Sex and Age Differences in Acute Myocarditis and Dilated Cardiomyopathy: A Single-Center Cohort Study

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Background: Myocarditis is an inflammatory disease of the myocardium and the third leading cause of sudden cardiac death in children and young adults. Roughly one-third of patients who recover can progress to dilated cardiomyopathy (DCM) in the future. Currently, myocarditis is likely underdiagnosed, and it remains difficult to predict who will progress to DCM. Moreover, there is a well-described sex difference among adult populations, with males having more severe disease than females. Yet, age as a factor in this disease remains relatively unexplored.

Methods: This study analyzed a cohort of pediatric and adult patients with myocarditis at the University of Florida and explored differences in prevalence, hospital stay, cardiac biomarkers, and medications. All analyses were stratified by sex and age. Overall, 762 patients have been diagnosed with myocarditis at UF since 2011.

Results: Based on the expected 50/50 female-to-male distribution in the population, there was a significant deviation from this distribution in the young adult (ages 18-35) cohort, with more males than females. However, there were also significant deviations in the prepubescent (ages 7-11 for females, 7-13 for males) and adolescent (ages 11-17 for females, 13-18 for boys) age cohorts. As expected, there were no significant deviations in the infant (ages <1), child (ages 1-7), or old age (ages > 54). However, this was also the case for the middle-aged cohort (ages 35-54), though males were slightly more prevalent among them. Patients under 1 year of age had a significantly longer median length of hospital stay at the time of initial diagnosis. Children under 7 years of age, regardless of sex, tended to have lower ejection fractions than other age cohorts. Sex, but not age, was a significant factor in troponin values, with males having higher values. However, age, but not sex, was a significant source of variation for C-reactive protein (CRP), B-type natriuretic peptide (BNP), and albumin. Neither age nor sex affected creatine kinase (CK) values. Longitudinal analysis of troponin values showed that males tended to have higher values within the first 10 days post-diagnosis. However, grouping values by months from diagnosis, this was reversed with females trending higher out to 30 months. Multiple logistic regression analysis of sex, age, Troponin, CRP, and CK with a diagnosis of DCM as the outcome showed that only the Troponin value at diagnosis was a predictive variable.

Discussion: The study represents an initial description of myocarditis patients at the University of Florida and shows that sex and age, as well as other important cardiac

biomarkers, are important factors in understanding myocarditis prevalence and should be further studied.