Veterinary Medication Errors

From A Mixed Practice Perspective
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It is difficult to find a veterinarian or nurse who has never accidently given the wrong pill or injection to a patient. Nor is it difficult to find a veterinarian or nurse who would deny doing such an action that could clearly have adverse outcome on the patient's well-being. Yet despite the experience and knowledge of workers in the industry, medication errors still comprise a significant component of avoidable errors by veterinarians. Efforts to shift blame to and punish individuals that perform errors in human medicine are, more often than not, ineffective (Reason 2000). This article aims to stimulate discussion on medication errors by those in the Australian veterinary industry and uses mixed practice as a case example.

What Is A Medication Error?

The National Coordinating Council for Medication Error Reporting and Prevention (NCCMERP) and the U.S. Food and Drug Administration (FDA) consider a medication error as any preventable event that may cause or lead to inappropriate medication use or patient harm while the medication is in the control of the health care professional, patient or consumer. For the purposes of this article, the term medication has been expanded to include vaccines and use of captive bolts and bullets for euthanasia. Medication errors can be classified into several simple categories (Tobias et al. 2013):

- Wrong dose - e.g. over - or underdosage
- Wrong medication or treatment - e.g. drugs, vaccines, captive bolt cartridge size
- Wrong route of administration
- Omission of medication
- Wrong frequency
- Use of spoiled medication - e.g. expired or incorrectly stored products

Veterinary Medication Errors In Literature

The majority of medication errors are preventable (US FDA 2012; Kim-jung 2014b). In human medicine, medication errors are a leading cause of morbidity and mortality in hospitals. One study reported a 16.6% incidence of adverse effects due to medication errors from 14,000 admissions (Kim-jung 2014a), highlighting the high level of avoidable errors by healthcare professionals in human medicine. Medication errors in veterinary medicine are often unreported, with few studies in literature and no known published statistics provided by government or veterinary bodies worldwide. In a survey investigating the common mistakes performed by new graduates in the United Kingdom, 29% of respondents performed an error involving drugs or medical therapy (Mellanby & Herrtage 2004), although it should be noted that medication errors were not the focus of the study.

Medication Errors In Mixed Practice

While veterinarians in small animal clinics offer a working environment akin to that of human hospitals, veterinarians in mixed practice are additionally required to work in the field and are so faced with a unique set of challenges in their line of work. Such demands include working with a limited availability of resources (often restricted to the equipment loaded in the back of their vehicle), the need to adapt to different species and pursue any developments while on the job. Moreover, mixed practice veterinarians may be required to attend farm calls at any time with little notice and often work in inclement weather and poor lighting. The addition of possible fatigue, non-ideal working conditions and urgency of administration exacerbate the chance of medication errors.

The following table outlines some factors that can contribute medication errors and likely scenarios that can occur in mixed practice.

Factor	Example	Figure
Misidentification of products due to similar packaging, sized bottles or small writing	Figure 1: Notice how uniform the tubes and bottles look. Even though colours help differentiate the products, they are often too similar or are too unnoticeable to help identify individual products. In the second row, the images have been greyscaled to highlight the lack of difference between the products when colour is not used. Hence, the identification of products solely based on size is not a good method on identifying products	
Sound-alike drug names (Tobias et al. 2013)	Figure 2: Carprofen and cartrophen sound similar but have different pharmacological effects. Carprofen is a non-steroidal anti-inflammatory (NSAID), while cartrophen is a disease-modifying osteoarthritis drug (DMOAD) used primarily for the treatment of joint disease (Cartrophen Vet 2011). Such drugs should be stored separately on shelves or in workboxes.	
Poorly legible drug labels (US FDA 2014)	Figure 3: Notice how similar the labels and drugs look. The difference in concentrations is not highlighted, making legibility an issue. A staff member has written the concentration on one of the bottles to highlight the difference.	
Inadequate or inconsistent labelling of product details and instructions for use (US FDA 2014)	Figure 4: In this image, the obverse face (top row) shows no difference between the 2 products other than colour and is in a foreign language. On the reverse side (bottom row), small text reveals the green captive bolt cartridges are used for calves/pigs while the blue cartridges are used for bulls. Use of the wrong product may not result in intended effect..	
Poor visualisation of labelling and packaging of products in poor ambient light	Figure 5: A box containing various drugs used in mixed practice taken in poor lighting. Note how similar the green and purple colours look like on several bottles. On night calls to properties, poor lighting can be a factor in picking up the wrong bottle or reading label instructions incorrectly.	
Untidy work, transport and storage environments	Figure 6: Untidy storage environments make it difficult to access drugs and equipment. Most working vehicles do not have proper refrigeration facilities to appropriately store antibiotics and vaccines. Additionally, this vehicle has not been fitted for its intended purpose.	
Complacent use of products without checking	Figure 7: Vaccination vials that have been stocked in the same way routinely can lead to staff assuming that a particular vaccine is on one side of a shelf constantly. This may result in veterinarians administering the wrong vaccine to a patient. Noroclox® is available in 2 different concentrations for dry and lactating cows. Their similar packaging and small text to identify their use can lead to inadvertent selection by staff for dispensing to clients.	
Use of unfamiliar products when an alternative treatment is available or required	Figure 8: Lethabarb® is commonly used in the euthanasia of dogs, cats and horses. In some situations, Lethabarb® may be unavailable and an alternative required. Overdosing on induction and combined injectable anaesthetic agents is considered appropriate (Tasker n.d., AVMA 2013).	
Miscommunication of products with clients when directing further care	Figure 9: The label here is hand written and contains medical jargon ('BID') which the client may be unfamiliar with and consequentially lead to a medication error. The use of printers to improve legibility and use of 'twice daily' to replace 'BID' is preferred when communicating with clients.	

