Examination of the independent contribution of rheumatic heart disease and congestive cardiac failure to the development and outcome of melioidosis in Far North Queensland, tropical Australia.

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Background: Melioidosis, a disease caused by *Burkholderia pseudomallei*, rarely develops in the absence of well-described predisposing conditions that include diabetes mellitus, hazardous alcohol intake, chronic kidney disease, chronic lung disease, malignancy and immunosuppression.[1] Indigenous Australians bear a disproportionate burden of this infection.[2] Patients with rheumatic heart disease (RHD) and congestive cardiac failure (CCF) are believed to have an increased risk of this infection and increased associated mortality.[3]

Aim: This study was performed to confirm these findings in the Far North Queensland (FNQ) region which has a high incidence of all three conditions.

Methods: All patients in FNQ with culture-confirmed *B. pseudomallei* infection between January 1, 1998, and December 31, 2021, were included in the study. The patients' medical records were reviewed, and their demographics, medical history and clinical course were recorded. The presence of comorbidities that predispose to melioidosis were specifically sought as well as a history of RHD and/or CCF. Data were de-identified, entered into an electronic database (Microsoft Excel 2016, Microsoft, Redmond, WA, USA) and analysed using statistical software (Stata version 14.2, StataCorp LLC, College Station, TX, USA). Groups were analysed using logistic regression, the chi-squared, Fisher's exact or Kruskal-Wallis tests, where appropriate. Trends over time were determined using an extension of the Wilcoxon rank-sum test.[4]

Results: Between January 1998 and December 2021 there were 392 cases of melioidosis in Far North Queensland, tropical Australia; 200 (51.0%) identified as an Indigenous Australian, and 337/392 (86.0%) had a confirmed predisposing comorbidity that increased risk for the infection. Overall, 46/392 (11.7%) died before hospital discharge; the case fatality rate declined during the study period (p for trend=0.001). There were only 3/392 (0.8%) with confirmed RHD, all of whom had at least one other risk factor for melioidosis; all 3 survived to hospital discharge. Among the 200 Indigenous Australians in the cohort, 2 had confirmed RHD; not statistically greater than the prevalence of RHD in the local general Indigenous population (1.0% versus 1.2%, p=1.0). RHD was present in only 1/193 (0.5%) cases of melioidosis diagnosed after October 2016, a period which coincided with prospective data collection. There were 26/392 (6.6%) with confirmed CCF, but all 26 had another traditional risk factor for melioidosis. Patients with CCF were more likely to also have chronic lung disease (OR (95% CI: 4.46 (1.93-10.31), p<0.001) and chronic kidney disease (odds ratio (OR) (95% confidence interval (CI): 2.98 (1.22-7.29), p=0.01) than those who did not have CCF.

Conclusions: In this region of tropical Australia RHD and CCF do not appear to be independent risk factors for melioidosis and have limited prognostic utility. The high prevalence of these cardiac diseases in patients with melioidosis may be, at least partly, explained by the confounding presence of socioeconomic disadvantage that increases the incidence of all three conditions.

References:

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