Impact of arterial hypertension and use of antihypertensive pharmacotherapy on mortality in patients hospitalized due to COVID-19: The CRACoV-HHS Study

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Table S1. Independent predictors of in-hospital death in multivariable logistic regression analysis in participants with arterial hypertension N= 3028

Each model besides the antihypertensive drug class use vs not use, includes: age, gender, diabetes mellitus, atrial fibrillation, coronary artery disease, heart failure, stroke, chronic kidney disease, chronic obstructive pulmonary disease, cancer, and increase of highly sensitive C-reactive protein

| Antihypertensive drug class | Odds ratio | 95% Confidence Interval |
|----------------------------|------------|------------------------|
| ACEI                       | 0.38       | 0.29 - 0.50            |
| ACEI+ARB                   | 0.29       | 0.22 - 0.37            |
| β - blockers               | 0.35       | 0.28 - 0.44            |
| CCB                        | 0.35       | 0.26 - 0.47            |
| Thiazides                  | 0.29       | 0.17 - 0.45            |

ACEI – angiotensin enzyme inhibitor; ARB – angiotensin receptor blockers; CCB – calcium channel blockers; Thiazides – thiazide diuretics;

P < 0.001 for each analyzed drug class.
Figure S1. Predictors of in-hospital death in multivariable logistic regression analysis in whole study group N= 5191 (model including hypertension and its treatment with first line blood pressure lowering drugs)

Odds Ratios with 95% Profile-Likelihood Confidence Limits
Age: 1 - indicates patients at age equal or above median for study group; BPLD – blood pressure lowering drugs (ACEI, ARB, CCB, β-blockers, thiazides diuretics/thiazides like diuretics, where 1 indicates use of any of those drugs.
1 – indicate presence of a disease for the following: Diabetes mellitus, AF - atrial fibrillation, CAD - coronary artery disease, HF - heart failure, Stroke; CKD - chronic kidney disease, COPD - chronic obstructive pulmonary disease, and Cancer; hsCRP - indicates increase in 10 mg/l of highly sensitive C-reactive protein).
Wave 1: admissions from 6th March until 31st July 2020; Wave 2: admissions from 1st August – 31st January 2021; Wave 3: admissions from 1st February 2021 – 13th May 2021.
Figure S2. Independent predictors of in-hospital death in multivariable logistic regression analysis in hypertensive patients N=3028

| Predictor        | Odds Ratio (95% CI)         |
|------------------|----------------------------|
| Age              | 3.05 (2.34-4.00)           |
| Male             | 1.13 (0.92-1.38)           |
| BPLD             | 0.25 (0.20-0.31)           |
| Diabetes mellitus| 1.18 (0.96-1.45)           |
| AF               | 1.21 (0.94-1.56)           |
| CAD              | 1.31 (1.04-1.65)           |
| HF               | 2.23 (1.69-2.94)           |
| Stroke           | 1.31 (0.96-1.79)           |
| CKD              | 1.98 (1.50-2.60)           |
| COPD             | 1.00 (0.71-1.41)           |
| Cancer           | 0.97 (0.72-1.30)           |
| hsCRP            | 1.08 (1.07-1.10)           |

| Predictor        | Odds Ratio (95% CI)         |
|------------------|----------------------------|
| Age              | 3.09 (2.38-4.05)           |
| Male             | 1.12 (0.91-1.37)           |
| Diabetes mellitus| 1.22 (1.00-1.50)           |
| AF               | 1.16 (0.90-1.50)           |
| CAD              | 1.33 (1.06-1.68)           |
| HF               | 2.09 (1.58-2.75)           |
| Stroke           | 1.32 (0.96-1.79)           |
| CKD              | 1.97 (1.50-2.59)           |
| COPD             | 1.01 (0.71-1.42)           |
| Cancer           | 0.94 (0.70-1.25)           |
| β-blocker        | 0.52 (0.41-0.65)           |
| ACEI             | 0.51 (0.38-0.69)           |
| ARB              | 0.24 (0.13-0.41)           |
| CCB              | 0.61 (0.44-0.84)           |
| Thiazides        | 0.40 (0.24-0.65)           |
| hsCRP            | 1.08 (1.07-1.10)           |

