https://doi.org/10.24875/RECICE.M21000235

SUPPLEMENTARY DATA

Section 1.

THE EPIDEMIOLOGY OF HYPERTENSION

The prevalence of hypertension (HTN) is difficult to estimate and is based on national registries.[1] Overall, it affects somewhere around 30% to 45% of the adult population.[2] HTN is more frequent at advanced age, and its prevalence is over 60% in people aged > 60. In the United States, when the definition of the Joint National Committee 7[3] is used, its prevalence in the adult population is 32%, a value that increases considerably up to 46% if the references established by the American Heart Association back in 2018 are used.[4] In Spain, data from the Di@bet.es trial showed that the prevalence of HTN in the adult population reaches 42.6%, and was more common in men (49.9%) compared to women (37.1%); undiagnosed hypertension was identified in 37.4% of patients. Meanwhile, a total of 88.3% of the patients with known hypertension were being treated with drug therapy, but well-controlled BP was found in 30% of the patients only.[5]

For decades, a large number of clinical trials have shown the benefits of blood pressure (BP) control, leading to a significant reduction of cardiovascular morbidity and mortality.[6,7] However, in industrialized countries this control is not optimal, with levels around 20% to 30% of hypertensive patients, which can be explained by various causes such as secondary hypertension, inadequate antihypertensive therapies, associated factors or comorbidities, as well as lack of compliance to drug treatment.[8,9] It is estimated that a little over 70% of hypertensive patients are, at least, partially compliant to prescribed medications (defined as patients with intake compliances $\geq$ 80%).[10] It has been confirmed that better compliance to treatment is associated with increases in HTN control.[11] This control not only improves the patient's quality of life, and in some cases can significantly simplify their

treatment, but also reduces cardiovascular events. In this sense, there is evidence of better compliance to pharmacological treatment in patients treated with renal sympathetic denervation (RSD).[12]

Resistant hypertension (R-HTN) is defined as uncontrolled hypertension (BP > 140/90 mmHg) despite lifestyle changes and treatment with ≥ 3 antihypertensive drugs at optimal doses, one of them being a diuretic or HTN controlled with ≥ 4 drugs,[13] having ruled out a secondary cause; HTN must be confirmed by ambulatory BP monitoring (ABPM). The prevalence of R-HTN in the United States is somewhere around 10% to 15% of hypertensive patients on treatment.[14] In Spain, the prevalence of R-HTN is between 10% and 13% of the patients treated.[15,16] There is also a small, but very important group of patients classified as patients with refractory HTN[17] including those with uncontrolled hypertension despite following a therapeutic regimen with ≥ 5 antihypertensive drugs including an anti-aldosterone agent. The prevalence of this subgroup of uncontrolled hypertensive patients is low, close to 0.5% of all hypertensive patients treated, and 3.6% of subjects with R-HTN. Despite its low prevalence, this group of patients with refractory HTN expresses an extreme phenotype of failure to pharmacological antihypertensive treatment. Therefore the only therapeutic option is non-pharmacological therapies such as RSD.[18]

The clinical characteristics of patients with R-HTN include a higher prevalence of obesity and overweight, type 2 diabetes mellitus, metabolic syndrome, chronic kidney disease, and silent target organ damage (left ventricular hypertrophy, carotid intima media thickness, carotid atheromatous plaques, retinopathy or microalbuminuria) compared to hypertensive populations who are not treatment-resistant. These characteristics are largely due to the damage caused by sympathetic hyperactivity that persists over time. RSD reduces these patients' sympathetic overactivity[19] leading to clinical benefits beyond optimal and desirable BP control.

Section 2.

