

Ornamental fish in veterinary practice

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Veterinary practice is a private business that provides professional health care to many species of animals. There is now an increasing division of the veterinary profession into specialist niches, and exotic pet medicine is currently an expanding area. Many veterinarians are becoming species-specific treating only horses or poultry, or food-fish. Some are discipline-specific such as dermatologists, ophthalmologists and orthopaedic surgeons. This division is mainly driven by a consumer demand for specialists with particular knowledge, skills or facilities. However, this is unlikely to occur in pet fish medicine for economic reasons despite the fact that, in the UK, it is estimated that there are over 100 million pet fish but only about 15 million dogs and cats. Veterinary health care is an expensive service to provide. It is all privately funded: there are no government subsidies, tax relief or concessions. Some ornamental fish may be financially valuable but their owners are often reluctant to spend money on professional fees.

Pets are animals that have been tamed and with which there is a degree of emotional bonding. Ornamental fish may have a low financial value but often have a very high emotional value. In many cases their owners consider them as members of the family, and most have been given a name. As a result, some owners expect their pet fish to receive the same standard of professional care that they would expect for all their other pets and the emphasis is very much on care for the individual.

Veterinary training may be limited in fish diseases but the five-year university course provides a broad education in animal health. This basic knowledge and skills can be easily transferred from one species to another and from terrestrial to aquatic species. However, in the UK, veterinarians are not as well integrated into the world of fish health as they are in other countries. Veterinary interest in ornamental fish varies but usually includes the clinical diagnosis and management of cases. An important role for the veterinarian

is to act as a bridge between the client and the laboratory, which provides services to back up clinical judgement and help make a rational decision about an appropriate course of action. Although the economically important and infectious diseases that affect large collections of fish have been thoroughly investigated, there is much to learn from the less common and often unique diseases of individuals.

Owners of ornamental fish will phone for information and professional advice and many health problems can be resolved with basic advice on husbandry and simple medical treatment. Fish are visited on site or brought to the practice for a consultation and clinical examination. Laboratory tests can provide valuable information: water quality tests are rarely performed by hobbyists but are often the first service offered by retailers, who may also offer skin scrape and post mortem examinations. Veterinarians are experienced at taking tissue samples for histopathology and other diagnostic

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procedures to identify an underlying disease. Many cases may only require basic investigations but there is an increasing awareness of internal disorders that require more sophisticated diagnostic imaging tools.

Radiography is the production of an image of internal structures by passing X-rays through the body. This equipment is found in most veterinary practices and can be used equally for animals and fish. Digital radiography is becoming more common and involves recording the image using electronic sensors instead of photographic film. Using experience of comparative anatomy and pathology it is possible to interpret images accurately and determine the underlying disease. Plain radiographs are often sufficient for most cases but contrast media and horizontal beam radiography can also be used to reveal some unusual disorders or highlight subtle pathological changes. The patient requires an anaesthetic and is removed from the water for a few minutes while the radiograph is taken. It is useful for identifying bone lesions and abnormalities of the swim bladder and some soft tissue disease. Several health and safety precautions must be taken for safe use of this equipment. Although the equipment costs involved can be significant, this is the cheapest form of diagnostic imaging.

Ultrasonography is the imaging of internal body structures by recording the reflections of pulses of ultrasonic waves. This is commonly used in veterinary practice but requires experience and skill to operate the equipment and interpret the images. In most cases, the patient does not require sedation or removal from the water since the water

itself acts as a coupling agent for the probe. This technique is useful for identifying soft tissue diseases but less useful for disorders of bone, swim bladder or kidneys. Some machines now incorporate Doppler ultrasound, a technique used to show the direction of blood flow and is useful for studying heart disease and blood supply to vital organs.

Scintigraphy involves the intravenous injection of radioactive labelled agents that are taken up by specific tissues, depending on the agent used. There are about 100 different procedures and it is used to assess structure and function of the targeted organs, bones or tissues, which enables disease to be detected before anatomical changes occur. A scintillation detector or gamma camera is used to view areas where the isotope accumulates. This has been used in fish but the handling and excretion of the radioactive isotope into the environment requires health and safety measures to be taken. In addition to diagnostic use, it can be used to treat humans and animals such as those with hyperactive thyroid disorders, hence its alternative name, nuclear medicine.

