

present 192 patients with confirmed FMD in at least one vascular bed. All patients underwent detailed clinical evaluation including ABPM, biochemical evaluation, biobanking, duplex Doppler of carotid and abdominal arteries and whole body angio-CT. All patients included in the study were evaluated by the multidisciplinary team including specialists in cardiology and hypertension, interventional cardiology, radiology, interventional radiology, neuroradiology and vascular surgery.

Results: Systematic evaluation of all 192 FMD patients included into the study revealed new FMD lesions in 61 (31.9 %) patients. Newly diagnosed vascular complications were found in 46 (24.0%) patients and in 2 patients more than one new vascular complications were revealed. Newly diagnosed aneurysms were found in 45 (32.4%) of patients and in 13 (6.8%) patients more than one aneurysms were found (Table). In 35 (18.2 %) FMD patients significant RAS was diagnosed.(Table).

Conclusions: Systematic and multidisciplinary evaluation of FMD patients reveals a high incidence of previously unknown FMD lesions and newly diagnosed vascular complications.

MEGALIN: A NOVEL ENDOCYTIC RECEPTOR FOR PRORENIN AND RENIN?

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Objective: Disturbed uptake of prorenin and renin [together denoted as (pro)renin] may result in hypertension and renal damage. Megalin is a major endocytic receptor contributing to nutrient reabsorption. Interestingly, patients with impaired expression or trafficking of megalin display a 20–40-fold rise in their urinary renin levels. Moreover, their urine contains prorenin, which normally is undetectable. Therefore, the aim of this study was to investigate whether megalin binds and/or internalizes (pro)renin.

Design and method: To distinguish megalin-mediated binding and internalization, megalin-expressing immortalized yolk sac cells from Brown Norway rats (BN16) were incubated at 4 C and 37 C, respectively, with different concentrations of recombinant human (pro)renin or albumin (an endogenous ligand of megalin) for up to 24 hours with or without mannose-6-phosphate (M6P). siRNA was used to silence megalin. After incubation, cells were washed with ice-cold phosphate-buffered saline and lysed, and the (pro)renin levels were assessed using an immunoradioactive assay.

Results: At 4 C, BN16 cells bound renin and prorenin in a dose-dependent manner, with similar affinity. When incubating at 37 C, prorenin accumulated in these cells at 3–4-fold higher levels than renin. Furthermore, incubation at 37 C, but not at 4 C, resulted in prorenin being present in its active (renin-like) form, supporting the occurrence of prorenin activation following internalization. Treating cells with M6P, an antagonist of the (pro)renin-binding M6P receptor, did not affect cellular (pro)renin uptake, indicating that M6P receptors are not responsible for (pro)renin uptake in BN16 cells. Importantly, inhibiting megalin expression reduced (pro)renin binding and internalization by >50%. Furthermore, treating cells with albumin decreased both binding and internalization of (pro)renin.

Conclusions: Megalin is a novel endocytic receptor for (pro)renin. Its selectivity towards prorenin may explain why urine normally does not contain prorenin, except under conditions where megalin trafficking is disturbed. Megalin-dependent regulation of (pro)renin, resulting in prorenin activation, may determine the degree of angiotensin generation in the kidney.

THE RELATIONSHIP BETWEEN PLASMA RENIN ACTIVITY AND SERUM LIPIDS PROFILE IN PATIENTS WITH PRIMARY ARTERIAL HYPERTENSION

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Objective: The aim of the study was to evaluate clinical and biochemical differences between patients with low-renin and high-renin primary arterial hypertension (AH), mainly in reference to serum lipids, and to identify factors determining lipid concentrations.

Design and method: In untreated patients with AH stage 1 we measured plasma renin activity (PRA) and subdivided the group into low-renin (PRA < 0.65 ng/mL/h) and high-renin (PRA > 0.65 ng/mL/h) AH. We compared office and 24-h ambulatory blood pressure, serum aldosterone, lipids and selected biochemical

parameters between subgroups. Factors determining lipid concentration in both subgroups were assessed in regression analysis.