ROLE OF SYMPATHIC NERVOUS SYSTEM IN ARTERIAL HYPERTENSION

The pathophysiology of HTN is complex and due to different factors. The sympathetic nervous system (SNS) is a key component in the network of HTN. In hypertensive patients, sympathetic hyperactivity conditions hemodynamic patterns that go from a high cardiac output to a pattern of increased resistance, leading to a reduced arterial compliance and cardiac hypertrophy with peripheral vascular hyperresponsiveness.[20]

The regulation of BP, at SNS level, is supported by several essential mechanisms. On the one hand, baroreceptors send their signals to the vasomotor center which, in turn, operates on the heart and vascular tree through parasympathetic and sympathetic nerves. The arterial baroreceptor reflex dampens sudden changes in BP. In established hypertension, less inhibition of the vasomotor center is seen as a consequence of the readjustment of arterial baroreceptors (mechanoreceptors). On the other hand, the activation of renal sensory nerves, called afferent nerves, produces sustained reflex increases in cardiac sympathetic (ventricular hypertrophy), muscular (insulin resistance), and splenic (vascular inflammation) neuronal activity.

The increased release of epinephrine and norepinephrine in individuals with essential HTN generates a cascade of events that can go from renin secretion, decreased urinary sodium excretion, and, finally, a decreased renal blood flow and glomerular filtration rate.

There is a feedback mechanism between the SNS and the renin-angiotensin-aldosterone system, where angiotensin II exerts stimulating effects on the central sympathetic outflow, the secretion of norepinephrine from adrenergic nerve endings, and on the response of its receptors. The renin-angiotensin-aldosterone system plays a major role in BP regulation and is a key mediator of target organ damage, cardiovascular events, as well as in the progression of kidney disease.[21-25]

In turn, there are other determinants of SNS activation that take place in states of insulin resistance, obesity, physical inactivity, stress or influence of genetic factors in hypertensive patients.[26,27] At renal level, sympathetic innervation consists of an interlocked neural network that includes both afferent and efferent nerve connections.[28] The efferent pathway is made up of postganglionic fibers that go from the hypothalamus to the kidneys through the pre- and paravertebral sympathetic ganglia. Postganglionic fibers run along the renal artery, enter the renal hilum, and split into small bundles to eventually penetrate the cortex and juxtaglomerular area parallel to the blood vessels. The stimulation of the SNS participates in vasoconstriction through 2 different mechanisms: the stimulation of norepinephrine on the postsynaptic alpha-adrenergic receptors located at the surface membrane of epithelial cells of the renal tubules, thus increasing the activity of sodium pump and intravascular volume. The other mechanism is the activation of the beta-adrenergic receptors of the juxtaglomerular apparatus that releases renin, thus increasing tubular sodium reabsorption which, added to the increased sympathetic activation, causes vasoconstriction and water absorption stimulated by angiotensin II. Finally, renal sympathetic activation causes the contraction of the smooth muscles of preglomerular vessels, thus reducing renal flow and the glomerular filtration rate. Renin release contributes to hypertension through the production of angiotensin II and aldosterone with their multiple hypertensive effects.[29]

Renal sympathetic afferent nerves originate mainly from the wall of the renal pelvis that includes mechanoreceptors that respond to pressure increases, and chemoreceptors of renal interstitium that are sensitive to changes in ionic concentration, osmolarity, and ischemia. The kidneys communicate with structures of the central nervous system through sensory afferent nerves. Renal ischemia results in an increase of the renal afferent activity, which contributes directly to systemic hypertension by modulating the sympathetic activity of the nervous system and favoring the release of vasopressin and oxytocin from the neurohypophysis.[30]

That modulation of the physiological mechanisms of BP control through renal innervation is the reason why its destruction could improve the regulatory mechanisms of hypertension.[31]

Section 3.

