Clinical experience with insulin detemir, biphasic insulin aspart and insulin aspart in people with type 2 diabetes: Results from the Abu Dhabi cohort of the A1chieve study

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ABSTRACT

Background: The A1chieve, a multicentric (28 countries), 24-week, non-interventional study evaluated the safety and effectiveness of insulin detemir, biphasic insulin aspart and insulin aspart in people with T2DM (n = 66,726) in routine clinical care across four continents. Materials and Methods: Data was collected at baseline, at 12 weeks and at 24 weeks. This short communication presents the results for patients enrolled from Abu Dhabi. Results: A total of 383 patients were enrolled in the study. Four different insulin analogue regimens were used in the study. Study patients had started on or were switched to biphasic insulin aspart (n = 134), insulin detemir (n = 152), insulin aspart (n = 13), basal insulin plus insulin aspart (n = 42) and other insulin combinations (n = 41). At baseline glycaemic control was poor for both insulin naïve (mean HbA1c: 9.4%) and insulin user (mean HbA1c: 9.1%) groups. After 24 weeks of treatment, both groups showed improvement in HbA1c (insulin naïve: −2.1%, insulin users: −1.8%). SADRs did not occur in any of the study patients. Major hypoglycaemic events remained same as that of baseline (0.1 events/patient-year) for insulin naïve group whereas major hypoglycaemia reduced from 0.1 events/patient-year to 0.0 events/patient-year in insulin users. Conclusion: Starting or switching to insulin analogues was associated with improvement in glycaemic control with a low rate of hypoglycaemia.

Key words: A1chieve study, Abu Dhabi, insulin analogues, type 2 diabetes mellitus

INTRODUCTION

The prevalence of diabetes in United Arab Emirates is estimated to be 12.6%, affecting 768 thousand people. Fear of hypoglycaemia and gain in body weight are barriers for initiation of insulin therapy. Modern insulin analogues are a convenient new approach or tool to glycaemic control, associated with low number of hypoglycaemia and favourable weight change. A1chieve, a multinational, 24-week, non-interventional study, assessed the safety and effectiveness of insulin analogues in people with T2DM (n = 66,726) in routine clinical care. This short communication presents the results for patients enrolled from Abu Dhabi.

MATERIALS AND METHODS

Please refer to editorial titled: The A1chieve study: Mapping the Ibn Battuta trail.

RESULTS

A total of 383 patients were enrolled in the study. The patient characteristics for the entire cohort divided as insulin-naïve and insulin users is shown in the Table 1. Glycaemic control at baseline was poor in this population. The majority of patients (39.7%) started on or switched to insulin detemir. Other groups were insulin aspart (n = 13), basal insulin plus insulin aspart (n = 42), Biphasic insulin aspart (n = 134) and other insulin combinations (n = 41).
After 24 weeks of treatment, overall hypoglycaemic events reduced from 2.0 events/patient-year to 0.2 events/patient-year in insulin user group whereas hypoglycaemia increased from 0.1 events/patient-year to 0.5 events/patient-year in insulin naive group. However, this hypoglycaemia incidence in insulin naive group at 24 weeks was still lower than that observed in insulin users at baseline. SADRs did not occur in any of the study patients. Major hypoglycaemic events remained same as that of baseline (0.1 events/patient-year) in insulin naïve group whereas it reduced from 0.1 events/patient-year to 0.0 events/patient-year in insulin users. Blood pressure decreased and overall lipid profile improved at week 24 in the cohort [Tables 2 and 3].

Table 1: Overall demographic data

| Parameters                  | Insulin naïve | Insulin users | All |
|-----------------------------|---------------|---------------|-----|
| Number of patients          | 206           | 177           | 383 |
| Male N (%)                  | 158 (76.7)    | 132 (74.6)    | 290 (75.7) |
| Female N (%)                | 48 (23.3)     | 45 (25.4)     | 93 (24.3) |
| Age (years)                 | 49.0          | 50.0          | 49.4 |
| Weight (kg)                 | 84.4          | 85.0          | 84.6 |
| BMI (kg/m²)                 | 29.9          | 29.6          | 29.8 |
| Duration of DM (years)      | 7.0           | 9.8           | 8.2 |
| No therapy                  | 11            |               |     |
| >2 OGLD                     | 29            | 18            | 47  |
| Hba₁c                       | 9.4           | 9.1           | 9.3 |
| FPG (mmol/L)                | 11.0          | 10.9          | 11.0 |
| PPPG (mmol/L)               | 14.7          | 12.3          | 13.9 |
| Macrovascular complications, N (%) | 26 (12.6) | 32 (18.1) | 58 (15.1) |
| Microvascular complications, N (%) | 113 (54.9) | 111 (62.7) | 224 (58.5) |
| Pre-study therapy, N (%)    |               |               |     |
| Insulin users               | 177 (46.2)    |               |     |
| OGLD only                   | 195 (50.9)    |               |     |
| No therapy                  | 11 (2.87)     |               |     |
| Baseline therapy, N (%)     |               |               |     |
| Insulin detemir±OGLD        | 152 (39.7)    |               |     |
| Insulin aspart±OGLD         | 13 (3.4)      |               |     |
| Basal+insulin aspart±OGLD   | 42 (11.0)     |               |     |
| Biphasic insulin aspart±OGLD| 134 (35.0)    |               |     |
| Others                      | 41 (10.7)     |               |     |
| Missing                     | 1 (0.3)       |               |     |

