Diastolic function assessment with left atrial strain in long-term survivors of childhood acute lymphoblastic leukemia

C. Fernandez-Aviles Irache1, R. Gonzalez Manzanares1, G. Heredia Campos1, A. Resua Collazo1, J.C. Castillo Dominguez1

1University Hospital Queen Sofia, Cordoba, Spain
On behalf of CTOXALL

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Background: Survivors of childhood cancer might be at increased risk of diastolic dysfunction at follow-up due to cardiotoxic treatment exposure. Although diastolic function assessment is challenging in this relatively young population, left atrial strain might provide a novel insight into this evaluation.

Purpose: To examine diastolic function in a cohort of long-term survivors of childhood acute lymphoblastic leukemia survivors using left atrial strain and conventional echocardiographic parameters.

Methods: Long-term survivors who were diagnosed at a single center between 1985-2015 and a control group of healthy siblings were recruited. Conventional diastolic function parameters and strain were compared, the latter measured during the three atrial phases: reservoir (PALS), conduit (LACS) and contraction (PACS). Inverse probability of treatment weighting was used to account for differences between the groups.

Results: 90 survivors (24.6 ± 9.7 years, time since diagnosis 18 [11-26] years) and 58 controls were analyzed. PALS and LACS were significantly reduced compared to the control group: 46.4 ± 11.2 vs 52.1 ± 11.7 (p = 0.003) and 32.5 ± 8.8 vs 38.2 ± 9.3 (p = 0.003), respectively (figure 1B). Conventional diastolic parameters and PACS were similar between the groups (figure 1A). The reductions in PALS and LACS were associated to cardiotoxic treatment exposure in age and sex adjusted analysis (≥ moderate risk, low risk, controls): 45.4 ± 10.5, 49.5 ± 12.9, 52.1 ± 11.7 (padj = 0.003) and 31.7 ± 9.0, 35.2 ± 7.5, 38.2 ± 9.3 (padj = 0.001), respectively (figure 2).

Conclusions: Long-term childhood leukemia survivors showed a subtle impairment in diastolic function that was detected using atrial strain but not with conventional measurements. This impairment was more pronounced in those with higher cardiotoxic treatment exposure.
Figure 2