

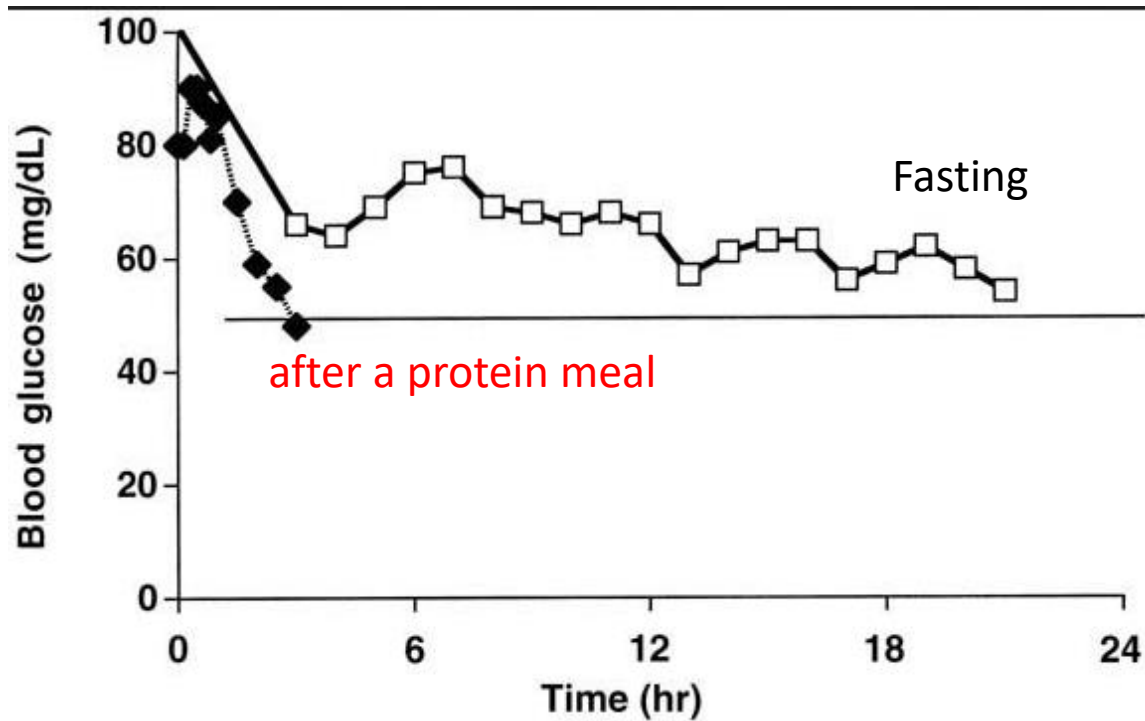
Should diet play a role in managing CHI by HI type?

