PARAGON
VETERINARY REFERRALS

PACEMAKERS – INFORMATION SHEET FOR VETS

What you need to do prior to referral…

- Provide a copy of the ECG or ambulatory Holter ECG showing the bradyarrhythmia to us for confirmation.
- Bloods (fasted): Haematology, comprehensive biochemistry with electrolytes + total T4 and troponin (External lab), avoid using the jugular vein for the sample if possible. The pacing lead is placed via the jugular and bruising could cause complications.
- An ACTH test performed if:
  - Atrial standstill is present
  - The electrolytes are abnormal
  - There is any suspicion of Addison's disease
- If T4 is low, then a TSH should also be done.
- Echocardiography, if possible, to screen for obvious problems such as: neoplasia, cardiomyopathy, endocarditis, or other heart diseases.
- It is preferable that dogs are not medicated with drugs that can potentially reduce the threshold to ventricular fibrillation or exacerbate ventricular arrhythmias such as vagolytic or 'stimulant' drugs.
- Please ensure the dog is free of any infections especially pyoderma or skin parasites - if present these should be treated before surgery can proceed.

What we might perform prior to pacemaker

- Detailed echocardiography to screen for more subtle heart conditions and the presence of a persistent left cranial vena cava.
- If a collapse is suspected, but not yet proven to be caused by an intermittent bradycardia then ideally a Holter recording of the collapse is needed.
- Chest x-rays, unless good quality radiographs have already been done and provided.
- Serum Troponin levels, unless this has been already done.

Indications

Pacemaker implantation is indicated for management of a symptomatic bradyarrhythmia such as:

- Heart block: 2nd or 3rd degree (advanced) AV block.
- Sinus arrest and sick sinus syndrome.
- Vasovagal collapse: provided the bradycardia is more significant than the vasodilation.
- Atrial standstill – however the underlying atrial cardiomyopathy makes the prognosis unpredictable.

Exclusions

There are a number of potential cardiac and medical causes that need to be excluded:

- Cardiac causes: tumour (cardiac), cardiomyopathy, significant congenital cardiac defects (e.g. severe aortic stenosis, large VSDs), bacterial endocarditis, myocarditis.
- Medical causes: electrolyte disturbance, endocrinopathies (e.g. hypothyroidism), drugs (e.g. tumour (cervical or mediastinal), severe pulmonary disease (e.g. idiopathic pulmonary fibrosis in Westies) and Lymes disease.

Outcome

Paragon Veterinary Referrals is one of the few specialist centres in the UK to perform this procedure. The success rate for pacing is high, in excess of 95%. The long-term outcome is generally fairly good providing the bradyarrhythmia is idiopathic and there is no underlying cardiac or medical disease.

Why we use latest generation pacemakers

These are only little more expensive but, in our opinion, provide significant benefits and advantages:

- Demand pacemaker – only paces when it senses a pause.
- Rate responsive, based on a programmable movement sensor.
- Bipolar pacing and sensing.
- Automatic daily threshold measurement and 'spark' setting adjustments.
- Remote uploading of pacemaker programming data for home monitoring.

Complications

The main complications are the risk of death, lead displacement requiring repeat surgery and seroma formation. It has been shown that the complication rate is less by cardiologists who perform pacemaker implantation regularly.

The risk of anaesthesia is reduced greatly by temporary pacing prior to induction. The use of a new pacing lead negates the complications seen with second-hand ones. Proper programming of the pacemaker post implantation with annual programming checks minimises complications with the pacemaker settings and ensures optimal battery life.

Following surgery, the neck and surgical sites are wrapped with a large bandage and the animal cage rested for 2 to 4 days. This helps to minimise the risks of lead displacement and damage or infection of the surgical sites by scratching. After 4-5 weeks the pacing lead fibroses into the endocardium and displacement is rare.

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Post-surgery follow-up

Sutures from the jugular area are due for removal 10-14 days post-surgery.

Seroma formation is not uncommon around the pacemaker or jugular sites. The bandage does help to minimise this and ideally this should be maintained, and antibiotics continued until it has resolved.

The first and most important pacemaker programming check is due around 3 to 4 months from implant.

After that check then annual checks are needed to ensure normal pacemaker function and to check battery status.

Long term precautions

Infection is a potentially lethal complication (hence the bandage), therefore please ensure supranormal doses and duration of antibiotics when there is a potential bacteriaemia such as dental disease, bite wounds, systemic infections, etc. and remember not to inject in or around the pacemaker (such as during a busy vaccination clinic!), or attempt blood sampling from the left jugular vein.

Anaesthesia should not be a problem if ever required, however electrocautery (or strong electric equipment) must not be used near the pacemaker.

Finally, upon death, the pacemaker must be removed and returned for disposal, as it explodes on cremation!