

Original article

Orthostatic hypotension is associated with more severe hypertension in elderly autonomous diabetic patients from the French Gerodiab study at inclusion

L'hypotension orthostatique est associée à une hypertension artérielle plus sévère pour un traitement antihypertenseur similaire chez les patients diabétiques âgés autonomes à l'inclusion dans l'étude Gerodiab

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Abstract

Orthostatic hypotension (OH) has deleterious effects on patients' cardiovascular prognoses. The combination of increased age and diabetes adds to the risk of OH. The aim of the study was to describe the elderly diabetic population relative to the degree of hypertension, the occurrence of complications, medications and cognitive function.

Methods. – In the Gerodiab study (a 5-year French multicentre, prospective, observational study), a total of 987 type 2 diabetic autonomous patients, aged 77 ± 5 years, were recruited between June 2009 and July 2010. Clinical blood pressure measurements were taken supine and then after 1, 3 and 5 minutes in a standing position. OH was defined as a decrease in systolic blood pressure (SBP) of at least 20 mmHg and/or a decrease in diastolic blood pressure (DBP) of at least 10 mmHg at any of the measurements while standing.

Results. – At inclusion 301 (30.5%) patients had OH; SBP and DBP at rest were higher in patients with OH than in those without ($146 \pm 21/78 \pm 11$ mmHg vs. $138 \pm 17/72 \pm 10$ mmHg; $P < 0.001$). Individuals with OH exhibited higher pulse pressure (PP) than individuals without (68 ± 18 vs. 65 ± 15 mmHg; $P < 0.05$). A significant increase in waist-to-hip ratio was recorded in those with OH versus patients without ($P < 0.01$). Despite more severe hypertension (SBP > 160 mmHg at inclusion; $P < 0.01$), no significant difference was recorded in the mean number of antihypertensive drugs (1.7 ± 1.1), or in the class of antihypertensive drugs, including beta-blockers ($P = 0.19$) and diuretics ($P = 0.84$). Patients with OH were more likely to have a history of peripheral arterial disease and amputations (31% vs. 24%, $P < 0.05$, and 3.3% vs. 1.5%, $P = 0.056$). There was no significant association between OH and history of peripheral neuropathy ($P = 0.37$), stroke, heart failure or ischemic heart disease. In multivariate analysis, OH remained associated with severe hypertension ($P < 0.01$), increased waist-to-hip ratio ($P < 0.05$) and amputations ($P < 0.05$).

Conclusion. – About one-third of elderly, autonomous diabetic patients had OH. They had more severe hypertension, with higher SBP, DBP and PP at rest. However, the number of anti-hypertensive drugs did not differ compared to patients without OH. This could reflect the medical teams' fears about intensifying treatment.

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Keywords: Hypertension in the elderly; Orthostatic hypotension; Geriatric tests

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Résumé

Les diabétiques âgés sont surexposés à l'hypotension orthostatique (HO), elle-même néfaste sur le pronostic cardiovasculaire. L'objectif était d'évaluer la fréquence de l'HO et ses facteurs associés dans la cohorte Gerodiab à l'inclusion.

Méthodes. – L'étude Gerodiab a recruté 987 diabétiques de type 2 autonomes, de 70 ans ou plus. La pression artérielle était mesurée, après 5 min de repos, et à 1, 3 et 5 minutes après passage en orthostatisme. L'HO était définie par une baisse de PAS d'au moins 20 mmHg et/ou de PAD d'au moins 10 mmHg à 1, 3 ou 5 minutes. Les données (m ± SD; %) ont été comparées par test *t* ou du χ^2 ; l'analyse multivariée a été réalisée par modèle logistique.

