Supplementary Table

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Table S1. Baseline characteristics of patients with APA or BAH according to sex.

	female			male		
Parameters	APA (n=275)	BAH (n=736)	p-value	APA (n=270)	BAH (n=616)	p-value
Age (years)	48±12	54±11	<0.001	52±12	51±10	0.106
BMI (kg/m^2)	22.6±3.7	24.4±4.2	<0.001	25.7±3.9	26.2±3.9	0.013
Age of onset of hypertension (years)	40±10	46±11	<0.001	41±11	43±11	<0.001
Family history of hypertension (%)	62.3	65.5		59.1	60.2	
Current or past Smoking (%)	21.4	18.4		52.3	51.3	
Current or past Drinking (%)	34.7	39.4		73.4	66.9	
SBP at first visit (mmHg)	165±23	158±27	<0.001	161±22	156±22	0.015
DBP at first visit (mmHg)	99±16	94±16	0.002	98±17	98±15	0.328
SBP after medication (mmHg)	140±21	142±19	0.118	144±17	142±17	0.012
DBP after medication (mmHg)	87±13	86±13	0.317	88±13	90±13	0.217
Biochemistry						
BUN (mg/dL)	12.3±4.0	13.1±3.8	<0.001	14.6±6.7	13.9±3.7	0.113
Serum Creatinine (mg/dL)	0.61±0.21	0.64±0.14	<0.001	0.91±0.25	0.86±0.40	0.001
eGFR (mL/min per1.73 m^2)	86.8±22.4	79.0±17.4	<0.001	75.7±21.7	79.5±18.4	<0.001
s-UA (mg/dL)	4.4±1.0	4.9±1.3	<0.001	6.0±1.3	6.5±4.4	0.016
s-K at first visit (mEq/L)	2.8±0.5	3.4±0.4	<0.001	2.8±0.5	3.4±0.5	<0.001
s-K after medication (mEq/L)	3.3±0.5	4.1±5.2	<0.001	3.3±0.5	3.9±0.4	<0.001
s-Na (mEq/L)	142±2	141±2	<0.001	143±2	141±6	<0.001
s-Cl (mEq/L)	104±3	105±4	<0.001	104±9	105±2	<0.001
FBS (mg/mL)	95±15	103±31	<0.001	107±28	107±23	0.380
HbA1c (NGSP) (%)	5.5±0.6	5.9±0.9	<0.001	5.8±0.8	5.9±1.0	0.103
TC, Total Cholesterol (mg/dL)	192±29	201±35	<0.001	185±33	190±33	0.039
TG, Triglyceride (mg/dL)	87±44	113±60	<0.001	137±74	150±85	0.012
LDL, LDL-Cholesterol (mg/dL)	111±29	119±31	<0.001	111±29	111±29	0.964
HDL, HDL-Cholesterol (mg/dL)	64±15	61±17	0.002	50±14	50±13	0.368
Urine test						
Urine protein (%)						
(-) or (±)	88.8	95.1		78.5	89.0	
(+)	9.5	4.0		10.9	7.4	
(2+)	1.2	0.31		4.5	2.2	
(3+)	0.41	0.61		6.1	1.4	
PA complications						
Stroke (%)	4.4	4.5		8.1	3.6	
IHD (%)	1.1	1.6		3.3	1.8	
Heart failure (%)	0.36	0.14		1.1	0.32	
Atrial fibrillation (%)	0.0	1.1		1.9	2.1	

