

Supplementary material

Tyczyński P, Kukuła K, Kądziała J, et al. Cardiovascular profile of patients with unilateral four renal arteries. A systematic study. *Kardiol Pol.* 2022.

Please note that the journal is not responsible for the scientific accuracy or functionality of any supplementary material submitted by the authors. Any queries (except missing content) should be directed to the corresponding author of the article.

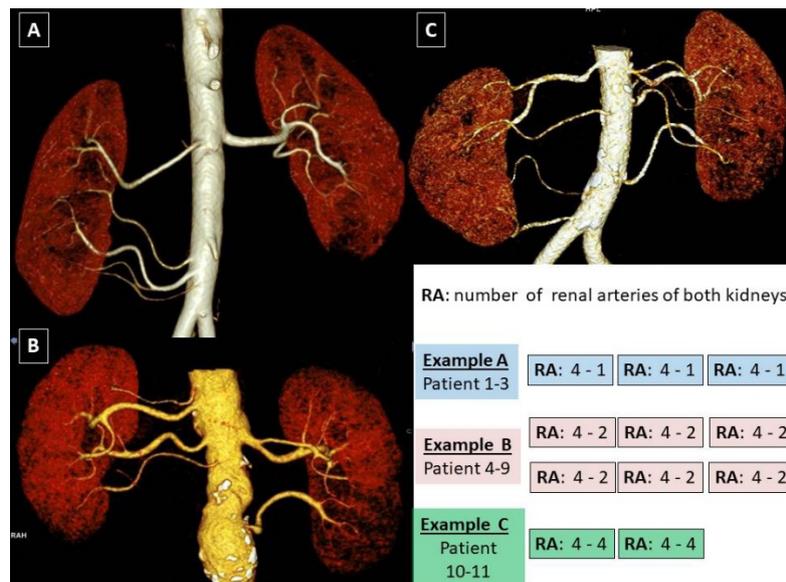


Figure S1. Computed tomography (A–C). **A.** Right kidney with four renal arteries and left kidney with one renal artery. **B.** Right kidney with four renal arteries and left kidney with two renal arteries. **D.** Both kidneys with four renal arteries. **E.** Scheme presenting consecutive patients (1–11), along with the number of their renal arteries

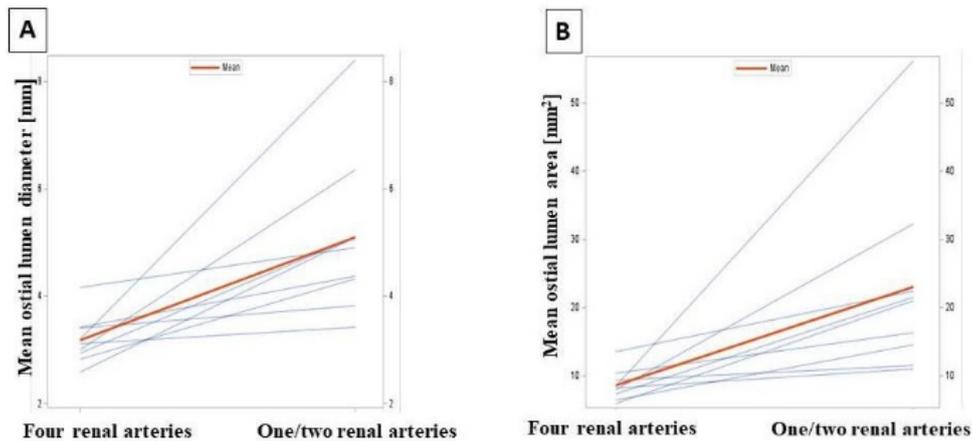


Figure S2. Chart presenting paired profiles (four renal arteries for the kidney versus one/two renal arteries for the opposite kidney) of the mean ostial lumen diameter (A) or mean ostial lumen area (B) of renal arteries for consecutive nine patients (two of eleven patients had four renal arteries for both kidneys, and were excluded from this chart)

