The aetiology of extreme tall stature in a screened Finnish paediatric population

J. Kärkinen MD,1 E. Sorakunnas BM,1 P. J. Miettinen MD PhD,1,2 T. Raitio MD PhD,1,3 M. Hero MD PhD1

1) New Children’s Hospital, Pediatric Research Center, Helsinki University Hospital, Helsinki, Finland
2) Department of Physiology, Medicum Unit, Faculty of Medicine, and Stem Cells and Metabolism Research Program, Research Programs Unit, University of Helsinki, Finland
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INTRODUCTION

• Guidelines suggest that extremely tall children (defined as height ≥ +3 SDS) should be referred to specialized health care for a comprehensive diagnostic work-up (1).
• The aetiology of tall stature is poorly characterized.
• No comprehensive studies describing aetiology and clinical features of extremely tall children currently exist.

AIM

To Report:
• diagnoses underlying extreme tall stature
• features associated with syndromic tall stature
• neurological and psychiatric diagnoses
dysmorphic features
• auxological clues indicative of an underlying pathology in a large cohort of extremely tall children that represent the general Finnish population.

METHOD

• We identified all children with height ≥+3 SDS after the age of three years from the Helsinki University Hospital (HUH) district growth database.
• The district covers a population of 1.2 million and corresponds to 23% of the Finnish population with an annual birthrate of approximately 13500 live births.
• The medical records were comprehensively reviewed and underlying diagnoses, auxological data, and clinical features gathered.

RESULTS

• We identified 424 subjects (214 girls and 210 boys) who fulfilled the inclusion criteria (Fig 1).
• A pathological cause for tall stature (i.e. a primary or a secondary growth disorder) was diagnosed in 61 patients (Fig 2).
• 17% of the girls and 12% of the boys (P=NS).

• Secondary causes were diagnosed in 42 (10%) patients.
  • premature adrenarche (n=16) and central precocious puberty (n=11) were more frequent in girls.
  • Primary causes for tall stature were diagnosed in 19 (4%) patients.
  • Marfan syndrome (n=10) was the most common primary cause.
  • Sex chromosome aneuploidy (n=3) was rare.
  • Genetic studies were employed in 120 subjects.
  • Chromosomal microarray (n=8) or gene panels (n=4) were seldom used.
  • Idiopathic tall stature (ITS) diagnosed in 363 (86%) subjects.
  • 141 had a tall parent (parental height above 2 SDS).
• Features associated with syndromic tall stature were noted in almost all patients with a primary cause (95%) and were common among subjects with ITS (29%).
• The risk of underlying growth disorder was influenced by auxological features (Fig 3) (Table 1).

CONCLUSIONS

• A considerable proportion of extremely tall children independent of sex has an underlying growth disorder.
• Clinical features related to syndromic tall stature were frequent in subjects with ITS, supporting the view that syndromic growth disorders with mild phenotypes may be underdiagnosed in extremely tall children.
• Analysis of auxological data may be beneficial in estimating the risk of growth disorders.
• Our results lend support to a comprehensive diagnostic work-up of extremely tall children.

REFERENCES


CONTACT INFORMATION

Matti Hero, MD, PhD
• New Children’s Hospital, Pediatric Research Center, Helsinki University Hospital, Helsinki, Finland
• E-mail: matti.hero@hus.fi

Figure 1. A flowchart depicting the formation of the study cohort of extremely tall statured children.

Figure 2. The aetiology of extremely tall stature, defined as height SDS of more than +3 after the age of three years, in children born 1990 or later with a place of residence in the HUH catchment area.

Figure 3. Distribution of the primary and secondary diagnoses according to the degree of tall stature.

Table 1. ROC analysis comparing patients with monogenic syndromes and subjects with ITS.