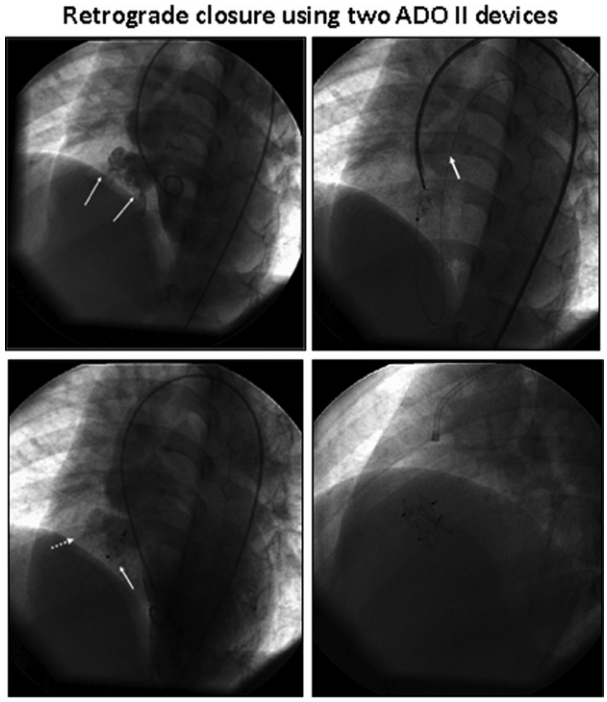

Figure 1 **Membranous Septal Aneurysm With Multiple Fenestrations**

See **arrows, top left panel**. A 0.014-inch guidewire in the pulmonary artery **(arrow, top right panel)** is used to stabilize the delivery catheter during device deployment. A significant residual shunt **(stippled arrow, lower left panel)** is seen, which was closed with a second device **(lower right panel)**. ADO II = Amplatzer duct occluder II (St. Jude Medical, St. Paul, Minnesota).

than 6.5 mm diameter cannot be closed with the ADO II. Because the retention discs are symmetrical, a minimum distance of 3 mm is required between the upper margin of the VSD and the aortic valve. The ADO II device is cheap and effective for closing pmVSDs. Availability of larger-sized ADO II devices might increase its applicability, allowing percutaneous closure of a wider range of VSDs.

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Research Correspondence

Eligibility for Renal Denervation in Patients With Resistant Hypertension

When Enthusiasm Meets Reality in Real-Life Patients

To the Editor: Percutaneous renal sympathetic denervation (RDN) by radiofrequency ablation is a novel therapeutic intervention that has been shown to decrease blood pressure (BP) significantly (1) and persistently (2) in patients with resistant hypertension (RH). However, the evidence supporting the use of this technique was obtained in a single randomized controlled open trial including 106 patients (1) that has been subject to methodological criticism (3,4). This led the European Society of Hypertension (ESH) to release a position paper that defined strict eligibility criteria for RDN (5). The exact proportion of patients eligible for RDN with the only device currently available (Symplicity, Medtronic, Minneapolis, Minnesota) in "real-life conditions" remains unknown. However, 36 of the 190 patients screened in the Symplicity HTN-2 (Renal Denervation in Patients With Uncontrolled Hypertension) trial (1) did not meet the BP criteria for inclusion, and 30 had a renal artery anatomy incompatible with RDN.

Therefore, we estimated the number of patients eligible for RDN by retrospectively reviewing the computerized medical records of all consecutive patients hospitalized for at least 1 day in 2011 at our tertiary hypertension center at a university hospital in

