Childhood Malignancy and Cardiotoxicity of Anthracyclines

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Background:

- Anthracyclines are antitumor agents with broad spectrum activity against many childhood malignancies. An important side effect of these drugs is cardiotoxicity which may happen even years after discontinuation.

Objective:

- Our objective was tried to determine the incidence of Anthracycline induced chronic cardiotoxicity and its risk factors in an Iranian cohort.

Methods:

- we carried out a prospective analytic descriptive study at Children's Medical hospital, Tabriz, Iran, from 2009 to 2010. To evaluate cardiotoxicity (early or late onset), echocardiographic investigation was carried out on 80 persons who had received anthracyclines to treat Acute lymphoblastic Leukemia [ALL] and Lymphoma malignancy before the echocardiographic examination. All patients were off treatment.

Results:

- Mean age ± SD was 9.74±3.79 years old .
- 66.25 % (53) was male and 33.75% (27) was female.
- M/F ratio was 1.96.
- 60(75%) had ALL and 20 (25%) had lymphoma.
- 12.50% (10 cases) had left ventricular systolic dysfunction, 25% (20 cases) had left ventricular diastolic dysfunction, and 27.5 % (22 cases) had arrhythmias.
- Radiotherapy was used in 6 cases (Group A) and 8 cases (Group B). There was significant relation between radiotherapy ,group B and cardiac toxicity (P=0.01).

Results:

Table 1: Values of quantitative risk factors in our patients

Risk Factors	Max	Min	Mean			Standard Deviation
Age at diagnosis(yr)	14	6(mo)	8.5			4.9
Length of follow up(yr)	9	2	3.9			2.8
Cumulative anthracycline dose($Mg/m^{2)}$	600	200	276			89.2
Individual anthracycline dose(Mg/m^2)	50 Group B	20 Group A	25.7			9.8

Echocardiographic results:

Table 2: Values of echocardiographic measurements

Echocardiography Finding	Mean	Standard Deviation	Min	Max
FS	33.1	8.1	21	52
EF	69.8	9.8	42	90
E/A	1.90	0.45	0.7	2.87
EDT	167	23.2	99	275
IVRT	60.1	19.8	23	98

Fs: Fractional Shortening, EF: Ejection Fraction, E/A ratio: Early rapid filling/Atrial contraction in mitral valve blood flow, EDT: early deceleration time, IVRT: Isovolumic Relaxation Time (left ventricle)

Table 3: Participants' cardiac function

			Frequency	Percent
Systolic function	Normal		70	87.5
	Decreased		10	12.5
	Total		80	100
Diastolic function	Normal		60	25
	Decreased	Stage1	10	12.50
		Stage2	7	8.75
		Stage3	3	3.75
	Total		80	100
Left ventricle dysfunction (systolic, diastolic or both)	Positive		21	26.25
	Negative		59	73.75
	Total		80	100

Discussion

- Apart from length of follow up, it seems that there may be different reasons for not finding significant relation between cardiac dysfunction and risk factors, including to have small sample size, wide range of cumulative anthracycline dose in cases, not to use different types of drug, not to have enough cases of genetic factors or pre-existing cardiac disease among our participants.

Conclusion:

- In the current study among survivors of childhood cancer, finding show that, incidence of arrhythmias due to Anthracyclines cardiotoxicity was greater than other side effects.

Acknowledgement

- We are very grateful to Mahak Charity that sponsor our study and children's Medical Center Hospital to help us for patient recruitments.

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