CKD (%)	1.5	2.0		7.8	3.9	
Hyperuricemia (%)	0.0	0.95		9.6	6.3	
Diabetes (%)	5.8	12.2		20.4	15.3	
Dyslipidemia (%)	19.3	27.2		25.6	26.6	
SAS (%)	0.72	1.2		6.3	5.4	
Depression (%)	0.72	1.6		1.1	1.5	
Periodic Paralysis (%)	0.36	0.0		0.37	0.32	
Pregnancy hypertension (%)	1.8	1.9		0.0	0.16	
Treatment						
ATC/DDD index of antihypertensive treatment	1.4±1.1	1.0±1.0	<0.001	2.1±1.5	1.4±1.2	<0.001
Potassium supplement dose (mEq/day)	18.5±22.8	1.7±7.0	<0.001	18.3±26.1	2.8±10	<0.001
Anti-diabetes treatment (%)	4.4	9.1		15.0	11.1	
Lipid- lowing medication (%)	14.4	16.6		14.7	13.1	
Screening test						
PAC (pg/mL)	373.9±289.8	182.6±192.5	<0.001	350.9±234.6	195.3±250.3	<0.001
PRA (ng/mL/hr)	0.28±0.26	0.41±0.33	<0.001	0.35±0.29	0.48±0.51	<0.001
ARR	2159±2677	664±751	<0.001	1669±1892	628±721	<0.001
Confirmatory test: CCT						
PAC on CCT 0 min (pg/mL)	357.1±223.0	147.8±78.4	<0.001	338.7±214.9	163.6±97.3	<0.001
PRA on CCT 0 min (ng/mL/hr)	0.25±0.18	0.40±0.48	<0.001	0.36±0.64	0.45±0.37	<0.001
ARR on CCT 0 min (PRA)	2137±2058	576±533	<0.001	1680±1796	532±519	<0.001
PAC on CCT 60 min (pg/mL)	358.9±228.1	110.9±71.8	<0.001	327.8±239.2	137.2±86.9	<0.001
PRA on CCT 60 min (ng/mL/hr)	0.27±0.26	0.45±0.54	<0.001	0.43±0.78	0.58±0.76	<0.001
ARR on CCT 60 min (PRA)	2219±2115	431±544	<0.001	1579±2053	443±502	<0.001
PAC on CCT 90 min (pg/mL)	354.2±229.6	112.3±76.6	<0.001	326.8±227.2	140.0±103.7	<0.001
PRA on CCT 90 min (ng/mL/hr)	0.31±0.73	0.49±0.69	<0.001	0.39±0.36	0.60±0.80	<0.001
ARR on CCT 90 min (PRA)	2114±1938	428±545	<0.001	1585±1955	439±539	<0.001
Confirmatory test: FUT						
PAC on FUT 0 min (ng/mL/hr)	386.5±279.5	145.3±83.3	<0.001	351.3±249.5	163.2±107.1	<0.001
PRA on FUT 0 min (ng/mL/hr)	0.25±0.18	0.37±0.27	<0.001	0.45±0.96	0.51±0.95	<0.001
PAC on FUT 120 min (ng/mL/hr)	635.1±431.5	358.9±184.2	<0.001	557.6±379.9	317.0±163.5	<0.001
PRA on FUT 120 min (ng/mL/hr)	0.53±0.66	1.2±1.1	<0.001	0.84±1.6	1.6±1.8	<0.001

Data are presented as mean±SD or percentages. The ATC/DDD index of antihypertensive medication was calculated according to the Anatomical Therapeutic Chemical/Daily Defined Dose Index 2020.

Abbreviations: APA, aldosterone-producing adenoma; ARR, aldosterone-to-renin ratio; BAH, bilateral adrenal hyperplasia; BMI, body mass index; BUN, blood urea nitrogen; CCT, captopril-challenge test; CKD, chronic kidney disease; DBP, diastolic blood pressure; eGFR, estimated glomerular filtration rate; FBS, fasting blood sugar; FUT, furosemide-upright test; HbA1c, glycated hemoglobin; HDL, high-density lipoprotein: IHD, ischemic heart disease; LDL, low-density lipoprotein; NGSP, National Glycohemoglobin Standardization Program; PA, primary aldosteronism; PAC, plasma aldosterone concentration; PRA, plasma renin activity; SAS, sleep apnea syndrome; SBP,

systolic blood pressure; s-Cl, serum chloride level; s-K, serum potassium level; s-Na, serum sodium level; s-UA, serum uric acid level

Table S2. Baseline characteristics of patients imputed by MissForest and missing data rate.