RENAL SYMPATHETIC DENERVATION RECOMMENDATIONS FROM INTERNATIONAL CLINICAL PRACTICE GUIDELINES AND OTHER CONSENSUS DOCUMENTS

International HTN societies have been publishing papers on RSD for nearly a decade in light of the first beneficial results seen in patients enrolled in major clinical trials. The main HTN experts from scientific societies in France, the Netherlands, Switzerland, the United Kingdom, Spain, the Czech Republic, and Germany have reached consensus on a series of recommendations based on the early evidence on RSD. However, in all cases they emphasized the need for confirming the data available in further scientific studies.[32-38] Afterwards, the consensus documents were interrupted following the result of the SYMPLICITY HTN-3 trial.[39]

Recently, after the publication of the new results and conclusions of studies on RSD, several consensus documents have been published. We are disclosing here some of the comments made in 3 of these documents:

The Joint UK Societies' consensus document on RSD including HTN and cardiovascular risk societies from the United Kingdom was published back in July 2019.[40] In this document, it is acknowledged that the NICE guidelines have not updated the recommendations published in 2012 in relation to RSD that stated that, despite the limitations in relation to the small number of patients treated, RSD can be offered as a therapy in patients with R-HTN to collect data and publish evidence in the mid- and long-term.[41] Back in July 2016, and following the publication of the SYMPLICITY HTN-3 trial, the usual public funding for RSD treatment was withdrawn.[42] In light of the new publications, the Joint UK Societies concludes that there are not enough data in the medical literature available to consider RSD as a routine treatment in the management of hypertensive patients. Also, that more evidence from clinical

trials is still needed. As a matter of fact, the Joint UK Societies proposes several areas for research to determine the role of RSD in the routine clinical practice:

- Pivotal studies and additional registries to determine the role of RSD in the management of HTN.

- Establish the durability/safety profile of RSD techniques.

- A cost-effectiveness study.

- Study the mechanism of action.

- Study of responsive patients.

- Study of markers of procedural success.

Finally, consensus recognizes the need for involving the patient in the process of choosing the optimal treatment for his condition.[40]

In its document published in May 2019,[43] the Taiwan Hypertension Society consensus paper establishes that RSD should be performed in the context of clinical trials and registries unless significant evidence is seen on pivotal studies with relevant samples of patients. They do not recommend the use of RSD treatment routinely, only after carefully screening the causes of secondary HTN and a detailed evaluation of the anatomy of the renal arteries. They recommend performing RSD in patients who meet any of the following criteria, regardless of the use of antihypertensive drugs, with an adequate renal artery anatomy, and an estimated glomerular filtration rate of ≥ 45 mL/min/1.73m^2:

1. Office BP ≥ 150/90 mmHg and daytime systolic BP in the 24-hour ABPM ≥ 135 mmHg or daytime diastolic BP in the ABPM ≥ 85 mmHg.

2. Systolic BP in the 24-h ABPM ≥ 140 mmHg, and diastolic BP in the 24-h ABPM ≥ 80 mmHg.

This Taiwanese consensus document has devised an acronym called “RSD i2” to identify the patients who would be the most suitable candidates when selecting patients for RSD including a total of 5 hypertensive subgroups:

- Patients with resistant hypertension.

- Patients with HTN-related organ damage.

- Noncompliant patients to antihypertensive treatment.

- Intolerant patients to antihypertensive medication.

- Patients with secondary HTN treated but with uncontrolled BP.

Similarly, the publication of the Taiwan Hypertension Society recommends assessing 3 fundamental aspects in uncontrolled hypertensive patients prior to starting RSD, which also is summarized under the acronym RAS (renal, ambulatory, and secondary):

1. Adequate renal artery anatomy assessed on a computed tomography (CT) scan or magnetic resonance imaging (MRI)-angiography if there is no contraindication.

2. True poorly controlled HTN, confirmed by 24-hour ambulatory blood pressure monitoring.

3. Secondary HTN ruled out or duly treated.

This consensus of HTN specialists also indicates that after the RSD procedure, BP should be monitored by ABPM for 24 hours at 6 months. They also recommend monitoring renal function including the serum creatinine levels, the glomerular filtration rate, the serum potassium levels, and the albumin-to-creatinine ratio or performing a urine dipstick test at 1-2 weeks and every 6 months after RSD. Similarly, they propose performing an imaging test, CT scan, or MRI-angiography of the renal arteries at 12 months to rule out the presence of renal artery stenosis, which may not be clinically evident.

