Journal of Obesity & Metabolic Syndrome 2017;26:291-292
https://doi.org/10.7570/jomes.2017.26.4.291

Letter to the Editor

jomes
pISSN 2508-6235
eISSN 2508-7576

Serum FGF21 Levels in Obese Korean Children and Adolescents (J Obes Metab Syndr 2017;26:204-9)

Jae Hyun Kim*

Department of Pediatrics, Seoul National University Bundang Hospital, Seongnam, Korea

*Corresponding author
Jae Hyun Kim

https://orcid.org/0000-0002-0203-7443

Department of Pediatrics, Seoul National University Bundang Hospital, 82 Gumi-ro 173beon-gil, Bundang-gu, Seongnam 13620, Korea
Tel: +82-31-787-7287
Fax: +82-31-787-4054
E-mail: pedendo@snubh.org

Since Kharitonenkov et al.[1] reported fibroblast growth factor-21 (FGF21) as a metabolic regulator in 2005, it has been shown to be an emerging component of the endocrine system that exerts influence on multiple organs. FGF21, mainly produced in the liver, promotes glucose uptake and improves insulin sensitivity, which are associated with increased energy expenditure. Moreover, it activates brown adipose tissue and affects browning of white adipose tissue, which can be directed by peripheral or central pathways and affects energy expenditure via the sympathetic nervous system.

Despite the beneficial effects of FGF21, increased FGF21 level has been observed in obese subjects. This paradoxical phenomenon led to the proposal that obesity is a state of FGF21 resistance.[2] This was explained by decreased local expression of β-klotho, a co-receptor of FGF, in the obesity-associated proinflammatory state. In addition to obesity, subjects with type 2 diabetes, lipodystrophy, metabolic syndrome, or insulin resistance are associated with increased level of FGF21. In this context, FGF21 was suggested as a surrogate marker of metabolic syndrome and type 2 diabetes. Extensive studies on this topic have been performed in adult populations.[3] In Korean adults, FGF21 was associated with abnormal lipid profile, insulin resistance and metabolic syndrome.[4]

In the pediatric population, although conflicting results have been reported according to study population, FGF21 was associated with obesity and type 2 diabetes.[5] Moreover, FGF21 has been shown to affect growth in humans.[6]

There have been only a few studies performed among Korean children to date. Ko et al.[7] reported that FGF21 level was not significantly different between elementary school children with metabolic syndrome and those without it. However, Baek et al.[8] showed that obese children and adolescents had higher FGF21 level than those with normal weight. Moreover, they showed significantly higher FGF21 levels among obese subjects with metabolic syndrome.

In a Danish study, FGF21 level differs according to sex in children and adolescents.[9] Girls showed significantly higher FGF21 concentration than boys. However, there has been no report on the reference range of FGF21, differences according to age, or cutoff values for detecting or predicting cardiometabolic risk factors or metabolic syndrome in a pediatric population.

Further study is warranted to validate the clinical role of FGF21 as a biomarker of metabolic and growth disorders in a pediatric population. Moreover, its reference range by age and sex should be determined.

CONFLICTS OF INTEREST

The author declares no conflict of interest.

REFERENCES

1. Kharitonenkov A, Shiyanova TL, Koester A, Ford AM, Micanovic R, Galbreath EJ, et al. FGF-21 as a novel metabolic regulator. J Clin Invest 2005;115:1627-35.
2. Fisher FM, Chui PC, Antonellis PJ, Bina HA, Kharitonenkov A, Flier JS, et al. Obesity is a fibroblast growth factor 21 (FGF21)-resistant state. Diabetes 2010;59:2781-9.
3. Giralt M, Gavaldà-Navarro A, Villarroya F. Fibroblast growth factor-21, energy balance and obesity. Mol Cell Endocrinol 2015;418 Pt 1:66-73.
4. Lee Y, Lim S, Hong ES, Kim JH, Moon MK, Chun EJ, et al. Serum FGF21 concentration is associated with hypertriglyceridaemia, hyperinsulinaemia and pericardial fat accumulation, independently of obesity, but not with current coronary artery status. Clin Endocrinol (Oxf) 2014;80:57-64.
5. Reinehr T, Woelfle J, Wunsch R, Roth CL. Fibroblast growth factor 21 (FGF-21) and its relation to obesity, metabolic syndrome, and nonalcoholic fatty liver in children: a longitudinal analysis. J Clin Endocrinol Metab 2012;97:2143-50.
6. Grunwald T, De Luca F. Role of fibroblast growth factor 21 (FGF21) in the regulation of statural growth. Curr Pediatr Rev 2015;11:98-105.
7. Ko BJ, Kim SM, Park KH, Park HS, Mantzoros CS. Levels of circulating selenoprotein P, fibroblast growth factor (FGF) 21 and FGF23 in relation to the metabolic syndrome in young children. Int J Obes (Lond) 2014;38:1497-502.
8. Baek J, Nam HK, Rhie YJ, Lee KH. Serum FGF21 levels in obese Korean children and adolescents. J Obes Metab Syndr 2017;26:204-9.
9. Bisgaard A, Sørensen K, Johannsen TH, Helge JW, Andersson AM, Juul A. Significant gender difference in serum levels of fibroblast growth factor 21 in Danish children and adolescents. Int J Pediatr Endocrinol 2014;2014:7.

https://doi.org/10.7570/jomes.2017.26.4.291