(A) all

Parameters	imputed APA (n=545)	imputed BAH (n=1,352)	p-value
Age (years)	50±12 (0.18)	52±11 (0.0)	<0.001
Sex, Female (%)	50.5 (0.0)	54.4 (0.0)	
BMI (kg/m^2)	24.1±4.1 (0.37)	25.2±4.1 (0.96)	<0.001
Age of onset of hypertension (years)	40±10 (5.9)	45±11 (7.8)	<0.001
Family history of hypertension (%)	63.1 (9.4)	63.5 (8.3)	
Current or past Smoking (%)	36.7 (6.4)	33.1 (6.8)	
Current or past Drinking (%)	53.4 (7.7)	51.8 (9.0)	
SBP at first visit (mmHg)	164±21 (51.2)	158±22 (38.8)	<0.001
DBP at first visit (mmHg)	100±15 (57.1)	97±14 (43.3)	<0.001
SBP after medication (mmHg)	142±19 (1.8)	142±18 (1.6)	0.235
DBP after medication (mmHg)	87±13 (1.8)	87±13 (1.6)	0.322
Biochemistry			
BUN (mg/dL)	13.4±5.5 (4.6)	13.4±3.7 (3.4)	0.053
Serum Creatinine (mg/dL)	0.76±0.27 (0.73)	0.74±0.31 (0.81)	0.236
eGFR (mL/min per1.73 m^2)	81.3±22.6 (0.73)	79.3±17.8 (1.0)	0.118
s-UA (mg/dL)	5.2±1.4 (8.4)	5.6±3.1 (7.0)	<0.001
s-K at first visit (mEq/L)	3.0±0.5 (25.7)	3.7±0.4 (76.0)	<0.001
s-K after medication (mEq/L)	3.3±0.5 (0.18)	4.0±3.8 (0.52)	<0.001
s-Na (mEq/L)	143±2 (0.37)	141±4 (0.81)	<0.001
s-Cl (mEq/L)	104±7 (0.73)	105±3 (1.3)	<0.001
FBS (mg/mL)	101±22 (15.0)	104±26 (15.0)	<0.001
HbA1c (NGSP) (%)	5.6±0.7 (18.7)	5.8±0.8 (20.9)	<0.001
TC, Total Cholesterol (mg/dL)	189±30 (21.3)	196±33 (16.1)	<0.001
TG, Triglyceride (mg/dL)	111±62 (12.3)	129±72 (10.9)	<0.001
LDL, LDL-Cholesterol (mg/dL)	112±28 (11.0)	116±29 (10.0)	<0.001
HDL, HDL-Cholesterol (mg/dL)	57±16 (11.7)	56±16 (10.6)	0.041
Urine test			
Urine protein (%)	(10.5)	(10.6)	
(-) or (±)	85.3	93.1	
(+)	9.2	5.0	
(2+)	2.6	1.0	
(3+)	2.9	0.89	
PA complications			
Stroke (%)	6.2 (0.0)	4.1 (0.0)	
IHD (%)	2.2 (0.0)	1.7 (0.0)	
Heart failure (%)	0.73 (0.0)	0.22 (0.074)	
Atrial fibrillation (%)	0.92 (0.0)	1.6 (0.0)	
CKD (%)	4.6 (0.0)	2.9 (0.074)	
Hyperuricemia (%)	4.8 (0.0)	3.4 (0.0)	
Diabetes (%)	13.0 (0.0)	13.6 (0.074)	
Dyslipidemia (%)	22.4 (0.0)	26.9 (0.074)	
SAS (%)	3.5 (0.0)	3.1 (0.0)	
Depression (%)	0.92 (0.0)	1.6 (0.0)	
Periodic Paralysis (%)	0.37 (0.0)	0.15 (0.0)	
Pregnancy hypertension (%)	0.92 (0.0)	1.1 (0.0)	
Treatment			
ATC/DDD index of antihypertensive treatment	1.8±1.4 (0.0)	1.2±1.1 (0.0)	<0.001
Potassium supplement dose (mEq/day)	18.4±24.5 (0.0)	2.2±8.6 (0.0)	<0.001
Anti-diabetes treatment (%)	9.7 (1.5)	9.8 (2.4)	
Lipid- lowing medication (%)	14.3 (1.5)	14.7 (2.4)	
Screening test			
PAC (pg/mL)	363.1±263.3 (0.92)	189.3±219.8 (1.0)	<0.001
PRA (ng/mL/hr)	0.32±0.28 (1.8)	0.44±0.41 (3.6)	<0.001
ARR	1895±2305 (3.5)	643±719 (6.3)	<0.001
Confirmatory test: CCT			

PAC on CCT 0 min (pg/mL)	348.1±214.9 (7.5)	156.6±87.8 (3.8)	<0.001
PRA on CCT 0 min (ng/mL/hr)	0.31±0.45 (8.4)	0.41±0.43 (5.6)	<0.001
ARR on CCT 0 min (PRA)	1861±1887 (8.6)	569±521 (5.7)	<0.001
PAC on CCT 60 min (pg/mL)	326.3±214.4 (31.7)	126.1±84.7 (26.4)	<0.001
PRA on CCT 60 min (ng/mL/hr)	0.37±0.54 (31.9)	0.51±0.66 (26.4)	<0.001
ARR on CCT 60 min (PRA)	1620±1677 (31.9)	452±519 (26.4)	<0.001
PAC on CCT 90 min (pg/mL)	338.9±224.3 (14.7)	126.3±89.1 (9.3)	<0.001
PRA on CCT 90 min (ng/mL/hr)	0.37±0.61 (15.4)	0.53±0.72 (11.2)	<0.001
ARR on CCT 90 min (PRA)	1756±1895 (15.4)	434±532 (11.2)	<0.001
Confirmatory test: FUT			
PAC on FUT 0 min (ng/mL/hr)	369.8±238.0 (37.6)	160.9±91.9 (35.3)	<0.001
PRA on FUT 0 min (ng/mL/hr)	0.36±0.60 (38.0)	0.44±0.57 (35.9)	<0.001
PAC on FUT 120 min (ng/mL/hr)	596.7±364.0 (40.0)	353.6±156.9 (38.0)	<0.001
PRA on FUT 120 min (ng/mL/hr)	0.75±1.1 (39.8)	1.3±1.3 (38.4)	<0.001