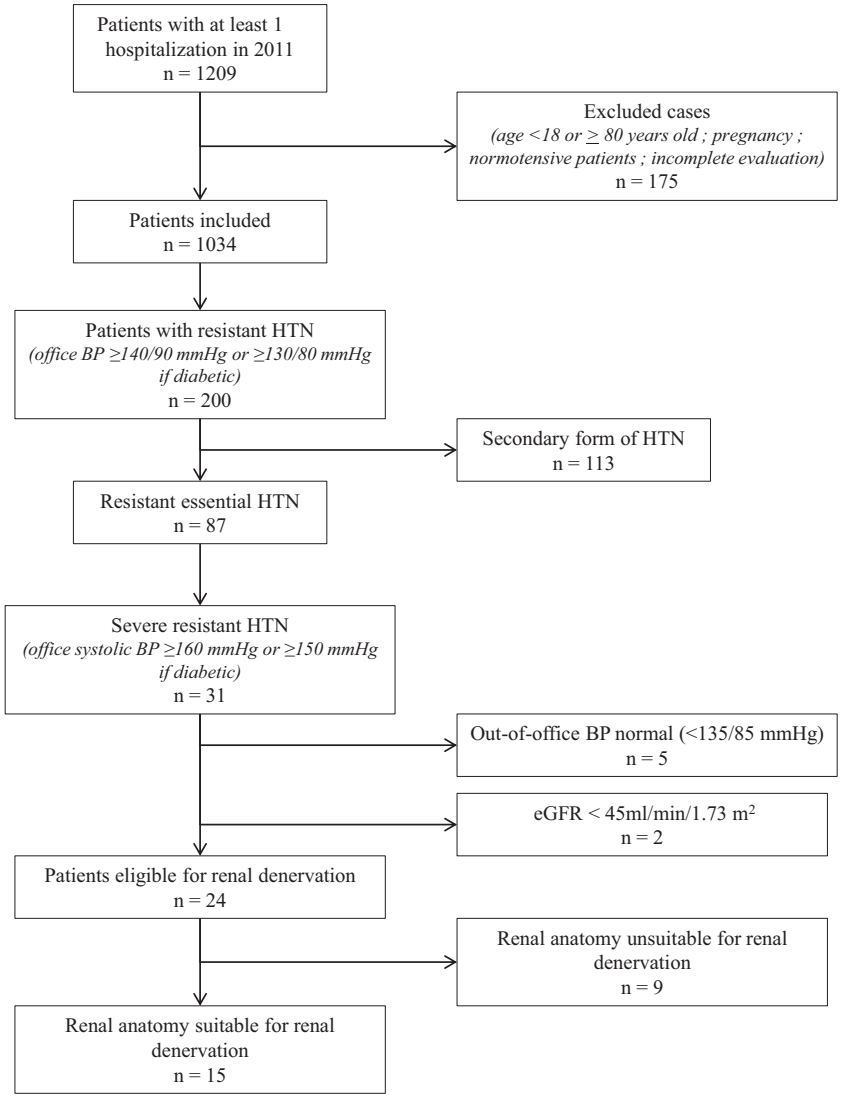

Figure 1 **Patient Screening and Selection**

Diagram showing patient screening for renal denervation in accordance with a European Society of Hypertension position paper.
BP = blood pressure; eGFR = estimated glomerular filtration rate; HTN = hypertension.

Paris, France. Patients were excluded if they were <18 years old or ≤80 years old, pregnant, or normotensive or if the in-hospital work-up to exclude secondary hypertension was incomplete. Resistant hypertension was defined according to ESH guidelines (6) as an office systolic/diastolic BP ≥140 and/or 90 mm Hg (or ≥130 and/or 80 mm Hg in diabetic patients) despite treatment with at least 3 drugs (including a diuretic) prescribed at the maximal tolerated dose. Secondary causes of hypertension were excluded, and compliance with treatment was checked by direct interview at each visit to define our cohort of patients with essential RH.

For the analysis, we considered BP values measured at the last follow-up visit or immediately before etiological treatment of secondary hypertension. We applied the eligibility criteria for RDN to our cohort of patients with essential RH (5): systolic office BP ≥160 mm Hg (or ≥150 mm Hg for patients with diabetes mellitus) despite at least 3 antihypertensive drugs, including a diuretic with out-of-office BP measurements (daytime ambulatory or home BP) ≥135 and/or 85 mm Hg, estimated glomerular filtration rate (eGFR) ≥45 ml/min/1.73 m^2 (according to the modification of diet in renal disease formula), and suitable renal artery anatomy (presence of a single main renal artery ≥4 mm in diameter and ≥20 mm in length, with no significant stenosis, no accessory artery >3 mm in diameter, no previous renal artery intervention, and the presence of 2 kidneys).