The consensus of the Italian Society of Arterial Hypertension (SIIA), published in March 2020, proposes an algorithm that describes the flow of hypertensive patients eligible for RSD to optimize the selection of the most appropriate candidate.[43]

This consensus suggests that the prescription of the evaluation process of a potential candidate for RSD should be performed by a primary care physician, a cardiologist or an HTN specialist including the initial assessments of office BP levels and 24-h ABPM levels, assessment of the patient's overall cardiovascular risk, compliance to treatment, and tolerability of medication. Similarly, this consensus proposes to exclude secondary causes of HTN, discuss with the patient the different therapeutic options available, and optimize the treatment scheme.

To optimize compliance to antihypertensive medication, they recommend 24-h ABPM to increase the medication intake or to monitor the dose.

Regarding patient preference when choosing treatment, they point out that young male patients choose RSD more often. A large percentage of patients, as published in the document, would opt for RSD so they would not have to take medication after the procedure or if they could reduce their BP levels > 10 mmHg. Consensus states that the clinician is of great importance in the decision-making process of patients eligible for RSD to clarify any doubts patients may have regarding the effectiveness of the procedure, subsequent follow-up, and data available. The SIIA consensus insists on the importance of compliance to treatment as a cause of poor BP control and the need to ensure this concept in the selection process of patients eligible for RSD.

Prior to performing RSD, they propose conducting an imaging test, angio-CT or angio-MRI. Subsequently, they propose that each case should be evaluated by a multidisciplinary team including, at least, the doctor who selected the patient, the HTN specialist, and the health professional who will eventually perform the intervention.

Section 4.

RENAL SYMPATHETIC DENERVATION PROCEDURE

Considering that the most widely used procedure in our setting is the one that uses a tetrapolar radiofrequency catheter, we will be describing the technical recommendations associated with it (Symplicity Spyral, Medtronic, Ireland). Figure 1 of the supplementary data shows details of the procedure. It should be considered that the use of different catheters (eg, ultrasound) can make both the location of the ablation points and their number different, but not the ultimate efficacy or safety goal for the patient in the short- and long-term.

Vascular access and renal catheterization

The procedure requires arterial access, usually via femoral access route. The device requires, at least, a 6-Fr introducer sheath. In the presence of difficulties via femoral access, the left radial or brachial approach can be considered. Since the Spyral catheter is 117 cm long, in patients shorter than 5.5 feet, radial access can be considered. If they are taller than 5.5 feet, brachial access can be considered.[44]

The procedure requires complete anticoagulation with unfractionated heparin (60 units/kg to 100 units/kg) to maintain an activated clotting time > 200 seconds. Once access has been achieved, an abdominal aortography is recommended to assess the anatomy of renal arteries, their origin (to choose the best curve to allow selective catheterization), and the presence of polar renal arteries.

The length of specific guide catheters for RSD is 55 cm with 2 compatible curves: IMA type (for cases of inferior origin at renal artery level), and RSD type (for cases of lateral or superior origin at renal artery level). Renal catheterization can be performed in the anteroposterior view or in the left anterior oblique view.

Once selective catheterization has been achieved, it is recommended to administer 200 micrograms of nitroglycerin due to its vasodilator effect, and perform a selective angiography. This will establish the denervation strategy that should be followed and identify the main trunk and branches eligible for treatment (they must have diameters between 3 mm and 8 mm).

After selective renal catheterization, a 0.014 in guidewire should be advanced to the distal portion of the renal arterial tree. In cases of tortuous anatomies, the use of a high-support guidewire is recommended while conventional guidewires are enough for normal anatomies. The use of hydrophilic guidewires is ill-advised due to the risk of distal perforation.