(B) female and male

Parameters	female			male		
	imputed APA (n=275)	imputed BAH (n=736)	p-value	imputed APA (n=270)	imputed BAH (n=616)	p-value
Age (years)	48±12 (0.0)	54±11 (0.0)	<0.001	52±11 (0.37)	51±10 (0.0)	0.104
BMI (kg/m^2)	22.6±3.7 (0.0)	24.4±4.2 (0.95)	<0.001	25.7±3.9 (0.74)	26.2±3.9 (0.97)	0.018
Age of onset of hypertension (years)	39±10 (5.5)	46±11 (9.2)	<0.001	41±10 (6.3)	43±11 (6.2)	<0.001
Family history of hypertension (%)	64.7 (10.2)	66.8 (8.7)		62.2 (8.5)	60.7 (7.8)	
Current or past Smoking (%)	20.0 (6.9)	17.1 (7.1)		54.4 (5.9)	52.9 (6.5)	
Current or past Drinking (%)	32.7 (8.7)	36.5 (9.6)		75.2 (6.7)	69.0 (8.3)	
SBP at first visit (mmHg)	162±20 (45.8)	157±23 (41.3)	<0.001	166±17 (56.7)	159±20 (35.9)	<0.001
DBP at first visit (mmHg)	98±13 (52.4)	94±14 (46.2)	<0.001	103±13 (61.9)	100±13 (39.8)	0.001
SBP after medication (mmHg)	140±21 (2.5)	142±19 (1.6)	0.120	144±17 (1.1)	142±17 (1.6)	0.013
DBP after medication (mmHg)	87±12 (2.5)	86±13 (1.6)	0.297	88±13 (1.1)	90±13 (1.6)	0.182
Biochemistry						
BUN (mg/dL)	12.3±3.9 (4.4)	13.1±3.7 (3.9)	<0.001	14.6±6.6 (4.8)	13.9±3.6 (2.8)	0.115
Serum Creatinine (mg/dL)	0.61±0.21 (1.1)	0.64±0.14 (0.95)	<0.001	0.91±0.25 (0.37)	0.86±0.40 (0.65)	0.001
eGFR (mL/min per1.73 m^2)	86.7±22.2 (1.1)	79.1±17.4 (1.2)	<0.001	75.7±21.7 (0.37)	79.5±18.3 (0.81)	<0.001
s-UA (mg/dL)	4.4±1.0 (9.1)	4.9±1.2 (7.3)	<0.001	6.0±1.3 (7.8)	6.4±4.3 (6.7)	0.006
s-K at first visit (mEq/L)	3.0±0.5 (22.9)	3.6±0.3 (78.0)	<0.001	3.0±0.5 (28.5)	3.7±0.4 (73.5)	<0.001
s-K after medication (mEq/L)	3.3±0.5 (0.0)	4.1±5.1 (0.54)	<0.001	3.3±0.5 (0.37)	3.9±0.4 (0.49)	<0.001
s-Na (mEq/L)	142±2 (0.36)	141±2 (0.68)	<0.001	143±2 (0.37)	141±6 (0.97)	<0.001
s-Cl (mEq/L)	104±3 (0.72)	105±4 (0.68)	<0.001	104±9 (0.74)	105±2 (1.3)	<0.001
FBS (mg/mL)	95±14 (16.4)	103±29 (15.8)	<0.001	107±27 (13.7)	106±22 (14.1)	0.272
HbA1c (NGSP) (%)	5.5±0.5 (21.1)	5.8±0.8 (23.6)	<0.001	5.7±0.8 (16.3)	5.8±0.9 (17.5)	0.025
TC, Total Cholesterol (mg/dL)	194±29 (20.7)	202±34 (16.6)	<0.001	187±31 (21.9)	190±31 (15.6)	0.148
TG, Triglyceride (mg/dL)	88±42 (11.3)	112±57 (11.4)	<0.001	134±69 (13.3)	149±82 (10.4)	0.002
LDL, LDL-Cholesterol (mg/dL)	112±28 (10.9)	120±29 (11.7)	<0.001	112±28 (11.1)	112±28 (8.0)	0.933
HDL, HDL-Cholesterol (mg/dL)	64±15 (10.5)	61±17 (12.5)	<0.001	50±13 (13.0)	50±13 (8.3)	0.473
Urine test						
Urine protein (%)	(12.4)	(11.4)		(8.5)	(9.6)	
(-) or (±)	90.2	95.7		80.4	90.1	
(+)	8.4	3.5		10.0	6.7	
(2+)	1.1	0.27		4.1	1.9	
(3+)	0.36	0.54		5.6	1.3	
PA complications						
Stroke (%)	4.4 (0.0)	4.5 (0.0)		8.1 (0.0)	3.6 (0.0)	
IHD (%)	1.1 (0.0)	1.6 (0.0)		3.3 (0.0)	1.8 (0.0)	
Heart failure (%)	0.36 (0.0)	0.14 (0.14)		1.1 (0.0)	0.32 (0.0)	
Atrial fibrillation (%)	0.0 (0.0)	1.1 (0.0)		1.9 (0.0)	2.1 (0.0)	
CKD (%)	1.5 (0.0)	2.0 (0.14)		7.8 (0.0)	3.9 (0.0)	

