



Patient nutrition, evolved.

Working with Numeta® on the Neonatal Intensive Care Unit

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Baxter

Why Is the 3-Chamber Bag Better Than the Preparation of the Solution on the ICU or in the Hospital Pharmacy?

- Less nosocomial infections
- Less contaminations
- Less calculation failures
- Easy handling

29+6 GA BW 1540g g



Numeta G13E Is Aligned with ESPGHAN/ESPEN Guidelines for PN in Preterm Infants

Nutrient	ESPGHAN / ESPEN Minimum ¹⁻⁵	Numeta G13E Content (3CB for First Day of Life) ⁶	Numeta G13E Content (3CB for Stable Growth Period) ⁶	ESPGHAN / ESPEN Maximum ¹⁻⁵
Total energy (kcal/kg/d)	45	46	100	120
Amino acids (g/kg/d)	1.5	1.6	3.4	3.5
Glucose (g/kg/d)	5.8	6.7	14.7	17.3
Lipids (g/kg/d)	0.25*	1.3	2.8	4
Sodium (mmol/kg/d)	0	1.1	2.4	5 (7)**
Potassium (mmol/kg/d)	0	1	2.3	3 (5)**
Magnesium (mmol/kg/d)	0.1	0.1	0.2	0.3
Calcium (mmol/kg/d)	0.8	0.6	1.4	3.5
Phosphate (mmol/kg/d)	1	0.6	1.4	3.5
Volume (mL/kg/d)	60	50	110	180

ESPEN=European Society for Clinical Nutrition and Metabolism; ESPGHAN=European Society for Paediatric Gastroenterology, Hepatology and Nutrition; PN=parenteral nutrition

*LA=linoleic acid 0.25g linoleic acid are provided by 56 ml **Numeta**; **Preterm neonates <1500 gr. First month of life, stable growth

1. Joosten K, et al. *Clin Nutr.* 2018; June 15 [Epub ahead of print]; 2. Lapillone A, et al. *Clin Nutr.* 2018; June 26 [Epub ahead of print]; 3. Messoten D, et al. *Clin Nutr.* 2018; June 15 [Epub ahead of print]; 4. van Goudoever JB, et al. *Clin Nutr.* 2018; June 15 [Epub ahead of print]; 5. Jochum F, et al. *Clin Nutr.* 2018; June 15 [Epub ahead of print]; 6. Baxter Healthcare. **Numeta G13E** Summary of Product Characteristics, 2019.

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Is that what we want???

KINDERKLINIK ST. ELISABETH NEUBURG/DONAU

VERORDNUNG für _____

Datum: _____

Gewicht: _____

+/- _____

EINFUHR _____ ml = _____ ml/kg/d = _____ kcal/kg/d

Nahrung _____ ml x _____ ml = _____ ml/kg/d = _____ kcal/kg/d

_____ x _____ g FMS = _____ g/kg/d = _____ kcal/kg/d

_____ x _____ g = _____ kcal/kg/d

Infusion _____ ml = _____ ml/kg/d = _____ kcal/kg/d

GRUNDINFUSION ml/h =

_____ ml _____ % = _____ g KH/kg/d

_____ ml Glucose _____ % = _____ g KH/kg/d

_____ ml (Bypässe) Glucose _____ % = _____ g KH/kg/d

= _____ g KH/kg/d gesamt = _____ kcal/kg/d

_____ ml Aminopäp 10% = _____ g AS/kg/d = _____ kcal/kg/d

_____ ml Lipovenös 20% = _____ g F/kg/d = _____ kcal/kg/d

_____ ml NaCl 11,7% = _____ mmol/kg/d Na⁺

_____ ml Na-Glycero-Phosphat = _____ mmol/kg/d Na⁺

= _____ mmol/kg/d PO₄³⁻

_____ ml (Bypässe) NaCl 0,9% = _____ mmol/kg/d Na⁺

= _____ mmol/kg/d gesamt Na⁺

_____ ml KCl 7,45% = _____ mmol/kg/d K⁺

_____ ml Ca-Glukonat 10% = _____ mmol/kg/d Ca⁺⁺

_____ ml Mg Diasporal = _____ mmol/kg/d Mg⁺⁺

= _____ ml/kg/d

_____ ml Soluvit = _____ ml/kg/d

_____ ml Peditrace = _____ ml/kg/d

_____ ml Zink = _____ µg/kg/d

_____ ml _____ = _____ /kg/d

	KH	Fett	Eiweiß
	g/kg/d	g/kg/d	g/kg/d
Nahrung			
FMS			
lv			
gesamt			

gesamt _____ ml Medikamente:

intravenös	
per os	
Labor:	
Sonstiges:	

EKG/Atmung	pCO ₂ /pO ₂ -Sonde	RR manuell	alle _____ Std.
O ₂ -Sättigung	RR arteriell Protokoll	Ausfuhr/Bilanz	alle _____ Std.
Grenzen:	Grenzen:		

Uhrzeit: _____ Arzt: _____ Pflege: _____

Is that what we want?



