A Case Report on the Use of Cardiac Troponins in Suspected Trastuzumab-Induced Cardiomyopathy During the Treatment of Metastatic Breast Cancer

Stacy Sebastian; Eddy Valdez MD; Rafael Otero MD; Adedayo Okanlawon; Henry Kwang MD

The University of Texas Rio Grande Valley School of Medicine, Edinburg, Texas
Valley Baptist Medical Center, Harlingen, Texas

BACKGROUND & PURPOSE

- Trastuzumab-induced cardiomyopathy (TIC) occurs in up to 10% of patients undergoing trastuzumab-containing regimens and is typically assessed by evaluation of left ventricular ejection fraction (LVEF).[1]
- Although often reversible, TIC is a serious side effect that justifies discontinuation[1], which presents a challenging decision in oncology patients with underlying heart disease
- We present such a patient with suspected TIC, in whom the use of serial cardiac troponins provided evidence against trastuzumab discontinuation.

CASE TIMELINE

PARTIAL UNILATERAL MASTECTOMY
- Indication: Metastatic adenocarcinoma of the breast
- Pathology: HER2+
- No post-operative complications

9 MONTHS

INITIATION OF CHEMOTHERAPEUTIC REGIMEN
- Contains trastuzumab
- Baseline echo: normal ventricular function with LVEF of 55-60%
- Baseline troponins: within normal limits

6 MONTHS

ADMISSION FROM ED
- CC: syncope, palpitations, chest pain
- Exam: unremarkable
- Serial cardiac troponins: within normal limits
- Echo: left ventricular diastolic dysfunction with LVEF of 35-40%
- Recommended continuation of regimen with close monitoring with cardiology and oncology services

6 MONTHS

COMPLETION OF CHEMOTHERAPEUTIC REGIMEN
- Final echo: normal left ventricular function with LVEF of 40-45%
- Imaging: near remission of metastatic malignancy
- Patient returned to baseline

CASE DESCRIPTION & OUTCOMES

- A 42-year-old female with a past medical history of breast cancer status post mastectomy and atrial flutter status post multiple ablations presented to our hospital with chief complaints of syncope, palpitations, and chest pain.
- The patient has been receiving a trastuzumab-containing chemotherapeutic regimen for 6 months.
- Baseline echocardiogram prior to regimen initiation showed normal ventricular function with left ventricular ejection fraction (LVEF) of 55-60%.
- Upon admission, vital signs included temperature of 98.1 F, heart rate 117, blood pressure 148/91, respiratory rate 12, and BMI 32.
- Cardiac and pulmonary auscultation were unremarkable.
- Serial cardiac troponins were within normal limits.
- Electrocardiogram indicated normal sinus rhythm. Chest X-ray was unremarkable.
- Echocardiogram indicated left ventricular diastolic dysfunction with LVEF of 35-40%.
- Cardiology and oncology allowed the patient to continue her chemotherapeutic regimen with diligent monitoring by both services until completion six months later. The patient remained at baseline following discharge.
- A final echocardiogram six months later showed normal left ventricular function with improved LVEF of 40-45%; subsequent imaging indicated near complete remission of metastatic malignancy.

DISCUSSION & CONCLUSIONS

- Trastuzumab-induced cardiomyopathy (TIC) typically causes a precipitous decline in LVEF.
- Research indicates TIC-associated damage often presents with significantly elevated cardiac troponins, which are sensitive biomarkers of cardiac injury[2,3].
- Although the patient's echocardiogram findings were concerning for TIC, the lack of elevated cardiac troponins provided reasonable justification evidence against drug-induced cardiac injury and prompted careful continuation of trastuzumab[2].
- Indeed, the patient continued trastuzumab for six more months without serious incident. The patient is now in near complete remission and has returned to cardiac baseline.
- This case demonstrates how the use of cardiac troponins as surrogate biomarkers of trastuzumab-associated cardiomyopathy can guide clinical decision-making.
- A strong oncology-cardiology alliance can prevent unnecessary withdrawal of a lifesaving intervention, one which allowed our patient to achieve near remission free of permanent cardiac consequence.

REFERENCES

1. Sengupta PP, et al. *Trastuzumab-Induced Cardiotoxicity: Heart Failure at the Crossroads.* Mayo Clinic Proceedings 2008;83:197-203.
2. Zardavas D, Suter TM, Van Veldhuisen DJ, Steinseifer J, Noe J, Lauer S, Al-Sakaff N, Piccart-Gebhart MJ, de Azambuja E. *Role of Troponins I and T and N-Terminal Prohormone of Brain Natriuretic Peptide in Monitoring Cardiac Safety of Patients With Early-Stage Human Epidermal Growth Factor Receptor 2-Positive Breast Cancer Receiving Trastuzumab: A Herceptin Adjuvant Study Cardiac Marker Substudy.* J Clin Oncol. 2017;35(8):878. Epub 2016 Oct 23.
3. Cardinale D, Colombo A, Torrisi R, Sandri MT, Civelli M, Salvatici M, Lamantia G, Colombo N, Cortinovis S, Dessanai MA, NolèF, Veglia F, Cipolla CM. *Trastuzumab-induced cardiotoxicity: clinical and prognostic implications of troponin I evaluation.* J Clin Oncol. 2010;28(25):3910. Epub 2010 Aug 2.

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