Hyperuricemia (%)	0.0 (0.0)	0.95 (0.0)		9.6 (0.0)	6.3 (0.0)	
Diabetes (%)	5.8 (0.0)	12.2 (0.14)		20.4 (0.0)	15.3 (0.0)	
Dyslipidemia (%)	19.3 (0.0)	27.2 (0.14)		25.6 (0.0)	26.6 (0.0)	
SAS (%)	0.72 (0.0)	1.2 (0.0)		6.3 (0.0)	5.4 (0.0)	
Depression (%)	0.72 (0.0)	1.6 (0.0)		1.1 (0.0)	1.5 (0.0)	
Periodic Paralysis (%)	0.36 (0.0)	0.0 (0.0)		0.37 (0.0)	0.32 (0.0)	
Pregnancy hypertension (%)	1.8 (0.0)	1.9 (0.0)		0.0 (0.0)	0.16 (0.0)	
Treatment						
ATC/DDD index of antihypertensive treatment	1.4±1.1 (0.0)	1.0±1.0 (0.0)	<0.001	2.1±1.5 (0.0)	1.4±1.2 (0.0)	<0.001
Potassium supplement dose (mEq/day)	18.5±22.8 (0.0)	1.7±7.0 (0.0)	<0.001	18.3±26.1 (0.0)	2.8±10.0 (0.0)	<0.001
Anti-diabetes treatment (%)	4.4 (1.5)	8.8 (2.7)		15.2 (1.5)	11.0 (2.1)	
Lipid- lowing medication (%)	14.2 (1.5)	16.2 (2.7)		14.4 (1.5)	13.0 (2.1)	
Screening test						
PAC (pg/mL)	374.8±289.1 (0.72)	183.1±191.7 (0.95)	<0.001	350.2±233.5 (1.1)	195.9±249.0 (1.1)	<0.001
PRA (ng/mL/hr)	0.28±0.27 (1.8)	0.41±0.32 (2.3)	<0.001	0.35±0.29 (1.9)	0.47±0.50 (5.0)	<0.001
ARR	2122±2642 (3.3)	657±736 (5.2)	<0.001	1663±1880 (3.7)	634±699 (7.6)	<0.001
Confirmatory test: CCT						
PAC on CCT 0 min (pg/mL)	351.5±216.6 (6.9)	148.8±77.5 (3.7)	<0.001	339.9±210.8 (8.1)	166.3±100.5 (3.9)	<0.001
PRA on CCT 0 min (ng/mL/hr)	0.26±0.18 (7.6)	0.39±0.47 (4.9)	<0.001	0.36±0.61 (9.3)	0.45±0.39 (6.5)	<0.001
ARR on CCT 0 min (PRA)	2066±2001 (8.0)	583±525 (5.0)	<0.001	1664±1735 (9.3)	559±573 (9.3)	<0.001
PAC on CCT 60 min (pg/mL)	335.5±211.7 (29.8)	113.1±69.2 (25.0)	<0.001	313.2±213.8 (33.7)	141.9±96.9 (28.1)	<0.001
PRA on CCT 60 min (ng/mL/hr)	0.30±0.33 (29.8)	0.46±0.57 (25.0)	<0.001	0.42±0.65 (34.1)	0.57±0.74 (28.1)	<0.001
ARR on CCT 60 min (PRA)	1919±1912 (29.8)	441±538 (25.0)	<0.001	1417±1777 (34.1)	451±535 (28.2)	<0.001
PAC on CCT 90 min (pg/mL)	348.0±229.1 (14.5)	113.1±73.9 (10.9)	<0.001	327.1±219.6 (14.8)	143.6±110.4 (7.5)	<0.001
PRA on CCT 90 min (ng/mL/hr)	0.33±0.69 (15.3)	0.47±0.65 (12.1)	<0.001	0.41±0.57 (15.6)	0.59±0.79 (10.1)	<0.001
ARR on CCT 90 min (PRA)	1993±1916 (15.3)	441±537 (12.1)	<0.001	1528±1841 (15.6)	466±573 (10.1)	<0.001
Confirmatory test: FUT						
PAC on FUT 0 min (ng/mL/hr)	363.0±237.3 (37.1)	148.1±75.4 (34.5)	<0.001	349.0±222.0 (38.1)	173.5±103.5 (36.2)	<0.001
PRA on FUT 0 min (ng/mL/hr)	0.25±0.17 (37.8)	0.37±0.24 (34.8)	<0.001	0.48±0.84 (38.1)	0.52±0.81 (37.3)	<0.001
PAC on FUT 120 min (ng/mL/hr)	611.6±357.0 (40.4)	366.4±153.6 (38.3)	<0.001	551.6±319.7 (39.6)	333.7±151.5 (37.7)	<0.001
PRA on FUT 120 min (ng/mL/hr)	0.53±0.58 (40.4)	1.1±0.98 (38.2)	<0.001	1.0±1.5 (39.3)	1.5±1.6 (38.6)	<0.001

Baseline characteristics of (A) all patients and (B) female and male patients imputed by MissForest.
Numerical and categorical variables are presented as mean±SD (missing data rate) and percentages (missing data rate), respectively. The ATC/DDD index of antihypertensive medication was calculated according to the Anatomical Therapeutic Chemical/Daily Defined Dose Index 2020.
Abbreviations: APA, aldosterone-producing adenoma; ARR, aldosterone-to-renin ratio; BAH, bilateral adrenal hyperplasia; BMI, body mass index; BUN, blood urea nitrogen; CCT, captopril-challenge test; CKD, chronic kidney disease; DBP, diastolic blood pressure; eGFR, estimated glomerular filtration rate; FBS, fasting blood sugar; FUT, furosemide-upright test; HbA1c, glycated hemoglobin; HDL, high-density lipoprotein: IHD, ischemic heart disease; LDL, low-density lipoprotein; NGSP, National Glycohemoglobin Standardization Program; PA, primary aldosteronism; PAC, plasma aldosterone concentration; PRA, plasma renin activity; SAS, sleep apnea syndrome;

SBP, systolic blood pressure; s-Cl, serum chloride level; s-K, serum potassium level; s-Na, serum sodium level; s-UA, serum uric acid level

Table S3. Performance of each model in screening model, confirmatory test model with SMOTE and FS, and top 5 variables with SMOTE in screening dataset.