Computed tomography (CT) scanning is based on conventional radiography where the X-ray generator rotates rapidly around the patient and the emergent beam is detected by electronic sensors. The signal is analysed and a cross-sectional image is produced by a computer. The patient must be anaesthetised and placed within the scanning unit for a few minutes. CT is best for investigating diseases of the skeleton, swim bladder and some soft tissues. The image can be electronically manipulated to improve detail and conventional contrast media can also be used.

Magnetic resonance imaging (MRI) produces an image by mapping out the location of protons (usually hydrogen nuclei) in body tissues using a combination of magnetism and radio waves. A computer generates a cross-sectional image. The patient must be anaesthetised and scanning can take up to one minute per centimetre of body scanned. MRI is best for soft tissues and specialised contrast media can be used for some studies. Both CT and MRI require expensive equipment and facilities, but now there are three mobile MRI units in the UK and several fixed, dedicated animal-only machines. Some human hospitals also offer opportunities to use their equipment.

Endoscopy is the examination of internal organs by direct vision using a lighted tube or telescope incorporating a series of lenses and can be used for both diagnostic and therapeutic purposes. Tissue samples can be collected using biopsy forceps through the instrument channel but due to the small size of most fish patients, the small diameter endoscopes (=5mm) should be used. The endoscopes can be inserted into natural orifices to inspect areas such as the oral cavity, pharynx, gills or proximal oesophagus. Examination of internal organs is an invasive procedure and requires a surgical approach. Due to the compact nature of the organs and the inelastic body wall, the body cavity must be inflated with air or carbon dioxide to improve visualisation.

The veterinarian is often seen by the hobbyist simply as a source of 'prescription only medicines'. In the UK, medicines legislation restricts the sale of prescription medicines to 'animals under our care'. This restricts vets

to dispensing medicines only to fish that have been physically seen or actively investigated. At present, few drugs are approved for use in fish, and most are only licensed for use in specific diseases of food fish. As a result, veterinarians must obtain informed consent from the owners and make professional judgements about the appropriate use of these and other drugs when treating ornamental fish. The veterinarian must take professional responsibility for the medicines dispensed and be fully aware of the legal issues regarding safety, side effects and discharge. There are many proprietary products available to the hobbyist over the counter in pet shops and without the need for a prescription. These products have been used for years in the hobby and most are based on standard ingredients such as formalin and organic dyes. However, most are only effective against external diseases and have limited effect on systemic diseases or internal disorders. Veterinary input will often include constructive advice on general husbandry and disease management, and it is this that is often more useful than pharmaceuticals when trying to achieve long-term disease control.

Veterinarians routinely perform a wide range of surgical procedures on terrestrial animals and can adapt many of these for use in fish. In general, fish are considered good surgical patients but health problems that can be treated exclusively by surgical means are relatively uncommon. Consequently only a limited number of procedures have been developed and reported in the literature. Common surgical procedures include the topical treatment of skin ulcers and removal or reduction of external tumours, particularly

if causing obstruction around the mouth and gills. Internal surgery, such as laparotomy to investigate the cause of abdominal swelling or buoyancy disorders, has also been performed successfully. Safe and controlled anaesthesia must be used for a variety of investigations and surgery. Many external procedures only require brief anaesthesia lasting a few minutes, and is achieved by immersion in an anaesthetic solution and removal from the water. More sophisticated investigations may last a few hours and require a recirculating anaesthetic system.

It is sometimes necessary to kill fish humanely either to avoid further suffering from disease or sacrifice a fish for post-mortem examination. The test of the human-animal bond is often how owners come to terms with death and euthanasia of their pet. This applies equally to fish as it does to a dog or a cat. Some pet fish may have been owned for many years and be of great personal value to their owners. They will often question if their pet is 'suffering' or is 'in pain' and whether the fish has any 'quality of life'. As a result, euthanasia must be handled sensitively and with compassion. Some owners have their pet fish cremated, or buried at home or in a commercial pet cemetery.

