MANAGEMENT OF HYPERNATRAEMIA – ONLINE SURVEY QUESTIONS

EDUCATION AND WORK HISTORY

Question 1. Which province do you work in?
- Gauteng
- Western Cape
- Northern Cape
- North West
- Eastern Cape
- Limpopo
- Mpumalanga
- KwaZulu-Natal
- Free State

Question 2. What is your current role?
- Paediatrician
- Paediatric registrar
- Other: _____

Question 2.1. If Paediatrician (consultant), how many years have you been practicing for? _____

Question 3. What sector do you work in?
- Private
- Public
- Both

Question 4. Where did you receive your post-grad training in paediatrics?
- Walter Sisulu University
- University of the Witwatersrand
- University of Pretoria
- University of KwaZulu-Natal
- University of Free State
- University of Cape Town
- Stellenbosch University
- Sefako Makgatho Health Sciences University (formerly Medunsa)
- University of Limpopo
- Nelson Mandela University
- Outside of South Africa

KNOWLEDGE OF PAEDIATRIC HYPERNATRAEMIA

Question 1. When would you consider a child hypernatraemic? *You can only choose ONE answer*

Serum [Na+]:
- ≥140mmol/l
- ≥146mmol/l
- ≥150mmol/l

Question 2. In the year 2019, approximately how many patients have you seen with hypernatraemia hospitalised from home (not hospital acquired)?

Number of cases:
- 1-5
- 5-10
- >10

Question 3. During the treatment of hypernatraemia, what is the single most important clinical or laboratory parameter that you will monitor?

- Serum sodium level
- pH, HCO3 and Base excess
- Urea and creatinine
- Serum osmolality
- Total body weight
- Urine Output

HYPERNATRAEMIA SENARIO

In the following hypothetical clinical scenarios, please assume that you are working in a well-resourced general paediatric clinical setting (i.e. not in an intensive care unit). Also assume that the patients have NO neurosurgical disorders, congenital or acquired cardiac disease, hepatic disease, cancer, or diabetes insipidus. Assume that all children were previously healthy and hospitalised from home (i.e. these are not cases of hospital-acquired hypernatraemia).

Please note that there is no standard accepted therapy for the management of hypernatraemia, and that many different guidelines exist. We also accept that there is no "ideal" intravenous solution to suit the fluid maintenance and replacement needs for all children. Nonetheless, we are interested in what you would do in these circumstances. If you do not agree with any of the choices, please choose "Other" as a response and specify your answer. You can only choose ONE answer.

Scenario 1

A 21-day-old female neonate presents with a 2 day history of worsening fever, fast breathing, and vomiting. The infant was previously well and born vaginally at term to a healthy mother (who had an uncomplicated pregnancy), and was exclusively breast feeding before the current illness. Her current weight is 2.5 kg. On examination, her vital signs are as follows: pulse 160 beats per minute, blood pressure 75/45 mm Hg, respiratory rate 55 breaths per minute, and her temperature is 38.5 ℃. Her oxygen saturation is 95% in room air and her initial reagent strip glucose is 8.5 mmol/L. She is lethargic, and has clinical signs suggesting 10% dehydration. However, there are no other abnormal clinical findings. A preliminary diagnosis of septicaemia is made, and she is started on broad spectrum antibiotics after a septic work-up is performed. Her initial venous gas analysis reveals a Na level of 155 mmol/L. Her formal urea and electrolyte results are expected in the next 4-6 hours. Her free water deficit (to correct to target Na 145 mmol/L over the next 24 hours) is approximately 100 mL. During the next 24 hours, assume that she receives only crystalloid intravenous fluids. She is able to pass urine, and assume that her potassium levels remain normal throughout therapy.

Question 1.1. What intravenous solution would you choose to provide maintenance requirements?
You can only choose ONE answer.

- o Neonatalyte
- o 5% Dextrose
- o 10% Dextrose
- o Pure water
- o Half-strength Darrow's dextrose solution
- o Half-normal (0.45%) saline with 5% dextrose
- o Normal (0.9%) saline with 5% dextrose
- o Ringer's lactate
- o Balsol® (or Plasmalyte B) with 5% dextrose
- o A modified solution containing sodium bicarbonate
- o A modified solution containing hypertonic sodium chloride
- o Other (please specify): _____

Question 1.2. *How much* <u>maintenance</u> fluid would you prescribe? Assume that there are no on-going losses. *You can only choose ONE answer.*

- o <100 mL/kg/24 hours
- o 100 mL/kg/24 hours
- o 120 - 150 mL/kg/24 hours
- o >150 mL/kg/24 hours
- o Other (please specify): _____

Question 1.3. *How much* fluid would you prescribe to replace her existing fluid <u>deficit</u>? Assume that there are no on-going losses. *You can only choose ONE answer.*

- o 0 mL (i.e. deficit replacement not required)
- o 100 mL (the free water deficit)
- o 125 mL (replacement at 50 mL/kg)
- o 188 mL (replacement at 75 mL/kg)
- o 250 mL (replacement at 100 mL/kg)
- o 313 mL (replacement at 125 mL/kg)
- o Other (please specify): _____

Scenario 2

A 6-week-old male infant presents with a 4 day history of worsening vomiting, lethargy, respiratory distress and poor feeding. He was previously well and born vaginally at term to a healthy mother (who had an uncomplicated pregnancy). He is exclusively breast fed. His current weight is 3.5 kg. On examination, his vital signs are: pulse 180 beats per minute, blood pressure 50/30 mm Hg, respiratory rate 65 breaths per minute, and his temperature is 38.5 ℃. His oxygen saturation is 85% in room air and his initial reagent strip glucose is 4.5 mmol/L. He is lethargic, and has clinical signs suggesting 10% dehydration. Apart from hyperinflation, there are no other abnormal clinical findings. A diagnosis of septicaemia is made. He is started on broad spectrum antibiotics after a septic work-up is performed. After oxygen therapy, his oxygen saturation improves to 95%. His initial venous gas analysis reveals a Na^+ level of 180 mmol/L, pH 7.0, [HCO_3^-] 5 mmol/L and a standard base excess of −20 mmol/L. His urea and electrolyte results are expected in the next 4-6 hours. His free water deficit (to correct to target Na^+ 170 mmol/L over the next 24 hours) is approximately 125 mL. During the next 24 hours, assume that he receives only intravenous fluids. He is able to pass urine, and assume that his potassium levels remain normal throughout therapy.