Age: 1 - indicates patients at age equal or above median for study group; 1 – indicate presence of a disease for the following: Diabetes mellitus, AF - atrial fibrillation, CAD-coronary artery disease, HF-heart failure, Stroke; CKD- chronic kidney disease, COPD - chronic obstructive pulmonary disease, and Cancer; hsCRP - indicates increase in 10 mg/l of highly sensitive C-reactive protein

Panels:
(A) BPLB: 1 - indicates treatment with blood pressure lowering drugs.
(B) shows the influence of antihypertensive treatment by antihypertensive drug classes. 1 - indicates the use of antihypertensive drug for the following drugs: β-blockers; ACEI – angiotensin enzyme inhibitor, ARB angiotensin receptor blockers, CCB – calcium channel blockers, and Thiazides – thiazide diuretics.
Figure S3. Independent predictors of in-hospital death in multivariable logistic regression analysis in hypertensive patients N=3028 (model including other cardiovascular drugs).

A. Odds Ratios with 95% Profile-Likelihood Confidence Limits

| Predictor       | Odds Ratio (CI) |
|-----------------|-----------------|
| Age 3.41        | (2.59-4.53)     |
| Male 1.16       | (0.94-1.44)     |
| BPLD 0.18       | (0.14-0.24)     |
| Diabetes mellitus 1.19 | (0.96-1.47)     |
| AF 1.73         | (1.31-2.29)     |
| CAD 1.52        | (1.18-1.95)     |
| HF 2.56         | (1.91-3.42)     |
| Stroke 1.41     | (1.01-1.94)     |
| CKD 1.96        | (1.47-2.61)     |
| COPD 1.02       | (0.71-1.46)     |
| Cancer 0.98     | (0.72-1.33)     |
| Statin 0.63     | (0.45-0.87)     |
| Heparin 3.75    | (2.93-4.83)     |
| NOAC 0.19       | (0.10-0.34)     |
| Antiplatelet 0.84 | (0.61-1.14)     |
| hsCRP 1.08      | (1.07-1.09)     |

B. Odds Ratios with 95% Profile-Likelihood Confidence Limits

| Predictor       | Odds Ratio (CI) |
|-----------------|-----------------|
| Age 3.40        | (2.59-4.50)     |
| Male 1.14       | (0.92-1.41)     |
| Diabetes mellitus 1.19 | (0.96-1.47)     |
| AF 1.65         | (1.25-2.18)     |
| CAD 1.52        | (1.19-1.96)     |
| HF 2.36         | (1.77-3.16)     |
| Stroke 1.39     | (1.01-1.92)     |
| CKD 2.00        | (1.50-2.66)     |
| COPD 1.04       | (0.72-1.49)     |
| Cancer 0.93     | (0.68-1.25)     |
| β-blocker 0.48  | (0.37-0.62)     |
| ACEI 0.49       | (0.36-0.66)     |
| ARB 0.23        | (0.12-0.41)     |
| CCB 0.50        | (0.36-0.69)     |
| Thiazides 0.37  | (0.22-0.61)     |
| Statin 0.65     | (0.46-0.89)     |
| Heparin 3.19    | (2.52-4.06)     |
| NOAC 0.17       | (0.09-0.30)     |
| Antiplatelet 0.85 | (0.62-1.15)     |
| hsCRP 1.08      | (1.07-1.09)     |

Age: 1 - indicates patients at age equal or above median for study group;
1 – indicate presence of a disease for the following: Diabetes mellitus, AF - atrial fibrillation, CAD - coronary artery disease, HF - heart failure, Stroke; CKD - chronic kidney disease, COPD - chronic obstructive pulmonary disease, and Cancer; 1 – indicate treatments with: Statins, Heparin, NOAC - non-vitamin K antagonist oral anticoagulants, Antiplatelet drugs; hsCRP - indicates increase in 10 mg/l of highly sensitive C-reactive protein.

