Objective

To assess whether growth velocity and change in height are predictive factors for a final adult height standard deviation score ≥–2 in the French cohort of children born small for gestational age and included in a prospective, observational French registry of children treated with Norditropin® (somatropin; Novo Nordisk A/S).

Introduction

• In 2011, Bang et al. showed that growth velocity (GV) and change in (Δ) height in the first year of treatment could be predictive factors of statural response in patients born small for gestational age (SGA) and treated with growth hormone (n=54).1
• Poor responders showed GV standard deviation score (SDS) <–0.5 (45%).
• In 2017, Ortego et al. confirmed the relevance of the Kabi Pharmacia International Growth Study mathematical model in a retrospective SGA cohort (n=103), showing that the percentage of good responders in the first year varies between 46.6% (Δ height SDS ≥0.5) and 81.6% (GV SDS ≥+1).2
• Of the 90 patients who completed the study, 51 were GH-naïve and were stratified as poor and good responders according to observed FAH SDS ≥–2 or >–2, respectively.
• A logistic regression model was used to predict the FAH SDS (≥–2 or >–2), considering GV or Δ height in the first year of treatment.
• The value of the area under the curve (AUC) defines the strength of the model to distinguish poor from good responders, considering the value of explanatory variables (GV or Δ height).
• The strength of the predictive model (AUC) was 36%.

Results

• Results are reported for the 51 GH-naïve patients who completed the study.
• Of the 291 patients, 183 were GH-naïve.

Δ height in the first year of treatment

• The best prediction of good response (AUC: 0.63) was obtained by stratifying the variable in these classes: Δ height SDS: ≤0.75/>0.75 (OR: 5.32, [CI: 1.35; 20.98]) p=0.017.
• The concordance of observed and predictive FAH for good responders was reported in 86.6% of patients.
• The error rate of wrong categorisation of patients was 36%.

Conclusions

• The strength of this predictive model has not been confirmed, perhaps due to the small sample size.
• This type of model could help to manage short stature in patients born SGA needing GH treatment.
• Further investigations are needed to confirm the exact predictive threshold values (Δ height; GV) during the first year of treatment.

References

Conflict of interest disclosures
RC, BL, MN and JS are members of the Scientific Committee of, and investigators for, the SGA Registry. EH and BV are the employees of Novo Nordisk.

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Table 1 • Change in height in the first year of treatment: confusion matrix

<table>
<thead>
<tr>
<th>SDS ≤–2</th>
<th>SDS &gt;–2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Observed</td>
<td>Predictive</td>
</tr>
<tr>
<td>SDS ≤–2</td>
<td>12</td>
</tr>
<tr>
<td>SDS &gt;–2</td>
<td>10</td>
</tr>
</tbody>
</table>

One patient with missing data. SDS, standard deviation score.

Table 2 • Growth velocity in the first year: confusion matrix

<table>
<thead>
<tr>
<th>SDS ≤–2</th>
<th>SDS &gt;–2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Observed</td>
<td>Predictive</td>
</tr>
<tr>
<td>SDS ≤–2</td>
<td>9</td>
</tr>
<tr>
<td>SDS &gt;–2</td>
<td>4</td>
</tr>
</tbody>
</table>

One patient with missing data. SDS, standard deviation score.