"All Creatures Great and Small and…Septic"

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Nothing to Disclose

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Introduction

Sepsis has long been known to be a leading cause of morbidity and mortality in the human medical field and in veterinary medicine, with up to 50% mortality documented and reports that one in five deaths is related to sepsis worldwide (Rudd et al, 2020).

Sepsis research in human medicine is extensive and ongoing, with changes to the way we define sepsis in patients to the way sepsis is managed in hospitals worldwide being made every few years. The Surviving Sepsis Campaign (SSC) was launched in 2002, and the first Sepsis Care Bundle was released in 2004, giving practitioners a guideline for approaching septic patients in hospital in order to improve survival rates.

Veterinary medicine developments are usually a few steps behind our human counterparts, and sepsis recognition and care is no different. Veterinary medicine bundles are not yet widely used, and although many advanced practitioners have good understanding of sepsis in our patients, many general practitioners struggle with sepsis recognition on a daily basis.

Rationale and Aims

- Bundles in veterinary medicine are a newer concept and are not used throughout veterinary practices worldwide yet as standard
- Correct implementation of sepsis bundles in human hospitals has shown huge improvements in patient survival
- The QMHA is a large multidisciplinary referral hospital for animals comprising of surgical, medical and intensive care units
- Many patients throughout the hospital may suffer with sepsis and be brought to ICU for intensive nursing care
- Data is currently being gathered for a prospective study into sepsis recognition in the surgical ward area of the QMHA (by Louise Olley, surgical RVN)
- We believe that with implementation of a bundle to the ward areas, we may pick up on these patients more quickly and improve morbidity and mortality

Sepsis Hour-1 Bundle (Human use)

The Surviving Sepsis Campaign developed the below bundle to be implemented when sepsis or septic shock is recognised in a patient (2020):

- Measure Blood Lactate level, remeasure if lactate elevated (>2mmol/L)
- Obtain blood cultures before administering antibiotics
- Administer antibiotics
- Administer 30ml/kg crystalloid fluids for hypotension or lactate >4mmol/L
- Use of vasopressors during or after fluid bolus to maintain a MAP >65mmHg

Veterinary Sepsis Recognition

Clinical Signs of Sepsis in Dogs and Cats

- **Respiration**
- Due to increased demand for oxygen in the tissues in sepsis, the respiratory rate and effort will both potentially increase in both dogs and cats
  - Dogs >24bpm
  - Cats >32bpm
- **Heart Rate**
- Dogs will often present tachycardic, with a heart rate of >140bpm
- Cats will present either tachycardic >220bpm, or bradycardic <140bpm

- **Blood Pressure**
- Hypotension
- If unresponsive to crystalloid resuscitation, then this is an indicator for septic shock.
- Vasopressors may be considered here

- **Fluid Resuscitation**
- Rates of up to for cats and for dogs
- Care must be taken in patients susceptible for fluid overload. This is especially important in feline patients who frequently have asymptomatic heart disease until they develop pulmonary oedema

- **Blood Lactate**
- High lactate (>2.5mmol/L) indicative of reduced tissue perfusion.
- Hyperlactataemia often precursor to increase in heart or respiratory rates

- **Lactate of Centesed Samples**
- Lactate can be measured in effusions to determine sepsis.
- If the lactate of effusion is higher than in blood, then sample is septic. This is due to anaerobic respiration of bacteria in the sample.

- **Blood Glucose**
- Hypoglycaemia due to increased use of glucose in cells and tissues.
- Effusions can be sampled, and glucose checked, if glucose levels lower than that of peripheral blood, then the effusion is septic. In non-septic effusions, glucose will be equal to or higher than peripheral.
- Hyperglycaemia is sometimes seen, thought to be due to insulin resistance brought on by the inflammatory cascade, but this is rare.
- Maintaining euglycaemia shown to improve morbidity and mortality of septic patients.

- **Mentation**
- Subjective in veterinary patients.
- Use of Modified Glasgow Coma Scale

- **Coagulation**
- Measurement of PT and APTT
- Coagulopathies develop with sepsis, especially with progression to MODS/DIC

Kirby's Rule of 20

- Used to ensure patients with complex pathology are nursed taking all needs into consideration.
- Can be reviewed multiple times in a day.
- Sepsis is a rapidly changing condition and patients should be nursed in hospitals with 24hour nursing care available.

- **Instrumentation**
  - Nurses should also be able to place and maintain central lines, urinary catheters, peripheral cannulas, nasal oxygen cannulas, feeding tubes and take care of chest drains and wound drains (such as the Jackson Pratt Active drain).
  - **All patients in the ICU with increased risk factors for sepsis are barrier nursed, such as those with heavy instrumentation or those with wounds.**

Record keeping

- Ensure all paperwork is complete and up to date:
  - Record vital parameters every hour (HR,RR,T,BP,SP02,etC02
  - Make thorough detailed notes as per any events or procedures

Communication

- Effective Communication within the veterinary team is paramount for sepsis recognition and survival

`Septic Canine Patient'

Other Considerations

- Antibiosis – Gold standard for blood cultures to be obtained from 1-3 sites prior to administration of broad-spectrum antibiotics such as Amoxicillin Clavulanic Acid at a dose of 20mg/kg intravenously Q8hourly
- Indwelling devices – dependent on individual
- ECGs/multiparameter monitoring to alert to rapid changes in patients when nursing care of multiple patients in the ICU
- Oxygen Therapy via nasal prongs, cannulae or mechanical ventilation (in case of ARDS)
  - (Oxygen kennels are less useful for sepsis as they prohibit rapid nursing care)
- Nutrition – aim for early enteral nutrition via NG tube vs parenteral nutrition, also used for obtaining gastric residuals
- Recumbency – turning Q2-4 to prevent decubitus ulcers and physiotherapy
- Oral care and Eye care to prevent ulceration and improve patient wellbeing

Summary

- **In order to improve our rates of survival in veterinary sepsis and septic shock, we first have to do more research into sepsis in both primary and referral veterinary hospitals**
- **Pilot study in 2017 (Gray) showed that with implementation of a veterinary bundle of care and education for the nursing and intern teams, we can improve our survival to discharge rates and start antibiotics sooner than before a bundle was used, although this was a very small study**
- **Nursing education and implementation of a bundle to wards areas may further improve rates of recognition and treatment in patients not yet in ICU care**

Acknowledgements and References

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