Making the change.....

- The nurses....
- The residents....
- The pharmacy...
- The hospital administration....

The nurses....



The residents.....



The hospital pharmacy and management



Objective 3

- The daily work and practice with the 3-chamber-bag (3CB)





How do we work with the 3-chamber-bag (1)

- A 3 chamber bag is ideal for all sick mature newborns and premature babies who need parenteral nutrition
- We have two bags on the NICU: a G16% solution for newborns and small babies till the age of 2 years old, and a G13% solution for preemies
- (T)PN should be administered for all preemies under 1800 g for the first days of life, and bigger preemies or newborns with medical conditions, that problems with enteral nutrition for more than 2-3 days (congenital GIT anomalies, NEC, etc.) can be anticipated¹



How Do We Work with a 3-Chamber Bag? (For Example, Numeta®) (cont.)

- Newborns and premature babies >1800 g should be administered standard solution with Glucose 10%, Calcium, NaCL and Kalium if they don't drink "enough" milk (MM or formula) on the first day of life
- Every resident is equipped with a pocket size Numeta® dosage card, or with "Numeta app"
- Basically all premature babies and sick newborns are provided only with Numeta® as a basic infusion. Rarely do we have the need for extra by-passes or external adjustment of the 3-chamber bag

How Do We Work with a 3-Chamber Bag? (For Example, Numeta®) (cont.)

- If needed, Na⁺, Kalium⁺, Magnesium⁺⁺, Calcium⁺⁺ und Phosphat can be added (see pocket dosage card left and above)
- Peditrace®, Soluvit N® und Vitalipid infant® should be added, for all preemies under 1200 g from the first day of life, for bigger babies from the 4th day of life, und as long the TPN is >25-50% from the total nutrition
- Babies who don't have a central line, should get a solution with a maximal osmolarity of 900 mosmol/L. In order to achieve this osmolarity one should add free water to the bag (see pocket dosage card left and above)

How Do We Work with a 3-Chamber Bag? (For Example, Numeta®) (cont.)

- Resident decides: **Numeta® yes or no** (possible contraindications are severe hyperglycemia, hyperkalemia or hyponatremia)
- Resident decides: **Lipids yes or no** (almost always with lipids, the only C/I is severe and hypertriglyceridemia)
- **Need daily volume according to our TPN “table”**

How Do We Work with a 3-Chamber Bag? (For Example, Numeta[®]) (cont.)

- Peripheral line – free water should be added (target osmolarity 900 mosmol/L)
- Don't forget Peditrace[®], Soluvit N[®] und Vitalipid infant[®]
- Extra Na⁺, Potassium⁺, Magnesium⁺⁺, Calcium⁺⁺ and Phosphat needed?

Limits

- When one adds water don't forget that all the ingredients are diluted!
- With peripheral lines it is sometimes hard to supply the baby with all needed nutrients
- Numeta[®] can't be used when the baby has severe hyperglycemia, hyperkalemia, hypernatremia or hyperphosphatemia
- Calculations without computer software might be challenging

Clinical case 1

- Preterm baby, 1,5 kg, esophageal atresia, no enteral nutrition allowed, being fed on TPN from first day of life
- Numeta® can be used from the first day of life
- Reducing parenteral nutrition as enteral nutrition becomes possible

Nutrient	ESPGHAN / ESPEN Minimum ¹⁻⁵	Numeta G13E Content (3CB for First Day of Life) ⁶	Numeta G13E Content (3CB for Stable Growth Period) ⁶	ESPGHAN / ESPEN Maximum ¹⁻⁵
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Glucose (g/kg/d)	5.8	6.7	14.7	17.3
Lipids (g/kg/d)	0.25*	1.3	2.8	4
Sodium (mmol/kg/d)	0	1.1	2.4	5 (7)**
Potassium (mmol/kg/d)	0	1	2.3	3 (5)**
Magnesium (mmol/kg/d)	0.1	0.1	0.2	0.3
Calcium (mmol/kg/d)	0.8	0.6	1.4	3.5
Phosphate (mmol/kg/d)	1	0.6	1.4	3.5
Volume (mL/kg/d)	60	50	110	180

Clinical case 2

- Preterm baby, 3,5 kg, 30 days of life, volvolous due to malrotation, no enteral nutrition allowed, TPN is needed
- Reducing parenteral nutrition as enteral nutrition becomes possible