BMI: Body mass index, OGLD: Oral glucose-lowering drug, HbA₁c: Glycated hemoglobin A₁c, FPG: Fasting plasma glucose, PPPG: Postprandial plasma glucose, DM: Diabetes mellitus

Table 2: Overall safety data

| Parameter                        | N     | Baseline | Week 24 | Change from baseline |
|----------------------------------|-------|----------|---------|----------------------|
| Hypoglycaemia (insulin naïve), events/patient-year | | | | |
| All                              | 206   | 0.1      | 0.5     | 0.4                  |
| Nocturnal                        |       | 0.0      | 0.0     | 0.0                  |
| Major                            |       | 0.1      | 0.1     | 0.0                  |
| Hypoglycaemia (insulin users), events/patient-year | | | | |
| All                              | 177   | 2.0      | 0.2     | −1.8                 |
| Nocturnal                        |       | 0.8      | 0.1     | −0.7                 |
| Major                            |       | 0.5      | 0.0     | −0.5                 |
| Body weight, kg                  |       |          |         |                      |
| Insulin naïve                    | 206   | 83.3     | 83.4    | 0.2                  |
| Insulin users                    | 177   | 85.5     | 85.2    | −0.2                 |
| Lipids and BP (insulin naïve)    |       |          |         |                      |
| LDL-C, mean (mmol/L), (N, % <2.5 mmol/L) | 181   | 3.1 (42, 23.2) | 2.6 (69, 39.4) | 0.4                  |
| HDL-C, mean (mmol/L), (N, % >1.0 mmol/L) | 178   | 1.0 (93, 52.2) | 1.1 (105, 60.3) | 0.0                  |
| TG, mean (mmol/L), (N, % <2.3 mmol/L) | 174   | 1.8 (142, 81.6) | 1.5 (166, 97.6) | −0.3                 |
| SBP, mean (mmHg), (N, % <130 mmHg) | 204   | 131.8 (71, 34.8) | 127.6 (97, 49.2) | −4.2                 |
| Lipids and BP (insulin users)    |       |          |         |                      |
| LDL-C, mean (mmol/L), (N, % <2.5 mmol/L) | 138   | 2.8 (64, 46.4) | 2.5 (66, 50.0) | −0.3                 |
| HDL-C, mean (mmol/L), (N, % >1.0 mmol/L) | 133   | 1.1 (79, 59.4) | 1.0 (78, 60.9) | −0.1                 |
| TG, mean (mmol/L), (N, % <2.3 mmol/L) | 138   | 1.7 (114, 82.6) | 1.5 (111, 91.7) | −0.2                 |
| SBP, mean (mmHg), (N, % <130 mmHg) | 174   | 132.7 (62, 35.6) | 127.2 (81, 49.7) | −5.5                 |

BP: Blood pressure, LDL-C: Low-density lipoprotein cholesterol, HDL-C: High-density lipoprotein cholesterol, TG: Triglycerides, SBP: Systolic blood pressure, VAS: Visual analogue scale
Basal + insulin aspart ± OGLD

Of the total cohort, 42 patients started on basal + insulin aspart ± OGLD, of which 11 (26.2%) were insulin naïve and 31 (73.8%) were insulin users. After 24 weeks of starting or switching to basal + insulin aspart, hypoglycaemic events reduced from 4.6 events/patient-year to 0.0 events/patient-year in insulin user group whereas hypoglycaemia was nil similar to baseline in insulin naïve group. Body weight decreased at the end of the study [Tables 8 and 9].

All parameters of glycaemic control improved from baseline to study end in those who started on or were switched to basal + insulin aspart ± OGLDs for both insulin naïve and insulin user groups [Table 10].

