Quality of Life, Treatment Satisfaction, and Treatment Preference Associated With Use of a Pen Device Delivering a Premixed 70/30 Insulin Aspart Suspension (Aspart Protamine Suspension/Soluble Aspart) Versus Alternative Treatment Strategies

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Interest in intensified insulin therapy has contributed to the increased popularity of alternative insulin delivery systems, including insulin pen delivery devices. Although there have been several studies of patient-reported outcomes associated with insulin pen use (1–6), there has been no adequate assessment of the long-term effects of pens for previously naive to insulin use. The most advanced devices, pens delivering premixed intermediate-acting and rapid-acting analog insulin, have contributed to the increased popularity of intensified insulin therapy. Most (85.2%) had used insulin before the study, and 41.4% had used an insulin pen.

Respondents were divided into five prior treatment subgroups: 1) a group that had never used insulin; 2) a group that had never used mixed insulin; 3) a group that had used 70/30 mixed insulin, but not a pen; 4) a group that had used 70/30 mixed insulin in a pen; and 5) a group that had used various mixed insulins via pen or syringe and did not fit into one of the other groups. Thus, each group allowed a comparison of the study pen with a different treatment strategy.

The criterion for statistical significance was set at P < 0.05, two tailed for all analyses. All analyses were conducted using SPSS 11.5 (SPSS, Chicago, IL).

RESULTS — Respondents rated the study pen significantly more positively than their prior treatment on all measures in the total sample and in all subgroups (Table 1). The advantage for the study pen ranged from 0.5 to 3.7 SD units (median 1.4).

Key determinants of overall treatment preference were identified by hierarchical multiple regression analyses controlling for age, sex, race/ethnicity, and education. Perceived convenience, flexibility, clinical efficacy, and quality of life were entered into the models together (results not shown). In the total sample, all ratings of the study pen except quality of life had significant independent associations with overall preference. In addition, conve-
Table 1—Rating of study pen device in the total sample and prior treatment subgroups

<table>
<thead>
<tr>
<th>Measures (no. of items)</th>
<th>Source of items</th>
<th>Pen naïve (no mixed insulin)</th>
<th>Pen naïve (70/30 mixed)</th>
<th>Pen (70/30 mixed)</th>
<th>Various mixed</th>
<th>Total sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>n</td>
<td></td>
<td>55</td>
<td>59</td>
<td>91</td>
<td>81</td>
<td>86</td>
</tr>
<tr>
<td>Convenience (1)</td>
<td>DTSQc no. 4</td>
<td>NA</td>
<td>2.42 ± 0.75 (3.22)</td>
<td>2.19 ± 1.15 (1.90)</td>
<td>2.03 ± 1.30 (1.56)</td>
<td>1.91 ± 1.44 (1.33)</td>
</tr>
<tr>
<td>Flexibility (1)</td>
<td>DTSQc no. 5</td>
<td>NA</td>
<td>2.17 ± 0.90 (2.41)</td>
<td>1.96 ± 1.22 (1.61)</td>
<td>1.82 ± 1.19 (1.53)</td>
<td>1.76 ± 1.28 (1.38)</td>
</tr>
<tr>
<td>Clinical efficacy (6)</td>
<td>DTSQc nos. 2 and 3; QLcs nos. 1–4</td>
<td>0.75 ± 1.28 ± 0.98 (1.30)</td>
<td>1.16 ± 0.81 (1.43)</td>
<td>1.12 ± 0.97 (1.15)</td>
<td>0.87 ± 0.84 (0.73)</td>
<td>0.81 ± 1.00 (0.81)</td>
</tr>
<tr>
<td>Quality of life (8)</td>
<td>QLcs nos. 5–12</td>
<td>0.94 ± 1.13 (0.83)</td>
<td>1.17 ± 0.94 (1.24)</td>
<td>1.06 ± 1.04 (1.02)</td>
<td>0.64 ± 0.89 (0.72)</td>
<td>0.59 ± 1.08 (0.53)</td>
</tr>
<tr>
<td>Overall preference (4)</td>
<td>DTSQc nos. 1, 7, and 8</td>
<td>0.82 ± 2.21 ± 0.95 (2.32)</td>
<td>2.42 ± 0.66 (3.66)</td>
<td>2.06 ± 1.18 (1.75)</td>
<td>2.16 ± 0.80 (2.70)</td>
<td>2.01 ± 1.01 (1.99)</td>
</tr>
</tbody>
</table>

Data are means ± SD (number of SD units >0). Possible range of means is −3 to 3. Means greater than zero indicate that the pen device was rated higher than the previous treatment system. All means are significantly greater than zero at P < 0.001 by one sample t test. For questions that were not diabetes specific (quality of life), respondents were asked to assess how they felt at the time they filled out the questionnaire compared with just before they started to use the study pen. For the remaining questions that were diabetes specific, respondents were asked to compare their experience with the study pen with their experience with the treatment they were using prior to using the study pen. *The overall preference measure contains an item developed for this study: “What is your overall view of taking insulin now compared with just before you started (the study)?”

CONCLUSIONS — Patients overwhelmingly preferred the study pen to their prior treatment strategies and using the study pen was associated with enhanced clinical efficacy, flexibility, perceived clinical efficacy, and quality of life. Among patients previously naïve to insulin, to pen experienced with mixed insulin, to pen experienced with unmixed insulin, to pen experienced with mixed insulin (pen naïve), to pen experienced with mixed insulin (prior treatment), and previous to insu

In addition, the data did not allow us to assess factors contributing to patients’ reported convenience. Flexibility, perceived clinical efficacy, and quality of life each made independent contributions to preference differences for treatment strategies among selected patient subgroups, and the contributing factors differed for different subgroups.
definitively confirm the treatment used immediately before the study pen. When patients reported more than one prior treatment, we assumed that the most intensive treatment was the most recent one, which could have led to underestimating the perceived advantages of the study pen. Despite these limitations, the present study has demonstrated the usefulness of performing subgroup analyses.

Patients new to insulin in this study reported improved quality of life and better glucose control and said their treatment had become more convenient and flexible, suggesting that pen use could counter some of the common reasons that patients raise for resisting insulin therapy (11–12). For patients already using insulin, an insulin delivery system that improves treatment satisfaction could help facilitate intensified treatment and result in improved clinical outcomes (13). The advantages of delivery systems like the pen device used in this study should be considered by health care providers when they counsel patients regarding treatment options.

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References
6. Dunbar JM, Madden PM, Gleeson DT, Fial TM, McKenna TJ: Premixed insulin in pen syringes maintain glycemic control and are preferred by patients. Diabetes Care 17:874–878, 1994