Nutrient	ESPGHAN / ESPEN Minimum ¹⁻⁵	Numeta G13E Content (3CB for First Day of Life) ⁶	Numeta G13E Content (3CB for Stable Growth Period) ⁶	ESPGHAN / ESPEN Maximum ¹⁻⁵
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Phosphate (mmol/kg/d)	1	0.6	1.4	3.5
Volume (mL/kg/d)	60	50	110	180

Clinical case 3

- Preterm baby, 28 weeks of gestation, 1200 gram, stable, starting feeding on 1-2 ml every 12 hours, no central line
- Numeta[®] can be used from the first day of life
- Reducing parenteral nutrition as enteral nutrition becomes possible

Nutrient	ESPGHAN / ESPEN Minimum ¹⁻⁵	Numeta G13E Content (3CB for First Day of Life) ⁶	Numeta G13E Content (3CB for Stable Growth Period) ⁶	ESPGHAN / ESPEN Maximum ¹⁻⁵
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Magnesium (mmol/kg/d)	0.1	0.1	0.2	0.3
Calcium (mmol/kg/d)	0.8	0.6	1.4	3.5
Phosphate (mmol/kg/d)	1	0.6	1.4	3.5
Volume (mL/kg/d)	60	50	110	180

Clinical case 4

- Preterm baby, 26 weeks of gestation, 800 gram, stable, starting feeding on 1-2 ml every 12 hours, umbilical vein catheter
- Numeta® can be used from the first day of life
- Reducing parenteral nutrition as enteral nutrition becomes possible

Nutrient	ESPGHAN / ESPEN Minimum ¹⁻⁵	Numeta G13E Content (3CB for First Day of Life) ⁶	Numeta G13E Content (3CB for Stable Growth Period) ⁶	ESPGHAN / ESPEN Maximum ¹⁻⁵
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Glucose (g/kg/d)	5.8	6.7	14.7	17.3
Lipids (g/kg/d)	0.25*	1.3	2.8	4
Sodium (mmol/kg/d)	0	1.1	2.4	5 (7)**
Potassium (mmol/kg/d)	0	1	2.3	3 (5)**
Magnesium (mmol/kg/d)	0.1	0.1	0.2	0.3
Calcium (mmol/kg/d)	0.8	0.6	1.4	3.5
Phosphate (mmol/kg/d)	1	0.6	1.4	3.5
Volume (mL/kg/d)	60	50	110	180

Clinical case 5

- Preemie, weight 1.0 kg, 28+0 weeks of gestation, 5th day of life, TPN, neonatal sepsis, IVH grade III, Hyperglycemia (blood glucose 250-350 mg/dl)
- Numeta[®] can be given when hyperglycemia is resolved

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Magnesium (mmol/kg/d)	0.1	0.1	0.2	0.3
Calcium (mmol/kg/d)	0.8	0.6	1.4	3.5
Phosphate (mmol/kg/d)	1	0.6	1.4	3.5
Volume (mL/kg/d)	60	50	110	180

Clinical case 6

- Preemie, weight 1.5 kg, 31 + 0 weeks, 5th day of life, partial parenteral nutrition, 40 ml/kg oral, 100 ml/kg iv, no central line
- Osmolarity too high

	Numeta 13% Pure (Osmolarity 1155 mOsm/L)	Numeta 13% Diluted (Osmolarity 900 mOsm/L)	Oral (Mother Milk)	Total	Target (maximum)
Lipids (g/kg/day)	2.5	2.0	1.5	3.5	4.0
AS (g/kg/day)	3.1	2.4	0.5	2.9	3,5
Glucose (g/kg/day)	13.3	10.4	6.8	17.2	18
Energy (cal/kg/day)	91	71	26.8	97.8	120

Clinical case 7

- Preemie, weight 750 g, 26 GSA, 30th day of life, NEC, renal failure, K⁺ – 6,5 mmol/l
- Numeta[®] can be used when hyperkalemia is resolved

Nutrient	ESPGHAN / ESPEN Minimum ¹⁻⁵	Numeta G13E Content (3CB for First Day of Life) ⁶	Numeta G13E Content (3CB for Stable Growth Period) ⁶	ESPGHAN / ESPEN Maximum ¹⁻⁵
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Magnesium (mmol/kg/d)	0.1	0.1	0.2	0.3
Calcium (mmol/kg/d)	0.8	0.6	1.4	3.5
Phosphate (mmol/kg/d)	1	0.6	1.4	3.5
Volume (mL/kg/d)	60	50	110	180

Conclusions

- Most sick newborns and premature babies can be treated with a 3-chamber bag
- Industrial bags are safe and easy to handle
- There are enough stability data
- Adaptation of the bag to the baby's needs is possible



Patient nutrition, evolved.

Thank You

