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Emergency and critical care: top tips for your survival!

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ABSTRACT: Emergency situations are relatively commonplace in the veterinary practice, and as such are linked in with the RCVS Day One competencies. Student veterinary nurses have always had an element of emergency nursing included in their training. Good teamwork, communication and preparation are key factors in the successful resolution of the emergent case. An appropriate framework should be followed during the triage process, which identifies the main issues and considerations in the critical patient. The use of monitoring equipment is vital during this period, and veterinary staff should endeavour to be familiar with its use to gain most value from the information it provides.

Introduction

Emergency situations arise frequently in practice, and provide ample opportunity to demonstrate excellent teamwork, and put to use skills that are otherwise often underused. This being said, they can be a source of anxiety for both the student veterinary nurse (SVN) and the newly qualified and registered veterinary nurse (RVN), who may feel they are lacking in experience. This article aims to provide some guidance as to how these members of the veterinary team can improve their skills and therefore confidence in these situations.

The new RCVS Day One competencies outline general professional skills that are expected of the RVN, including “The new veterinary nurse must be able to perform basic first aid, and know when and how to call for assistance from others if called to deal with an animal outside their immediate area of competence or where there are potential risks to health and safety” (RCVS, 2014). The nursing progress log (NPL) has always included an element of emergency work, and this is reflected in the RCVS Day One Skills for Veterinary Nurses – small animal, launched earlier this year, which states that the SVN should be able to “Assist with a range of emergency care techniques” (RCVS, 2016).

Triage

The first involvement of the RVN (or wider veterinary team) comes when the owner/client (hereafter the client) makes contact with the practice to seek advice for their pet (Davis, 2012, p. 5). At this stage, triage begins; either through a telephone conversation or in person if the client has rushed into the practice with their pet. Triage is defined as “the evaluation and allocation of treatment to patients according to a system of priorities designed to maximise the number of survivors” (Brown & Drobatz, 2007, p. 1).

Telephone triage is the usual first point of contact between the client and the practice (Aldridge & O’Dwyer, 2013, p. 1). Often clients can be distressed so the RVN needs to remain calm, and endeavour to gain the relevant information to advise the veterinary team in advance, while not delaying the arrival of the patient at the practice. It can be useful to make notes while speaking to the client in order to relay information accurately (**Figure 1**). Information gathered during the telephone triage stage will enable the veterinary team to prepare for the arrival of the patient (Davis, 2012, p. 5), saving vital time when initiating stabilisation (Aldridge & O’Dwyer, 2013, p. 2). The key questions asked of the client should be basic and straightforward, and address



Figure 1. Note-taking during telephone triage (image author's own)

level of consciousness, whether the animal is breathing, experiencing seizures, or has obviously broken or exposed bones, and any active bleeding (Davis, 2012, p. 5). Some information can be gained from the patient's record, if they are a registered client, which can help save time, although ensure information is recent (e.g. weight) otherwise it could be misleading.

Basic first aid advice can be given to the client regarding transporting the animal to the practice; this can include how to staunch bleeding through pressure or bandaging, immobilising the animal, or

even application of muzzles to protect the client (Breton, 2012, p. 7). It is also vital that clear directions or a postcode are provided to the client, especially if you are not their normal practice or branch, and an estimated arrival time should be given to the veterinary team.

Once the pertinent information has been received, the veterinary team will need to prepare and organise resources in readiness for the arrival of the client and animal (Breton, 2012, p. 7). Something as simple as knowing the breed or weight of the patient can allow appropriate endotracheal tubes, intravenous catheters (IV) and fluid bags to be selected (Davis, 2012, p. 5). Preparation of the crash cart and equipment for providing oxygen therapy would also be beneficial at this point. Other equipment, for example medications, will be dependent on the emergency in question and the severity of the case, so the RVN should seek guidance from the veterinary surgeon (VS) in this matter. There are many different motivational quotes out there relating to preparation, but the common theme among them suggests that good preparation in any situation is linked to the successful outcome of said situation!

Once the animal has arrived at the practice the three major body systems need evaluation (Brown & Drobatz, 2007, p. 2; Davis, 2012, p. 6). An initial, yet basic triage assessment can be carried

out within 90 s, and should focus on the respiratory, cardiovascular and central nervous systems (Howie, 2016). Triage should be carried out by a member of the veterinary team (Brown & Drobatz, 2007, p. 2); this could be either RVN or VS. This assessment will provide information to classify the emergency, and determine the urgency with which it needs to be seen (Howie, 2016). The animal trauma triage (ATT) scoring system (Table 1) has been around for over 20 years and helps classify emergencies and can provide information relating to prognosis. Six categories are rated from 0 to 3, and the scores added up to give a value out of 18; the higher the score, the more guarded the prognosis.

