



Interventional Radiology and Endoscopy

Interventional radiology and endoscopy are established tools in human medicine which have many applications and tremendous potential for the treatment of veterinary patients. This means that there are many new treatment options becoming available for often difficult to treat diseases; whilst interventional radiology and endoscopy does not replace traditional therapy, such as surgery, it does give us many exciting new avenues to explore. At Dick White Referrals we are at the cutting edge of applying and developing interventional radiology and endoscopy for small animals and are now able to offer a broad range of these techniques to our patients.

Interventional radiology describes the use of advanced imaging such as fluoroscopy, to allow access into areas of the body to deliver treatment or obtain diagnostic samples. Many of these procedures allow minimally invasive approaches to areas which would usually only be accessible at surgery, thus interventional radiology offers non-surgical alternatives to many areas, leading to less invasive surgery and reduced recovery times. Many interventional procedures involve the placement of a implant called a 'stent' this is an expandable tube which helps to hold a tubular organ open, either to stop it collapsing (for example in the treatment of tracheal collapse or urethral tumours) or to hold implants in place (for example in the treatment of intra-hepatic portosystemic shunts).

Interventional endoscopy involves the use of an endoscopy to look inside a body cavity (e.g. the urinary or gastrointestinal tract) for diagnostic or therapeutic reasons. With the expansion of equipment available in human medicine this has allowed the development of endoscopic procedures for small animals such as polypectomies, bladder stone removal and ectopic ureter surgery.

Tracheal Stents

Tracheal collapse is a chronic degenerative condition usually seen in small dogs, where the normally strong cartilaginous rings that support the trachea, lose their rigidity. This leads to dynamic collapse of the airway during respiration and reduced airflow to the lungs. In many cases medical therapy will help, however in severe cases surgery to physically support the trachea and open the airway is needed. Classically external support has been used in the form of prosthetic tracheal rings, however this surgery is technically challenging and associated with a high number of possible complications.

As an alternative intra lumen stents have been developed to allow dynamic support of the airway wall. These are placed under anaesthesia, from within the airway using fluoroscopic guidance. Once the correct stent is chosen, placement usually involves only a short period of anaesthesia. The stent is made of woven mesh which integrates into the wall of the airway, allowing normal respiratory epithelium to grow over it. This means they are very well tolerated and in most cases lead to a rapid and often dramatic improvement in clinical signs.



Ureteral Stents

Ureteral stents offer a minimally invasive option for the management of ureteral obstruction. Obstruction due to stones, stricture formation and neoplasia has traditionally be approached at open surgery, however ureteral surgery is technically challenging due to the very small size of the ureter (around 1mm in cats and 2-3mm in dogs) and as a result, is associated with a high number of potential complications. Placement of ureteral stent ensures urethral patency and allows flow of urine from the kidney to the bladder. Stents can be placed in a number of ways however the easiest is usually by sliding the stent over a wire which has been placed in the ureter under endoscopic guidance.



Urethral Stents

Tumours of the urinary outflow tract and urethra can be difficult to treat. Firstly because they are in difficult locations to remove surgically and secondly because they often do not respond well to medical management alone. Due to their location most urethral tumours cause difficulty in urination whilst the tumour is still at a very small size. Placement of a urethral stent allows free passage of urine through the area of constriction and allows normal urination. Whilst this does not affect the tumour size, in many cases the types of tumour treated are slow growing allowing many months of palliative care.



Nasopharyngeal Stents

Nasopharyngeal stenosis is a pathological narrowing of nasopharynx (the back of the nose), which leads to obstruction of nasal airflow. Some animals are born with a narrowing in this area, however nasopharyngeal stenosis is most common as the result of chronic inflammation (for example secondary to chronic rhinitis or vomiting/regurgitation whilst under anaesthesia). Traditionally treatment is based on surgery to dilate the narrowed area, however it is very hard to access and the surgery itself often invokes inflammation, which leads to further narrowing. As an alternative the use of interventional radiology to place metallic stents over balloon expanding catheters has been very successful, allowing a more permanent and less invasive way of opening the nasopharynx.



Vascular Interventions

Intrahepatic Portosystemic Shunts

Portosystemic shunts are abnormal vessels which connect the portal and venous systems. When these occur outside the liver (extrahepatic shunts) they are usually easily found and closed using traditional surgical techniques. Shunts which are positions within the liver tissue (intrahepatic shunts) are more challenging to close and can now be approached using interventional techniques. To allow closure of an intrahepatic shunt the vessel is approached from the venous system, this allows placement of a stent within the caudal vena cava, forming a mesh work across the opening of the shunting vessel. Via the same venous approach vascular coils, which cause clotting can be inserted into the portal vein. These lodge against the stent, leading to occlusion of the shunting vessel.



Intra-arterial Chemotherapy

By directly giving chemotherapy to an affected organ via its artery, greatly increased concentrations of chemotherapy accumulate in the targeted tissue. This not only allows a better treatment action, but

reduces possible side effects as normal tissues receive reduced dosages compared to non selective intravenous administration. After the administration of chemotherapy the artery is often partially embolised to reduce blood supply to the affected area, this increases the action of the chemotherapy. Intra-arterial chemotherapy has lots of potential applications; the administration of intra-arterial chemotherapy to canine nasal, hepatic and prostatic tumours has been very promising.

Intra-arterial Embolisation

Intra-arterial embolisation allows the delivery of PVA beads to tissues; this creates an embolism within the vessel, which reduces the blood flow to that tissue. This technique is very useful for treating intractable bleeding, for example nasal haemorrhage or for use after the delivery of intra-arterial chemotherapy, where reducing the blood supply to the tissue reduces the regenerative response and adds to the effectiveness of the treatment given.

Interventional Endoscopy

Feeding Tube Placement

Interventional endoscopy allows the placement of both gastrostomy (Percutaneous endoscopic gastrostomy – PEG) and jejunostomy (J) through G or nasally positioned) tubes. Placement of these tubes is usually over a wire which is placed under endoscope guidance. They allow delivery of nutrition to patients without the need of invasive surgery, making them very good ways of being able to give nutrition to very sick patients.

Oesophageal Stricture Dilation

Oesophageal strictures form as the result of chronic oesophageal inflammation and can be very difficult to treat. The most effective treatment is repeated high pressure dilation of the stricture using a balloon catheter placed under endoscopic and / or fluoroscopic guidance. Focal injection of steroid using an injection catheter via the endoscope helps reduce the chance of repeat stricture formation. In really difficult to manage strictures dissolvable stents may be placed.

Ectopic Ureters

Ectopic ureters usually enter the bladder wall at the trigone, but run in the wall and empty in the urethra. This leads to incontinence and have traditionally been re-implanted into the bladder wall at surgery. Due to the intramural location many ectopic ureters are amenable to treatment using endoscopic resection. Using endoscope guidance a catheter is placed into the ureter and then the abnormal wall trimmed back to the normal position using a laser. Although not suitable for all ectopic ureters it offers a much less invasive alternative to open surgery in many cases.



Mass Removal

Most masses are best removed surgically, however some polypoid masses or those in difficult to reach locations (for example within the airway or the portion of colon within the pelvis) may be amenable to endoscopic cautery and removal.