Sedation and analgesia during the intervention

The application of radiofrequency to the renal arterial wall is painful. When possible, the involvement of an anesthesiologist is recommended for the management of sedation and anesthesia.

Renal sympathetic denervation device and radiofrequency application

The device used to perform RSD consists of 2 main components: catheter, and generator.

The Symplicity Spyral is a 117 cm long, tetrapolar monorail catheter with a self-expanding helical coil shape located at the catheter distal end. The helix is introduced into the treatment site in a straight configuration and mounted on the 0.014 in guidewire. Once in correct position, the guidewire is retracted proximal to the helical section, thus adjusting the tip of the catheter to the arterial circumference. The catheter has a built-in lead that connects to the Symplicity G3 generator.

The Symplicity G3 generator is a self-controlled electrosurgical generator that produces radiofrequency energy based on a programmed algorithm. During power management, current is constantly controlled and monitored with temperature and impedance measurements at the electrode-tissue interface, thus guaranteeing a proper operation. The generator allows simultaneous activation of the 4 ablation points or each of them separately. Energy is applied for 60 seconds.

After completing treatment, the 0.014 in guidewire is advanced again so the tip of the catheter remains straight and can be safely repositioned. As many applications as required by the patient can be performed, always leaving a safety distance of 5 mm between each application. The application of radiofrequency is not recommended in areas with parietal disease, bifurcation areas or areas that remain in contact with the renal parenchyma.

Once the procedure is completed, the administration of 200 micrograms of nitroglycerin is recommended to reverse any possible renal vasospasms. Also, a renal arteriography to confirm the lack of local complications is advised.

https://doi.org/10.24875/RECICE.M21000235

Table 1 of the supplementary data. Main efficacy trials in patients treated with renal sympathetic denervation.

Clinical trial	Trial design	HTN criteria	Patients (n)	RSD device	Follow-up	BP improvement compared to baseline levels (mmHg)	24-h SBP improvement compared to baseline levels (mmHg)
SYMPLICITY HTN-1 12 months results[45]	Cohort of patients treated with RSD	R-HTN	45	Monopolar radiofrequency Symplicity Flex catheter	12 months	−27/−17 (SBP/DBP)	NA
SYMPLICITY HTN-1 24 months results[46]	Cohort of patients treated with RSD	R-HTN	153	Monopolar radiofrequency Symplicity Flex catheter	24 months	−26/−14 (SBP/DBP)	NA
SYMPLICITY HTN-1 36 months results[47]	Cohort of patients treated with RSD	R-HTN	153	Monopolar radiofrequency Symplicity Flex catheter	36 months	−32/−14 (SBP/DBP)	NA
SYMPLICITY HTN-2[48]	Randomized to RSD vs control group treated with drugs only	R-HTN	106 (52 with RSD and 54 as control)	Monopolar radiofrequency Symplicity Flex catheter	6 months	−32/−12 (SBP/DBP RSD) vs +1/0 (SBP/DBP control) *P* < .0001	NA
ACHIEVE[49]	Cohort of patients treated with RSD	R-HTN	96	Ultrasound Paradise catheter	12 months	−15/−7 (SBP/DBP) *P* < .0001	-7.5
ENLIGHTN-1[50]	Cohort of patients treated with RSD	R-HTN	46	Multielectrode radiofrequency EnligHTN catheter	6 months	−26/−10 (SBP/DBP) *P* < .0001	NA
INSPiRED[51]	Randomized to RSD vs control group treated with drugs only	R-HTN	15 (6 with RSD and 9 as control)	Multielectrode radiofrequency EnligHTN catheter	6 months	−12/−8 (SBP/DBP RSD) vs +8/+2 (SBP/DBP control) *P* = .088	−22 (RSD) vs +1 (control) *P* = .49
DENERHTN[52]	Randomized to RSD and staged standardized pharmacological strategy vs control group with staged standardized pharmacological strategy	R-HTN	106 (53 with RSD and 53 as control)	Monopolar radiofrequency Symplicity Flex catheter	6 months	−15.8 (SBP RSD) vs −9.9 (SBP control) *P* = .03	−15.4 (RSD) vs −9.5 (control) *P* = .02