Results: Patients with high-renin hypertension (N = 58) were characterized by higher heart rate (p = 0.04), lower serum sodium (p < 0.01) and aldosterone-to-renin ratio (p < 0.01), and significantly higher serum aldosterone (p = 0.03), albumin (p < 0.01), total protein (p < 0.01), total cholesterol (p = 0.01) and low-density lipoprotein cholesterol (LDL-C) (p = 0.04) than low-renin subjects (N = 39). In univariate linear regression, only PRA in the low-renin group was in a positive relationship with LDL-C (R² = 0.15, beta = 1.53 and p = 0.013); this association remained significant after adjustment for age, sex, and serum albumin and aldosterone concentrations.

Conclusions: Higher serum levels of total and LDL-C characterized high-renin subjects, but the association between LDL-C level and PRA existed only in low-renin primary AH.

FIBROMUSCULAR DYSPLASIA – FIRST REPORT FROM CROATIAN COHORT FOR EUROPEAN REGISTRY

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Objective: To report characteristics of patients diagnosed with fibromuscular dysplasia (FMD) who were included in Croatian registry, a cohort for the European FMD registry.

Design and method: All patients in whom the diagnose of FMD was made by histopathology or angiography, were included in the registry. All patients were from University Hospital Centre Zagreb. After history taking and physical examination, basic laboratory analysis was performed and angiograms or histologic findings were collected.

Results: So far, 17 Caucasian patients were enrolled in the registry (women 64.7%). Smoking was detected in 52.9%. The most common clinical manifestation was hypertension. Worse and earlier clinical manifestations including neurological ones, were observed in men. The median age at diagnosis of hypertension was 35 years (28 years in men and 39 years in women). The median age at diagnosis of FMD was 42 years, indicating that the average delay from the time of the first symptom or sign to diagnosis of FMD was 7 years. All patients had renal artery disease and in 17.6% of cases cerebral arteries were affected. Unilateral renal disease was diagnosed in 70.6% and 75% of them had right artery affected. The most common intervention was PTA with the balloon. The average number of antihypertensive drugs was 2.8 despite intervention and only 1 patient was without antihypertensive therapy.

Conclusions: More women than men had FMD, but the worse clinical manifestations and more interventions were observed in men. Despite small number of patients included in the registry, even though this number should be interpreted in the context of the total number of Croatian population, and potential bias by the referral nature of the registry cohort (our centre is a hypertension referral centre), these results present the first Croatian report on FMD patients. Further analysis is needed for better understanding of FMD.

RENAL FUNCTION AND ACTIVITY OF LOW-GRADE INFLAMMATION IN PATIENTS WITH RESISTANT ARTERIAL HYPERTENSION

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Objective: To study the activity of low-grade inflammation and determine an interaction of its parameters with hypertensive kidney damage in patients (pts) with resistant arterial hypertension (AH).

Design and method: A cohort of 109 pts with AH (including 72 pts with controlled AH and 57 pts with resistant AH) has been studied. All pts in addition to routine general clinical examination underwent 24-hours' blood pressure monitoring; evaluation of blood concentrations of systemic inflammation markers (C-reactive protein (CRP), interleukin 6 (IL-6), tumor necrosis factor alpha (TNF α), fibrinogen), activity of matrix metalloproteinase 12 (MMP-12), cystatin C and citrulline levels; detection of 24-hours' excretion of albumin.

Results: Diabetic and hypertensive chronic kidney disease (CKD) has been revealed in 20,5 % of resistant AH pts (GFR 74,9 ± 2,7 ml/min/1,73m²). The average GFR in pts with controlled AH was 82,3 ± 2,0 ml/min/1,73m², none of them have chronic kidney disease. Albumin excretion rate (by 14.1 %), blood levels of