	AUC	Sensitivity	Specificity	PPV	NPV
(A) Screening model					
all					
RF (n=19)	0.895 (0.048)	0.811 (0.062)	0.859 (0.055)	0.705 (0.091)	0.918 (0.029)
MLP (n=12)	0.891 (0.043)	0.828 (0.055)	0.832 (0.059)	0.673 (0.087)	0.922 (0.028)
LightGBM (n=13)	0.888 (0.048)	0.816 (0.058)	0.852 (0.051)	0.695 (0.084)	0.919 (0.028)
SVM (n=12)	0.889 (0.039)	0.816 (0.054)	0.839 (0.061)	0.679 (0.088)	0.918 (0.027)
LR (n=12)	0.889 (0.040)	0.814 (0.049)	0.837 (0.058)	0.676 (0.082)	0.917 (0.025)
KNN (n=7)	0.880 (0.037)	0.797 (0.026)	0.837 (0.075)	0.678 (0.096)	0.910 (0.013)
NB (n=9)	0.882 (0.037)	0.802 (0.071)	0.833 (0.076)	0.676 (0.106)	0.913 (0.028)
female					
RF (n=43)	0.905 (0.059)	0.787 (0.055)	0.897 (0.044)	0.746 (0.087)	0.918 (0.023)
MLP (n=9)	0.897 (0.054)	0.820 (0.057)	0.822 (0.094)	0.652 (0.121)	0.922 (0.032)
LightGBM (n=29)	0.899 (0.051)	0.791 (0.061)	0.875 (0.047)	0.708 (0.086)	0.918 (0.027)
SVM (n=9)	0.894 (0.049)	0.525 (0.075)	0.968 (0.017)	0.863 (0.063)	0.845 (0.022)
LR (n=12)	0.900 (0.056)	0.803 (0.066)	0.852 (0.081)	0.686 (0.119)	0.919 (0.033)
KNN (n=15)	0.881 (0.041)	0.804 (0.042)	0.811 (0.076)	0.626 (0.087)	0.916 (0.021)
NB (n=7)	0.888 (0.045)	0.773 (0.071)	0.847 (0.071)	0.668 (0.109)	0.908 (0.031)
male					
RF (n=14)	0.884 (0.049)	0.823 (0.059)	0.829 (0.089)	0.695 (0.113)	0.914 (0.031)
MLP (n=14)	0.879 (0.049)	0.836 (0.062)	0.808 (0.106)	0.679 (0.118)	0.918 (0.029)
LightGBM (n=10)	0.873 (0.053)	0.823 (0.051)	0.811 (0.103)	0.677 (0.118)	0.911 (0.029)
SVM (n=7)	0.881 (0.041)	0.814 (0.055)	0.832 (0.060)	0.686 (0.082)	0.910 (0.028)
LR (n=16)	0.867 (0.051)	0.798 (0.082)	0.806 (0.103)	0.666 (0.120)	0.902 (0.040)
KNN (n=6)	0.863 (0.047)	0.774 (0.058)	0.851 (0.057)	0.701 (0.087)	0.895 (0.029)
NB (n=5)	0.875 (0.045)	0.696 (0.070)	0.901 (0.049)	0.766 (0.098)	0.872 (0.027)
(B) Top 5 variables Screening model					
all					
RF	0.884 (0.045)	0.821 (0.052)	0.833 (0.061)	0.672 (0.085)	0.920 (0.027)
MLP	0.884 (0.048)	0.816 (0.061)	0.835 (0.068)	0.676 (0.096)	0.918 (0.029)
LightGBM	0.881	0.817	0.837	0.676	0.918

