Original Article

Clinical experience with insulin detemir, biphasic insulin aspart and insulin aspart in people with type 2 diabetes: Results from the Mumbai cohort of the A_1chieve study

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ABSTRACT

Background: The A_1chieve, 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 Mumbai, India. **Results:** A total of 2112 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 = 1561), insulin detemir (n = 313), insulin aspart (n = 144), basal insulin plus insulin aspart (n = 53) and other insulin combinations (n = 41). At baseline glycaemic control was poor for both insulin naïve (mean HbA_1c: 8.7%) and insulin user (mean HbA_1c: 9.2%) groups. After 24 weeks of treatment, both the groups showed improvement in HbA_1c (insulin naïve: −1.4%, insulin users: −1.8%). 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: A_1chieve study, insulin analogues, Mumbai, 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] A_1chieve, 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 Mumbai, India.

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Materials and Methods

Please refer to editorial titled: The A_1chieve study: Mapping the Ibn Battuta trail.

Results

A total of 2112 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 (73.9%) started on or switched to biphasic insulin aspart. Other groups were insulin detemir (n = 313), insulin aspart (n = 144), basal insulin plus insulin aspart (n = 53) and other insulin combinations (n = 41).

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After 24 weeks of treatment, overall hypoglycaemic events reduced from 1.5 events/patient-year to zero events in insulin user group while hypoglycaemia remained nil in insulin naïve group similar to that of baseline. No hypoglycaemic episode in insulin naive group even at 24 weeks suggests low event rate than insulin users at baseline. SADRs including major hypoglycaemic events did not occur in any of the study patients. Blood pressure decreased whereas overall lipid profile and quality of life improved at week 24 in the cohort [Tables 2 and 3].

All parameters of glycaemic control improved from baseline to study end in the total cohort [Table 4].

Table 1: Overall demographic data

Parameters	Insulin naïve	Insulin users	All
Number of participants	1952	160	2112
Male *N* (%)	1052 (53.9)	103 (64.4)	1155 (54.7)
Female *N* (%)	900 (46.1)	57 (35.6)	957 (45.3)
Age (years)	51.4	54.9	51.7
Weight (kg)	69.7	70.0	69.7
BMI (kg/m^2)	26.9	27.0	26.9
Duration of DM (years)	6.2	9.6	6.4
No therapy			82
>2 OGLD	502	43	545
HbA$_1$c	8.7	9.2	8.7
FPG (mmol/L)	11.9	10.6	11.8
PPPG (mmol/L)	17.2	17.0	17.2
Macrovascular complications, *N* (%)	368	52	420
Microvascular complications, *N* (%)	694	97	791
Pre-study therapy, *N* (%)			
Insulin users			160 (7.6)
OGLD only			1870 (88.4)
No therapy			82 (3.9)
Baseline therapy, *N* (%)			
Insulin detemir±OGLD			313 (14.8)
Insulin aspart±OGLD			144 (6.8)
Basal+insulin aspart±OGLD			53 (2.5)
Biphasic insulin aspart±OGLD			1561 (73.9)
Others			41 (1.9)

BMI: Body mass index, OGLD: Oral glucose-lowering drug, HbA$_1$c: Glycated hemoglobin A$_1$c, FPG: Fasting plasma glucose, PPPG: Postprandial plasma glucose, DM: Diabetes mellitus

Biphasic insulin aspart ± OGLD

Of the total cohort, 1561 patients started on biphasic insulin aspart ± OGLD, of which 1471 (94.2%) were insulin naïve and 90 (5.8%) were insulin users. After 24 weeks of starting or switching to biphasic insulin aspart, hypoglycaemic events reduced from 1.2 events/patient-year to 0.0 events/patient-year in insulin user group, whereas hypoglycaemia was nil in insulin naive group similar to baseline. A slight increase in body weight was observed. Quality of life improved after 24 weeks of treatment [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, 53 patients started on basal + insulin aspart ± OGLD, of which 27 (50.9%) were insulin naïve and 26 (49.1%) were insulin users. After 24 weeks of starting or switching to basal + insulin aspart, hypoglycaemic events reduced from 1.0 events/patient-year to 0.0 events/patient-year in insulin user group, while hypoglycaemia was nil in insulin naive group similar to baseline. Quality of life improved 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

