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The Clinical and Epidemiological Peculiarities of Short Stature during childhood in the Odessa Region (Ukraine)

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Abstract

The clinical and epidemiological examination of children who present to a children's clinic in the Odessa region (Ukraine) demonstrates under diagnoses of short stature, including Growth Hormone Deficiency (GHD). Optimization of GHD management is a significant challenge in primary health care in Ukraine. Parent awareness of GHD and education on the importance of treatment adherence, up-to-date training for medical staff, more emphasis on using the national growth charts for growth monitoring, increased family and social support to the patient, and social media development are strategies needed to improve primary health care medicine in developing nations. There is a need for database and registries for monitoring various possible ethnicity-specific growth responses and adverse effects. Ukraine-specific databases or registries may help provide epidemiological data for GHD in the Ukrainian context.

Keywords: Dwarfism/Growth hormone deficiency; Epidemiology; Prevalence; Short Stature

Abbreviations

SS: Short Stature; GHD: Growth Hormone Deficiency

Introduction

Children with a height that is two standard deviations (SDs) below average or the third percentile for that age and gender are deemed to have short stature (SS) [1]. The most important endocrine and treatable cause of SS is growth hormone deficiency (GHD). The cause of GHD may be congenital or acquired. It can be isolated or combined with other anterior and/or posterior pituitary hormone deficiencies. Diagnosis is based on a combination of biochemistry, neuroradiology, and clinical phenotype. The objective of this study was to explore the clinical and epidemiological peculiarities of the short stature during childhood.

Methods

The work was conducted in the Odessa region (Ukraine) at the Odessa Regional Children's Hospital. A retrospective review by a hand search of the children's medical record review was conducted by the first two authors. Using a systematic approach, all medical records were hand searched, and reviewed to determine children of small stature. Authors used the agreed definition of small stature adopted by the Ukraine, and all records of short status were agreed by both authors. Other information, including age of child, social economic status, and comorbidity, was also extracted.

Results

A total of 76,932 children aged 0–17 years were identified in the 2016, cohort of children attending the outpatient clinic, which represented 17% of the total paediatric population. The children presenting to the outpatient clinic was reflected of the general group of children aged 0–17 in the region regarding gender, age, illnesses presenting. Of the 76,932 children, 448 were identified as short stature (0.058%).

The diagnosis of growth hormone deficiency was reported in the medical records during two broad age peaks. The first age peak occurring at five years for both boys and girls, the second age peak occurring in girls aged 10–11 years and boys aged 12–14 years. These age peaks are typical for the time of GHD diagnosis in childhood, with the first at the time of pre-school examination of children, and the second peak emerging at the start of puberty.

Various causes of SS in children were identified (Table 1), with the most important of them being endocrinopathies (19.2%), hereditary diseases (15.9%), cardiac pathologies (13.4%), respiratory pathologies (13.2%), and gastrointestinal pathologies (13.2%). The idiopathic SS rate (including family short stature and constitutional delay of growth and puberty) was comparatively low at 18.3%.

Among children with SS associated with endocrinopathies, the leading

CAUSE	n	%
Endocrinopathies		19.2%
GHD	43	9.6
Hypothyroidism	8	1.8
Mauriac syndrome	5	1.1
Hypercortisolismor Cushing syndrome	30	6.7
Gastrointestinal pathologies		13.2%
Protein or caloric deprivation	18	4.0
Inflammatory bowel disease (including Crohn's disease, ulcers)	8	1.8
Sprue (gluten intolerance)	31	6.9
Protein-losing enteropathy	2	0.5
Pulmonary pathologies		13.2%
Cystic fibrosis	34	7.6
Severe asthma	25	5.6
Cardiac pathologies		13.4%
Congestive heart failure	32	7.1
Rheumatic diseases	28	6.3
Renal pathologies		4.9%
Chronic renal insufficiency	20	4.5
Renal tubular acidosis	2	0.4
Hereditary diseases		15.8%
Turner syndrome	31	6.8
Down syndrome (trisomy 21)	36	8.0
Hurler syndrome	4	1.0
Other medico-biological causes		20.3%
Psychosocial dwarfism (including chronic neglect)	9	2.0
Idiopathicshortstature (including family short stature and constitutional delay of growth and puberty)	82	18.3

Table 1: The causes of short stature in children presenting in the outpatient department of the Odessa Regional Children's Hospital, 2016.

cause was represented by GHD – 43 children, or 9% of the sample. As all children were Caucasian, no racial difference could be determined.

