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VCA MidWest Veterinary Referral & Emergency Center

A Case of Neonatal Sepsis

PATIENT HISTORY

SIGNALMENT:

Suzie, a 3 ½ week old Bouvier des Flandres female puppy, 1.26 kg

PRESENTING CONCERN:

Acute onset of vomiting, inappetence, and lethargy

PERTINENT HISTORY:

Suziei's history included:

- Suzie was the smallest of four in the litter, but her 31 kg birth weight was normal for the breed (usually 30 to 35 kg at birth).
- She had gained weight at an appropriate rate of 5 to 10% daily.
- She was dewormed twice with a 5 day series of panacur.
- She was not currently weaned.

PHYSICAL EXAMINATION

On examination, Suzie was lethargic, obtunded, with noted abdominal discomfort on palpation, intermittently vocalizing. Her mucous membranes were light pink and tacky, skin turgor normal.

INITIAL DIAGNOSTIC EVALUATION

THE INITIAL DIAGNOSTIC PLAN INCLUDED:

- Blood glucose monitoring every 2hours
- *Complete blood count (CBC)*
- *Fecal flotation*

Due to the initial obtunded state, and lack of availability of feces (would be performed as possible), only an initial blood glucose was obtained.

RESULTS

The Blood glucose was initially 72 mg/dl.

Treatment Plan

The updated diagnostic plan included:

- *Initial bolus of 10 ml/kg of LRS*
- *IV LRS with 5% dextrose at 100 ml/kg/day, with IV catheterization in the jugular*
- *Unasyn 25 mg/kg IV every 8 hours*
- *Cerenia 1 mg/kg IV every 24 hours*
- *Methadone at 0.1 mg/kg IV every 6 hours*
- *Heat support with a circulating water blanket*

ADDITIONAL DIAGNOSTIC RESULTS:

- *Ongoing blood glucose results showed hypoglycemia, despite dextrose supplementation*
- *Fecal flotation was negative*
- *PCV was 16%, despite dehydration*

Suzie continued to be obtunded, so additional blood tests were not obtained

CHANGES TO TREATMENT PLAN:

- *Dextrose supplementation was increased to 7.5%*
- *Whole blood transfusion, collected from the dam*

Despite aggressive, continuous critical care, Suzie passed away 15 hours after admission to the hospital. Tissue samples were submitted to a neonatal pathologist, who confirmed the samples were consistent with neonatal sepsis.

DIAGNOSIS

Neonatal Sepsis

DISCUSSION

Sepsis is a not uncommon sequelae to wounds or infectious processes in neonates, often secondary to tail docking or umbilical cord infections. Clinical signs in neonates can be very subtle, difficult to assess. The symptoms include crying, changes in nursing or suckling reflex, pale mucous membranes, decreased urine output, cool extremities, lethargy.

Detecting sepsis in neonates is a very difficult endeavor, and often must be a presumptive diagnosis based on clinical observation of the symptoms. Laboratory values of neonates differ from adults and older pediatric patients, which make interpretation difficult. Liver and kidneys do not mature until after 4 weeks for liver, to 8 weeks for kidney. The kidneys have poor ability to compensate for dehydration via urine concentration, and have a resulting propensity to dehydrate very rapidly. Couple this with the neonate's limited ability to adjust heart rate and cardiac output with decreased cardiovascular volume (such as dehydration), results in decompensation and rapid decline in the neonate. The immature liver has limited ability for gluconeogenesis, and cannot compensate for hypoglycemia.

Treatment of suspect sepsis in a neonate should include IV fluids, with initial bolus of 22 to 45 ml/kg (warmed, if possible), followed by maintenance of at least 80 ml/kg/day. LRS should be the fluid of choice, with added dextrose, initially starting at 1.25%, increasing as needed to maintain appropriate blood glucose values. Peripheral veins are not usually utilized in most neonates that are debilitated, so venous access should be attempted using jugular veins initially. For severely dehydrated and debilitated individuals, where venous access is not possible, intraosseous access is recommended. An IO catheter should be switched to venous access within 2 hours, if possible.

Neonates have limited ability to maintain appropriate body temperature, and should be in a warmed environment. Circulating warming blankets, incubators, warm water bottles, all are good means of maintaining body temperature. Hypothermia can result in gastrointestinal stasis, creating greater debilitation.

Monitoring fluid resuscitation in a neonate is best evaluated by the use of serial PCV, urine specific gravity, lactate. Individuals that appear appropriately fluid resuscitated, yet area still exhibiting signs of sepsis, such as cool extremities, dull mentation, vocalizating, other means of supportive care should be considered. Inotropic drugs are one potential consideration. Plasma harvested from the dam, given as a CRI, may also be beneficial. Puppies that area believed to have inadequate passive transfer from colostrum can also receive subcutaneous injections of harvested plasma.

Acceptable antibiotics for treatment of neonatal sepsis are very limited. Penicillins, such as ampicillin or amoxicillin potentiated with clavulonic acid (clavamox, or the IV equivalent of unasyn) are the first line of defense, with a secondary choice of cephalosporins. Fluoroquinolones should never be given to a neonate, and doxycycline is also not to be utilized.

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