Inpatient Management of Patients On Ketogenic Diet

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Key Amendments to Document

Date	Amendment	Approved by
10/10/2018	New document	Paediatric Quality Improvement Meeting
19th Nov 2020	Document extended for one year	Dr J West/Paediatric QIM
26th March 2021	Approved with no amendments	Paediatric QIM
9th February 2024	Reapproved with no amendments	Paediatric QIM

The ketogenic diet (KD) is a high-fat, low-carbohydrate and normal protein diet used for the treatment of complex epilepsy. It is extremely important that KD is not suddenly stopped/ withdrawn as this may result in metabolic instability causing worsening of seizures.

The KD is also used as first line treatment for the inherited metabolic disorders *Glut 1 Deficiency* and *Pyruvate Dehydrogenase (PDH complex Deficiency)*.

On Admission/ Pre-admission

All children on the ketogenic diet who are to be admitted as an inpatient should be referred to the ketogenic dietitians. Where possible the ketogenic dietitians should be informed prior to admission.

Drug Charts

All medications should be low carbohydrate where possible (tablets are usually lower in carbohydrate than liquids). The ward pharmacist should be informed on admission and 'ketogenic diet' should be clearly marked on the front of the patient's drug chart. Some 'sugar-free' preparations are unsuitable as some sweeteners can still affect ketones (e.g. sugar free Calpol should be avoided where possible).

Nutrition

The ketogenic dietitian will provide the ward with a copy of the ketogenic menu. The ward will order meals daily via diet kitchen before 9.30am. For tube-fed children, the dietitian will arrange for the Special Feed Unit to send feeds on a daily basis.

Monitoring

The optimal range of blood ketones for seizure control is between 2 and 5 mmol/L. Ketones above 5 (hyperketosis) should be avoided. Blood glucose should be maintained above 2.5mmol/L.

Finger prick blood ketones/ blood glucose levels should be done twice daily and levels documented. Ketone testing trained wards are: 2, 7, 9, 10 and PICU. Surgical Day Care (SDC) is not ketone testing trained but there is a local agreement with ward 9 that they will provide support to SDC when staffing allows. For elective admissions the ward manager should be informed to ensure they are aware of admission in advance and trained staff are available on shift.

The risk of hyperketosis/hypoglycemia is increased during illness or when fasted. If a child is NBM or diet/ feeds are not tolerated then monitoring should be increased to four hourly

Treatment of Hypoglycaemia or Hyperketosis

If ketones greater than 5mmol/l OR blood glucose less than 2.5mmol/l to treat with 10g carbohydrate (given as 30ml Polycal Liquid diluted with 30ml water). For infants (<one year age) to treat with 5g carbohydrate (15ml Polycal diluted with 15ml water). Levels should eb rechecked 20 minutes after treatment and repeated as necessary until levels have been corrected.

If child is nil by mouth or refuses to drink and requires treatment then the medical team should be contacted and IV dextrose or glucogel be given to provide 10g carbohydrate (10g in infants).

(Glucogel or Dextrogel should not be administered to an unconscious or fitting child)

Once treated please continue to follow the usual ketogenic meals/ feed and test again after 4 hours. Nil by mouth/Fasting

If solid foods are not tolerated, sugar free clear fluids should be encouraged (e.g. sugar- free squash or water). Dioralyte contains 2% glucose so water is generally preferred for short-term use (<24hrs) with daily U&Es.

Bolus tube feeds should be slowed down to a continuous rate to help improve tolerance.

If child is unable to tolerate clear fluids or is to be NBM (for more than 24 hours) then IV saline should be commenced and finger prick blood ketone/sugar testing should be increased to four hourly.IV dextrose should be avoided unless necessary to correct hypoglycaemia/ hyperketosis.

If fasting is required for a procedure, the child should be put first on the theatre list to avoid unnecessary fasting. Metabolic acidosis has been reported in children on Ketogenic diet who have had anaesthesia time more than three hours.

REFERENCES

1. Matthews Friends Medical Board (2018). Hospital Guidance for those on Ketogenic Therapy. www.matthewsfriends.org

2. Valencia I. et al (2002). General anesthesia and the ketogenic diet: clinical experience in nine patients. Epilepsia. 43(5): 525-529.

3. van der Louw E. et al (2016) Ketogenic diet guidelines for infants with refractory epilepsy. Eur J. Paediatr Neurol 20:798-809