Racial differences of endothelial function and plasma endothelin-1 level in preclinical Tibetan and Han male population

Preklinik Tibet ve Han erkek popülasyonunda endotel fonksiyonu ve plasma endotelin-1'in ırksal farklılıkları

In recent two decades, endothelial function has been suggested as an independent marker of atherosclerotic vascular disease (ASVD). Racial variations have been reported in the endothelial function among African American and Caucasian. Our previous studies revealed endothelial dysfunction in Tibetan young adults (1), even in adolescents (2). To the best of our knowledge, the difference of endothelial function between Tibetan population (a minority in south-west China, about 0.2% of the total Chinese population) and Han population (the majority in China, more than 90% of the total population) is still unknown. This study was designed to investigate the difference in endothelial function between Tibetan and Han population.

Totally 272 Tibetan male subjects and 580 Han male subjects were enrolled in this study. All of them were Qinghai-Tibet Railway constructers. All subjects lived and worked in the same situation (the altitude of Lhasa is 3658 m). Basic characteristics were evaluated. Brachial artery flow-mediated dilation (FMD) was measured (3). Venous blood was sampled for the measurement of lipid profile and glycosylated hemoglobin (HbA1c). Plasma endothelin-1 (ET-1) was quantitated using ELISA kits.

Body mass index and waist-hip ratio in Tibetan subjects were much higher than those in Han subjects (Table 1). Low-density lipoprotein (LDL) cholesterol and plasma ET-1 concentration in Tibetan subjects were significantly higher than Han subjects (Table 1). The baseline brachial artery diameter in Tibetan group was much higher than that of Han group (Table 1). The absolute and percent changes in brachial artery diameter were lower in Tibetan population compared with Han population (Table 2).

In this study, all subjects were age-matched and recruited from the similar working environment with similar physical activity. The Tibetan subjects were overweight. The possible reason is the difference of dietary pattern between Tibetan and Han population. The traditional Tibetan food is rich of protein and fat, but poor of fruit and vegetables (4). Studies showed that LDL cholesterol was related with impaired endothelial function. Our study showed LDL cholesterol in Tibetan subjects was significantly higher than that in Han subjects. We suppose that the higher LDL cholesterol level play a role in endothelial function impairment among Tibetan population. We found ET-1 levels in Tibetan to be much higher than in Han subjects. Since ET-1 has potent contractile and proliferative properties, it has been suggested to be involved in the pathogenesis of endothelial dysfunction and atherosclerotic diseases (5). In our study, the higher plasma ET-1 concentration in Tibetan subjects than in Han subjects may partly explain the deteriorated endothelial function in Tibetan.

In conclusion, this study revealed the deteriorated endothelial function in Tibetan than in Han populations. Future questions should address how to ameliorate the public health situation in Tibet.

Table 1. Characteristics of the study population

Variables	Han nationality	Tibetan nationality	*t/x^2	*p
Age, years	41.8±11.1	42.9±9.4	1.4137	0.1578
SBP, mmHg	132.5±18.1	133.2±14.7	0.5574	0.5774
DBP, mmHg	79.6±11.2	81.1±9.1	1.9300	0.0539
HbA1c, %	5.76±0.78	5.82±0.87	1.0082	0.3136
Total cholesterol, mmol/L	5.37±1.05	5.42±0.97	0.6637	0.5071
HDL cholesterol, mmol/L	1.21±0.37	1.20±0.33	0.3804	0.7038
LDL cholesterol, mmol/L	3.07±0.86	3.49±0.91	6.5223	<0.001
Triglyceride, mmol/L	1.97±1.44	2.31±1.31	3.4200	0.0007
BMI, Kg/m^2	26.5±3.4	30.1±2.5	15.5951	<0.001
Waist-hip ratio	0.88±0.05	0.92±0.07	9.5254	<0.001
ET-1, pg/mL	6.57±1.47	8.11±2.15	12.2097	<0.001
Baseline brachial diameter, mm	4.03±0.04	4.28±0.06	71.9156	<0.001
Hypertension, n (%)	103 (17.8)	58 (21.3)	1.5354	0.2150
Diabetes, n (%)	48 (8.3)	28 (10.3)	0.9284	0.3350
Smoking, n (%)	492 (84.8)	243 (89.3)	3.1801	0.0750
Smoke	1.78±0.56	1.85±0.46	1.7966	0.0727

