Pediatric Endocrinology

PEDIATRIC PUBERTY, TRANSGENDER HEALTH, AND GENERAL ENDOCRINE

Age of Critically Ill Children at Time of Exposure to Early Parenteral Nutrition Determines Its Impact on Long-Term Physical and Cognitive Development

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Background

The PEPaNIC RCT, which investigated critically ill children admitted to the pediatric intensive care unit, showed that early administration of parenteral nutrition (early PN) as compared with withholding PN for 1 week (late PN) negatively affected 6 neurocognitive functions assessed 2 years later (1). However, it is theoretically possible that age at time of exposure determines whether early PN has negative or positive impact on long-term physical and cognitive development, possibly resulting in a neutral outcome for the total study population. In this secondary analysis of the PEPaNIC RCT, we investigated whether age at exposure to early PN determined its 2 years developmental impact.

Methods

The 786 children who were evaluated 2 years after inclusion in the PEPaNIC RCT for health status, anthropometrics, executive functioning, emotional and behavioral problems, intelligence and visual motor integration were categorized for age at randomization (0–17 years). We defined 4 ±similarly sized age groups based on previously reported timing of cerebral maturation spurts: neonates ≤28 days old (n=121), infants 29 days to <11 months old (n=239), toddlers 11 months to <5 years old (n=223), children 5 years or older (n=203). For each outcome, interaction between the randomized intervention and age at randomization was assessed with a multivariable linear regression analysis adjusted for baseline risk factors. For the outcomes with an interaction p≤0.15, we subsequently compared the adjusted effect of early PN versus late PN within each age group.

Results

Interaction between randomization and age group was identified for weight, development of inhibitory control, flexibility, working memory, planning and organization, metacognition, total executive functioning and internalizing and total behavioral problems. In particular among infants 29 days to <11 months old, harm by early PN was observed for several neurocognitive functions [inhibitory control (p=0.008), flexibility (p=0.02), working memory (p=0.009), planning and organization (p=0.004), metacognition (p=0.008), total executive functioning (p=0.004), internalizing (p=0.005) and total behavioral problems (p=0.01)]. Among toddlers 11 months to <5 years old, neurocognitive harm by early PN was only observed for inhibitory control (p=0.003) and total executive functioning (p=0.02). In neonates ≤28 days old, early PN did not affect neurocognitive development whereas it increased weight (p=0.03) but not height. Among children 5 years or older, early PN only appeared to affect development of planning and organization in a positive manner (p=0.03).

Conclusion

Critically ill children who were exposed to early PN at an age between 29 days and 11 months were found to be most vulnerable for neurocognitive developmental harm evoked by early administration of PN, as assessed 2 years later.

1 Verstraete et al. Lancet Respir Med 2018

Neuroendocrinology and Pituitary

PITUITARY TUMORS II

Acromegaly Comorbidity Costs, Quality of Life, and Mortality: Lifetime Comparisons for Controlled Acromegaly, Uncontrolled Acromegaly, and the General US Population

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Acromegaly is a rare, chronic disorder characterized by hypersecretion of growth hormone (GH) that stimulates the production of insulin-like growth factor 1 (IGF-1). In addition to the physical manifestations, such as acral soft-tissue enlargement and maxillofacial changes, patients may develop a number of comorbidities, often prior to diagnosis. The goal of acromegaly treatment is to achieve biochemical control (normalization of GH and IGF-1 levels), which may resolve or prevent worsening of comorbid conditions. The objective of this study was to quantify the economic burden of comorbidities associated with acromegaly, including diabetes, hypertension, colon cancer, sleep apnea, and hypopituitarism. Comparisons were made between patients with acromegaly and biochemical control, patients with acromegaly without biochemical control, and the general population. Literature was reviewed to identify the prevalence of comorbidities among the groups, as well as the influence of each comorbidity on healthcare costs, quality of life, and mortality. Inputs from the literature were synthesized using a decision-analytic cohort model with a starting age of 55 years old and 55% female and extrapolated over a lifetime. Acromegaly-associated morbidity and mortality were not modeled due to possible double counting between acromegaly and other comorbidities. The average comorbidity count measure (range from 0 to 5) was a sum across all 5 comorbidity prevalence rates for all those living in the cohort per year of survival. Comorbidity prevalence was higher among acromegalic patients vs the general population for all comorbidities. Within acromegaly, uncontrolled disorder was associated with a higher prevalence of diabetes, hypertension, and sleep apnea. Lifetime discounted comorbidity costs were ~$121,000, ~$313,000, and ~$406,000 in the general population, acromegaly controlled, and acromegaly uncontrolled populations, respectively. Lifetime discounted life years were 17.6, 16.9, and 16.7 in the general population, acromegaly controlled, and acromegaly uncontrolled populations, respectively. Lifetime discounted quality-adjusted life years were 14.6, 11.7, and 10.4 in in the general population, acromegaly