Table 2: Overall safety data

Parameter	*N*	Baseline	Week 24	Change from baseline
Hypoglycaemia (insulin naïve), events/patient-year				
All	1952	0.0	0.0	0.0
Nocturnal		0.0	0.0	0.0
Major		0.0	0.0	0.0
Hypoglycaemia (insulin users), events/patient-year				
All	160	1.5	0.0	−1.5
Nocturnal		0.7	0.0	−0.7
Major		0.7	0.0	−0.7
Body weight, kg				
Insulin naïve	1738	69.5	69.7	0.2
Insulin users	142	69.7	69.7	0.0
BP (insulin naïve)				
SBP, mean (mmHg), (*N*, % <130 mmHg)	1842	130.9(644,35.0)	123.3(1314, 75.5)	−7.7
BP (insulin users)				
SBP, mean (mmHg), (*N*, % <130 mmHg)	153	137.3 (21, 13.7)	124.7 (82, 60.7)	−12.6
Quality of life, VAS scale (0-100)				
Insulin naïve	1709	39.9	79.2	39.3
Insulin users	116	39.4	80.6	41.3

BP: Blood pressure, SBP: Systolic blood pressure, VAS: Visual analogue scale

Table 3: Insulin dose

Insulin dose, U/day	*N*	Pre-study	*N*	Baseline	*N*	Week 24
Insulin naïve	0	0	1952	25.5	1775	24.6
Insulin users	160	31.9	160	33.5	148	29.9

Table 4: Overall efficacy data

Parameter	*N*	Baseline	Week 24	Change from baseline
Glycaemic control (insulin naïve)				
HbA$_1$c, mean (%)	1545	8.7	7.3	−1.4
FPG, mean (mmol/L)	1717	11.9	6.6	−5.3
PPPG, mean (mmol/L)	1156	17.2	8.9	−8.3
Glycaemic control (insulin users)				
HbA$_1$c, mean (%)	129	9.2	7.4	−1.8
FPG, mean (mmol/L)	136	10.6	6.6	−4.1
PPPG, mean (mmol/L)	77	17.0	9.1	−7.9
Achievement of HbA$_1$c <7.0% at week 24				
Insulin naïve (% of patients)	1766	13.5		
Insulin users (% of patients)	146	11.6		

HbA$_1$c: Glycated haemoglobin A$_1$c, FPG: Fasting plasma glucose, PPPG: Postprandial plasma glucose

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	1471	0.0	0.0	0.0
Insulin users	90	1.2	0.0	−1.2
Body weight, kg				
Insulin naïve	1329	68.9	69.1	0.2
Insulin users	81	69.2	69.4	0.2
Quality of life, VAS scale (0-100)				
Insulin naïve	1300	40.0	79.1	39.1
Insulin users	78	40.1	80.8	40.7

VAS: Visual analogue scale

Table 6: Insulin dose

Insulin dose, U/day	*N*	Pre-study	*N*	Baseline	*N*	Week 24
Insulin naïve	0	0	1471	25.7	1353	25.5
Insulin users	90	30.9	90	30.7	85	30.6

basal + insulin aspart ± OGLDs for both insulin naïve and insulin user groups [Table 10].

Insulin detemir ± OGLD

Of the total cohort, 313 patients started on insulin detemir ± OGLD was 313, of which 302 (96.5%) were insulin naïve and 11 (3.5%) were insulin users. After 24 weeks of starting or switching to insulin detemir, hypoglycaemic events was nil in both insulin naïve and user groups similar to baseline. Body weight decreased and quality of life improved at 24 weeks [Tables 11 and 12].

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

Parameter	*N*	Baseline	Week 24	Change from baseline
Glycaemic control (insulin naïve)				
HbA$_1$c, mean (%)	1169	8.7	7.3	−1.5
FPG, mean (mmol/L)	1299	11.9	6.6	−5.3
PPPG, mean (mmol/L)	862	17.2	8.9	−8.3
Glycaemic control (insulin users)				
HbA$_1$c, mean (%)	73	9.1	7.5	−1.6
FPG, mean (mmol/L)	74	10.8	6.7	−4.1
PPPG, mean (mmol/L)	52	17.1	9.1	−8.1

HbA$_1$c: Glycated haemoglobin A$_1$c, FPG: Fasting plasma glucose, PPPG: Postprandial plasma glucose

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

Parameter	*N*	Baseline	Week 24	Change from baseline
Hypoglycaemia, events/patient-year				
Insulin naïve	27	0.0	0.0	0.0
Insulin users	26	1.0	0.0	−1.0
Bodyweight, kg				
Insulin naïve	25	69.8	70.1	0.4
Insulin users	24	70.7	70.9	0.2
Quality of life, VAS scale (0-100)				
Insulin naïve	24	36.6	80.1	43.5
Insulin users	16	33.4	80.3	46.9