Discussion

Epidemiological studies of GHD in developing countries are very relevant and critical as a dataset to be monitored. The lack of reliable data on the prevalence of GHD in developing countries greatly reduces the ability to determine the true effects of the problem. In developing countries, studies on the prevalence of GHD are varied and do not occur with regularity of where they are conducted [2–3]. Documenting the prevalence of GHD would greatly help in a more effective means of screening children.

On available international data, the prevalence of GHD amongst children who present at the Odessa regional children's clinic is comparatively low. However, more accurate comparisons are problematic because of the different diagnostic criteria and different cultural definitions of GHD. For instance, GHD has been reported to range from 1 case per 1,800 children in Sri Lanka, to 1 case per 30,000 children in Newcastle, United Kingdom [4–5]. The difference could be the lack of standardized agreed method of reporting.

The cultural definitions of GHD are also different between developed and developing countries. In a developing nation, perception of height as a marker of general health is less pronounced as compared to weight. This is due to the social health system being more focused on common causes of malnutrition, rather than on normal growth and development. This factor might lead to under-diagnosis of the pathologic causes of SS and other conditions potentially associated with poor growth.

Further, there is insufficient awareness by clinicians of the need to measure height using agreed height measurement techniques. It is often up to families to recognise that their child is not gaining proper height and seek advice from their primary care physician. In most of the cases, children suspected of GHD are only referred to endocrinologists in their adolescence and late puberty, when opportunities to treat the condition are limited.

Poor recognition and understanding of growth disorders by paediatricians in developing countries and no available diagnostic tool to confirm the diagnosis hampers the identification of GHD. Diagnosis of GHD is based on a combination of auxological and biochemical analyses, such as growth hormone stimulation tests, insulin-like growth factor 1 (IGF-1) tests, assessment of skeletal age, magnetic resonance imaging, and exclusion of other systemic diseases that can have a similar presentation [6–8]. To-date, no single test has been developed that can be considered to be definitive in diagnosing GHD.

The treatments of GHD in developing countries face various challenges, such as the restricted availability of growth hormone therapy to only a limited segment of the children. If children are identified, they may not be able to access growth hormone therapy and the identification can do more harm.

Education and awareness about growth disorders among parents needs to be increased. Social media can also be a good mode to spread awareness about the early diagnosis and treatment of GHD. After identification increased family and social support can also help in improving adherence by working with parents to treatment protocols. Parents could be instructed to use diaries to improve adherence to the therapy (e.g. record their child's growth/height), and clinics could establish automatic reminders via text messaging for upcoming appointments. Regular training for physicians and more emphasis on using the national growth charts for growth monitoring would help improve the diagnosis and treatment of children with GHD in the Ukraine.

Conclusion

In conclusion, the clinical and epidemiological examination of children who present to a children's clinic in the Odessa region (Ukraine) demonstrates under diagnoses of short stature, including GHD. Optimization of GHD management is a significant challenge in primary health care in Ukraine. Parent awareness of GHD and education on the importance of treatment adherence, up-to-date training for medical staff, more emphasis on using the national growth charts for growth monitoring, increased family and social support to the patient, and social media development are strategies needed to improve primary health care medicine in developing nations.

Finally, in summary, there is a need for database and registries for monitoring various possible ethnicity-specific growth responses and adverse effects. Ukraine-specific databases or registries may help provide epidemiological data for GHD in the Ukrainian context.

Conflicts of Interest

The authors declare that publication ethics have been observed, and that no conflict of interest exists with the results and conclusions presented in this paper.

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