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Cardiotoxicity in Acute Lymphoblastic Leukaemia - long-term follow-up in a group of paediatric patients

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Introduction: The use of anthracyclines in the treatment of acute lymphoblastic leukaemia (ALL) is limited by its cardiotoxic effects. Anthracycline-induced cardiotoxicity in long-term survivors of childhood cancer is well known. The aim of this study was to evaluate the effects of anthracycline therapy on cardiac function in a group of children with high risk LLA.

Methods: The authors carried out a retrospective echocardiographic analysis in a group of 40 patients with high risk ALL aged from 1 to 17 years over a period of 10 years (2007-2017) treated with at least 250 mg/m² of a cumulative anthracycline dose. The parameters used were: fraction shortening (FS), ejection fraction (EF) by the Simpson biplane method and the tricuspid annular plane systolic excursion (TAPSE). The echocardiographic evaluation was carried out at diagnosis, 3, 6 and 12 months after the onset of chemotherapy and then yearly.

Results: Twenty five patients (62,5%) were male. The cardiovascular risk factors identified prior to therapy were: arterial hypertension (5); type 1 diabetes mellitus (2); dyslipidaemia (3) and chronic kidney disease (2). None underwent mediastinal radiotherapy. The sample was divided into 3 groups according to their age at diagnosis and the beginning of chemotherapy: 0-5 years (n=11), 6-11 (n=15) and 12-18 (n=14). The ALL cell lineage was evenly distributed (1:1 ratio between B and T cell lineage) and 2 patients had the Philadelphia chromosome.

The fraction shortening after the first year of treatment was lower in the female group (n=29; p=0,039) as was the ejection fraction in the 6-11 and 12-18 years age groups when compared to the 0-5 years age group (n=32; p=0,035). We also found that overall the fraction shortening (n=15; p=0,019) and TAPSE (n=20; p=0,003) were lower during the first year of treatment.

Conclusion: Based on our results, systolic dysfunction is most likely to occur during the first year of anthracycline treatment and is most prominent in girls and older children. This highlights the importance of a long-term follow-up in paediatric cancer survivors treated with anthracyclines in order to diagnose potential cardiovascular toxicity.