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

Abhay Kumar Sahoo, Sambit Das¹, Pitambar Prusty¹, Anand Shankar², Shaibal Guha³
Department of Endocrinology, IMS and SUM Hospital and Medical College, ¹Apollo Hospitals, Bhubaneshwar, Odisha, ²Shankar Diabetes Care Centre, ³Positive Health Centre, Patna, Bihar, India

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 East India. Results: A total of 2177 patients were enrolled in the study. Four different insulin analogue regimens were used in the study. Patients had started on or were switched to biphasic insulin aspart (n=1605), insulin detemir (n=230), insulin aspart (n=233), basal insulin plus insulin aspart (n=49) and other insulin combinations (n=54). At baseline glycaemic control was poor for both insulin naïve (mean HbA1c: 8.9%) and insulin user (mean HbA1c: 9.1%) groups. After 24 weeks of treatment, both the groups showed improvement in HbA1c (insulin naïve: -1.6%, insulin users: -1.6%). SADRs including major hypoglycaemic events or episodes did not occur in any of the study patients. Conclusion: Starting or switching to insulin analogues was associated with improvement in glycaemic control with a low rate of hypoglycaemia.

Key words: A1chieve study, East India, insulin analogues, type 2 diabetes mellitus

INTRODUCTION

62.4 million Indians were reported to have type 2 diabetes mellitus (T2DM) putting India on the forefront of diabetic epidemic across globe.[¹,²] Fear of hypoglycaemia and gain in body weight are barriers for initiation of insulin therapy.[³] Modern insulin analogues are a convenient new approach or tool to glycaemic control, associated with low number of hypoglycaemia and favourable weight change.[⁴] A1cheve, 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.[⁵] This short communication presents the results for patients enrolled from East India.

MATERIALS AND METHODS

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

RESULTS

A total of 2177 patients were enrolled in the study. The patient characteristics for the entire cohort divided as insulin-naïve and insulin users is shown in Table 1. Glycaemic control was poor at baseline in this population. The majority of patients (73.8%) started on or switched to biphasic insulin aspart. Other groups were insulin detemir (n = 230), insulin
Biphasic insulin aspart + OGLD

Of the total cohort, 1605 patients started on biphasic insulin aspart + OGLD, of which 1317 (82.1%) were insulin naïve and 288 (17.9%) were insulin users. After 24 weeks of starting or switching to biphasic insulin aspart, hypoglycaemic events reduced in both insulin naïve (from 0.9 events/patient-year to 0.6 events/patient-year) and insulin user (from 14.8 events/patient-year to 0.9 events/patient-year) groups. Quality of life also improved at the end of the study [Tables 5 and 6].

All parameters of glycaemic control improved from baseline to study end in those who started on or were switched to biphasic insulin aspart for both insulin naïve and insulin user groups [Table 7].
Basal + insulin aspart ± OGLD
Of the total cohort, 49 patients started on basal + insulin aspart ± OGLD, of which 22 (44.9%) were insulin naïve and 27 (55.1%) were insulin users. After 24 weeks of treatment, hypoglycaemic events reduced from 9.2 events/patient-year to 0.0 events/patient-year in insulin users group, whereas hypoglycaemic events were nil in insulin naïve group similar to that of baseline. Quality of life improved at the end of 24 weeks [Tables 8 and 9].

Table 3: Insulin dose

| Parameter     | Pre-study | Baseline | Week 24 |
|---------------|-----------|----------|---------|
| Insulin naïve | 0         | 0        | 1764    |
| Insulin users | 407       | 29.3     | 407     |

Table 4: Overall efficacy data

| Parameter                   | N | Baseline | Week 24 | Change from baseline |
|-----------------------------|---|----------|---------|----------------------|
| Glycaemic control           |   |          |         |                      |
| (insulin naïve)             |   |          |         |                      |
| HbA1c, mean (%)             | 1201 | 8.9     | 7.3     | −1.6                 |
| FPG, mean (mmol/L)          | 1255 | 10.9    | 6.6     | −4.2                 |
| PPGP, mean (mmol/L)         | 279  | 15.3    | 8.2     | −7.0                 |
| Glycaemic control           |   |          |         |                      |
| (insulin users)             |   |          |         |                      |
| HbA1c, mean (%)             | 287  | 9.1     | 7.5     | −1.6                 |
| FPG, mean (mmol/L)          | 299  | 10.4    | 6.1     | −4.3                 |
| PPGP, mean (mmol/L)         | 52   | 16.8    | 9.0     | −7.8                 |
| Achievement of HbA1c <7.0% at week 24 |   |   |   |                      |
| Insulin naïve              | 1246 | 35.9%   |         |                      |
| Insulin users              | 298  | 23.8%   |         |                      |