https://doi.org/10.24875/RECICE.M21000235

PRAGUE-15[53]	Randomized to RSD vs intensified medical treatment	R-HTN	106 (52 with RSD and 54 as control)	Monopolar radiofrequency Symplicity Flex catheter	6 months	−12 (SBP RSD) vs −14 (SBP control) *P* = NS	−8.6 (RSD) vs −8.1 (control) P = NS
SYMPLICITY HTN-3[39]	Randomized, double-blind, with RSD vs sham procedure	R-HTN	535 (364 with RSD and 171 as control)	Monopolar radiofrequency Symplicity Flex catheter	6 months	−14 ± 24 (SBP RSD) vs −2 ± 26 (SBP control) *P* = .26	−7 ± 15 (RSD) vs −5 ± 17 (control) *P* = .98
SPYRAL HTN-ON MED[54]	Randomized, double-blind, with RSD vs sham procedure	Moderate HTN with pharmacological treatment	80 (38 with RSD and 42 as control)	Tetrapolar radiofrequency Symplicity Spyral catheter	6 months	−9.4 (SBP RSD) vs −2.6 (SBP control) *P* = .02	−9.0 (RSD) vs −1.6 (control) *P* = .005
SPYRAL HTN-OFF MED[55]	Randomized, double-blind, with RSD vs sham procedure	Moderate HTN without pharmacological treatment	331 (166 with RSD and 165 as control)	Tetrapolar radiofrequency Symplicity Spyral catheter	3 months	−6.5 (95%CI, −9.6 to −3.5) (SBP difference RSD vs control)	-3.9 (95%CI, −6.2 to −1.6) (SBP difference RSD vs control)
RADIANCE HTN-SOLO[56]	Randomized, double-blind, with RSD vs sham procedure	Moderate HTN without pharmacological treatment	146 (74 with RSD and 72 as control)	Ultrasound Paradise catheter	2 months	−6.5 (95%CI, −11.3 to −1.8) (SBP difference RSD vs control) *P* = .007	−4.1 (95%CI, −7.1 to −1.2) (SBP difference RSD vs control) *P* = .006
RADIANCE HTN-TRIO[57]	Randomized, double-blind, with RSD vs sham procedure	R-HTN on a single pill combination of CCB, ARB, and TD.	136 (69 with RSD and 67 as control)	Ultrasound Paradise catheter	2 months	−7.0 (95%CI, −13.0 to −0.0) (SBP difference RSD vs control) *P* = .037	−4.2 (95%CI, −8.3 to −0.3) (SBP difference RSD vs control) *P* = .016

ARB, angiotensin receptor blocker; BP, blood pressure; DBP, diastolic blood pressure; CCB, calcium channel blocker; HTN, arterial hypertension; NA, not available; NS, not significant; R-HTN, resistant hypertension; RSD, renal sympathetic denervation; SBP, systolic blood pressure; TD, thiazide diuretic.

https://doi.org/10.24875/RECICE.M21000235

Table 2 of the supplementary data. Main registries of patients treated with renal sympathetic denervation.

