

Implementing a ketogenic diet in a patient with super-refractory status epilepticus: the pharmacists role

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BACKGROUND

- Super-refractory status epilepticus (SRSE) is defined as status epilepticus (SE) that continues for at least 24 hours after initiation of general anesthetic medications.¹
- The ketogenic diet (KD) is a low carbohydrate diet designed to mimic a fasting state, an effective dietary therapy for some children with epilepsy.¹
- Initiation of KD requires multidisciplinary input.
- Pharmacist involvement is essential for:
 - Identifying and calculating carbohydrate content in medication excipients
 - Recommending alternative formulations and therapies to minimise carbohydrate content in medications e.g. avoiding liquids, suspensions, effervescent tablets where possible

LITERATURE

- Several case reports and case series demonstrate the successful use of a KD in adults with SRSE.^{1,2}
- The largest and most recent case series described 15 adult patients treated with a KD therapy after a median of 10 days in SRSE, of which 79% achieved resolution of SE in a median of 5 days.²

CASE FEATURES

- 17-year old male with no background medical history.
- Acute onset severe diffuse cerebral dysfunction manifesting SRSE, aetiology unknown.
- Maximal antiepileptic and general anesthetic therapy in ICU – no improvement after 2 weeks.
- Trial of KD requested by neurology team.

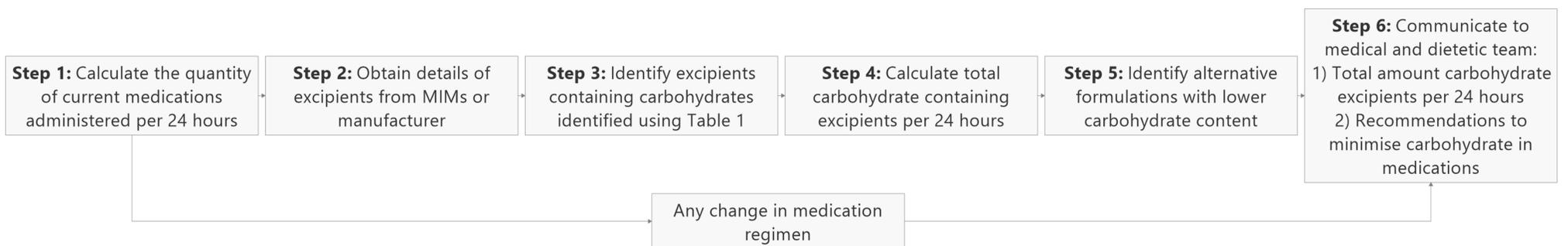


Figure 1: Process for identifying and calculating total carbohydrate excipients in medication regimen

Table 1: Table adapted from McArtney et al.³

Ingredients to be avoided	Ingredients that are not usually avoided
<ul style="list-style-type: none"> - Sugars: dextrose, fructose, glucose, lactose, sucrose, sugar, maltodextrin - Starches: cornstarch, pregelatinized starch, sodium starch glycolate - Maltitol, Xylitol - Isomalt - Sorbitol - Alcohol - Propylene glycol 	<ul style="list-style-type: none"> - Asulfamine potassium - Aspartame - Cellulose - (carboxy, hydroxy) methylcellulose - Erythritol - Magnesium stearate - Mannitol - Stevia (rebiana) - Saccharine

Table 2: Breakdown of medications used containing carbohydrate excipients.

Medication	Dose	Carbohydrate excipients/ 24 hrs
Clonazepam IV	4mg tds	2.24g
Phenytoin IV	600mg d	5.6g
Propofol (1g/100mL) IV	20mL/hr	10.8g
Paracetamol IV	1g qid	14.8g
Thiamine IV	100mg d	0.02g
Chlorvescent NG	2 tds	3.33g
Total:		36.8g

PHARMACIST INTERVENTION:

- 1) Medication carbohydrate calculation communicated to dietetics to facilitate enteral feed adjustment.
- 2) Minimising carbohydrates: Change Chlorvescent to IV potassium chloride replacement and consider cessation of paracetamol.

CASE OUTCOME AND CONCLUSION

- KD introduced for approximately 7 days, then ceased.
- Recovery from SRSE achieved after 2 months.
- The pharmacist role is integral for the identification, management and communication of carbohydrates contained in medications for the initiation of KD.

References:

- 1) Thakur KT, Probasco JC, Hocker SE, et al. Ketogenic diet for adults in super-refractory status epilepticus. *Neurology*. 2014;82(8):665–670. doi:10.1212/WNL.0000000000000151
- 2) Cervenka MC, Hocker S, Koenig M, et al. Phase I/II multicenter ketogenic diet study for adult superrefractory status epilepticus. *Neurology*. 2017;88(10):938–943. doi:10.1212/WNL.0000000000003690
- 3) McArtney R, Bailey A, Champion H. What is a ketogenic diet and how does it affect the use of medicines. *Archives of Disease in Childhood - Education and Practice* 2017;102:194-199.