Values are presented as mean±SD and number (percentage)
*t-test for independent samples and Chi-square test
All subjects are male. Han nationality: 580 subjects, Tibetan nationality: 272 subjects.
Cigarette smoking: never smoke scored as 0, quitted as 1, always smoking as 2. The "always smokers" were included to analyze smoke rate.
BMI - body mass index, DBP - diastolic blood pressure, ET-1 - endothelin-1, FMD - flow-mediated dilatation, HbA1c - glycosylated hemoglobin, HDL - high-density lipoprotein, LDL - low-density lipoprotein, SBP - systolic blood pressure

Table 2. Changes in brachial artery FMD

Variables	Han nationality	Tibetan nationality	*t	*p
Absolute change, mm	0.141±0.006	0.124±0.005	40.5820	<0.001
Percent change, %	3.587±0.152	2.934±0.204	52.1732	<0.001

Values are presented as mean±SD
*t-test for independent samples
FMD - flow-mediated dilatation

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Intermittent fasting and laboratory findings in patients with prosthetic valves

Protez kapaklı hastalarda aralıklı açlık ve laboratuvar bulguları

Prosthetic valve thrombosis (PVT) is an uncommon, but dreadful complication of valve replacement, far more frequently associated with mechanical prosthetic valves. During the lunar month of Ramadan, the majority of adult practicing Muslims refrain from eating, drinking, and sexual intercourse during the daylight hours (from dawn to sunset) throughout the lunar month. In summer time, this period of abstinence may extend for as long as 14 hours; and in quite hot weather (1). The inevitable ensuing dehydration may portend a particular risk of PVT in patients with mechanical prosthetic valves. We explored whether daytime fasting during the month of Ramadan reduces the efficacy of oral anticoagulation in patients with mitral mechanical prosthetic valves.

Prospectively, we enrolled 70 consecutive patients, who underwent prior surgical mitral valve replacement for symptomatic severe mitral regurgitation in all patients, with or without mitral stenosis. All patients received a mechanical bileaflet prosthesis; either St. Jude prosthesis (St. Jude Medical Inc, USA), or CarboMedics valve (CarboMedics Inc, USA). All patients had been prescribed warfarin sodium at discharge; the dose was subsequently adjusted with the aim to keep the international normalized ratio (INR) between 2.5 and 3. All patients fasted for 30 days during the calendar month of Ramadan, with complete abstinence from food and fluids continuously for at least 15 hours of daylight, at which time the local temperature averaged 38° Celsius. Patients underwent lab assessment of INR, serum sodium and potassium, at day 21 of fasting; all were repeated one month later in the non-fasting state. Clinical follow-up was performed at day 21 of fasting and monthly thereafter for 3 months in the non-fasting state. Assessment of the prosthetic valves by trans-thoracic echocardiography was performed at day 21 of fasting, as well as 3 months later in the non-fasting state. Venous samples were taken at day 21 of fasting between 11 and 12 AM (on average after 8 hours of starting the fasting state), as well as one month later in the non-fasting state; samples were taken at almost the same timing.

Table 1. Mean laboratory values for the coagulation profile, serum electrolytes and plasma osmolality in the fasting and non-fasting states

Variables	Fasting state (n=70)	Non-fasting state (n=70)	Laboratory control value	*p
Prothrombin time, sec	34.2±7	34.7±13	10.5-12	0.7
INR	2.7±0.5	2.7±0.9		0.6
Serum potassium, meq/L	4.17±0.3	3.9±0.3	3.4-5.2	0.83
Serum sodium, meq/L	147±4.3	145±6.0	134-148	0.74
Plasma osmolality, mosm/Kg	315±4.3	314±5.9	275-295	0.81

All variables are presented as mean±SD
*t-test for independent samples
INR - international normalized ratio

A total of 70 patients with prior surgical mitral valve replacement were enrolled in the current study. The mean age of the study cohort was 31.2±5.1 years; 37 (52.9%) were males, 33 (47.1%) females. Sixty-four patients (91.4%) were in sinus rhythm. Three patients (4.3%) were diabetic, and none was hypertensive. No significant difference was found between the INR value or serum electrolytes in the fasting state and that in the non-fasting state (p>0.05 for all) (Table 1). No patient developed any symptoms suggestive of PVT. Assessment by echocardiography revealed well-functioning prosthetic valves, with no evidence of PVT in any patient at the two time points of follow-up.

Recent reports showed no increase in the incidence of acute myocardial infarction, unstable angina, or cerebrovascular stroke during Ramadan fasting (2, 3). Another study concluded that Ramadan fasting does not increase coronary events (4). This argues in favor of the notion that the effects of Ramadan fasting on stable patients prone to thrombotic events are quite minimal (5).

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