Thomas Meissner
and Düsseldorf Team

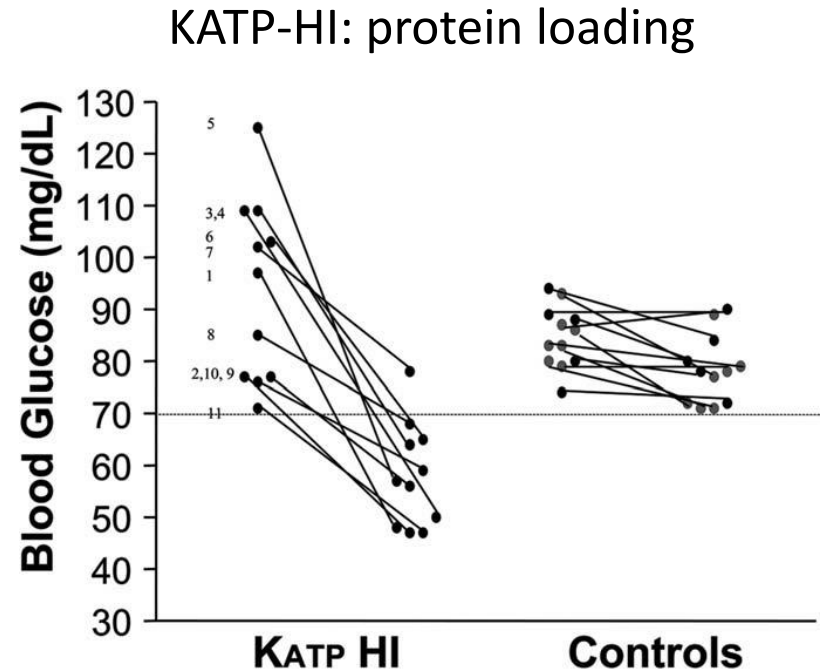
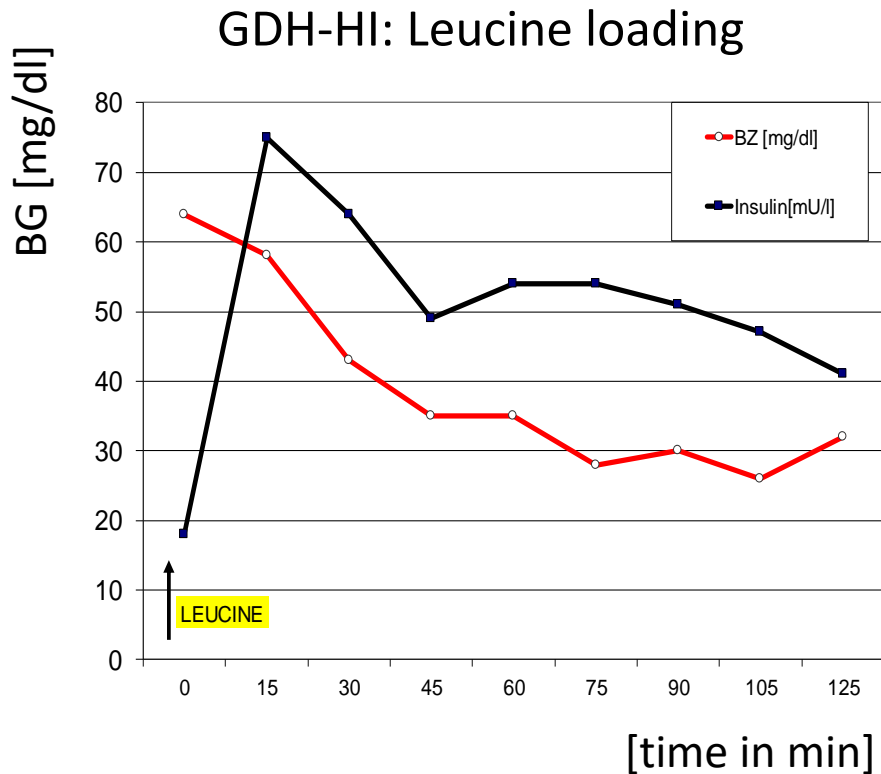


Protein-sensitive and fasting hypoglycemia in children with the HI/HA syndrome (GDH-HI)

Blood glucose responses to fasting and protein feeding in a 15y old patient.



Role of protein or leucine induced hypoglycemia



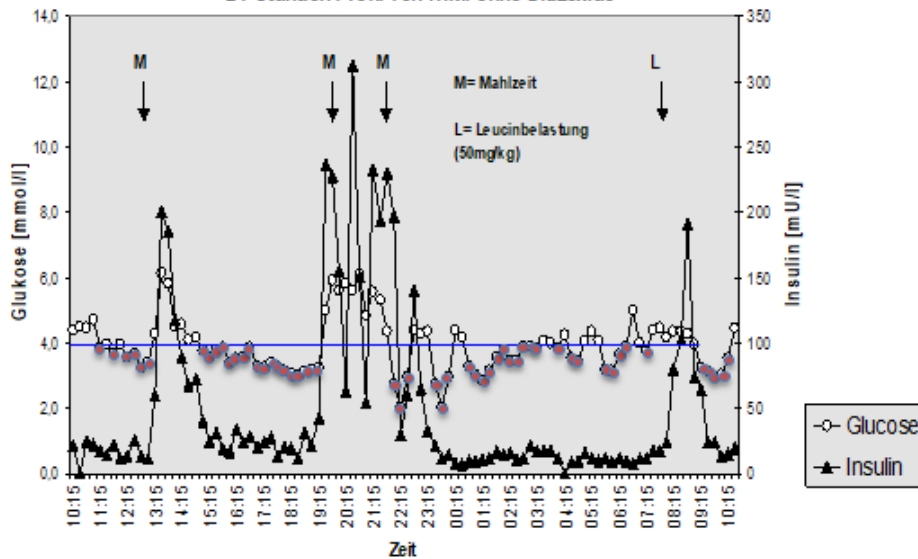
- oral protein load in (n = 11)
- similar to GDH-HI