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

| Parameter                      | N | Baseline | Week 24 | Change from baseline |
|--------------------------------|---|----------|---------|----------------------|
| Hypoglycaemia, events/patient-year |   |          |         |                      |
| Insulin naïve                   | 1317 | 0.9     | 0.6     | −0.3                 |
| Insulin users                   | 288  | 14.8    | 0.9     | −13.9                |
| Body weight, kg                 | 919  | 65.5    | 65.2    | −0.2                 |
| Insulin naïve                   | 224  | 64.5    | 64.7    | 0.2                  |
| Insulin users                   | 442  | 59.3    | 68.7    | 9.4                  |
| Quality of life, VAS scale (0-100) | 137 | 57.6    | 67.4    | 9.8                  |

Table 6: Insulin dose

| Parameter     | Pre-study | Baseline | Week 24 |
|---------------|-----------|----------|---------|
| Insulin naïve | 0         | 1317     | 22.5    |
| Insulin users | 288       | 30.1     | 29.7    |

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

| Parameter                   | N | Baseline | Week 24 | Change from baseline |
|-----------------------------|---|----------|---------|----------------------|
| Glycaemic control           |   |          |         |                      |
| (insulin naïve)             |   |          |         |                      |
| HbA1c, mean (%)             | 908  | 9.0     | 7.3     | −1.6                 |
| FPG, mean (mmol/L)          | 946  | 10.9    | 6.7     | −4.3                 |
| PPGP, mean (mmol/L)         | 183  | 15.3    | 8.2     | −7.1                 |
| Glycaemic control           |   |          |         |                      |
| (insulin users)             |   |          |         |                      |
| HbA1c, mean (%)             | 220  | 9.2     | 7.5     | −1.7                 |
| FPG, mean (mmol/L)          | 232  | 10.3    | 6.2     | −4.2                 |
| PPGP, mean (mmol/L)         | 41   | 17.0    | 9.2     | −7.8                 |

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

| Parameter                   | N | Baseline | Week 24 | Change from baseline |
|-----------------------------|---|----------|---------|----------------------|
| Hypoglycaemia, events/patient-year |   |          |         |                      |
| Insulin naïve               | 22  | 0.0      | 0.0     | 0.0                  |
| Insulin users               | 27  | 9.2      | 0.0     | 0.0                  |
| Body weight, kg             |  15 | 66.6    | 67.0    | 0.4                  |
| Insulin naïve               | 14  | 70.5    | 69.9    | 0.6                  |
| Insulin users               |  5  | 58.4    | 68.8    | 8.4                  |

Table 9: Insulin dose

| Parameter     | Pre-study | Baseline | Week 24 |
|---------------|-----------|----------|---------|
| Insulin naïve | 0         | 22       | 37.7    |
| Insulin users | 27        | 32.9     | 45.9    |
insulin detemir ± OGLDs for both insulin-naïve and insulin user groups [Table 13].

### Table 10: Basal+insulin aspart±oral glucose-lowering drug efficacy data

| Parameter                      | N | Baseline | Week 24 | Change from baseline |
|--------------------------------|---|----------|---------|----------------------|
| **Glycaemic control (insulin naïve)** |   |          |         |                      |
| HbA1c, mean (%)                | 14| 8.8      | 7.3     | −1.5                 |
| FPG, mean (mmol/L)             | 15| 11.0     | 6.9     | −4.1                 |
| PPPG, mean (mmol/L)            | 2 | 14.9     | 7.5     | −7.4                 |
| **Glycaemic control (insulin users)** |   |          |         |                      |
| HbA1c, mean (%)                | 14| 9.5      | 8.2     | −1.4                 |
| FPG, mean (mmol/L)             | 15| 12.2     | 5.9     | −6.2                 |
| PPPG, mean (mmol/L)            | 1 | 16.2     | 7.2     | −9.0                 |

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

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

| Parameter                      | N | Baseline | Week 24 | Change from baseline |
|--------------------------------|---|----------|---------|----------------------|
| Hypoglycaemia, events/patient-year |   |          |         |                      |
| Insulin naïve                  | 212| 1.0      | 0.2     | −0.8                 |
| Insulin users                  | 18 | 7.9      | 1.1     | −6.8                 |
| Body weight, kg                | 138| 69.7     | 68.1    | −1.5                 |
| Insulin naïve                  | 12 | 70.8     | 70.8    | 0.0                  |
| Quality of life, VAS scale (0-100) | 89| 59.2     | 68.4    | 9.2                  |
| Insulin naïve                  | 4 | 60.5     | 66.8    | 6.3                  |

VAS: Visual analogue scale

### Table 12: Insulin dose

| Insulin dose, U/day | N | Pre-study | N | Baseline | N | Week 24 |
|---------------------|---|-----------|---|----------|---|---------|
| Insulin naïve       | 0 | 0         | 212| 13.3     | 158| 15.5    |
| Insulin users       | 18| 19.2      | 18 | 17.3     | 12 | 22.0    |