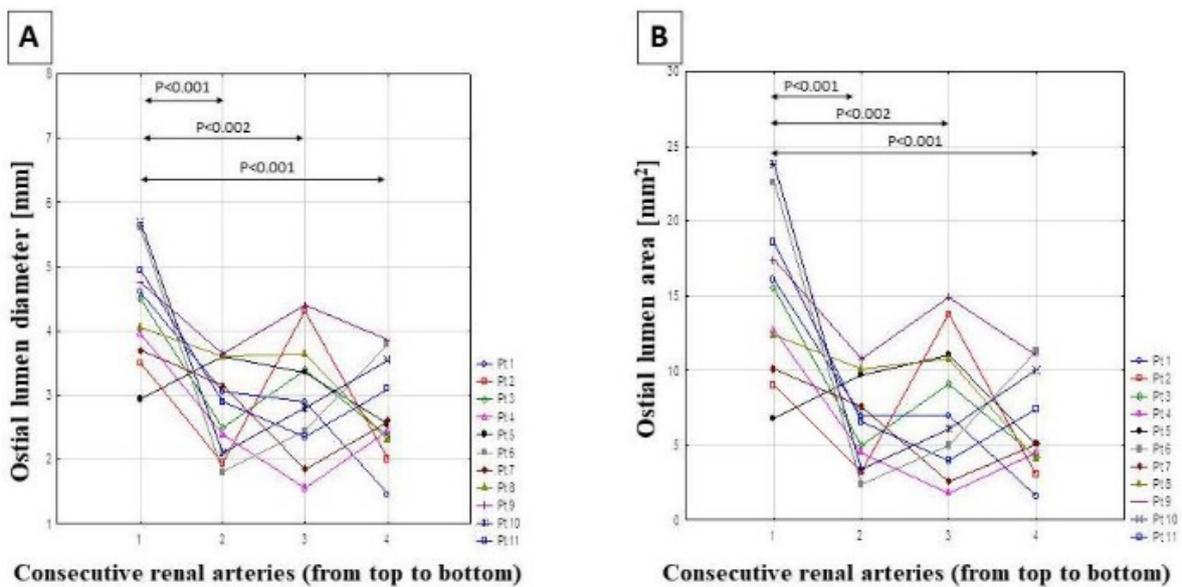


Figure S3. Profiles of ostial lumen diameter (A) or ostial lumen area (B) of renal arteries of kidneys with four renal arteries (11 patients)

Table S1. Comparison of cardiovascular profile of patients with (at least) unilateral four renal arteries and matched cohort (1:3, by sex and age) with (at least) unilateral two renal arteries

	Group 1 (n = 11)	Group 2 (n = 33)	Relative risk (95% CI)	P-value

Age, median (IQR)	60.0 (56–72)	61.0 (56–72)	—	1.00
At the CT diagnosis, median (IQR)	53.0 (42–70)	52.0 (48–65)	—	0.88
Male, n (%)	9 (81.8)	27 (81.8)	—	1.00
HTN, n (%)	10 (90.9)	26 (78.8)	1.2 (0.9–1.5)	0.66
Resistant HTN, n (%)	4 (36.4)	4 (12.1)	3.0 (0.9–10.0)	0.09 ¹
DM, n (%)	4 (36.4)	7 (21.2)	1.7 (0.6–4.8)	0.42
HF, n (%)	2 (18.2)	2 (6.1)	3.0 (0.4–18.8)	0.26
HL, n (%)	8 (72.7)	18 (54.5)	1.3 (0.8–2.1)	0.48
AF, n (%)	2 (18.2)	6 (18.2)	1.0 (0.2–4.3)	1.00
CAD, n (%)	4 (36.4)	8 (24.2)	1.5 (0.6–4.0)	0.46
AMI, n (%)	3 (27.3)	2 (6.1)	4.5 (0.9–23.5)	0.09 ²
PCI, n (%)	2 (18.2)	6 (18.2)	1.0 (0.2–4.3)	1.00
CABG, n (%)	2 (18.2)	2 (6.1)	3.0 (0.5–18.8)	0.26
CAS, n (%)	1 (9.1)	0	NA	0.25
Stroke, n (%)	0	1 (3.0)	NA	1.00
LVEF, median (IQR)	63.5 (60–65)	64.0 (60–70)	0.98 (0.41–2.38) ³	0.90
e-GFR, mL/min/1.73 m², mean (SD)	71.7 (17.9)	67.2 (17.2)	0.76 (0.31–1.83) ⁴	0.48
Glucose, mg/dl, median (IQR)	103 (93–118)	105 (95–118)	0.77 (0.25–2.37) ⁵	0.83
TC, mg/dl, mean (SD)	166 (42)	181 (44.3)	0.60 (0.21–1.75) ⁶	0.38
LDL, mg/dl, mean (SD)	90.7 (42.9)	93.8 (37.6)	0.85 (0.28–2.59) ⁷	0.84
Medication	n = 10	n = 27		
ASA, n (%)	3 (30.0)	11 (40.7)	0.70 (0.22–2.29)	0.71
ACE-I, n (%)	4 (40.0)	11 (40.7)	0.98 (0.33–2.88)	1.00
ARB, n (%)	5 (50.0)	9 (33.3)	1.64 (0.58–4.68)	0.454
MRA, n (%)	8 (80.0)	19 (70.4)	1.48 (0.38–5.82)	0.694
BB, n (%)	9 (90.0)	19 (70.4)	2.89 (0.42–19.82)	0.39
Statin, n (%)	9 (90.0)	16 (59.3)	4.32 (0.62–30.3)	0.12
Diuretic, n (%)	4 (40.0)	9 (33.3)	1.23 (0.42–3.59)	0.72
Anticoagulant, n (%)	7 (70.0)	23 (85.2)	0.54 (0.19–1.59)	0.36

