SPLANCHNIC GLUTAMINE METABOLISM IN PRETERM INFANTS

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1. To determine the rate of splanchnic utilization of glutamine, proposed to be conditionally essential for premature infants.2. To quantify the rate of splanchnic oxidation of dietary glutamine, which is supposed to be one of the major fuel...

Ethical review	Approved WMO
Status	Pending
Health condition type	Gastrointestinal conditions NEC
Study type	Observational invasive

Summary

ID

NL-OMON30405

Source
ToetsingOnline

Brief title
SPLANCHNIC GLUTAMINE METABOLISM IN PRETERM INFANTS

Condition

- Gastrointestinal conditions NEC
- Neonatal and perinatal conditions

Synonym
metabolism

Research involving
Human

Sponsors and support

Primary sponsor: Vrije Universiteit Medisch Centrum
Source(s) of monetary or material Support: Sophia Foundation Rotterdam

Intervention

Keyword: gastrointestinal tract, glutamine, preterm infants, stable isotopes

Outcome measures

Primary outcome

The splanchnic uptake of dietary glutamine to determine the relationship

between the level of protein intake and splanchnic amino acid metabolism.

Secondary outcome

The amount of glutamine that is substrate for energy in the gut of preterm

neonates.

Study description

Background summary

Recent animal and human research, including studies in neonatal preterm infants, have demonstrated that intestinal amino acid utilization not only has a major impact on dietary amino acid availability, but that amino acids play a critical and specific role in intestinal metabolism. In a general sense, the rate of amino acid utilization by the intestine will determine their systemic availability and, as such, the magnitude of intestinal metabolism could be an important regulator of whole-body protein accretion. Studies in milk formula-fed neonatal piglets have shown that as much as half of the dietary protein intake is utilized by the portal drained viscera (stomach, pancreas, spleen, duodenum and colon; PDV), and that the energy needed to sustain the high rate of protein turnover in the gut is largely derived from the oxidation of amino acids. Glutamine is described as a conditionally essential amino acid for critically ill patients, and glutamine is important in several key metabolic processes of immune cells and enterocytes. There is also considerable evidence that glutamine can enhance the barrier function of the gut, which is of particular importance in preterm neonates which can be seen immunological vulnerable patients.
The present study is designed to quantify, in preterm infants, the splanchnic uptake and catabolism of dietary glutamine, to determine whether glutamine is one the major substrates for energy in the gut of the preterm infants.

Study objective

1. To determine the rate of splanchnic utilization of glutamine, proposed to be conditionally essential for premature infants.
2. To quantify the rate of splanchnic oxidation of dietary glutamine, which is supposed to be one of the major fuel subtrates for the intestinal tissues.

Study design

At 07.30 h on each study day two baseline breath samples and a baseline blood sample will be obtained for measurement of background isotopic enrichment. The breath samples are collected according the method described by Van der Schoor. A nasal prong (6Fr) (Argyle, Sherwood Medical, Petit Rechain, Belgium) will briefly be placed in the nose and 10 ml end-tidal breath is sampled slowly with a syringe. The breath samples will be stored in vacutainers. Blood samples (0.5 ml) will be withdrawn from the arterial catheter, if present, or by heelstick. The baseline bloodsample in the morning will be combined with routine blood sampling. At 08.00 h a priming dose of the [1-13C]bicarbonate infusion (10 µmol/kg) will be given first followed by a 2 hours [1-13C]bicarbonate infusion (10 µmol/kg) to measure the CO2 production rate. Following this [1-13C]bicarbonate infusion, a labeled glutamine infusion will be started intravenously simultaneously with a different labeled form of the same amino acid tracer intragastrically. At the start of the glutamine tracer infusion (t = 120 min) priming doses of the tracers are given by their respective routes. Both the enteral and the intravenous tracer infusions will be continued at a constant rate for 5 h. After 390 min one bloodsample (0.5 ml) will be taken in combination with routine blood sampling. At the end of each study day at 420 min one blood sample (0.5 ml) will be taken for determination of plasma enrichments. The total volume of blood sampled will therefore be 3.0 ml, which is <2.5% of blood volume in a 1,500 g baby.

Tracer protocol

Infusionscheme study: Glutamine metabolism (n=10 infants)

Study day 1:
0-2 h [1-13C]Na-bicarbonate intravenous 10 µmol/kg/h
2-7 h [U-13C]glutamine 30 µmol/kg/h intragastric
2-7 h [15N]glutamine 30 µmol/kg/h intravenous

Study day 2:
0-2 h [1-13C]Na-bicarbonate intravenous 10 µmol/kg/h
2-7 h [15N]glutamine 30 µmol/kg/h intragastric
2-7 h [U-13C]glutamine 30 µmol/kg/h intravenous

Study burden and risks

not applicable.

Contacts

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Trial sites

Listed location countries

Netherlands

Eligibility criteria

Age
Children (2-11 years)

Inclusion criteria

1. written and informed consent from both parents or a legal guardians.
2. birth weight 750 - 1,500 g.
3. appropiate for gestational age.
4. at least 8 hours formula fed.

Exclusion criteria

1. congenital metabolic disease.
2. congenital intestinal disease and/or malformation.
3. ventilatory support like Infant Flow or CPAP.

Study design

Design

Study type: Observational invasive

Masking:	Open (masking not used)
Control:	Uncontrolled
Primary purpose:	Other

Recruitment

NL

Recruitment status:	Pending
Start date (anticipated):	01-10-2006
Enrollment:	10
Type:	Anticipated

Ethics review

Approved WMO

Application type:	First submission
Review commission:	METC Amsterdam UMC

Study registrations

Followed up by the following (possibly more current) registration

No registrations found.

Other (possibly less up-to-date) registrations in this register

No registrations found.

In other registers

Register	ID
CCMO	NL14172.029.06