

# THE VALUE OF ECHOCARDIOGRAPHY FOR THE DIAGNOSIS OF ANTHRACYCLINES INDUCED CARDIOTOXICITY IN CHILDREN WITH MALIGNANT DISEASES,

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**Background.** Anthracycline induced cardiotoxicity, which may lead severe cardiac sign of cardiac sufferind to congestive heart failure, may limits the therapeutic use of this antineoplastic agents. The prognosis of anthracycline-induced cardiotoxicity is poor with high morbidity, poor quality of life, and premature mortality. The early detection of chemotherapy-induced cardiac damage, even if subclinical, is warranted. Echocardiography and ECG are the most important non invasive methods of investigation on anthracycline induced cardiotoxicity and monitoring the therapy of patients with malignancies.

**Objective.** Assessment of the most important parameters of systolic and diastolic function of left ventricle (LV) and establishing who are most predictive for early dysfunction in children with anthracyclines treatment for malignancies.

**Methods.** Patients:124 patients (aged 3 month -19 years) treated with anthracyclines for malignant diseases. Mean cumulative dose of anthracyclines was 320 mg/m<sup>2</sup> (240-820 mg/m<sup>2</sup>). Doppler echocardiography (echo) had evaluated the most important LV systolic and diastolic function parameters. The interval between examinations have been established depending on the cumulative anthracyclines doses (200,300, 400 and > 500 mg/m<sup>2</sup>). The data were correlated with the dispersion of QT/QTc intervals in 40 patients. Control group: 40 healthy children without cardiovascular suffering.

**Results.** Echo exam revealed suggestive modifications for cardiotoxicity in 63 cases (51%) with/without clinical manifestations of cardiac suffering up to heart failure.

The most important echo modifications have been found at the patients with a cumulative dose over 350 mg/m<sup>2</sup>:

- higher incidence (48%) and precocious onset of the diastolic dysfunction of the LV type relaxation impairment of LV(17%) (Fig.1) or compliance impairment of LV(31%)(Fig.2);
- systolic dysfunction of LV: decrease of ejection fraction (19%) ⇒dilated cardiomyopathy(Fig.3) and left atrial enlargement(Fig.4)
- increase of the deceleration time of E wave-DTE (35%) and of the isovolumic relaxation time- IVRT (28%).
- The Tei index: increased in 30 cases: 21 cases values beetwen 0.39-0.62, 9 cases >0.62.

ECG:an increase in the dispersion of interval QT/QTc in 73% of patients correlated with the cumulative doses of the anthracyclines > 400 mg/m<sup>2</sup>.

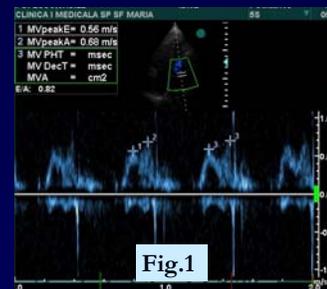


Fig.1

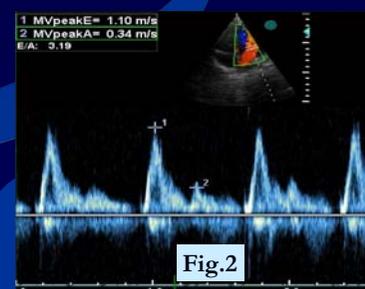


Fig.2



Fig.3

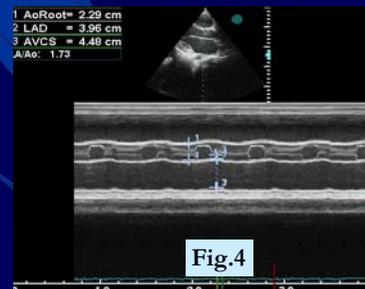


Fig.4

## Conclusions.

Diastolic dysfunction of LV occurs earlier and with a superior incidence (48 %) versus systolic dysfunction (19%) of LV, proved by decline of the ejection fraction of LV.

Diastolic echo parameters (E, E/A, DT, IVRT, IVCT) and Tei index, allows a precocious detection of anthracyclines-induced cardiotoxicity that are frequently missed or not suspected clinically, especially when the LVEF is normal.

The echocardiographic modifications and increased of QT/QTc intervals, well correlated with cumulative doses of the anthracyclines, can put in evidence the signs of cardiac suffering in the stage infraclinic and it is necessary to be follow up booth during and after the cytostatic treatment