THE AUSTRALIAN AND NEW ZEALAND COLLEGE OF VETERINARY SCIENTISTS

ABN 50 000 894 208

Garden City Office Park
Building 3
2404 Logan Road
EIGHT MILE PLAINS QLD 4113
Telephone: 07 3423 2016

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To: The Australian Veterinary Association
Unit 40, 6 Herbert Street, St Leonards NSW 2065

RE: Intravenous fluid shortages – suggestions for management and conservation

2024 Executive of Veterinary Anaesthesia and Analgesia Chapter, Australian & New Zealand College of Veterinary Scientists

Background & purpose

There is a current and ongoing supply disruption affecting 1000 mL bags of balanced isotonic crystalloid fluid solutions including sodium chloride 0.9% (Saline) and sodium lactate solutions (Hartmann's, Ringer's, Lactated Ringer's, CSL). These solutions are used intravenously (IV) to replace and manage deficiencies in hydration and electrolyte imbalance. Additionally, they may be used as a diluent for compatible IV medicines. Of note, it is possible that these shortages may have flow-on effects to other IV fluids (e.g. Plasmalyte-148).

The purpose of this document is to recommend conservation and risk management strategies for veterinary professionals to best use available fluid stock.

Recommendations

1. Veterinary premises review current stock quantities to enact appropriate stock management during the supply disruption.
2. Liaise with preferred wholesalers/suppliers, and where required, ensure back orders based on average usage are placed to ensure adequate distribution of stock when it becomes available.
3. Consider use of alternate **volume** preparations where available (e.g. 250 mL, 500 mL, 5L bags or commercial pre-drawn saline flush syringes for IV flushes). Other fluids such as 0.45% sodium chloride solutions, plasmalyte-56, dextrose, and dextrose/saline should continue to be used as clinically appropriate rather than as a first-line replacement.
4. Exercise judicious selection of prescribed IV fluid.[1] For example, for peri-operative fluid administration, 0.9% sodium chloride may be suitable for short (< 1 hour) routine surgeries but avoided for longer procedures where there is increased risk of metabolic acidosis associated with the administration of large volumes.
5. Consider alternate IV administration practices to avoid wastage.
    - Sterile preparation of aliquots into appropriately sized, **labelled** syringes.
    - Administer via a syringe pump.

- Intermittent bolus or “IV push” administration as indicated.
- Useful Healthcare resource: ISMP Safe Practice Guideline for Adult IV Push Medications https://online.ecri.org/hubfs/ISMP/Resources/ISMP_IV_Push_Guidelines.pdf
- T-Port Extension tubing connected to the IV catheter can be helpful for this type of administration (*Figure 1*).
- Use of paediatric burette giving sets (*Figure 2*) (see #6 below regarding minimising bag contamination).

Figure 1: T-Port extension

Figure 2: IV burette administration set

6. Minimise risk of contamination with the multiuse of IV fluid bags.
    - Date and label opened fluid bags using a visible label.
    - Avoid hanging bags over or near a sink as this can increase the incidence of contamination.[2]
    - There are no definitive guidelines; however, it is generally recommended to discard opened bags after 48-72 hours.[2]
    - Use gloves and alcohol swabbing to minimise contamination.[3,4]
    - Use needless injection ports connected to fluid bag to avoid multiple spikes (e.g. needless IV bag spike – Figure 3).
    - In times of shortages, the same fluid bag may be used for multiple animals in certain situations (i.e., perioperative use for routine elective procedures) and with careful sterile technique. It is recommended that the giving set be connected to an extension line (Figure 4) which is then connected to a T-Port connected to the animal’s IV catheter. The extension set should be changed between patients, leaving the same giving set in place to avoid the risks associated with multiple bag spiking such as contamination and the introduction of air into the system (risk of air embolism).

Figure 3: Back spike (needless port)

Figure 4: IV Luer lock extension set

7. While hypertonic saline can be added to sterile water for injection to make isotonic crystalloid, the VAA Chapter **does not recommend compounding in-house fluids at this time**. This should be done as a last resort due to significant risks associated with formulation errors, loss of sterility, and introduction of air into the system. If all other options have been exhausted, 120 ml of 7% sodium chloride can be added to 880 ml of sterile water for injection to make 1L of 143 mmol/L sodium chloride.

Table 1: Example of commercial sodium chloride preparations & concentrations

Sodium chloride %	mmol/mL
0.9%	0.154
3%	0.513
7%	1.19

References

1. Davis H, Jensen T, Johnson A, Knowles P, Meyer R, Rucinsky R, Shafford H; American Association of Feline Practicioners; American Animal Hospital Association. 2013 AAHA/AAFP fluid therapy guidelines for dogs and cats. J Am Anim Hosp Assoc. 2013 May-Jun;49(3):149-59. doi: 10.5326/JAAHA-MS-5868. PMID: 23645543. (**Note: 2024 guidelines to be available in July**)
2. Guillaumin J, Olp NM, Magnusson KD, Butler AL, Daniels JB. Influence of hang time and location on bacterial contamination of intravenous bags in a veterinary emergency and critical care setting. J Vet Emerg Crit Care (San Antonio). 2017 Sep;27(5):548-554. doi: 10.1111/vec.12647. Epub 2017 Aug 18. PMID: 28834108.
3. Sabino CV, Weese JS. 2006. Contamination of multiple-dose vials in a veterinary hospital. *Can Vet J* 47:779–782 [PMC free article] [PubMed] [Google Scholar]
4. Salzman MB, Isenberg HD, Rubin LG. Use of disinfectants to reduce microbial contamination of hubs of vascular catheters. *J Clin Microbiol*. 1993;31(3):475-479.