personal, unpublished data

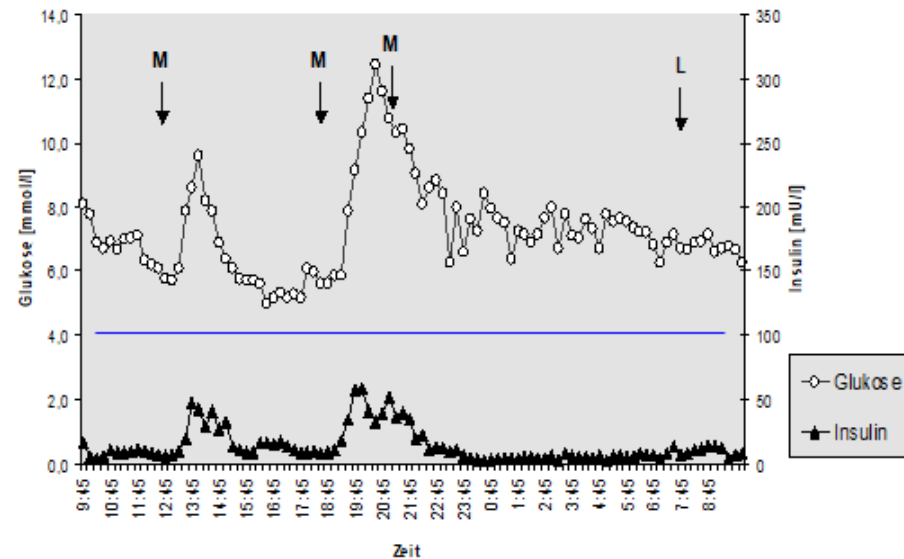
Fourtner et al J.Pediatr. (2006); 149(1):47-52

GDH-HI: meals and leucine loading - real life 24hour profile *

without diazoxide



with diazoxide



*personal data

*If diazoxide is effective,
you do not need to worry
about protein/leucine*

Hyperinsulinism and Hyperammonemia Syndrome (GDH-HI): Report of Twelve Unrelated Patients

- 9/12 patients were fully sensitive to diazoxide
- 1/12 patients was diazoxide-resistant
- 2/12 required cornstarch in addition to diazoxide

A leucine-restricted diet (200 mg/meal) without medication

- adequately controlled hypoglycemia in five cases
 - plasma glucose stable while fed at normal intervals and
- was ineffective in four cases.

