recommended during this period to prevent licking, scratching, or self-trauma—even if the patient appears comfortable.

Outcomes and clinical value

Electrochemotherapy is not intended to replace surgery or radiotherapy, but rather to complement them within a modern multimodal oncology approach.

Its main strengths include:

- Excellent local drug concentration within the tumour
- Minimal systemic toxicity
- Preservation of surrounding healthy tissue
- Suitability for challenging anatomical locations
- Repeatability if needed

For many patients, it provides an effective balance between tumour control and quality of life, particularly in cases where traditional options are limited.

Referrals and further information

If you have a patient who may benefit from electrochemotherapy, or you would like to discuss suitability in a specific case, we are happy to provide guidance and support with case selection and treatment planning.

Contact: oncology@dwr.co.uk