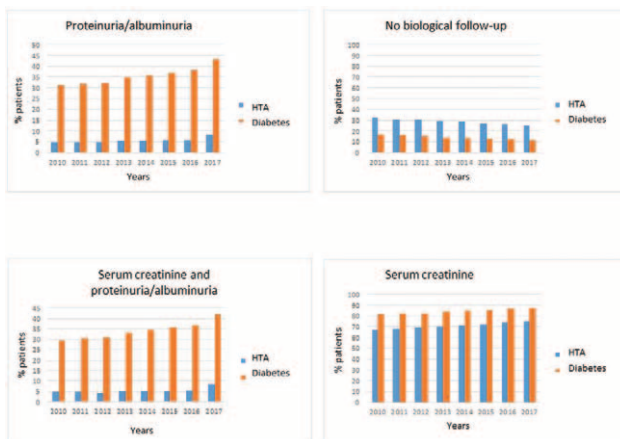
cystatin C (by 8.5 %) and citrulline (by %) were higher in resistant AH pts. These patients also characterize by activation of low-grade inflammation: levels of CRP (by 17.3 %; $r = 0.02$, fibrinogen (by 10.6 %; $r = 0.03$), and IL-6 (by 21.8 %; $p = 0.01$) and TNFa (by 13.0 %; $p = 0.003$) were significantly higher in pts with resistant AH comparing with those with controlled AH. GFR was associated with concentration of CRP ($r = -0.379$; $r = 0.01$) and TNFa ($r = -0.398$; $r = 0.002$), MMP-12 activity was correlated with kidney damage markers – cystatin C ($r = 0.405$; $P = 0.01$) and citrulline ($r = 0.338$; $P = 0.03$).

Conclusions: Kidney damage is significantly more frequent in pts with resistant AH. Activation of low-grade inflammation correlates with decreased renal function, activity of MMP-12 associates with kidney damage markers.

MONITORING OF CHRONIC KIDNEY DISEASE IN HYPERTENSIVE AND DIABETIC PATIENTS IN FRANCE

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Objective: High blood pressure and diabetes have a high morbidity and mortality rate and are the first causes for kidney diseases. In order to limit these complications, it is necessary to regularly monitor these patients, including close biological monitoring. In this study, we analyzed the serum creatinine and albuminuria/proteinuria measurements for hypertensive and diabetic patients in the Central Region in France.



Design and method: We collected data from the National Health Data System of the Central Region in France for all hypertensive and diabetic patients from 2010 to 2017. We assessed the annual evaluation of at least one serum creatinine and one albuminuria/proteinuria measurement for these patients.

Results: From the 1,653,694 patients over 30 years old in the Central Region in France in 2010, 286,089 (17.3%) had hypertension with medication and 92,606 (5.6%) had diabetes with medication. The proportions of hypertensive and diabetic patients increased in 2017 with 21.0% and 8.2% respectively among the 1,718,712 patients over 30 years old. The proportion of patients with a complete annual biological check-up (serum creatinine and albuminuria/proteinuria) increased from 4.6% to 8.2% for hypertensive patients and from 29.3 to 42.0% for diabetic patients between 2010 and 2017. The proportion of patients without an annual biological check-up decrease from 32.5% to 24.5% for hypertensive patients and from 16.8% to 11.3% for diabetic patients between 2010 and 2017.

Conclusions: Despite a progressive increase for the screening of kidney disease in hypertensive and diabetic patients, this follow-up remains insufficient. It seems essential to continue information campaigns for the search for kidney disease in hypertensive and diabetic patients in France.

RESISTANT ARTERIAL HYPERTENSION AND ARTERIAL STIFFNESS IN RENAL TRANSPLANTATION RECIPIENTS

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Objective: In renal transplantation recipients (RTRs), several factors could accelerate the stiffness process, such as the use of calcineurin inhibitors (CNIs), the presence of chronic kidney disease and other classical cardiovascular factors (arterial hypertension), which would explain, at least in part, the high cardiovascular mortality and morbidity. The aim of this study was to

evaluate difference in parameters of arterial stiffness, blood pressure and body composition among hypertensive RTCs with special focus on resistant arterial hypertension (RAH)

Table 1. Difference in blood pressure, arterial stiffness and body composition parameters between those RTRs with (N=53) and without RAH (N=25). ($p < 0.05$)