*If diazoxide is effective,
you do not need to worry
about protein/leucine*

Severe dietary protein sensitivity in HADH-HI

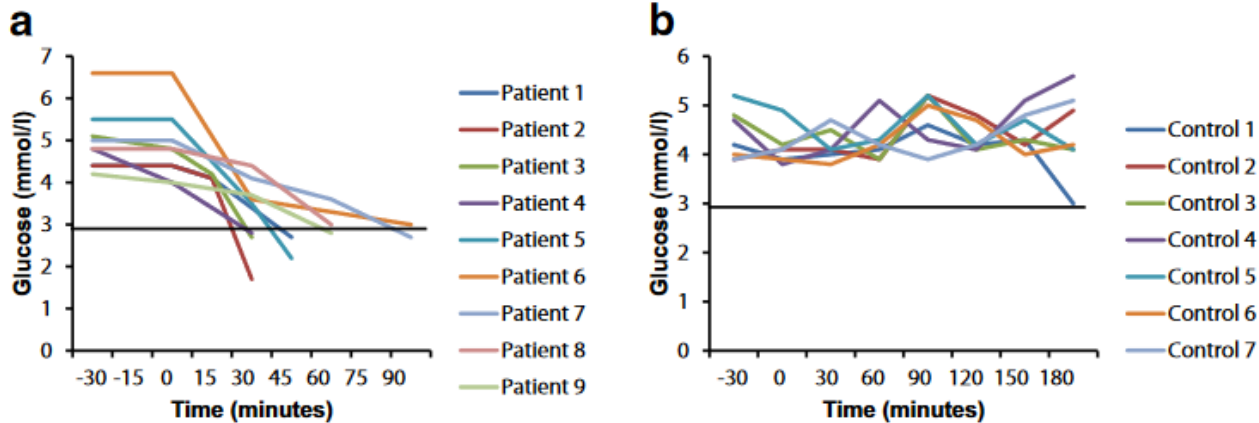


Figure 1 Blood glucose concentrations in response to the oral leucine load in the nine patients with a mutation in *HADH*. All the patients demonstrated marked hypoglycaemia (blood glucose concentration of ≤ 3.0 mmol/l) in response to the leucine load (1a). In contrast, none of the control subjects developed hypoglycaemia in response to an oral protein load (1b).

HADH-HI conclusions:

- protein-sensitive, diazoxide-responsive
- manage with diazoxide prior to diet
- avoid protein excess

*If diazoxide is effective,
you do not need to worry
about protein/leucine*

Should diet play a role in managing CHI by HI type?

...If so, how?

Ketogenic diet (KD) in GCK-HI

- Effective in GLUT1 deficiency and epilepsy
- Ketones are alternative cerebral energy
- Italian group administered a ketogenic diet (KD) in three drug-unresponsive GCK-HI
- All patients and their families reported an improvement of physical and psychosocial well-being

CGMS- Time in hypoglycemia [%]	Patient 1	Patient 2	Patient 3
Without KD	32	68	50
With KD	37	100	100

- *We have to be careful!*
- *KD might be considered as an alternative treatment in the severe forms of GCK-HI, especially in therapy refractory epilepsy*

Therapy goals – Change of management

Düsseldorf Team recommendation

Overall aims:

- No risk of brain damage
- As far as possible: **normal diet and sufficient fasting tolerance**
- To be **fed at regular, age-appropriate intervals**
- Individual approach not fixed on numbers
- Healthy diet

Indications for nutritional therapy

Düsseldorf

Team recommendation

Always individual approach:

- **Hypoglycemia < 70%; > 54mg/dl and reduced fasting tolerance:**

Discuss options with parents

- Optimise/intensify drug therapy?
- Use of nutritional therapy with low intensity of measures
- Tolerate these episodes of mild hypoglycemia

- **Hypoglycemia occasional < 54mg/d**

- **Episode of blood glucose < 45mg/dl**

- **Severe symptomatic hypoglycemia**

- Change of management necessary!
- „Buffer zone“ not broad enough to be safe with respect to brain damage

Basic principles
of nutrition
therapy

“...limiting dips
and spikes?”

Absorption of food and rise of glucose concentration

Rapid rise in blood sugar:

- the more liquid
- the lower in fat
- the lower in fiber
- the higher in monosaccharides (glucose, fructose, galactose)

Slow blood sugar rise:

- the more solid
- the higher in fat
- the higher in protein (**cave! protein sensitivity**)
- the lower in monosaccharides
- the higher in fiber

Take home:

- *A slow or constant glucose absorption is beneficial*
- *Fiber is often found in healthy food*

Use of different carbohydrates

Glucose

- for continuous supply e.g. nasogastric tube

Maltodextrin

- can be used in the first six months of life
(added to milk/meals)

Oatmeal

- to thicken your baby's formula at 4 month (starch partially degraded)

Uncooked cornstarch

- is not used for the first 6 (-12) months
- 1.6 g/kg every three to four hours for young children
1.7 to 2.5 g/kg every four to six hours for older children,
- a single dose of uncooked cornstarch is often given for the night

Thanks to



Germany

The ProBrain-Team
