

## GROWTH AND VITAMIN DEFICIENCIES IN CHILDREN WITH INTESTINAL FAILURE RECEIVING LONG-TERM PARENTERAL NUTRITION

Esther Neelis<sup>1,2</sup>, Noortje Rijnen<sup>1</sup>, Joanne Olieman<sup>2,3</sup>, René Wijnen<sup>2</sup>, Edmond Rings<sup>1,4</sup>, Barbara De Koning<sup>1</sup>, Jessie Hulst<sup>1</sup>

<sup>1</sup>Department of Paediatric Gastroenterology, Erasmus MC - Sophia Children's Hospital, Rotterdam, The Netherlands, <sup>2</sup>Department of Paediatric Surgery, Erasmus MC - Sophia Children's Hospital, Rotterdam, The Netherlands, <sup>3</sup>Department of Dietetics, Erasmus MC - Sophia Children's Hospital, Rotterdam, The Netherlands, <sup>4</sup>Department of Paediatric Gastroenterology, Leiden University Medical Center, Leiden, The Netherlands

**Aim of the study:** To quantify the prevalence of growth failure and vitamin deficiencies in children with intestinal failure (IF) receiving long-term parenteral nutrition (PN).

**Methods:** A retrospective study in all children with IF and  $\geq 6$  months PN, treated by our IF team between 2000 and 2015. Height for age (HFA), weight for age (WFA) and weight for height (WFH) standard deviation scores (SDS) were calculated. A WFH  $< -2$  SD was defined as underweight and a HFA  $< -2$  SD as growth failure. Target height (TH) SDS and TH range (TH  $\pm 1.6$  SD) were calculated. All vitamin measurements were obtained. Data were collected until January 1, 2015.

**Main results:** Fifty-nine children (27 male) were identified. Twenty-two had short bowel syndrome (SBS), 23 surgical IF but no SBS, 13 functional IF and 1 child a combination. Most common underlying diseases were intestinal atresia (24%) and necrotizing enterocolitis (20%). Median PN duration was 15 months (IQR 9-32 months) and median follow-up duration was 3.6 years (IQR 1.8-7.5 years).

One year after start of PN, 23% of the children still on PN had growth failure and 19% was growing below their TH range (Table 1). Vitamin A and E deficiency were prevalent during PN (35/37 (95%) and 23/27 (62%) respectively) and after weaning (21/24 (88%) and 16/25 (64%)). During PN, 50% (14/28) of the children had a vitamin D  $< 50$  nmol/L compared to 59% after weaning (13/22).

**Conclusion:** One year after the start of PN, 23% of the children still dependent on PN had growth failure. Nineteen percent of the children still on PN were growing below their TH range. Vitamin deficiencies were common, both during PN and after weaning. Close nutritional monitoring and patient tailored adjustment should maximize the potential for growth and prevent vitamin deficiencies.

### Table:

Table 1 Anthropometric indices below  $< -2$  SD in children with IF 12 months after start of PN.

Anthropometric variable	Children on PN N (%)	Children weaned off PN N (%)
HFA SDS $< -2$	7/31 (23)	1/12 (8)
WFA SDS $< -2$	7/35 (20)	2/12 (17)
WFH SDS $< -2$	2/31 (7)	1/12 (8)
Below TH range	5/27 (19)	0/10 (0)

HFA: height for age, SDS: standard deviation score, TH: target height, WFA: weight for age, WFH: weight for height.