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

| Parameter                      | N | Baseline | Week 24 | Change from baseline |
|--------------------------------|---|----------|---------|----------------------|
| **Glycaemic control (insulin naïve)** |   |          |         |                      |
| HbA1c, mean (%)                | 150| 8.8      | 7.3     | −1.5                 |
| FPG, mean (mmol/L)             | 158| 10.6     | 6.5     | −4.2                 |
| PPPG, mean (mmol/L)            | 51 | 15.2     | 8.3     | −6.8                 |
| **Glycaemic control (insulin users)** |   |          |         |                      |
| HbA1c, mean (%)                | 12 | 8.9      | 7.0     | −1.8                 |
| FPG, mean (mmol/L)             | 11 | 11.5     | 6.2     | −5.3                 |
| PPPG, mean (mmol/L)            | 4  | 15.0     | 8.6     | −6.4                 |

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

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

| Parameter                      | N | Baseline | Week 24 | Change from baseline |
|--------------------------------|---|----------|---------|----------------------|
| Hypoglycaemia, events/patient-year |   |          |         |                      |
| Insulin naïve                  | 190| 7.3      | 0.4     | −6.9                 |
| Insulin users                  | 43 | 24.2     | 0.0     | −24.2                |
| Body weight, kg                | 117| 65.2     | 64.4    | −0.7                 |
| Insulin naïve                  | 24 | 65.3     | 65.0    | −0.3                 |
| Quality of life, VAS scale (0-100) | 63| 60.4     | 68.6    | 8.2                  |
| Insulin naïve                  | 20 | 58.4     | 66.6    | 8.3                  |

VAS: Visual analogue scale

### Table 15: Insulin dose

| Insulin dose, U/day | N | Pre-study | N | Baseline | N | Week 24 |
|---------------------|---|-----------|---|----------|---|---------|
| Insulin naïve       | 0 | 0         | 190| 21.4     | 125| 24.8    |
| Insulin users       | 43| 29.1      | 43 | 25.0     | 24 | 22.3    |

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

| Parameter                      | N | Baseline | Week 24 | Change from baseline |
|--------------------------------|---|----------|---------|----------------------|
| **Glycaemic control (insulin naïve)** |   |          |         |                      |
| HbA1c, mean (%)                | 119| 8.6      | 7.2     | −1.5                 |
| FPG, mean (mmol/L)             | 124| 10.4     | 6.6     | −3.8                 |
| PPPG, mean (mmol/L)            | 41 | 15.3     | 8.4     | −7.0                 |
| **Glycaemic control (insulin users)** |   |          |         |                      |
| HbA1c, mean (%)                | 23 | 8.6      | 7.2     | −1.4                 |
| FPG, mean (mmol/L)             | 23 | 10.4     | 5.9     | −4.4                 |
| PPPG, mean (mmol/L)            | 5  | 16.7     | 7.7     | −8.9                 |

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

**Insulin aspart ± OGLD**

Of the total cohort, 233 patients started on insulin aspart ± OGLD, of which 190 (81.5%) were insulin naïve and 43 (18.5%) were insulin users. After 24 weeks of treatment, hypoglycaemic events reduced in both insulin naïve (from 7.3 events/patient-year to 0.4 events/patient-year) and insulin user (from 24.2 events/patient-year to 0.0 events/patient-year) groups. Quality of life improved at the end of the study [Tables 14 and 15].

All parameters of glycaemic control 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 (HbA1c, FPG, PPPG) and quality of life 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 including major hypoglycaemic events or episodes did not occur in any of the study patients. Overall, a slight reduction in body weight was noted for insulin naïve group while there was a small increase in body weight for 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 East India.

REFERENCES

1. Wild S, Roglic G, Green A, Sicree R, King H. Global prevalence of diabetes: Estimates for the year 2000 and projections for 2030. Diabetes Care 2004;27:1047-53.
2. Shetty P. Public health: India’s diabetes time bomb. Nature 2012;485:S14-6.
3. Korytkowski M. When oral agents fail: Practical barriers to starting insulin. Int J Obes Relat Metab Disord 2002;26 Suppl 3: S18-24.
4. Hirsch IB. Insulin analogues. N Engl J Med 2005;352:174-83.
5. Shah SN, Litwak L, Haddad J, Chakkarwar PN, Hajjaji I. The A1chieve study: A 60 000-person, global, prospective, observational study of basal, meal-time, and biphasic insulin analogs in daily clinical practice. Diabetes Res Clin Pract 2010;88 Suppl 1:S11-6.

Cite this article as: Sahoo AK, Das S, Prusty P, Shankar A, Guha S. Clinical experience with insulin detemir, biphasic insulin aspart and insulin aspart in people with type 2 diabetes: Results from the East India cohort of the A1chieve study. Indian J Endocr Metab 2013;17:S501-5.

Source of Support: Nil, Conflict of Interest: None declared.