Insulin detemir ± OGLD

Of the total cohort, 152 patients started on insulin detemir ± OGLD, of which 99 (65.1%) were insulin naïve and 53 (34.9%) were insulin users. After 24 weeks of starting or switching to insulin detemir, hypoglycaemic events reduced 

Table 3: Insulin dose

| Insulin        | Pre-study | Baseline | Week 24 |
|----------------|-----------|----------|---------|
| Insulin naïve  | 0         | 0.0      | 205     | 42.0    | 197     | 58.0    |
| Insulin users  | 177       | 46.8     | 177     | 57.5    | 164     | 69.4    |

Table 4: Overall efficacy data

Parameter | N | Baseline | Week 24 | Change from baseline |
|----------|---|----------|---------|----------------------|
| Glycaemic control (insulin naïve) | 193 | 9.4 | 7.3 | −2.1 |
| HbA1c, mean (%) | 152 | 11.0 | 6.0 | −5.0 |
| FPG, mean (mmol/L) | 106 | 14.7 | 8.4 | −6.3 |
| Glycaemic control (insulin users) | 146 | 9.1 | 7.3 | −1.8 |
| HbA1c, mean (%) | 104 | 10.9 | 7.0 | −3.9 |
| FPG, mean (mmol/L) | 49 | 12.3 | 8.4 | −3.9 |
| Achievement of HbA1c <7.0% at week 24 | 197 | 37.6 |
| Insulin naïve (%) | 160 | 33.1 |
| Insulin users (%) | 160 | 33.1 |

HbA1c: Glycated haemoglobin A1c, FPG: Fasting plasma glucose, PPPG: Postprandial plasma glucose

Table 5: Biphasic insulin aspart±oral glucose-lowering drug efficacy data

| Parameter | N | Baseline | Week 24 | Change from baseline |
|-----------|---|----------|---------|----------------------|
| Glycaemic control (insulin naïve) | 80 | 9.3 | 7.2 | −2.1 |
| HbA1c, mean (%) | 62 | 11.3 | 6.0 | −5.4 |
| FPG, mean (mmol/L) | 47 | 15.8 | 8.1 | −7.6 |
| Glycaemic control (insulin users) | 32 | 9.6 | 7.6 | −1.9 |
| HbA1c, mean (%) | 18 | 11.6 | 7.0 | −4.6 |
| FPG, mean (mmol/L) | 6 | 15.4 | 8.6 | −6.8 |

Table 6: Insulin dose

| Insulin        | Pre-study | Baseline | Week 24 |
|----------------|-----------|----------|---------|
| Insulin naïve  | 0         | 0.0      | 84      | 45.7    | 80     | 73.4    |
| Insulin users  | 50        | 55.8     | 50      | 65.6    | 43     | 75.3    |

Table 7: Biphasic insulin aspart±oral glucose-lowering drug safety data

| Parameter | N | Baseline | Week 24 | Change from baseline |
|-----------|---|----------|---------|----------------------|
| Hypoglycaemia, events/patient-year | 11 | 0.0 | 0.0 | 0.0 |
| Insulin naïve | 31 | 4.6 | 0.0 | −4.6 |
| Body weight, kg | 10 | 81.7 | 81.5 | −0.2 |
| Insulin naïve | 28 | 90.8 | 88.0 | −2.8 |

Table 8: Basal+insulin aspart±oral glucose-lowering drug efficacy data

| Parameter | N | Baseline | Week 24 | Change from baseline |
|-----------|---|----------|---------|----------------------|
| Glycaemic control (insulin naïve) | 9 | 10.2 | 7.2 | −3.0 |
| HbA1c, mean (%) | 10 | 15.4 | 6.2 | −9.2 |
| FPG, mean (mmol/L) | 5 | 18.3 | 7.7 | −10.6 |
| Glycaemic control (insulin users) | 31 | 8.2 | 6.9 | −1.4 |
| HbA1c, mean (%) | 29 | 9.5 | 6.8 | −2.7 |
| FPG, mean (mmol/L) | 23 | 11.5 | 8.7 | −2.9 |

HbA1c: Glycated haemoglobin A1c, FPG: Fasting plasma glucose, PPPG: Postprandial plasma glucose
from 2.7 events/patient-year to 0.0 events/patient-year in insulin user group, whereas hypoglycaemia increased from 0.0 events/patient-year to 0.3 events/patient-year in insulin naïve group. A decrease in body was also observed at 24 weeks [Tables 11 and 12].

All parameters of glycaemic control improved from baseline to study end in those who started on or were switched to insulin detemir ± OGLDs for both insulin-naïve and insulin user groups [Table 13].

