PULMONARY HYPERTENSION AS A RISK FACTOR FOR MORTALITY AND CARDIOVASCULAR EVENTS IN CKD: A SYSTEMATIC REVIEW AND META-ANALYSIS

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INTRODUCTION AND AIMS: Pulmonary hypertension (PH), a pathological condition defined by increased pulmonary arterial pressure ≥25 mmHg at rest, is nowadays considered a new, emerging risk factor for mortality and adverse cardiovascular outcomes at the community level. In individuals with heart disease, PH is a powerful predictor of mortality and worsen cardiovascular outcomes independently of age, presence of chronic lung disease and severe heart dysfunction. As sparse evidence exists indicating that PH is highly pervasive also in renal patients, we aimed at performing a systematic review of the available literature to assess: 1) the pooled prevalence of PH in CKD and ESKD populations 2) the prognostic impact of this condition on all-cause and cardiovascular mortality and non-fatal cardiovascular events.

METHODS: We searched for longitudinal cohort studies dealing with individuals affected by CKD of any-stage (also including ESKD and kidney transplantation) stratified according to presence/absence of PH and with available outcome data on all-cause and cardiovascular mortality and non-fatal cardiovascular events. A random-effects meta-analysis approach was adopted for assessing a pooled PH prevalence and for performing cumulative outcome analyses. Heterogeneity was explored by subgroup or meta-regression analyses.

RESULTS: From a source of 5712 potential articles, 18 eligible studies (10740 participants) were retrieved. PH had an overall prevalence (PP) of 0.33 (95% CI 0.28-0.42) that resulted apparently lower in CKD (0.30; 0.13-0.47) than in ESKD (0.35; 0.28-0.42) (Figure 1). Overall, PH portended a higher risk of all-cause mortality (12 studies, 6638 participants; RR 2.89; 95%CI 1.07-7.01), a finding that persisted in ESKD (RR 1.96; 1.64-2.35) while was not confirmed in CKD studies. PH predicted high cardiovascular mortality (3 studies; 1364 participants; RR 3.77; 2.46-5.78) and non-fatal cardiovascular events (9 studies; 7360 participants; RR 1.59; 1.28-1.98), particularly in CKD (RR 1.50; 1.49-2.42). CKD severity, follow-up length and study sample size were the main effect modifiers to the pooled analyses.

CONCLUSIONS: PH is a highly prevalent condition in CKD and appears to be a significant risk factor for mortality and worsen cardiovascular outcomes, particularly in selected sub-categories. Future research is advocated to confirm the need for clinical attention on PH and to define benefits of appropriate therapeutic approaches also in the CKD setting.