P-0654 - Treatment of resistant hypertension and glycemic control in Emirati patients with type 2 diabetes

Noor Amar, Bashair Mussa, Hessa Qatami, Salah Abusnana
University of Sharjah, College of Medicine, Sharjah, UAE
Rashid Center For Diabetes and Research, Ministry of Health, Ajman, UAE

Background

- Hypertension (HTN) and type 2 diabetes mellitus (T2DM) are major risk factors of cardiovascular diseases.
- Recent studies have shown the prevalence of HTN among Emiratis with T2DM is more than 60%.
- It has been found that several hypertensive patients with T2DM have high systolic blood pressures (SBP) despite being on several antihypertensives.
- This uncontrolled hypertension despite the use of at least 3 antihypertensive medications is defined as resistant hypertension (rHTN). The prevalence of rHTN has recently doubled in clinical practice.
- The precise prevalence of rHTN among Emirati patients with T2DM is yet to be determined. Therefore, the present study aimed to investigate the prevalence of rHTN among this group of patients and the relationship between antihypertensive medications and HbA1C.

Participants

- Emiratis patients with T2DM who attended Rashid Centre for Diabetes and Research between June 2010 – June 2015 were included in the present study.
- 500 patients with hypertension and T2DM were randomly selected from a database of 3214 patients. 97 patients were excluded.

Methods

- The following variables were evaluated for each of 403 patients at their first, 6-month, 12-month and 24-month visits: age, gender, diabetes profile, BMI, diastolic blood pressure (DBP), SBP and lipid profile.

Analysis

- All data are expressed as means for continuous and percentage for discrete variables.
- Statistically significant *p*-value was set below 0.05.
- ANOVA and post-hoc Tukey test were done to correlate the variables between the groups and visits.

Results

- The 403 patients were divided into 3 groups in each visit. Group 1 used one antihypertensive (antiHTN), group 2 used only two antiHTN, and group 3 used three or more antiHTN.
- The baseline demographic profiles of these 3 groups are shown in table 1.
- The mean age was 61 years & was significantly different between the 3 groups (*p* < 0.001).

Table 1: Baseline demographic profile of 3 groups

Variable	Group 1	Group 2	Group 3
No. of patients (mean, %)	158 (38.7)	142 (34.8)	103 (25)
Age (years)	58 ± 10	61 ± 10	66 ± 8
Females (%)	71.5	67.6	76.5
Males (%)	18.5	32.4	23.5
Diabetes Duration (Years)	13 ± 7	15 ± 7	17 ± 8

- The average diabetes duration in the 3 groups was 14.7 years and it was significantly different between groups 1 and 3 with mean duration of 13 years and 17 years, respectively (*p* = 0.001).
- The number of participants using more than one antiHTN increased from the first to the fourth visits.

Figure 1: Change in number of antiHTN used across visits

The average of the variables in each visit is illustrated in table 2.

- SBP decreased across visits (*p*<0.001), specifically between visit 1 and 2 (*p*<0.001).
- There was also a decrease in HbA1c from visit 1 to the visit 4 (*p*<0.001) which began in visit 2 and remained constant to visit 4.
- Similarly, total cholesterol and LDL also decreased across the visits (*p*<0.001 for both).

Table 2: Average of variables in each visit

Variable	Visit 1	Visit 2	Visit 3	Visit 4
BMI (kg/m²)	34.1	33.8	33.9	33.7
Pulse (bpm)	80	81	80	80
SBP (mmHg)	142	138	140	141
DBP (mmHg)	74	72	73	73
HbA1c (%)	8.8	8.0	8.1	8.0
Cholesterol (mmol/L)	4.5	4.25	4.15	4.15
Triglycerides (mmol/L)	1.70	1.75	1.75	1.75
HDL (mmol/L)	1.20	1.25	1.25	1.25
LDL (mmol/L)	2.70	2.55	2.45	2.45

- Table 3 shows the change in SBP among the 3 groups across the visits. Only group 3 shows significant change in SBP across the visits particularly a decrease from visit 1 & 2 (*p*=0.003) & increase from visit 2 & 3 (*p*=0.002).
- In visit 1, SBP is higher in group 3 (using >3 antihypertensives) than in group 1 (*p*<0.001).
- A similar result among the groups is demonstrated in all visits.

Table 3: SBP of each group in each visit

(mmHg)	Visit 1	Visit 2	Visit 3	Visit 4	P-value
Group 1	137	134	134	136	0.154
Group 2	142	138	140	142	0.172
Group 3	151	142	149	147	0.001
P-value	<0.001	0.008	<0.001	<0.001	

- The changes in HbA1c among the groups are shown in table 4 and are significant for each group across all visits (*p*<0.001).
- However, only visit 2 shows a mildly significant increase in HbA1c between the groups 2 & 3 (*p*=0.038).

Table 4: HbA1c of each group in each visit

(%)	Visit 1	Visit 2	Visit 3	Visit 4	P-value
Group 1	8.9	8.0	8.2	7.9	<0.001
Group 2	8.6	7.8	7.9	7.9	<0.001
Group 3	9.0	8.3	8.1	8.2	<0.001
P-value	0.175	0.038	0.195	0.270	

- The results have also shown that the lipid profile of the studied groups have changed significantly across the visits.
- Cholesterol has decreased significantly in each group from the first to the fourth visits with *p*-value of <0.001.
- Similarly, LDL decreased from an average of 4.4mmol/L to an average of 4.05mmol/L in all groups from visit 1 to visit 4 (*p*<0.001).

Conclusion

- The present study demonstrated that despite the use of more than three antihypertensives, the third group was found to have significantly higher SBP than the first group.
- This suggest the presence of rHTN among this group of T2DM patients.
- This resistance seems to be age – and diabetes duration- dependent.
- The prevalence of patients who used >3 antiHTN and still had high BP was 2.64%.

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