At present, most veterinary involvement in fish health relates to food-fish production but there is a growing interest in pet fish and knowledge in this area is expanding rapidly. Most cases in veterinary practice are from private owners who keep fish as a hobby. Retail outlets and dealers occasionally require veterinary assistance for investigations and supply of prescription medicines. Some

laboratories use species, commonly kept as pet fish, for genetic studies and in the UK may require veterinary supervision under the Animals (Scientific Procedures) Act 1986. Public aquaria have become more popular, either as purpose-built facilities or as part of a zoological garden. Here, the role of the veterinary surgeon may include routine health inspections, advising on health monitoring schemes, training staff in basic investigations and treating large fish. Vets may be involved in legal disputes and asked for advice on fish matters as an expert witness in court.

Immense amounts of information can be found with a simple search on the internet and clients often arrive with lengthy printouts from various web sites. In ornamental fish medicine, much of that information is based on anecdotal comment, often with insufficient detail or inaccurate interpretation and some diseases have not been written up or described before. In last four years only a handful of papers were published on ornamental fish in the major fish pathology journals. In addition to the standard texts, other veterinary publications include *Exotic DVM*, *Fish Veterinary Journal*, *Veterinary Clinics of North America: Exotic Animal Practice* and the *Veterinary Record*. Vets will often write up cases in these publications since they are primarily directed towards a clinical rather than a pathological approach.

There are several areas in ornamental fish health that need further research:

Koi herpesvirus has become one of the most important diseases in ornamental carp but due to its devastating effect it has improved

attitudes to health, hygiene and management practices more than anything else in the koi hobby. There is still much to learn about this disease and the development of a quick and reliable diagnostic test together with a practical method to minimise its impact is urgently required.

Obtaining meaningful information by culturing bacteria from body ulcers of koi has proved problematic. *Aeromonas hydrophila* and atypical *A. salmonicida* are commonly isolated but often yield questionable antibiotic sensitivity results. It often requires a significant improvement in their fish husbandry and pond management to resolve the problem but there are many cases where it is particularly difficult to make any progress. Granulomatous disease is common in sick aquarium fish but rare in pond fish. Few fish show characteristic clinical signs of weight loss or colour change and typical acid fast organisms are rarely found histologically. It is debatable what should be done with in-contact survivors since they may not be affected and cannot be treated effectively. Equally, slaughter, disinfection and restocking may not prevent the reintroduction of mycobacteria with new stock.

Neoplasia is common in pet fish since many are old and suffering from age-related health problems. Some tumours appear to be species-specific such as fibromas in goldfish, abdominal carcinomas in carp, renal tumours in oscars and retinal tumours in black goldfish. These could provide useful models for medical research.

Haematology and biochemistry tests are one of the first lines of investigation for internal disorders in other animals, and compact dry chemistry analysers are found in most veterinary practices. However, it is essential to obtain normal baseline values from testing large numbers of healthy individuals. Biochemistry tests must be validated to ensure sensitivity and specificity before being performed on clinical cases to identify consistency between abnormal blood results and the underlying pathology. Blood tests are increasingly used in other exotic pets to identify disease and assist in the choice of treatment or offer a prognosis.

Veterinarians still retain a strong scientific curiosity about their work despite the challenges of trying to run a successful business. There is no financial advantage or professional requirement to publish scientific papers but often the significant effort of advancing our own knowledge brings satisfaction from the personal achievement and friendship through collaboration with non-veterinary colleagues. The field of ornamental fish medicine is moving forward in many areas. Some things haven't changed but the new challenges involve KHV, neoplasia, internal diseases and a need to provide a greater degree of professional investigation. It is hoped that this paper has given an insight into the skills and abilities of veterinary surgeons and given a flavour of the problems and diverse cases encountered in veterinary practice.