During the course of 2011, 3,067 patients were referred to our department, and 1,209 of these patients were hospitalized for their work-up, 175 of whom were excluded from the analysis on the basis of the exclusion criteria listed in the preceding text. Of the remaining 1,034 patients, 200 (19.3%) met the definition of RH according to the ESH criteria. In total, 113 of these 200 patients (56.5%) were diagnosed with secondary hypertension, leaving 87 of 200 (43.5%) patients with a diagnosis of essential RH. Only 31 of

the 87 with essential RH (35.6%) fulfilled the office systolic BP criteria (≥160 mm Hg or ≥150 mm Hg for diabetics) for RDN; 5 of these patients had out-of-office BP <135/85 mm Hg, and 2 had an eGFR <45 ml/min/1.73 m^2. Consequently, only 24 patients were eligible for RDN on both BP and eGFR criteria. Renal artery anatomy was appropriate for RDN on a computed tomography angiogram reviewed by a senior radiologist in only 15 of these 24 patients (62.5%). Therefore, only 1.5% (15 of 1,034) of all hypertensive patients or 17.2% (15 of 87) of the patients with essential RH referred to our tertiary care hypertension department were fully eligible for RDN (see Fig. 1). These proportions might even be overestimates, because: 1) spironolactone, which has proved effective for the treatment of RH (7), was prescribed to only 7 of 29 patients (24.1%); and 2) compliance with treatment was not assessed by systematic plasma or urinary drug determinations.

Our findings demonstrate that percutaneous RDN, whether for clinical trials or specific patients, is limited to a highly selected fraction of patients with RH—even in a specialist hypertension unit—and that a thorough diagnostic work-up is essential for appropriate patient selection. Moreover, the risk associated with this invasive procedure also depends on the careful selection of patients eligible for RDN as well as the experience of the radiologist/cardiologist conducting the intervention. Finally, further evaluation of this technique is still required in large, correctly designed clinical trials, with ambulatory BP as the primary endpoint.

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Please note: Drs. Frank, Bobrie, Plouin, Sapoval, and Azizi were investigators in the Symplicity HTN-2 (Renal Denervation in Patients With Uncontrolled Hypertension) trial (ARDIAN, Inc.) and are participating in the REDUCE-HTN protocol (Vessix Vascular, Inc., Laguna Hills, California). Dr. Azizi has served as a consultant for Vessix Vascular, Inc. and Cordis. Dr. Sapoval has served as a consultant for Vessix Vascular, Inc., Cordis, and St. Jude Medical and is a member of the advisory board of ReCord Medical. Dr. Savard has received financial support from la Société Québécoise d'Hypertension Artérielle, la Société Québécoise de Néphrologie, and La Faculté de Médecine de l'Université Laval (McLaughlin Scholarship Program) for his post-doctoral fellowship.

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Letters to the Editor

The Impact of Treatment on the Pathophysiologic Mechanisms Linking Coronary Heart Disease and Depression

We would like to congratulate Blumenthal et al. (1) for their interesting paper recently published in the *Journal* in which patients with coronary heart disease (CHD) and depression symptoms treated with aerobic exercise reached significantly greater reduction in depression symptoms as compared with the control group. This reduction in depression symptoms is comparable to the sertraline group (1). However, some issues should be addressed. First, in the Results section, the authors stated that sertraline and exercise had a null effect on flow-mediated dilation (FMD). Conversely, in Table 2, the sertraline group showed an improvement in FMD (+1.5%; before treatment 2.6%, after treatment 4.1%) (1). The association between the treated group and improvement in depression symptoms, the autonomic nervous system, FMD, and other markers will be assessed by a 2-sided test (2). This test provides objective information on evaluating the effects of interventions in clinical trials. This clinical trial confirms a recent randomized controlled trial that sertraline improved FMD in those CHD patients treated with 85% statins (3). The data of this study demonstrated vascular endothelial dysfunction in CHD, and depression symptoms might be improved beyond the effects of statins. Nevertheless, the authors did not comment on it in the Discussion section. Second, Blumenthal et al. (1) found that physical activity during daily life was associated with significantly less sympathetic nervous system activity as measured by the standard deviation of the normal-to-normal R-R intervals as compared with the sertraline group and the placebo group. This beneficial effect on the autonomic nervous system does not have a