Vascular access

The placement and maintenance of an IV catheter are skills all RVNs should be competent in, and can be considered one of the most vital skills when working in an emergency and critical care situation. Prompt placement allows for administration of IV fluids and medications, as well as the potential to draw blood samples in an atraumatic method. A basic blood profile can be run at this point which includes a packed cell volume (PCV), blood glucose (BG) and serum protein (using a refractometer). This gives a baseline to work from, recognise improvements and compare to any previous blood test history.

Table 1. The animal trauma triage scoring system*

Grade	Parameters							
	Perfusion	Cardiac	Respiratory	Wounds	Skeletal	Neurological		
0	Pink and moist mucous membranes (MM)	HR: Within expected normal	Normal rate	Partial thickness abrasions, lacerations	Weight bearing on 3-4 limbs	Central: conscious and alert		
	Temp: >37.8°C						No fractures	Peripheral: normal
	Strong/bounding pulses							
1	Pale pink or congested MM	HR: Increased rate but normal sinus rhythm	Mild increase in rate and effort	Full-thickness abrasions, lacerations, but no deep tissue involvement	Closed fracture (fx)	Central: conscious but depressed mentation		
	Temp: >37.8°C						Mild increase upper airway sounds	Peripheral: abnormal yet purposeful spinal reflexes
	Good pulses							
2	Pale MM	HR: Significant increase and arrhythmias	Moderate increased effort with abdominal component	Full-thickness and deep tissue involvement abrasions, lacerations; ocular proptosis	Single long bone open fx	Central: unconscious, with responses to noxious stimuli		
	Capillary refill time (CRT): 2-3 s						Moderate increase upper airway sounds	Peripheral: absent purposeful movement; decreased anal and/or tail tone
	Temp: <37.8°C							
3	Grey/blue/white MM	HR: Decreased rate with erratic arrhythmias	Marked effort or gasping	Full-thickness abrasions, lacerations with artery, nerve or muscle involved; penetration body cavity	Vertebral body fx (not including Cd)	Central: nonresponsive, uncontrolled seizures		
	Temp: >37.8°C						Little or no detectable air passage	Peripheral: absent nociception
	No femoral pulses							

*A one-point increase from 0 is suggested to result in a 2.3-2.6 decrease in the animal's chance of survival (Adapted from Breton, 2012).



■ **Figure 2.** Placement of peripheral catheter in the cephalic vein (image author's own)

Consideration should be given to the location of venous access, and whether this is to be peripheral or central in location. Peripheral catheterisation is more commonplace in the immediate emergent situation, due to the need for rapid and effective placement. For this reason, it is common to catheterise the cephalic vein (**Figure 2**), although lateral or medial saphenous and auricular veins are useful alternatives (Adamantos & Alwood, 2007, p. 8).

The venous cutdown procedure can be used in peripheral veins where access has proved difficult. This could be because the patient is showing signs of vascular collapse, perhaps due to hypovolaemia, and percutaneous attempts at catheterisation have been unsuccessful. In venous cutdown, an incision is made through the skin to allow visualisation of the vessel. As such, this is a technique that should be carried out under aseptic conditions (Trent, 2012, p. 54).

Wound management

In the emergency situation, it is necessary to prioritise the treatment of life-threatening injuries, meaning a complete assessment and subsequent management of any wounds is often delayed. At the point of triage, it is sufficient to employ management techniques which prevent further injury and minimise contamination. This would include, but is not limited to: covering with sterile dressings, control of bleeding, lavage for heavily contaminated wounds and administration of antibiotics

and analgesia (Aldridge & O'Dwyer, 2013, p. 150). A more thorough examination and subsequent treatment plan can be initiated once the patient is stable. Non-life-threatening wounds or injuries that may be prioritised during triage include those that may have life-altering effects if not treated promptly, e.g. ocular proptosis.

Shock and perfusion

During triage, it is important to consider conditions such as hypovolaemia, hypoxia and hypotension (Howie, 2016) as all three relate to shock and patient prognosis depends on the early recognition and correction of these deficits. Shock refers to poor oxygen delivery to tissues, resulting from tissue hypoperfusion (where oxygen delivery does not meet oxygen demand – see **Figure 3**). Hypoperfusion can initially lead to cell damage, and without

correction, organ dysfunction, failure and ultimately patient death (O'Dwyer, 2016).