Résultats. – Trois cent un (30,5 %) patients avaient une HO; la PAS et la PAD étaient plus élevées au repos chez les patients présentant une HO (146 ± 21 et 78 ± 11 vs. 138 ± 17 et 72 ± 10 mmHg; $p < 0,001$). Ils avaient également une HTA plus sévère ($p < 0,01$). Les patients avec HO présentaient une pression pulsée plus élevée (68 ± 18 vs 65 ± 15 mmHg; $p < 0,05$). Leur ratio taille-hanche était augmenté ($p < 0,01$). Aucune différence significative n'était constatée pour les traitements antihypertenseurs, notamment bêta-bloquants et diurétiques, l'âge, l'ancienneté du diabète ou les scores gériatriques. Les patients avec HO avaient plus souvent une artériopathie oblitérante des membres inférieurs (31 % vs 24 %; $p < 0,05$) et des amputations (3,3 % vs 1,5 %; $p = 0,056$). Ils n'avaient pas plus fréquemment de neuropathie périphérique, d'AVC, d'insuffisance cardiaque, de cardiopathie ischémique. En analyse multivariée, l'HO était associée successivement à l'HTA sévère ($p < 0,01$), au ratio taille-hanche ($p < 0,05$) et aux amputations ($p < 0,05$).

Conclusion. – Un tiers environ des patients diabétiques âgés autonomes présente une HO. Ils ont une HTA plus sévère sans majoration du traitement antihypertenseur. L'HO pourrait constituer une limitation à l'intensification du traitement antihypertenseur dans cette population.

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Mots clés : HTA du sujet âgé; Hypotension orthostatique; Tests gériatriques

1. Introduction

Orthostatic hypotension (OH) is common in the elderly, affecting up to 30% of the general population over 65 years old [1–3]. Large differences have been reported in its prevalence, ranging from 18% to 60% of people living in institutions [4,5]. OH may or may not be symptomatic [6]. Various hemodynamic mechanisms underlying orthostatic adjustments have been reported with ageing, including a decline in the efficiency of baroreflexes [7]. OH has deleterious effects on cardiovascular function, leading to an increased incidence of cerebrovascular disease, myocardial infarction and mortality [8].

Diabetes is another well-known condition that causes autonomic failure [9]. Compared with younger diabetic patients, the consequences of diabetes and ageing accumulate in the elderly, and exacerbate degenerative complications and the effects of comorbidities [10]. Although numerous studies have investigated the macroangiopathic complications in type 2 diabetic patients under the age of 70 years, little is known about elderly diabetic patients, particularly regarding the impact of OH on the occurrence of complications [11]. Additionally, there is no clear data about possible relationships between OH and other geriatric parameters such as cognition, nutrition and mood in elderly diabetic patients.

The purpose of the present study was to assess the prevalence of orthostatic hypotension and its potential associations with the degree of hypertension, diabetic complications and cognitive function in diabetic patients aged 70 years and older from the Gerodiab cohort at inclusion.

2. Material and methods

The Gerodiab study is a French multicentre, prospective, observational 5-year follow-up study designed to analyze glycemic control, morbidity and mortality in type 2 diabetic

patients aged 70 years and older, with relatively preserved autonomy (Activity of Daily Living score > 3/6). Protocol details and a description of the population at inclusion have been published previously [12]. Data collection was primarily based on the patient history, including demographic data, cardiovascular risk factors and physical examination.

2.1. Definition of orthostatic hypotension

Blood pressure was measured in a supine position after a 5-minute rest, and orthostatic hypotension was based on measurements after 1, 3 and 5 minutes of standing. OH was defined as a decrease in systolic blood pressure (SBP) of at least 20 mmHg and/or a decrease in diastolic blood pressure (DBP) of at least 10 mmHg at any of the blood pressure measurements after 1, 3 and 5 minutes of standing. Pulse pressure was defined as the difference between the extremes of blood pressure, i.e. SBP minus DBP.

Microvascular complications, including retinopathy and nephropathy, were diagnosed through medical history, systematic ophthalmologic exam, a possible angiography and laboratory assays including glomerular filtration rate (GFR) as estimated by the Modification of Diet in Renal Disease (MDRD) formula and measurement of 24-hour urinary albumin excretion [13]. Cardiovascular complications were diagnosed through medical history, physical examination and ECG. Myocardial infarction, heart failure, vascular disease of the lower limb and cerebral blood vessels were defined if any evidence was found in the history, physical exam, ECG, or complementary examinations such as Doppler tests [14]. A clinical investigation was systematically done for neuropathy (including symptoms, muscular strength, 10 g monofilament testing, and deep tendon reflexes). Due to the observational nature of the study, other complementary investigations were left to the discretion of the

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