	N	RSD device	Follow-up	Office SBP (mmHg)	Office DBP (mmHg)	24-h SBP (mmHg)	24-h DBP (mmHg)	Renal function	Medication changes	Severe complications
Global Symplicity Registry, 2019[58]	2237	Symplicity Flex	36 months	−16.5		−8		-7.1 if baseline GFR > 60 mL/min/1.73 m^2 -3.7 if baseline GFR < 60 mL/min/1.73 m^2	−0.1	No
Spanish Registry, 2019[59]	125	Symplicity Flex (68%)	12 months	−18.7	−7.0	−13.5	−9.8	No significant changes	−0.5	No
Swedish Registry, 2018[60]	252	Symplicity Flex (61%)	36 months	−15	−6	−8	−7	No significant changes	NA	No
UK Registry, 2016[61]	253	Symplicity Flex (81%)	11 months	−22	−9	−12	−7	No significant changes	80%	NA
TREND Registry, 2016[62]	407	Symplicity Flex	12 months	−20	−8	−10	−6	No significant changes	NA	7 patients (< 5%)
Heidelberg Registry, 2014[63]	63	Symplicity Flex (93.7%)	12 months	−26	−9	NA	NA	No significant changes	NA	3 patients (punction site)
Portugal Registry, 2014[64]	177	Symplicity Flex	6 months	−22	−9	NS	NS	No significant changes	NA	No

DBP, diastolic blood pressure; GFR, glomerular filtration rate; SBP, systolic blood pressure; N, number of patients enrolled; NA, not available; NS, not significant.

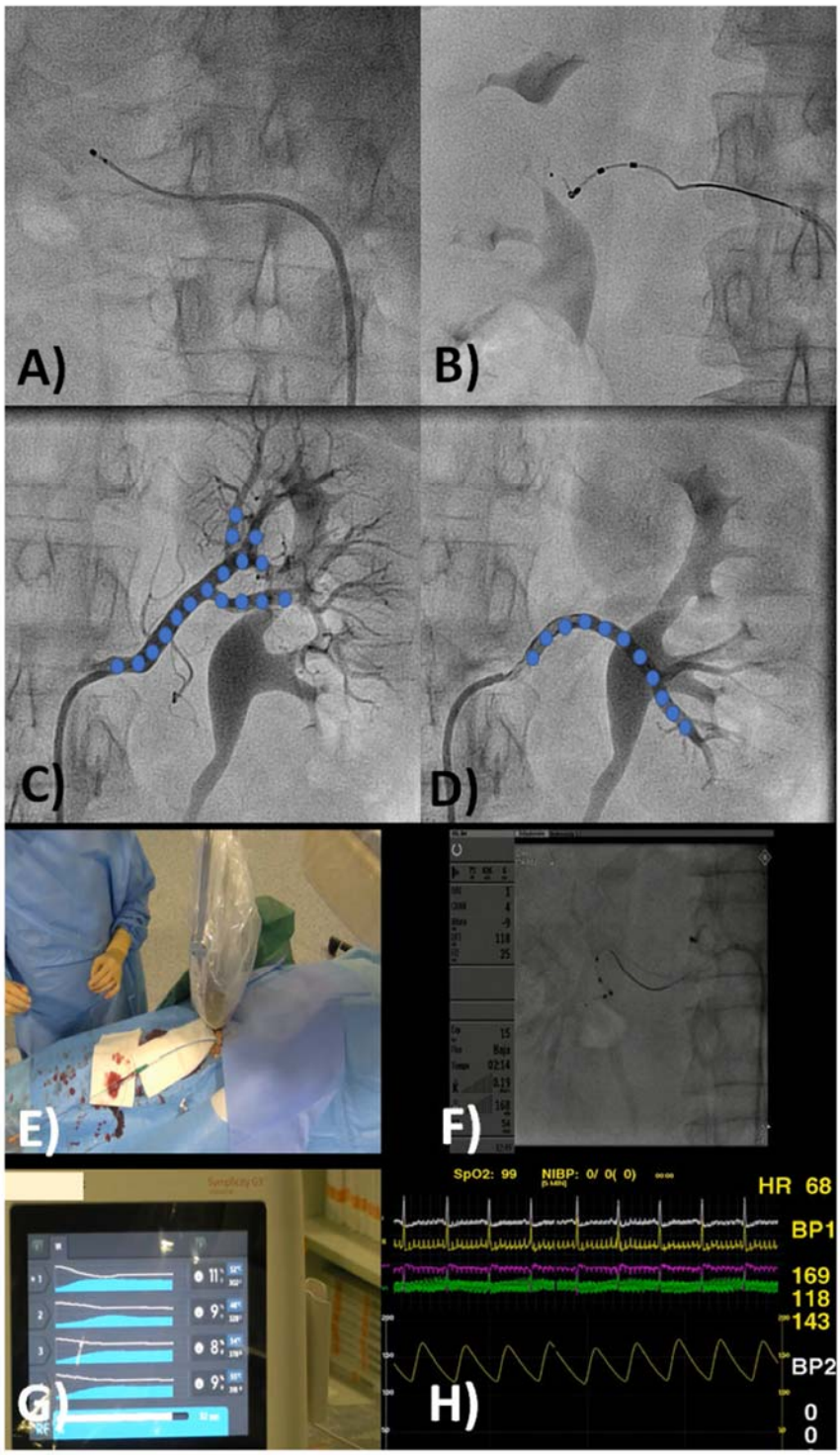
https://doi.org/10.24875/RECICE.M21000235

