**Incidence and heritability of vascular rings in Michigan**

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Background: Vascular rings describe a variety of vascular abnormalities resulting from the abnormal development of the aortic arch. Complications include the compression of the trachea, esophagus, or both. The overall incidence of vascular rings in the U.S. is approximately 1% of all congenital heart lesions. A tertiary referral center in the Midwest had an average of 3.8 patients with vascular rings per year. Another Midwest hospital averaged 4.8 patients a year. The average at our hospital is 5.5 patients per year. A retrospective chart review study was performed to learn about the cause of the higher incidence of vascular rings in West Michigan.

Methods: Following Spectrum Health Institutional Review Board approval, a retrospective chart review was conducted on patients with diagnosis of vascular rings in a 10-year period (2003-2013). Census block and tract data and mother’s maiden name was collected to determine familial and/or geographic trends.

Results: Of the 55 vascular ring patients, 58% (n=32) were males with average age of 14 years (range = 3 to 52 years). The majority of patients (52%, n=28) were noted to be from Kent County, 11% (n=6) from Ottawa County, 7% (n=4) from Montcalm County with the remaining 30% from 13 other Michigan counties. Only 2 patients were noted to be from the same county, block, and tract (Figure 1). Mother’s maiden name was inconclusive to determine any familial associations.

Conclusions: Our study suggests a high incidence of vascular rings in Kent County in West Michigan. However, the potential of selection bias through a single regional center population is a major limitation. Future comprehensive studies with a larger cohort of patients are required to determine if genetic factors contribute to the higher incidence of vascular rings in Michigan. Environmental factors such as proximity to toxic waste sites must also be considered.

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| **Figure 1**. Census block tract map of Michigan with blue lines showing individual locations of persons born with vascular rings. The red lines show 2 persons within the same county, block, and tract born with vascular rings. |