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Congenital Heart Disease

IMMUNOLOGIC AGING IN ADULTS WITH CONGENITAL HEART DISEASE: DOES INFANT STERNOTOMY MATTER?

Oral Contributions

Room 146 A

Saturday, March 29, 2014, 8:00 a.m.-8:15 a.m.

Session Title: Adult Congenital Heart Disease

Abstract Category: 9. Congenital Heart Disease: Adult

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Background: Thymectomy is performed routinely in infants during cardiothoracic surgery to enable repair of congenital heart disease (CHD). Prior work has shown that children post-sternotomy have decreased T-lymphocyte levels, without proven compromise in immune function. Long-term assessment of immune function of adults with congenital heart disease (ACHD) with infant cardiac repair is not known. We hypothesized that ACHD patients would show more pronounced changes in T-lymphocyte repertoire and markers for immune senescence.

Methods: ACHD patients >18 yrs were recruited who had sternotomy to repair CHD as infants (<1 yr) as well as age-matched ACHD patients without prior sternotomy. Institutional practice was to perform thymectomy concurrently with infant sternotomy. Exclusion criteria included known or suspected DiGeorge syndrome, pregnancy, recent infection, or NYHA class III-IV. Blood was analyzed using flow cytometry for known markers of lymphocyte maturation, exhaustion and senescence. Group differences were analyzed using Mann-Whitney-U and Fisher's exact tests.

Results: 18 ACHD patients ages 21-40 yrs participated: 10 cases and 8 controls. Mean age at sternotomy for cases was 85.5 days (SD 103.7). Diagnoses were not matched, but CHD complexity was similar in both groups and ranged from simple to complex. Cases and controls were matched for age (28.9 vs. 29.1 yrs; $p=0.83$), gender ($p=0.15$), and race ($p=0.62$). Mean percentage of cytotoxic CD8 lymphocytes was lower in cases compared to controls (26.8 vs. 33.9%; $p=0.016$). Naïve, undifferentiated CD8 T-cells were also lower in cases than controls (31.0 vs. 53.6%; $p=0.027$). CD8 cells expressing PD1, a marker of immune exhaustion, tended to be higher in sternotomy cases vs. controls (25.6 vs. 19%; $p=0.083$). Mean percentage of CD4 cells was higher in cases vs. controls (65.6 vs. 59.6%; $p=0.027$); there were no differences in CD4 T-cell subtype or markers of senescence.

Conclusion: ACHD patients who undergo sternotomy as infants exhibit differences in T lymphocyte composition compared to ACHD controls, suggesting accelerated immunologic aging. Further investigation is warranted to understand these differences and any clinical effects.