Methods On How To Prevent Medication Errors

Although the prevention of medication errors sounds obvious in theory, this is often overlooked in practice due to a perceived lack of practicality. For absolute prevention to occur, all stakeholders must be involved, including the veterinarian, practice, pharmaceutical companies and client. The responsibilities of various stakeholders on how to prevent medication errors is mentioned below:

A) THE VETERINARIAN

The veterinarian bears the primary responsibility for medication errors. They should check bottles and packaging for their proprietary name, active ingredient, concentration rate and expiration date as is intended for administration, in order to prevent giving the wrong drug, dose or an expired product. When medications are drawn up or seals broken, they should be labelled appropriately with the aforementioned information unless they are to be administered immediately. Should the veterinarian be unable to identify such information from the label or is similarly in doubt, the drug should not be administered.

While inexperienced veterinarians are expected to perform medication errors (Tobias et al. 2013), the familiarity of products regarding size, concentration and doses of products can cause more experienced veterinarians to become complacent and not read labels carefully. It is not uncommon to be in a scenario whereby a veterinarian will pick up a bottle based on its size or coloured label and expect it to be a specific drug because it is usually stored in that location. For this reason, it is the experienced veterinarian who is just, if not more, likely to perform medication errors than their novice counterparts. It is therefore always important to not become complacent and read all labels before administering treatments.

Veterinarians must also adhere to practice protocols. Such protocols may dictate for vets to clean up after themselves. Vehicles used for locum travel should be restocked, cleaned out and drugs returned to their correct position on return to the clinic. In clinics, veterinarians should ensure the correct replacement of items on the shelf, container or vial holder to prevent a complacent veterinarian from picking up the incorrect product. If protocols need to be broken to facilitate a procedure, then logically the practitioner is in the wrong or the protocols are insufficient or injudicious. In such cases, the circumstance should be addressed in staff meetings and protocols reassessed.

It is needless to say that veterinarians are also legally responsible for medical decisions regarding their patients and this includes the administration of medications by clients. Ensure that the client understands the therapeutic plan and is able to perform treatments to a satisfactory level. It may be necessary to provide a written treatment plan or ask the client to perform the procedure before leaving the property to gauge their competency and understanding.

B) THE PRACTICE

The practice, through the action of nurses, receptionists and other team members, can play an assisting role in the prevention of medication errors. Medications stocked on shelves should be organised in such a way that similar packaging or bottles are not confined in close proximity to one another (Zeltzman 2012). To prevent the use of expired products, products with closer expiration dates should be placed in front of those with longer ones and should be reordered based on turnover rate and shelf life. Variations of the same drug (different brands, concentrations, etc.) should be kept to a minimum in order to prevent incorrect drug administration and dosing. It is advised that additional labelling to highlight differences and hazards be used for products deemed 'high risk', such as sound-alike drugs and look-alike containers (Kim-jung 2014b). Practices should also develop, enforce and reassess protocols regarding use of medications and equipment.

C) PHARMACEUTICAL COMPANIES

Pharmaceutical companies inadvertently contribute to medication errors through their packaging and labelling. Companies should employ clear and concise labelling, particularly concerning the text of active ingredients as well as concentration and the colouring of the packaging. Changes in text can include highlighting sections of drug names in bold and large letters to distinguish similar product names (e.g. predniSOLONE and predniSONE) and large font sizes for drug concentration. Colouring changes include obvious contrasting text and distinctive background colours that can be used to differentiate products in poor lighting conditions. Companies should also attempt to avoid misleading or confusing proprietary names (Kim-jung 2014b).

D) CLIENTS

Clients need to understand that performing a procedure outside the veterinarian's instructions or advice is at their own risk. Nevertheless, it is unlikely that clients maliciously disregard veterinary advice and more than often than not is due to miscommunication, misperception, a lack of confidence or lapse of memory. It is essential that veterinarians are confident with their clients' ability to administer treatments and comply with instructions. Veterinarians should also be aware of the legal

implications of dispensing medication to clients and instructing clients to perform procedures that infringe restricted acts of veterinary science.

Protocol On How To Prevent Medication Errors

Medication errors are preventable and are usually performed by veterinarians who are inexperienced, experienced but complacent, fatigued or under pressure. A checklist should be used to reinforce the rights of medication. A simple protocol can involve the following actions as suggested by Tobias et al. (2003):

- Checking whether the choice of treatment is correct for the patient - consider species, age, body weight, dose, concurrent diseases, etc.
- Checking both packaging AND the bottle under a reliable light source - is the right drug in its proper package, concentration, route of administration, legibility of text
- Checking the bottle for spoilage - consider storage conditions (e.g. temperature and away from direct sunlight) and expiration date
- Checking the patient's last treatment - ensure the treatment administration interval is correct, consider possible drug interactions
- Checking the dose or treatment in relation to the site of administration - eg. toxic dose of local anaesthetics and use of captive bolts into the cranial cavity (and not the frontal sinus)

Final Remarks

Despite the possible legal implications medication errors have on veterinarians, medication errors are still commonly performed by those in the veterinary profession on a daily basis. Recognition of the factors involved and willingness to change by veterinarians, practice staff, pharmaceutical companies and clients alike will help reduce the incidence of medication errors.

Stakeholders can voluntarily report cases of medication errors to the Centre for Veterinary Medicine (CVM) to help monitor safety issues regarding drug names, labels and packaging.

Disclaimer

Images depicting certain products in this article have been used to illustrate known or likely cases of medication errors based on consultation with practising veterinarians. They do not reflect the product's efficacy or advocate/discourage the use of a product or brand in any way.

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