### Insulin aspart ± OGLD

Of the total cohort, 13 patients started on insulin aspart ± OGLD, of which 5 (38.5%) were insulin naïve and 8 (61.5%) were insulin users. After 24 weeks of starting or switching to insulin aspart, hypoglycaemia was nil similar to that of baseline for both insulin naïve and insulin user groups. A decrease in body weight was observed in insulin naïve group [Tables 14 and 15].

Mean HbA₁c and FPG values improved from baseline to study end in those who started on or were switched to insulin aspart ± OGLDs for both insulin naïve and insulin user groups [Table 16].

**Conclusion**

Our study reports improved glycaemic control following 24 weeks of treatment with any of the insulin analogues (Biphasic insulin aspart; basal + insulin aspart; insulin detemir; insulin aspart) with or without OGLD. SADRs did not occur in any of the study patients. Major hypoglycaemic events remained same as that of baseline (0.1 events/patient-year) in insulin naïve group whereas major hypoglycaemia reduced from 0.1 events/patient-year to 0.0 events/patient-year in insulin users. Overall, a small weight reduction was observed in insulin user group. Though the findings are limited by number of patients, still the trend indicates that insulin analogues can be considered effective and possess a safe profile for treating type 2 diabetes in Abu Dhabi.

### Table 11: Insulin detemir±oral glucose-lowering drug safety data

| Parameter                  | Baseline Week 24 | Change from baseline |
|---------------------------|------------------|----------------------|
| Hypoglycaemia, events/patient-year |                 |                      |
| Insulin naïve             | 0.0              | 0.3                  | 0.3 |
| Insulin users             | 2.7              | 0.0                  | −2.7 |
| Body weight, kg           |                 |                      |
| Insulin naïve             | 86.4             | 85.6                 | −0.9 |
| Insulin users             | 85.2             | 84.2                 | −0.9 |

### Table 12: Insulin dose

| Insulin dose, U/day | N Pre-study | N Baseline | N Week 24 |
|---------------------|-------------|------------|-----------|
| Insulin naïve       | 0           | 99         | 41.5      |
| Insulin users       | 53          | 53         | 46.0      |

### Table 13: Insulin detemir±oral glucose-lowering drug efficacy data

| Parameter                  | Baseline Week 24 | Change from baseline |
|---------------------------|------------------|----------------------|
| Glycaemic control (insulin naïve) |                 |                      |
| HbA₁c, mean (%)           | 9.4             | 7.5                  | −1.9 |
| FPG, mean (mmol/L)        | 10.1            | 6.0                  | −4.0 |
| PPPG, mean (mmol/L)       | 13.2            | 8.7                  | −4.5 |
| Glycaemic control (insulin users) |                 |                      |
| HbA₁c, mean (%)           | 9.3             | 7.5                  | −1.8 |
| FPG, mean (mmol/L)        | 9.8             | 7.0                  | −2.8 |
| PPPG, mean (mmol/L)       | 12.0            | 8.4                  | −3.5 |

### Table 14: Insulin aspart±oral glucose-lowering drug safety data

| Parameter                  | Baseline Week 24 | Change from baseline |
|---------------------------|------------------|----------------------|
| Hypoglycaemia, events/patient-year |                 |                      |
| Insulin naïve             | 0.0              | 0.0                  | 0.0 |
| Insulin users             | 0.0              | 0.0                  | 0.0 |
| Body weight, kg           |                 |                      |
| Insulin naïve             | 99.2             | 98.6                 | −0.6 |
| Insulin users             | 97.9             | 98.0                 | 0.1 |

### Table 15: Insulin dose

| Insulin dose, U/day | N Pre-study | N Baseline | N Week 24 |
|---------------------|-------------|------------|-----------|
| Insulin naïve       | 0           | 5          | 28.4      |
| Insulin users       | 8           | 8          | 65.3      |

### Table 16: Insulin aspart±oral glucose-lowering drug efficacy data

| Parameter                  | Baseline Week 24 | Change from baseline |
|---------------------------|------------------|----------------------|
| Glycaemic control (insulin naïve) |                 |                      |
| HbA₁c, mean (%)           | 10.9            | 7.0                  | −3.9 |
| FPG, mean (mmol/L)        | 12.3            | 5.5                  | −6.8 |
| Glycaemic control (insulin users) |                 |                      |
| HbA₁c, mean (%)           | 8.2             | 7.5                  | −0.7 |
| FPG, mean (mmol/L)        | 6.3             | 5.7                  | −0.6 |

HbA₁c: Glycated haemoglobin A₁c, FPG: Fasting plasma glucose, PPPG: Postprandial plasma glucose
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