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International Journal of Cardiology 116 (2007) 219–224

International Journal of Cardiology

www.elsevier.com/locate/ijcard

Target organ damage in hypertensive patients of different ethnic groups

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Received 6 December 2005; received in revised form 16 March 2006; accepted 25 March 2006
Available online 5 July 2006

Abstract

Background: Hypertension is associated with involvement of target organs which varies among the different ethnic groups. The multiplicity of the population in Israel offers an opportunity for evaluating target organ damage in hypertensive patients of different ethnic origins.
Methods and results: Data were collected from the computerized medical files of hypertensive patients in primary care clinics. The analysis was done on 576 hypertensive patients: 138 Bedouins (Arab residents), 141 Sephardic Jews (immigrants from North Africa and the Middle East), 152 Asian-Indian Jews (immigrants from India) and 145 Ashkenazi Jews (immigrants from Europe and North and South America). In multivariable logistic regressions adjusted for known risk factors and ethnicity, the prevalence of cerebrovascular disease was the highest among the Asian-Indian Jews (OR=3.09, p value=0.009). Renal damage was highest among the Bedouins (OR=4.54, p value<0.0001) and Asian-Indian Jews (OR=2.88, p value=0.005). The differences in the prevalence of renal damage among the various ethnic groups were even more pronounced among patients without diabetes (OR=8.31, p value<0.0001 in Bedouins and OR=7.46, p value=0.001 in Asian-Indian Jews). The prevalence of ischemic heart disease did not differ significantly among the four ethnic groups.
Conclusions: The prevalence of cerebrovascular and renal diseases are both significantly associated with ethnic origin of Asian-Indian Jews and Bedouins. However, the multivariate analysis shows that the prevalence of ischemic heart disease is not associated with ethnicity.

Keywords: Hypertension; Target organ damage; Ethnicity

1. Introduction

The prevalence of hypertension associated target organ involvement, as well as the damage caused to the various target organs in hypertensive patients, tend to differ among various ethnic groups [1,2]. However, to the best of our knowledge, most of the studies done on this subject until today compare only two ethnic groups, usually Caucasians with either Blacks or Asians and focus on one target organ at a time [3,4]. It was found that both Afro-Americans and Asians experience higher mortality and morbidity due to stroke compared to Caucasians [5–7].

The aim of our study was to evaluate the target organ damage (TOD) in several ethnic groups of hypertensive patients. Israel is characterized by two facts that assisted us in achieving this aim. The first fact is the multiplicity of ethnic groups of the Israeli population, and the second fact is that for more than a decade, Israel was introduced to the National Health Insurance Law (NHIL), and since then all the population enjoys similar availability and accessibility to health services, regardless of socio-economic constraint. These two facts provided us the opportunity to assess the prevalence of TOD in hypertensive patients of four ethnic groups. We examined the following TOD: the brain, the heart and the kidney. The hypertensive population that came from the southern region of the country, the Negev area, and included (1) Ashkenazi Jews, whose origin is from Europe or

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doi:10.1016/j.ijcard.2006.03.049

America; (2) Sephardic Jews, whose origin is from North Africa or the Middle East; (3) Asian-Indian Jews, whose origin is from India; and (4) Bedouin Arabs residing in Israel.

2. Patients and methods

2.1. Study population

The study population came from the Negev region of Israel, which is populated by 850,000 citizens including both Jewish and Bedouin Arab residents. Patients were recruited from three primary care clinics of the same health service (Clalit Health Services).

Inclusion criteria: Subjects above 20 years of age with the diagnosis of essential hypertension in their computerized medical files were included.

Exclusion criteria: Subjects with secondary hypertension, pregnancy, active malignant disease, patients with acquired immunodeficiency syndrome, patients who were born in Israel and their ethnic origin was not documented, and patients with the diagnosis of essential hypertension who did not receive antihypertensive medication and their recorded BP measurements were below 130 mm Hg systolic and 80 mm Hg of diastolic were not included in the study group.

We aimed to include approximately 150 patients from each of four ethnic groups, We worked with three primary care clinics, where we identified the first 150 hypertensive patients from each ethnic group meeting the inclusion criteria. We recruited the Ashkenazi Jews and the Sephardic Jews from one clinic [286 patients: Ashkenazi ($n=145$), Sephardic ($n=141$)] and, the Asian-Indian Jews and the Bedouins were recruited from the other two clinics [290 patients: Asian-Indian ($n=152$) and Bedouins ($n=138$)]. Overall, we enrolled 576 hypertensive patients. The classification of patients into one of the ethnic groups was according to the country of birth, indicated on the computerized medical file.

2.2. Data collection

Data were collected from computerized medical files of the subjects. Computerized data have been available in the participating clinics since 1998. Earlier data are included in the file, but they are less complete. The data presented in the study are up to the year 2002.

For each patient, the following data were included: age, gender, country of birth, the age of diagnosis of hypertension, blood pressure values at the time of the diagnosis, other blood pressure measurements during the study period and the last blood pressure measurement that were recorded in the computerized medical file. We collected data on renal function and damage: the first and the last values of urea and creatinine, urinary protein excretion or microalbumin in a 24 h urine collection were recorded.

Data on other atherosclerotic risk factors (besides hypertension) were collected as well: presence of diabetes mellitus (DM), LDL (low-density lipoprotein) and HDL (high-density lipoprotein) levels, the first and the last value that was recorded in the file, were also collected.

In addition data were collected on the following diseases:

1. Ischemic heart disease (IHD), diagnosed as one of the following: documented myocardial infarction, documented acute coronary syndrome, history of coronary artery bypass grafting or percutaneous transluminal coronary angioplasty.
2. Cerebrovascular disease, diagnosed by documented cerebrovascular event, transient ischemic attack or the finding of cerebral infarction on computerized tomography of the brain.
3. Renal damage was diagnosed if creatinine level was above 1.4 mg/dL and/or microalbuminuria above 30 mg/24 h was present. Only patients with measurement of 24 h urine collection of microalbumin and at least one creatinine measurement were considered for this category (from the total of 576 hypertensive patients in our study only 424 hypertensive patients had the data described above).

Data on the antihypertensive treatment patients were taking were collected as well.

The medications considered as antihypertensive treatment were beta blockers; alpha blockers; calcium channel blockers: dihydropyridines and non-dihydropyridines, angiotensin II antagonists, angiotensin converting enzyme inhibitors; diuretics: thiazide, loop-diuretics and aldospirone. The study was approved by the ethics committee of our institution.

2.3. Statistical analysis

One way ANOVA, Tukey and chi-square tests were carried out to test for the significance of differences of continuous and discrete variables, as appropriate. These analyses were followed by multivariate logistic regression analyses, aiming to estimate the contribution of ethnic origin to cerebrovascular, cardiovascular and renal pathology, while controlling for such confounding variables as age (70+ yes/<70 yes.), gender, diabetic status (yes/no), the known duration of HTN (5+ yes/<5 yes) and whether or not HTN was controlled. Finally, patients were classified into two groups according to their diabetic status: with and without diabetes and the same logistic regression were re-carried out for each of the two groups separately.

The sample size was calculated to reach a power (1-beta) of 0.8 for general target organ involvement.

3. Results

3.1. A comparison of demographic and risk factors characteristics among the four ethnic groups

Significant differences were found in the age, the known duration of hypertension and the level of systolic and