The association between growth hormone dose and short-term height outcomes in a large cohort of paediatric patients with Turner syndrome: real-world data from the NordiNet® International Outcome Study (IOS) and the ANSWER Program

Jo Blair; Tilman R. Rohrer; Birgitte Tonnes Pedersen; Sebastian Röhrich; Philippe Backeljauw

1Alder Hey Children’s NHS Foundation Trust, Liverpool, UK; 2University Children’s Hospital, Saarland University Medical Center, Homburg, Germany; 3Novo Nordisk A/S, Søborg, Denmark; 4Novo Nordisk Health Care AG, Zurich, Switzerland; 5Cincinnati Children’s Hospital Medical Center, University of Cincinnati College of Medicine, Cincinnati, OH, USA

Objective
To analyse the impact of growth hormone dose on short-term height outcomes in a large cohort of paediatric patients with Turner syndrome.

Introduction
- The aims of growth-promoting therapy in girls with Turner syndrome (TS) are to optimise height during childhood and adulthood to minimise the physical restrictions of short stature, and to allow puberty to start at a similar age to peers.1 It is important to achieve optimal height during adolescence to facilitate normal body proportions, self-esteem, and the quality of life of paediatric patients with TS.2
- Clinical practice guidelines recommend a growth hormone (GH) dose of 45–50 μg/kg/day, increasing to 68 μg/kg/day, to achieve bone age/maturity at a similar age to peers within the normal range.3
- We analysed the impact of GH dose on short-term (up to 2 years) height outcomes in a large cohort of patients with Turner syndrome.4

Methods
- The design and methodology of NordiNet® IOS and the ANSWER Program have been published previously.5 Patient information was entered by participating physicians using a web-based system, and NordiNet® was administered according to routine practice and local regulations.6
- In both studies, paediatric patients were eligible if they had an appropriate diagnostic indication for Nordiropin® and treatment was initiated before the age of 18 years.

Results
- Baseline characteristics are presented in Table 1. Height SDS at baseline (cm) was 8.46 (2.53) (n=1014) at year 1 and 15.12 (3.60) (n=864) at year 2.
- A GH dose of ≥50 μg/kg/day was associated with a significantly greater ΔHSDS than a dose of <50 μg/kg/day (p=0.0407).
- Estimated mean (SD) ΔHSDS from baseline at years 1 and 2, by GH dose group, is shown in Figure 1.

Conclusions
- Real-world data from NordiNet® IOS and the ANSWER Program indicate that patients with TS exhibit dose-dependent, short-term responsiveness to GH therapy.
- GH doses of ≥50 μg/kg/day were associated with greater short-term height gain than lower doses.
- Our data support the concept that dose optimisation during the first 2 years of GH therapy may improve height outcomes in the TS patient population.

Table 1 • Baseline characteristics for patients with Turner syndrome analysed in this report

<table>
<thead>
<tr>
<th>Patients, n/Year</th>
<th>Age, yrs (n=1125)</th>
<th>Height, cm (n=1125)</th>
<th>Height SDS (n=1125)</th>
<th>Target height SDS (n=1125)</th>
<th>RF1 1SD* (n=633)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1A</td>
<td>11.25</td>
<td>151.82</td>
<td>−2.54</td>
<td>−2.06</td>
<td>−0.93</td>
</tr>
<tr>
<td>2B</td>
<td>11.25</td>
<td>151.82</td>
<td>−2.54</td>
<td>−2.06</td>
<td>−0.93</td>
</tr>
<tr>
<td>Total</td>
<td>11.25</td>
<td>151.82</td>
<td>−2.54</td>
<td>−2.06</td>
<td>−0.93</td>
</tr>
</tbody>
</table>

Table 2 • Growth hormone exposure for patients with Turner syndrome analysed in this report

<table>
<thead>
<tr>
<th>GH dose at baseline &lt;50 μg/kg/day</th>
<th>≥50 μg/kg/day</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td>GH dose at baseline</td>
<td>42.95 (28.57,48.91)</td>
<td>53.55 (50.31,63.73)</td>
</tr>
<tr>
<td>Average GH dose during year 1</td>
<td>43.64 (33.48,46.64)</td>
<td>53.53 (50.48,64.62)</td>
</tr>
<tr>
<td>Average GH dose during year 2</td>
<td>43.14 (32.01,48.62)</td>
<td>53.80 (50.63,65.27)</td>
</tr>
</tbody>
</table>

ΔHSDS = mean (SD) ΔHSDS in years 1 and 2.

References

Conflict of interest disclosures
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