	(0.047)	(0.056)	(0.058)	(0.084)	(0.028)
SVM	0.887	0.789	0.853	0.693	0.908
	(0.045)	(0.049)	(0.061)	(0.094)	(0.023)
LR	0.878	0.795	0.841	0.680	0.910
	(0.045)	(0.065)	(0.069)	(0.099)	(0.030)
KNN	0.863	0.777	0.841	0.676	0.903
	(0.049)	(0.050)	(0.069)	(0.098)	(0.025)
NB	0.879	0.761	0.870	0.714	0.901
	(0.038)	(0.083)	(0.055)	(0.092)	(0.030)
female					
RF	0.895	0.805	0.854	0.681	0.920
	(0.055)	(0.050)	(0.057)	(0.089)	(0.024)
MLP	0.884	0.807	0.816	0.652	0.916
	(0.054)	(0.031)	(0.124)	(0.131)	(0.024)
LightGBM	0.888	0.806	0.856	0.685	0.921
	(0.056)	(0.048)	(0.058)	(0.091)	(0.023)
SVM	0.882	0.773	0.853	0.698	0.908
	(0.050)	(0.030)	(0.114)	(0.138)	(0.018)
LR	0.876	0.750	0.852	0.699	0.899
	(0.052)	(0.035)	(0.131)	(0.153)	(0.022)
KNN	0.858	0.794	0.785	0.609	0.907
	(0.061)	(0.040)	(0.131)	(0.119)	(0.030)
NB	0.877	0.761	0.867	0.692	0.906
	(0.052)	(0.057)	(0.053)	(0.094)	(0.023)
male					
RF	0.872	0.846	0.790	0.659	0.920
	(0.047)	(0.040)	(0.108)	(0.110)	(0.023)
MLP	0.878	0.822	0.830	0.688	0.913
	(0.041)	(0.053)	(0.065)	(0.089)	(0.028)
LightGBM	0.875	0.826	0.814	0.676	0.913
	(0.047)	(0.050)	(0.093)	(0.104)	(0.028)
SVM	0.874	0.806	0.832	0.689	0.906
	(0.047)	(0.058)	(0.076)	(0.101)	(0.030)
LR	0.865	0.802	0.791	0.662	0.901
	(0.048)	(0.069)	(0.138)	(0.134)	(0.030)
KNN	0.854	0.799	0.818	0.671	0.901
	(0.046)	(0.055)	(0.087)	(0.102)	(0.031)
NB	0.875	0.697	0.901	0.766	0.872
	(0.045)	(0.071)	(0.050)	(0.099)	(0.027)
(C) Confirmatory test model					
all					
RF (n=23)	0.914	0.821	0.888	0.754	0.925
	(0.042)	(0.049)	(0.048)	(0.086)	(0.021)
MLP (n=19)	0.910	0.858	0.848	0.709	0.936
	(0.043)	(0.048)	(0.073)	(0.110)	(0.024)
LightGBM (n=25)	0.910	0.845	0.877	0.743	0.933
	(0.045)	(0.043)	(0.054)	(0.090)	(0.020)
SVM (n=21)	0.907	0.831	0.867	0.728	0.926
	(0.050)	(0.062)	(0.067)	(0.111)	(0.030)
LR (n=21)	0.903	0.832	0.859	0.719	0.927
	(0.044)	(0.043)	(0.073)	(0.104)	(0.020)
KNN (n=7)	0.888	0.820	0.857	0.711	0.921
	(0.047)	(0.049)	(0.070)	(0.104)	(0.023)
NB (n=10)	0.906	0.724	0.917	0.786	0.892
	(0.034)	(0.054)	(0.041)	(0.084)	(0.019)
female					
RF (n=31)	0.935	0.847	0.918	0.796	0.942
	(0.020)	(0.046)	(0.020)	(0.041)	(0.017)

MLP (n=16)	0.931 (0.018)	0.857 (0.044)	0.899 (0.025)	0.762 (0.043)	0.944 (0.016)
LightGBM (n=25)	0.932 (0.021)	0.848 (0.049)	0.911 (0.027)	0.784 (0.050)	0.942 (0.017)
SVM (n=16)	0.931 (0.018)	0.853 (0.044)	0.905 (0.024)	0.771 (0.046)	0.943 (0.016)
LR (n=16)	0.930 (0.020)	0.845 (0.047)	0.911 (0.021)	0.780 (0.043)	0.941 (0.017)
KNN (n=16)	0.922 (0.020)	0.847 (0.043)	0.904 (0.023)	0.768 (0.042)	0.941 (0.015)
NB (n=6)	0.923 (0.021)	0.725 (0.054)	0.945 (0.014)	0.832 (0.037)	0.903 (0.017)
male					
RF (n=22)	0.893 (0.052)	0.824 (0.071)	0.862 (0.060)	0.735 (0.099)	0.919 (0.032)
MLP (n=10)	0.895 (0.043)	0.851 (0.045)	0.830 (0.066)	0.696 (0.091)	0.927 (0.023)
LightGBM (n=22)	0.891 (0.051)	0.825 (0.054)	0.843 (0.077)	0.713 (0.109)	0.917 (0.025)
SVM (n=10)	0.891 (0.044)	0.814 (0.057)	0.859 (0.057)	0.725 (0.086)	0.913 (0.026)
LR (n=15)	0.891 (0.038)	0.781 (0.060)	0.884 (0.044)	0.753 (0.076)	0.902 (0.025)
KNN (n=8)	0.879 (0.040)	0.816 (0.062)	0.843 (0.067)	0.705 (0.097)	0.912 (0.031)
NB (n=10)	0.894 (0.041)	0.691 (0.056)	0.905 (0.052)	0.775 (0.095)	0.871 (0.019)

