



# Diet induced ketosis in brain injured adult patients in the subacute phase is feasible

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## Background:

Research in animals on cerebral metabolism after brain injury highlights the potential benefits of ketosis in brain injury. The ketogenic diet (KD) has been shown to reduce the secondary brain injury in animal models, but human studies are lacking.

## Aim:

This study sought to examine if a KD with added medium chain triglycerides (MCT) was feasible in adult brain injured patients for six weeks in the subacute phase, and if maintainable ketosis could be achieved without serious adverse events.

## Methods:

The intervention was a KD supplemented with MCT (MCT-KD) to obtain a plasma concentration of  $\beta$ -hydroxybutyrate (BHB)  $\geq 0,5$  mmol/L. Enterally fed patients were given KetoCal<sup>®</sup> 2.5:1 LQ MCT Multi Fiber (Nutricia), supplemented with Liquigen<sup>®</sup> (Nutricia). Patients consuming oral nutrition were given KetoCal<sup>®</sup> 2.5:1 LQ MCT Multi Fiber supplemented with Liquigen<sup>®</sup>, in addition to ketogenic meals.

## Results:

During a 13-week inclusion period, 92% of eligible patients (43% of all patients) admitted to the department were included. Deputy consent was given in 100% of all patients unable to give consent. Two-thirds of the patients completed the six weeks intervention. It took a median of one day to achieve ketosis from starting 100% MCT-KD, and it was maintained for 97% of the intervention period after ketosis first was obtained. There were no serious adverse events. The treatment was accepted by patients for all of the intervention days.

Table 1. Number and percent of days with adverse events out of total 428 intervention days

	Number of days with one or more adverse events
Nausea	13 (3%)
Vomit	9 (2%)
Diarrhea	37 (8.6%)
Constipation	3 (0.7%)
Stomachache	2 (0.5%)
Headache	2 (0.5%)
Hypoglycemia	0 (0%)

## Conclusion:

We found that an intervention with MCT-KD is feasible, safe, and tolerated for six weeks in hospitalized adult patients with severe brain injury in the subacute phase. Randomized controlled trials are needed to document the effect of MCT-KD on patients' recovery.

Figure 1. Weekly mean blood  $\beta$ -hydroxybutyrate levels

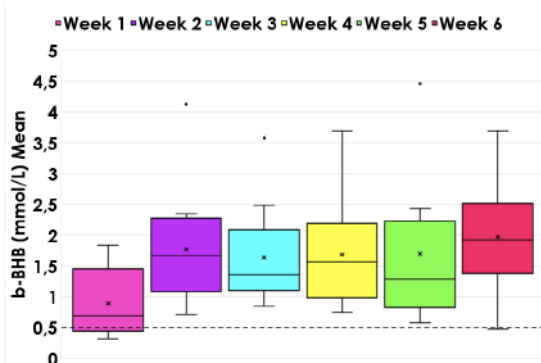


Figure 2. Weekly mean blood glucose levels