Panels:
(A) BPLD: 1 - indicates treatment with blood pressure lowering drugs.
(B) shows the influence of antihypertensive treatment by antihypertensive drug classes. 1 - indicates the use of antihypertensive drug for the following drugs: β-blockers, ACEI – angiotensin enzyme inhibitors, ARB - angiotensin receptor blockers, CCB – calcium channel blockers, and Thiazides – thiazide diuretics.
Figure S4. Independent predictors of in-hospital death in multivariable logistic regression analysis in untreated (panel A) and treated (panel B) hypertensive patients.

A. Odds Ratios with 95% Profile-Likelihood Confidence Limits

- Age 3.11 (2.2-4.4)
- Male 0.92 (0.7-1.3)
- Diabetes mellitus 1.18 (0.9-1.5)
- AF 1.54 (1.1-2.2)
- CAD 1.49 (1.1-2.0)
- HF 3.13 (2.1-4.7)
- Stroke 0.72 (0.4-1.1)
- CKD 2.74 (1.8-4.0)
- COPD 1.07 (0.7-1.7)
- Cancer 1.02 (0.7-1.5)
- hsCRP 1.09 (1.07-1.1)

B. Odds Ratios with 95% Profile-Likelihood Confidence Limits

- Age 2.97 (1.9-4.6)
- Male 1.39 (1.01-1.9)
- Diabetes mellitus 1.17 (0.8-1.6)
- AF 0.87 (0.5-1.3)
- CAD 1.13 (0.8-1.6)
- HF 1.76 (1.1-2.7)
- Stroke 2.10 (1.4-3.1)
- CKD 1.25 (0.8-1.9)
- COPD 0.91 (0.5-1.6)
- Cancer 0.94 (0.6-1.5)
- hsCRP 1.08 (1.05-1.1)

Age: indicates patients at age equal or above median for study group; AF - atrial fibrillation, CAD - coronary artery disease, HF - heart failure, Stroke; CKD - chronic kidney disease, COPD - chronic obstructive pulmonary disease; hsCRP - indicates increase in 10 mg/l of highly sensitive C-reactive protein
Figure S5. Independent predictors of in-hospital death in multivariable logistic regression analysis in participants without arterial hypertension N= 2163

| Predictor         | Odds Ratio (95% CI) |
|-------------------|---------------------|
| Age               | 5.58 (4.05-7.74)    |
| Male              | 1.20 (0.55-1.63)    |
| Diabetes mellitus | 1.41 (0.94-2.10)    |
| AF                | 1.23 (0.72-2.09)    |
| CAD               | 1.10 (0.63-1.92)    |
| HF                | 2.14 (1.16-3.90)    |
| Stroke            | 1.29 (0.62-2.56)    |
| CKD               | 4.08 (2.43-6.81)    |
| COPD              | 1.26 (0.61-2.53)    |
| Cancer            | 1.05 (0.67-1.62)    |
| β-blocker         | 0.72 (0.46-1.09)    |
| ACEI              | 0.47 (0.21-0.96)    |
| ARB               | 0.38 (0.02-2.61)    |
| CCB               | 1.14 (0.54-2.28)    |
| Thiazides         | 0.63 (0.09-2.54)    |
| hsCRP             | 1.11 (1.09-1.12)    |

Odds Ratios with 95% Profile-Likelihood Confidence Limits
Age: 1 - indicates patients at age equal or above median for study group; 1 – indicate presence of a disease for the following: Diabetes mellitus, AF - atrial fibrillation, CAD - coronary artery disease, HF - heart failure, Stroke; CKD - chronic kidney disease, COPD - chronic obstructive pulmonary disease, and Cancer; hsCRP - indicates increase in 10 mg/l of highly sensitive C-reactive protein
1 - indicates the use of antihypertensive drug for the following drugs: β-blockers; ACEI – angiotensin enzyme inhibitor, ARB angiotensin receptor blockers, CCB – calcium channel blockers, and Thiazides – thiazide diuretics