Table 3 of the supplementary data. Overall safety data in randomized clinical trials with a control group.

Clinical trial	N	Follow-up	RSD Device	Trial design	Renal function	Other issues
SYMPLICITY HTN-2[48]	52 (RSD) vs 54 (control)	6 months	Symplicity Flex (Medtronic, United States)	Randomized with control group	No significant changes in the GFR, creatinine or cystatin C levels	1 patient with possible progression to atherosclerotic lesion who still did not require the intervention
SYMPLICITY HTN-3[39]	364 (RSD) vs 171 (sham-control)	6 months	Symplicity Flex (Medtronic, United States)	Randomized with sham-control group	No changes in renal function parameters	No differences in clinical events (death, heart attack, need for renal intervention, vascular complications, hypertensive crisis, heart failure or atrial fibrillation)
SPYRAL HTN-ON MED[54]	38 (RSD) vs 42 (sham-control)	6 months	Symplicity Spyral (Medtronic, United States)	Randomized with sham-control group	No changes in renal function parameters	No differences in the clinical events reported
SPYRAL HTN-OFF MED[55]	166 (RSD) vs 165 (sham-control)	3 months	Symplicity Spyral (Medtronic, United States)	Randomized with sham-control group	No changes in renal function parameters	No differences in the clinical events reported
RADIANCE-HTN SOLO[56]	74 (RSD) vs 72 (sham-control)	2 months	Paradise System (ReCor Medical, United States)	Randomized with sham-control group	No changes in renal function parameters	No differences in the clinical events reported

GFR, glomerular filtration rate; N, number of patients enrolled; RSD, renal sympathetic denervation.

Figure 1 of the supplementary data. Renal sympathetic denervation procedure.



A: Detail of a first-generation monopolar radiofrequency RSD device. **B:** New-generation multipolar RSD device. **C:** and **D:** Image of the the same patient's left renal arteries. An inferior accessory artery

can be seen with separate ostia. Blue points show the places where, a priori, we would consider applying radiofrequency. **E:** Procedural image showing the 6-Fr vascular access and the usual position of the operator. **F:** Simultaneous to the previous one and to the 2 following figures, the scope of the position of the radiofrequency catheter in the right kidney of the patient can be seen. **G:** Detail of the radiofrequency generator. Simultaneous application of pulses in the 4 poles of the device can be seen. The monitor provides information on time of application, impedance, and temperature at each point. If safety or efficacy parameters are exceeded, the device will automatically stop the application of radiofrequency. The operation of the various poles can be selected independently, which is simultaneous in the figures. **H:** Patient monitoring. Electrical artifact—in the form of multiple spicules—on the electrocardiographic line due to radiofrequency pulses can be observed.

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