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Anthracycline prescribing in Lymphoma: Traffic light guidance using NT-proBNP and echocardiogram

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INTRODUCTION

Anthracycline's have been utilised in certain malignancies for decades with cardiotoxicity related to anthracycline use widely recognised among clinicians. Whilst estimated data of worldwide prevalence of anthracycline induced cardiotoxicity has been lacking, the mechanism of cardiotoxicity is thought to be due to inhibition of the topoisomerase 2β enzyme resulting in impairment of subsequent mitochondrial biogenesis in non-proliferating cardiomyocytes.

AIM

To pre-emptively risk assess patients and minimize irreversible cardiotoxicity we have developed **traffic light-based guidance** for our lymphoma cohort, implemented in March 2019.

In any patients with: Age >60, history of hypertension, diabetes or previous cardiac event, smoking history, or presence of ECG changes consistent with Left Ventricular (LV) hypertrophy, baseline investigations including NT-proBNP and transthoracic echocardiogram are recommended. Results then guide anthracycline dosing from cycle 1 (or before second cycle in urgent cases).

METHOD

- A green light 'go ahead' was given to anthracycline administration in patients with LV ejection fraction (EF) ≥55%, no ventricular dilatation and NT-proBNP <300.
- Amber caution was advised for patients with preserved LVEF ≥55% but NT-proBNP >300 in whom anthracycline was administered at cycle 1 but a cardiac MRI and cardio-oncological opinion expedited pre cycle 2.
- Anthracyclines were not administered if baseline LVEF was found to be 40 -55 % or patients had LV dilatation- until the echocardiogram had been reviewed or repeated and a cardio-oncological opinion sought. Anthracycline's were contraindicated in those with LVEF <40 %. Cardio-oncological optimization was sought and alternatives to anthracyclines considered.

RESULTS

Retrospective data collection of patients treated at our institution between March and October 2019 highlights a total of 58 patients who had both been diagnosed with lymphoma and where anthracycline containing regimens were considered.

Patients were aged 22-89 years; 35 were diagnosed with DLBCL, 11 with Hodgkin's, 3 with T-NHL and the remaining 9 with other high grade B-NHL subtypes. 9 patients were excluded from further analysis as they were not deemed suitable for chemotherapy in view of performance status and comorbidities and one was excluded as they were treated outside of our institution. Of the 48 patients who were considered for treatment with an anthracycline, 10 did not meet the criteria

for use of the traffic light guidance. 24 of the 38 patients who met traffic guidance criteria use had both NT-proBNP and an echocardiogram performed. Only one patient had an EF precluding anthracycline use, and had received historical anthracycline chemotherapy for prior breast cancer and were now aged >60. 15 patients had a straight forward green go ahead for anthracycline use. 8 had amber warnings, managed with dose adjustments and cardiological advice. Only one patient went on to have a cardiac MRI, highlighting potential difficulties in obtaining this test.

Traffic light guidance for Anthracycline prescribing:

ECHO / BNP RESULT	Traffic Guidance	ACTION	SPECIALIST INPUT
EF >55% No ventricular dilatation NT-proBNP <300		Administer Anthracycline	Nil
EF >55% but NT –proBNP >300		Administer Anthracycline cycle 1 and get cardiac MRI	Cardiac MRI and review before cycle 2
EF 40-55% or ventricular dilatation		**Hold Anthracycline**	**Echo review**
EF<40%		**No Anthracycline**	**Refer patient**

CONCLUSIONS

The importance of risk assessing patients for cardiotoxicity has been discussed in departmental teaching sessions with a more robust roll out of the guidance. The traffic light guidance will be reassessed in future with larger numbers to assess its ease and practicalities of use and impact on cardio protection, ensuring no deleterious effect on patient outcomes.

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