(A) In the screening model, algorithms were developed using SMOTE and feature selection. The number of selected features based on best AUC values were 19, 12, 13, 12, 12, 7, and 9 variables (women; 43, 9, 29, 9, 12, 15, and 7 variables, men; 14, 14, 10, 7, 16, 6, and 5 variables) in RF, MLP, LightGBM, SVM, LR, KNN, and NB, respectively.
(B) In the Top 5 variables screening model, algorithms were oversampled with SMOTE. The five most important features were serum potassium level before and after potassium supplementation, the dose of potassium supplementation, plasma aldosterone concentration, and aldosterone-to-renin ratio.
(C) The confirmatory test model developed algorithms using SMOTE and feature selection. The number of selected features based on best AUC values were 23, 19, 25, 21, 21, 7, and 10 variables (Female; 31, 16, 25, 16, 16, 16, and 6 variables, Male; 22, 10, 22, 10, 15, 8, and 10 variables) in RF, MLP, LightGBM, SVM, LR, KNN, and NB, respectively.
Data are presented as mean (SD).
Abbreviations: AUC, area under the curve; ELM, ensemble learning model; FS, feature selection; KNN, k-nearest neighbor algorithm; LightGBM, Light Gradient Boosting Machine; LR, Logistic Regression; MLP, multilayer perceptron; NB, Naïve Bayes; NPV, negative predictive value; PPV, positive predictive value; RF, Random Forest; SMOTE, Synthetic Minority Oversampling Technique; SVM, Support Vector Machine.

Table S4. Detailed clinical information of APA, BAH cases.

	Case 1	Case 2
Basal information		
Age (years), Sex	42, M	47, F
BMI (kg/m^2)	23.5	23.9
Age of onset of HT (years)	39	37
Family history of HT	(+) *	-
Current or past Smoking / Drinking	- / +	- / -
BP at first visit (mmHg)	199/124	160/100
BP after medication (mmHg)	138/78	110/71
anti-HT medication per day	AML 5mg DOX 2mg	AML 5mg
PA Subtype	APA	BAH
Biochemistry		
BUN (mg/dL)	12.1	11.7
Serum Creatinine (mg/dL)	0.90	0.60
eGFR (mL/min per1.73 m^2)	78.3	83.0
s-UA (mg/dL)	3.9	3.5
s-K at first visit (mEq/L)	3.3	4.2
s-K after medication (mEq/L)	3.5	4.0
s-Na (mEq/L)	139	139
s-Cl (mEq/L)	105	108
FBS (mg/mL)	101	97
HbA1c (NGSP) (%)	4.9	5.4
Total Cholesterol (mg/dL)	159	(185±3) *
Triglyceride (mg/dL)	(100±15) *	89
LDL-Cholesterol (mg/dL)	77	117
HDL-Cholesterol (mg/dL)	(54±4) *	45
Urine test		
Urine protein	-	(-) *
PA complications		
Stroke	-	-
IHD	-	-
Heart failure	-	-
Atrial fibrillation	-	-
CKD	-	-
Hyperuricemia	-	-
Diabetes	-	-

Dyslipidemia	-	-
SAS	+	-
Depression	-	-
Periodic Paralysis	-	-
Pregnancy hypertension	-	+
Treatment		
ATC/DDD index of antihypertensive treatment	1.5	1.0
potassium supplement dose (mEq/day)	28.8	0.0
Anti-diabetes treatment	-	-
Lipid- lowing medication	-	-
Screening test		
PAC (pg/mL)	161.0	98.0
PRA (ng/mL/hr)	0.50	0.3
ARR	322	327
Confirmatory test: CCT		
PAC on CCT 0 min (pg/mL)	182.0	88.3
PRA on CCT 0 min (ng/mL/hr)	0.20	0.10
ARR on CCT 0 min (PRA)	910	883
PAC on CCT 60 min (pg/mL)	165.0	72.6
PRA on CCT 60 min (ng/mL/hr)	0.40	0.20
ARR on CCT 60 min (PRA)	412.5	363
PAC on CCT 90 min (pg/mL)	199.0	67.7
PRA on CCT 90 min (ng/mL/hr)	0.40	0.30
ARR on CCT 90 min (PRA)	497.5	226
Confirmatory test: FUT		
PAC on FUT 0 min (ng/mL/hr)	(194.4±12.2) *	(101.6±13.1) *
PRA on FUT 0 min (ng/mL/hr)	(0.45±0.08) *	(0.28±0.04) *
PAC on FUT 120 min (ng/mL/hr)	(376.8±41.4) *	(275.5±60.7) *
PRA on FUT 120 min (ng/mL/hr)	(1.3±0.56) *	(1.5±1.1) *

Case 1 was predicted using the EML model for men, and Case 2 using the EML model for women. Variables in parentheses are the variables complemented by MissForest. "*" is a missing value and is expressed as mean±SD. MissForest complemented with a family history of hypertension on 47 of 50 occasions and no family history of hypertension on 3 occasions in the case 1. Urine protein in the case 2 was imputed minus on 50 of 50 occasions. Abbreviations: BMI, body mass index; HT, hypertension; BP, blood pressure; AML, Amlodipine; DOX, Doxazosin; PA, primary aldosteronism; APA, aldosterone producing adenoma; BAH, bilateral adrenal hyperplasia; s-K, serum potassium. PAC, plasma aldosterone concentration; ARR, aldosterone renin ratio