Question 2.1. What intravenous bolus solution would you use to correct shock? *You can only choose ONE answer.*

- Normal (0.9%) saline
- 0.9% NaCl with added hypertonic NaCl (final solution contains 165 - 170 mmol/L sodium)
- 0.9% NaCl with added sodium bicarbonate (final solution contains 165 - 170 mmol/L sodium)
- Ringer's lactate
- Balsol® (or Plasmalyte B)
- Other (please specify): _____

Question 2.2. What intravenous solution would you choose to provide maintenance requirements? *You can only choose ONE answer.*

- 5% Dextrose
- 10% Dextrose
- Pure water
- Half-strength Darrow's dextrose solution
- Half-normal (0.45%) saline with 5% dextrose
- Normal (0.9%) saline with 5% dextrose
- Ringer's lactate
- Balsol® (or Plasmalyte B) with 5% dextrose
- A modified solution containing sodium bicarbonate
- A modified solution containing hypertonic sodium chloride
- Other (please specify): _____

Question 2.3. *How much* <u>maintenance</u> fluid would you prescribe? Assume that there are no on-going losses. *You can only choose ONE answer.*

- <100 mL/kg/24 hours
- 100 mL/kg/24 hours
- 120 - 150 mL/kg/24 hours
- >150 mL/kg/24 hours
- Other (please specify): _____

Question 2.4. *How much* fluid would you prescribe to replace his existing fluid <u>deficit</u>? Assume that there are no on-going losses. *You can only choose ONE answer.*

- 0 mL (i.e. deficit replacement not required)
- 125 mL (the free water deficit)
- 175 mL (replacement at 50 mL/kg)
- 263 mL (replacement at 75 mL/kg)
- 350 mL (replacement at 100 mL/kg)
- 438 mL (replacement at 125 mL/kg)
- Other (please specify): _____

Scenario 3

A 6-month-old male infant presents with a 5 day history of worsening watery (but non-bloody) diarrhoea. He passed ten watery stools in the previous 24 hours. He was previously well. His current weight is 8.0 kg. On examination, his vital signs are: pulse 125 beats per minute, blood pressure 75/45 mm Hg, respiratory rate 30 breaths per minute, and his temperature is 37.2 ℃. His oxygen saturation is 95% in room air and his initial reagent strip glucose is 4.5 mmol/L. He has clinical signs suggesting 5% dehydration but is alert, able to feed and otherwise well-appearing. He has no other abnormal clinical findings. A preliminary diagnosis of acute gastroenteritis is made. Although he is able to tolerate oral fluids, he is hospitalised because his exhausted mother is unable to maintain his hydration with oral rehydration solution any longer.

His initial venous gas analysis reveals a Na level of 165 mmol/L. His formal urea and electrolyte results are expected in the next 4-6 hours. His free water deficit (to correct to target Na^+ 155 mmol/L over the next 24 hours) is approximately 310 mL. He is able to pass urine, and assume that his potassium levels remain normal throughout therapy.

Question 3.1. *How* would you replace his existing fluid <u>deficit</u>? *You can only choose ONE answer.*

- o Oral (or nasogastric) fluids only
- o Combination of oral and intravenous fluids
- o Intravenous fluids only

Question 3.2. If you choose NOT to administer oral feeds, what intravenous solution would you choose to provide maintenance requirements? *You can only choose ONE answer.*

- o 5% Dextrose
- o 10% Dextrose
- o Pure water
- o Half-strength Darrow's dextrose solution
- o Half-normal (0.45%) saline with 5% dextrose
- o Normal (0.9%) saline with 5% dextrose
- o Ringer's lactate
- o Balsol® (or Plasmalyte B) with 5% dextrose
- o A modified solution containing sodium bicarbonate
- o A modified solution containing hypertonic sodium chloride
- o Other (please specify): _____

Question 3.3. *How much* <u>maintenance</u> fluid would you prescribe? Assume that there are no on-going losses. *You can only choose ONE answer.*

- o <100 mL/kg/24 hours
- o 100 mL/kg/24 hours
- o 120 - 150 mL/kg/24 hours
- o >150 mL/kg/24 hours
- o Other (please specify): _____

Question 3.4. *How much* fluid would you prescribe to replace his existing fluid <u>deficit</u>? Assume that there are no on-going losses. *You can only choose ONE answer.*

- o 0 mL (i.e. deficit replacement not required)
- o 310 mL (the free water deficit)
- o 400 mL (replacement at 50 mL/kg)
- o 600 mL (replacement at 75 mL/kg)
- o 800 mL (replacement at 100 mL/kg)
- o 1000 mL (replacement at 125 mL/kg)
- o Other (please specify): _____

INDIVIDUAL INTERVIEW

Question 1. Would you be available and interested in taking part in an individual interview where we will discuss, in detail, the challenges and recommendations in treating paediatric hypernatraemia in South Africa?

- Yes
- No

Question 1.1. If YES, please provide your contact details so that we may contact you to schedule a time for the interview.

- Email: _____
- Cell phone number: _____