Does better adherence to growth hormone (GH) treatment using jet rather than needle delivery translate into improved growth outcomes?

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Background

We previously reported improved adherence with growth hormone treatment in children using jet rather than needle delivery devices, in a large nationwide cohort [1]. We wanted to assess whether this also translated into significant improvement in growth outcomes.

Aim

To retrospectively audit growth markers in our local split-site (GOSH / UCLH) cohort of children, starting GH using ZomaJet® between 01.01.2010 and 31.12.2012, for whom we had previous adherence (PDC) scores.

Methods

- 75 local patients were identified from the national cohort
- 55 met the eligibility criteria for indication (GHD) and age (<16 years).
- Adherence was evaluated using the PDC index which was calculated using the following equation.

$$PDC = \frac{\text{Number of days with access to viable heads}}{\text{Number of days receiving treatment}}$$

- Patients with PDC score >0.8 were considered adherent.

- Standard deviation scores for the following auxology parameters were compared:
  - Height (HTSDS)
  - Height velocity (HVSDS)
  - IGF-1 (IGF1SDS)
- Comparisons were made using non parametric statistics, within and between adherent and non adherent groups
  - 1 year after the start of jet-delivered GH
  - At end of the assessment period

Table 1. Baseline characteristics show no significant difference

	Adherent N=33	Non-adherent N=22	Overall N=55
Sex n (%)			
Male	21 (64)	16 (73)	37 (67)
Female	12 (36)	6 (27)	18 (33)
Starting age, years*			
Median	9.31	6.80	7.76
Range	0.93-15.57	2.93-15.89	0.93-15.89
Treatment duration (days)*			
Median	1179	1279	1209
Range	243-1814	166-1820	166-1820
PDC Score**			
Median	1.08	0.65	0.92
Range	0.82-1.71	0.24-0.75	0.24-1.71
Switch			
n (%)	8 (24)	1 (5)	9 (16)
Baseline Auxology	median(range)		
HTSDS*	-1.73 (-3.88-2.43)	-2.04 (-3.83-0.69)	-1.79 (-3.88-2.43)
HVSDS*	-1.92 (-6.70-4.68)	-3.07 (-5.07-5.63)	-1.96 (-6.70-5.63)
IGF1 SDS*	-2.70 (-2.80-3.40)	-2.20 (-4.10-1.30)	-2.55 (-4.10-3.40)

*** p>0.05 **p<0.05**

Results

- A large proportion of patients (67%) are classed as adherent **(Table 1)**.
- Adherent (n33) and non-adherent (n22) patients demonstrated comparable increments in HTSDS , HVSDS and IGF1SDS, both at 1 year and end treatment (p>0.05).
- Significant longitudinal intragroup improvements occurred in adherent patients (n33) in all three auxology parameters, both at 1 year and at end treatment. (p<0.05) **(fig 1)**
- Non adherent patients (n22) showed significant improvement in HVSDS at 1 year and at end treatment (p<0.05), but not in HTSDS or IGF-1SDS at any point in time. **(fig 1)**
- 9 patients have reached their final height (6 adherent, 3 non adherent), all with adult HTSDS close to individual target MPHSDS (p<0.05).

Changes in auxology parameters according to adherence

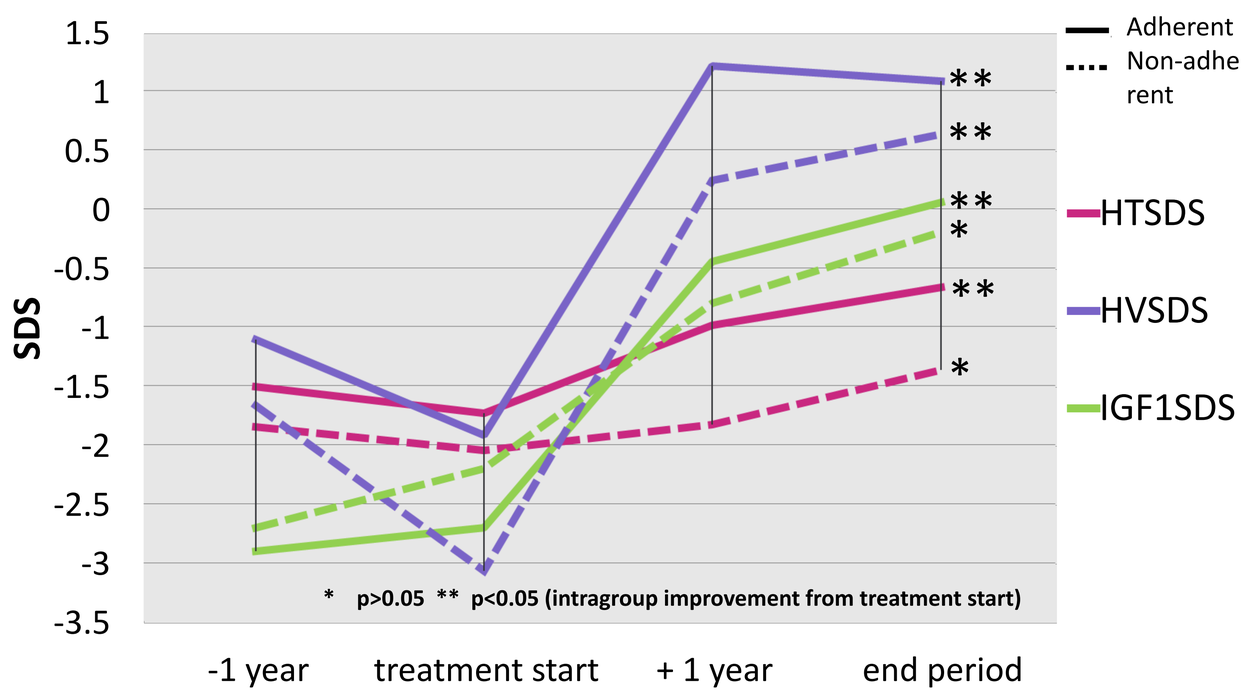

Figure 1. Patients using ZomaJet ® show significant improvement in HVSDS, regardless of adherence. Significant improvement in HTSDS and IGF-1SDS over time is only seen in adherent patients.

Conclusions

- Jet-delivered growth hormone seems to significantly improve height velocity SDS in this cohort, regardless of adherence.
- Improved adherence with ZomaJet ® may translate into better height outcomes.
- This hypothesis will be explored in a larger local dataset comparing jet with needle devices.

References: 1. Spoudeas et al 2014. Maintaining persistence and adherence with subcutaneous growth hormone therapy in children: comparing jet-delivery and needle-based devices. Patient Preference and Adherence 2014:8 (1255-1263)