	Central value – (non RAH)	Deviation	Central value (RAH)	Deviation Female	test value	P*
Age (years)	56.81	14.13	61.02	10.55	1.61	0.056
Body mass index (kg/m ²)	25.01	4.68	26.56	3.15	1.84	0.035
Urea (mmol/L)	8.85	6.95-10.25	10.80	8.20-14.10	2.73	0.003
Creatinine (μmol/L)	112.50	101.00-139.00	130.00	112.00-164.00	2.48	0.007
Fat Mass (kg)	19.10	11.30-24.30	18.60	12.60-22.7	0.08	0.469
Fat free mass (kg)	2386	9.75	22.30	8.93	0.74	0.231
Visceral Fat (kg)	819	4.59	9.56	2.90	1.64	0.052
Muscle mass (kg)	5429	9.94	58.64	9.69	1.95	0.028
Central systolic blood pressure (mmHg)	12984	14.56	130.21	18.03	0.09	0.464
Central diastolic blood pressure (mmHg)	88.04	11.66	87.15	12.88	0.30	0.384
Glomerular filtration (mL/min/1.73m ²)	54.41	19.70	44.65	15.84	2.51	0.007
Pulse Wave Velocity (m/s)	8.55	1.64	9.22	1.66	1.70	0.046
Augmentation Index (%)	13.50	8.00-28.00	19.25	12.00-34.50	1.67	0.048
Peripheral systolic blood pressure (mmHg)	132.63	13.82	130.53	22.44	0.44	0.329
Peripheral diastolic blood pressure (mmHg)	88.20	12.55	86.83	12.59	0.45	0.326

Design and method: 89 RTRs, 48 (53.93%) men and 41 (46.07%) women, aged 59.31 years were included. For each RTRs patient data about number and type of antihypertensive drugs, age, gender, body weight and height were collected. Also, serum urea and creatinine were measured and body mass index (BMI) and glomerular filtration (GF) was calculated. The Agedio B900 device was used to measure arterial pressure (peripheral and central systolic as well as peripheral and central diastolic arterial pressure) and parameters of arterial stiffness (pulse wave velocity (PWV) and augmentation Index (AIx)). Furthermore, Tanita MC780 Multi Frequency segmental body composition analyser was used to measure content of body fat, muscle mass and visceral fat each study subject.

Results: 78 RTRs have AH (91.76%) and 53 (67.94%) of them have RAH. Those RTRs with RAH have statistically higher value of serum urea ($p = 0.003$) and creatinine ($p = 0.007$) and lower GF ($p = 0.007$). Also, those patients have higher BMI ($p = 0.035$) and muscle mass ($p = 0.028$), but significant differences in fat tissue parameters were not found. Therefore, RTRs with RAH have significantly higher value PWV ($p = 0.046$) and AIx ($p = 0.048$) were statistically significant differences in age and blood pressure parameters were not found between those two groups of RTCs as shown in Table 1.

Conclusions: Prevalence of RAH is high in RTRs and those patient with RAH have higher arterial stiffness and lower kidney functions although they were not significantly older than those hypertensive RTRs without RAH. RTRs with RAH could be especially vulnerable population of patients and experience higher mortality and morbidity.

THE RELATIONSHIP BETWEEN BODY COMPOSITION AND BLOOD PRESSURE DIFFERS IN THOSE WITH AND WITHOUT CHRONIC KIDNEY DISEASE

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Objective: Thought it is generally accepted that measures of adiposity are related to cardiovascular disease risk, this relationship may not be consistent in disease states, particularly chronic kidney disease (CKD). This study aimed to investigate the relationship between measures of adiposity and blood pressure indices in a community-based sample of adults with and without prevalent CKD.

Design and method: Mixed-ancestry South Africans residing in Cape Town ($n = 1621$) were examined between February and November 2015. Glomerular filtration rate (GFR) was estimated using the Modification of Diet in Renal Disease (MDRD) equation, without ethnicity correction. CKD was defined as an estimated GFR (eGFR) < 60 mL/min/1.73m². Body composition was assessed using anthropometry [body mass index (BMI) and waist circumference (WC)] and dual-energy x-ray absorptiometry (DXA) (in a sub-sample, $n = 152$). Blood pressure was recorded using a semi-automated digital monitor. Pulse pressure (PP) and mean arterial pressure (MAP) were calculated from mean systolic and diastolic blood pressure (SBP and DBP).

Results: In bivariate correlation analysis, in those without CKD, an increase in anthropometric and DXA-derived measures of body composition correlated with an increase in SBP, DBP and MAP (all, $p < 0.02$); with BMI, WC and visceral adipose tissue also having a positive association with PP (all, $p < 0.004$). Contrary, in those with