VAS: Visual analogue scale

Table 9: Insulin dose

Insulin dose, U/day	*N*	Pre-study	*N*	Baseline	*N*	Week 24
Insulin naïve	0	0	27	44.1	24	32.3
Insulin users	26	31.7	26	44.2	24	35.0

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

Parameter	*N*	Baseline	Week 24	Change from baseline
Glycaemic control (insulin naïve)				
HbA$_1$c, mean (%)	23	8.7	7.2	−1.5
FPG, mean (mmol/L)	24	12.7	6.6	−6.1
PPPG, mean (mmol/L)	19	18.0	8.8	−9.2
Glycaemic control (insulin users)				
HbA$_1$c, mean (%)	21	9.0	7.4	−1.6
FPG, mean (mmol/L)	24	12.7	6.6	−6.1
PPPG, mean (mmol/L)	19	18.0	8.8	−9.2

HbA$_1$c: Glycated haemoglobin A$_1$c, FPG: Fasting plasma glucose, PPPG: Postprandial plasma glucose

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, 144 patients started on insulin aspart ± OGLD, of which 131 (91.0%) were insulin naïve and 13 (9.0%) were insulin users. After 24 weeks of starting or switching to insulin aspart, hypoglycaemic events reduced from 2.0 events/patient-year to 0.0 events/patient-year in insulin user group, whereas hypoglycaemia remained nil in insulin naïve group similar to baseline. 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 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, body weight increased in insulin naïve group while there was no change 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 Mumbai, India.

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

Parameter	*N*	Baseline	Week 24	Change from baseline
Hypoglycaemia, events/patient-year				
Insulin naïve	302	0.0	0.0	0.0
Insulin users	11	0.0	0.0	0.0
Body weight, kg				
Insulin naïve	264	72.1	71.9	−0.2
Insulin users	9	73.0	71.5	−1.5
Quality of life, VAS scale (0-100)				
Insulin naïve	269	39.2	79.7	40.5
Insulin users	6	42.0	80.7	38.7

OGLD: Oral glucose-lowering drug, VAS: Visual analogue scale

Table 12: Insulin dose

Insulin dose, U/day	*N*	Pre-study	*N*	Baseline	*N*	Week 24
Insulin naïve	0	0	302	20.4	275	20.7
Insulin users	11	21.6	11	13.5	10	14.6

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

Parameter	*N*	Baseline	Week 24	Change from baseline
Glycaemic control (insulin naïve)				
HbA$_1$c, mean (%)	239	8.8	7.3	−1.5
FPG, mean (mmol/L)	271	12.0	6.6	−5.4
PPPG, mean (mmol/L)	178	17.2	8.9	−8.3
Glycaemic control (insulin users)				
HbA$_1$c, mean (%)	8	9.2	7.2	−2.0
FPG, mean (mmol/L)	10	9.9	6.2	−3.8
PPPG, mean (mmol/L)	5	14.6	8.3	−6.3

HbA$_1$c: Glycated haemoglobin A$_1$c, 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	131	0.0	0.0	0.0
Insulin users	13	2.0	0 0	−2.0
Body weight, kg				
Insulin naïve	104	70.2	70.3	0.1
Insulin users	8	71.1	71.4	0.3
Quality of life, VAS scale (0-100)				
Insulin naïve	101	40.6	78.8	38.2
Insulin users	8	43.8	83.6	39.9

OGLD: Oral glucose-lowering drug, VAS: Visual analogue scale

Table 15: Insulin dose

Insulin dose, U/day	*N*	Pre-study	*N*	Baseline	*N*	Week 24
Insulin naïve	0	0	131	28.7	106	22.0
Insulin users	13	35.8	13	35.7	9	23.2

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

Parameter	*N*	Baseline	Week 24	Change from baseline
Glycaemic control (insulin naïve)				
HbA1c, mean (%)	98	8.5	7.2	−1.4
FPG, mean (mmol/L)	106	11.6	6.6	−5.0
PPPG, mean (mmol/L)	85	17.2	8.8	−8.4
Glycaemic control (insulin users)				
HbA1c, mean (%)	8	10.0	7.4	−2.6
FPG, mean (mmol/L)	8	11.3	7.1	−4.2
PPPG, mean (mmol/L)	5	19.7	10.5	−9.2

HbA$_1$c: Glycated haemoglobin A$_1$c, FPG: Fasting plasma glucose, PPPG: Postprandial plasma glucose

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