TABLE 12D

Calculating Expected Changes in Sodium Concentration

Stevie, a 10 kg, 5-year-old, male neutered Jack Russell terrier, presented for evaluation of vomiting and diarrhea of 72 hours duration. Stevie was mildly lethargic, but all perfusion parameters (heart rate, capillary refill time, blood pressure, pulse quality) were normal, and no other abnormalities were found on physical examination. Stevie's serum sodium concentration was 115 mEq/L.

Stevie is presumed to have chronic hyponatremia because clinical signs have been present for longer than 48 hours. Stevie does not have neurologic signs, so treatment with a hypertonic saline bolus is not indicated. An isotonic crystalloid bolus is also not indicated because Stevie's perfusion parameters are normal.

To correct the hyponatremia, the Adrogue-Madias formula was used with Normosol R as the fluid of choice:

Expected change in serum sodium concentration with 1 L of Normosol R =

$$\frac{140\ \text{mEq/L} - 115\ \text{mEq/L}}{(10\ \text{kg} \times 0.6) + 1} = 3.57\ \text{mEq/L}$$

Therefore, 1 L of Normosol R will change Stevie's sodium concentration by ~3.5 mEq/L.

If Stevie is treated at 25 mL/hr (60 mL/kg/day), ~600 mL of Normosol R will be administered over 24 hours, which will estimate the sodium change at 2.1 mEq/L.

For a faster correction rate, hypertonic saline may be infused into Normosol R to increase fluid sodium concentration using this formula:

Fluid Na = Patient Na + [Target increase in patient's NA over set time x (TBW + Volume of fluids administered over set time)][1]

TBW = body weight in kg × 0.6

1. Heinz J, Cook A. Evaluation and management of the hyponatremia patient. *Today's Veterinary Practice*. 2022;12(2). February 10, 2022 Available at https://todaysveterinarypractice.com/internal-medicine/evaluation-and-management-of-the-hyponatremic-patient/. Accessed January 4, 2024.