Commonly, tissue hypoperfusion occurs as a result of hypovolaemic shock following fluid loss which decreases circulating blood volume (Aldridge & O'Dwyer, 2013, p. 31). The nursing aim in this situation is the restoration and maintenance of circulating blood volume, and this is often achieved through administration of IV fluid therapy (Lock, 2015, p. 34). Acute fluid therapy is desirable in this situation, as the deficits should be quickly corrected in order to restore adequate perfusion (Aldridge & O'Dwyer, 2013, p. 37). A bolus dose at a higher administration rate (as directed by the VS) should be given over 15–60 min in order to correct circulating blood volume and restore normal perfusion parameters (**Table 1**). Therefore, these parameters should be observed on a regular basis (every 30 min or as indicated) during the bolus delivery of fluids, as well as after administration, as once they have returned to normal the rate should be slowed as appropriate (Aldridge & O'Dwyer, 2013, p. 37; Lock, 2015, p. 36).

Non-invasive monitoring techniques

Monitoring of the critical patient is essential in the emergency situation and veterinary practice has progressed with the use of electronic monitoring equipment. Accurate and comprehensive record keeping is also vital because sequential observations will highlight trends indicative of progress or deterioration (Farry, 2012, p. 64). However, care must be taken to not rely solely on electronic equipment when monitoring, and to ensure that the information gained from them is collated and interpreted before any action is taken by the veterinary team (McMillan, 2016, p. 297). It is vital to be familiar with all monitoring equipment

Hypovolaemic shock; a decrease in circulating blood volume
Reduction in the ability of blood to deliver oxygen
Cardiogenic shock; a decrease in the ability of the heart to pump blood
Maldistributive shock; a decrease in the ability of the vascular system to maintain vasomotor tone
Obstructive shock; resulting from an obstruction of blood flow from, or to, the heart

■ **Figure 3.** Causes of tissue hypoperfusion (Adapted from Aldridge & O'Dwyer, 2013, p. 31)

available for use, as it is no good having a valuable piece of monitoring equipment that the veterinary team are not accustomed to using, as this can lead to inaccuracies on the occasions where it is employed. Regular use in the routine setting allows use of the equipment to become second nature to the veterinary team.

Non-invasive blood pressure monitoring (NIBP) is a useful tool in the emergency situation where hypotension is a consideration during triage and can lead to hypoperfusion. There are many conditions of which hypotension can be a clinical sign, including all types of shock as well as gastric dilatation–volvulus (Williamson & Leone, 2012, p. 136). Non-invasive methods of monitoring blood pressure include Doppler flowmetry and oscillometry, both of which use an inflatable cuff to occlude blood flow, which is usually placed on an extremity (McMillan, 2017, p. 9) such as the distal forelimb, although the proximal tail is an alternative. As discussed by McMillan (2017), there are advantages and disadvantages to both.

The pulse oximeter is possibly the most commonly used piece of monitoring equipment; RVNs are familiar with its use during anaesthesia. However, it is the most likely to produce readings that are in error. Pulse oximetry produces a percentage reading that estimates the oxygen saturation of arterial haemoglobin, yet it is advised that readings should also take into account the pulse waveform that many devices display because this shows the signal is of good quality and therefore more reliable (McMillan, 2016).

An abbreviated neurological examination can be carried out by the RVN as part of triage and should consider three main components: ambulation, mental status and cranial nerve function. This should then be continued during the critical nursing period. Assessment of gait, including a proprioceptive function test should be carried out alongside testing of withdrawal reflexes. Mental status can be assessed in terms of level of consciousness, which can include responses to noise and tactile stimuli. Cranial nerve assessment includes consideration of pupil size and symmetry, menace and pupillary

light responses as well as observation for anisocoria and nystagmus (Vite & Long, 2007, p. 130).

Communicating with the owner

A key point to remember is that the client did not anticipate being in this situation, and can often be in considerable distress as a result (O'Sullivan, 2016). This can be exacerbated in situations where they were witness to a traumatic event, e.g. road traffic collision. Clear communication is vital in the emergency situation, but can be hindered by the client's distress. The onus falls on the veterinary team to gather information (as previously discussed in triage) and later gain a more in-depth history and summary of the incident that caused their arrival at the practice. Empathy is a key part of the RVN's communication skills and involves both an intellectual and emotional understanding of the client's experience (Dawson, 2010, p. 86).

We must not forget the clients and animals already waiting in the practice, perhaps for routine appointments or because their animal is ill. They should be informed as emergencies present, as it is likely that this will impact on their waiting time (Breton, 2012, p. 10).

Conclusion

Emergency situations can be a source of anxiety for all members of the veterinary team, not least the less-experienced members. A good understanding of triage methodology and the importance of preparation, communication and teamwork will serve any RVN well when presented with an emergency. The RVN's aim is to prevent suffering, but there are limitations regarding the provision of treatment laid down in the RCVS Code of Professional Conduct for Veterinary Nurses, and the individual RVN should be aware of their own level of competency.

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