Insulin, n (%)	5 (50.0)	1 (3.7)	5.17 (2.14–12.44)	0.003
OHA, n (%)	8 (80.0)	6 (22.2)	6.57 (1.62–26.6)	0.002

¹The power of the test: 45%. ²The power of the test: 49%. ³RR for LVF <60. ⁴RR for e-GHR <60. ⁵RR for glucose >99. ⁶RR for TC >155. ⁷RR for LDL >100

Abbreviations: ACE-I, angiotensin converting enzyme inhibitor; AF, atrial fibrillation; AMI, acute myocardial infarction; ARB, angiotensin receptor blocker; ASA, acetylsalicylic acid; BB, β -blocker; CABG, coronary artery by-pass grafting; CAD, coronary artery disease; CAS, carotid artery stenosis; CT, computed tomography; DM, diabetes mellitus; HL, hyperlipidemia; HF, heart failure; HTN, arterial hypertension; IQR, interquartile range; LDL, low density lipoprotein; MRA, mineralocorticoid receptor antagonist; OHA, oral hypoglycemic agent; PCI, percutaneous coronary intervention; SD, standard deviation; TC, total cholesterol

Table S2. Comparison between left and right kidney. Dimensions and number of renal arteries

	Total kidney (n = 22)	Right kidney (n = 11)	Left kidney (n = 11)	P-value
Kidney dimensions				
Length, mm, mean (SD)	116.8 (9.1)	117.1 (5.4)	116.6 (12.0)	0.887
Volume, cm ³ , mean (SD)	186.2 (29.5)	186.9 (31.1)	183.9 (30.0)	0.941
Thickness of the parenchyma, mm, mean (SD)	19.5 (3.4)	19.4 (3.7)	19.6 (3.3)	0.825
Number of renal arteries originating from kidney				
1 RA, n (%)	3 (13.6)	2 (18.2)	1 (9.1)	0.950
2 RA, n (%)	6 (27.3)	3 (27.3)	3 (27.3)	
3 RA, n (%)	0 (0)	0 (0)	0 (0)	
4 RA, n (%)	13 (59.1)	6 (54.5)	7 (63.6)	

Abbreviation: SD, standard deviation

Table S3. Dimensions of the renal arteries and comparison between four renal arteries vs. one or two renal arteries

Measurements of RA	Total RA	The number of RA	
---------------------------	-----------------	-------------------------	--

		(n = 67)	originating from kidney		P-value
			Unilateral 4 (n = 52)	Unilateral 1 or 2 (n = 15)	
Mean diameter, mm					
	At the ostium, mean (SD)	3.6 (1.4)	3.3 (1.1)	4.8 (1.7)	0.005
	At the narrowest point, mean (SD)	3.1 (1.1)	2.8 (0.9)	4.0 (1.4)	0.005
Lumen area, mm ²					
	At the ostium, me- dian (IQR)	10 (5.1-14.9)	7.5 (4.7-11.8)	17.1 (10.9-29.1)	0.003
	At the narrowest point, median (IQR)	7.0 (3.4-10.5)	6.6 (3.3-8.6)	11.6 (7.3-18.7)	0.027
	Distance from the RA os- tium to bifurcation, mm, mean (SD)	48.3 (17.0)	51.1 (15.7)	38.4 (18.0)	0.009

Abbreviations: IQR, interquartile range; RA, renal artery; SD, standard deviation