BMC Cardiovascular Disorders

Case report

5-Fluorouracil-induced cardiotoxicity mimicking myocardial infarction: a case report

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Abstract

Background: Severe cardiotoxicity is a documented, but very unusual side-effect of intravenous 5-fluorouracil therapy. The mechanism producing cardiotoxicity is poorly understood.

Case presentation: A case of 5-fluorouracil-induced cardiotoxicity, possibly due to coronary artery spasm, and mimicking acute anterolateral myocardial infarction is presented and discussed. Electrocardiographs highlighting the severity of the presentation are included in the report along with coronary angiograms demonstrating the absence of significant coronary atherosclerosis.

Conclusion: Severe 5-fluorouracil-induced cardiotoxicity is rare, but can be severe and may mimic acute myocardial infarction, leading to diagnostic and therapeutic dilemmas. Readministration of 5-fluorouracil is not advised following an episode of cardiotoxicity.

Background

Severe 5-fluorouracil (5-FU) cardiotoxicity is unusual, but documented. Intravenous infusion of the drug has been documented to cause angina [1], myocardial infarction [2], acute pulmonary oedema [3], supraventricular and ventricular arrythymias [4], and sudden death [1]. Although the incidence of angina related to application of 5-FU is between 1.2 and 18% [5], severe or life-threatening cardiotoxicity, defined as ST segment elevation on electrocardiogram or ventricular arrythymias, is much rarer, with an incidence of about 0.55% [6].

The mechanisms involved in 5-FU cardiotoxicity have not yet been fully identified, but coronary artery spasm has been identified as one possibility.

The case discussed outlines the presentation of a gentleman receiving 5-FU therapy to our cardiology unit with chest pain and electrocardiograph changes consistent with acute anterolateral myocardial infarction. Subsequent management and investigation, and the rationale to our final conclusion that his presentation was secondary to 5-FU cardiotoxicity are also discussed.

Case Presentation

A 77 year old man was transferred from an oncology unit. He had been diagnosed with squamous cell carcinoma of the anus and was admitted for combined radiotherapy and chemotherapy with 5-fluorouracil and mitomycin C. On the fourth day of intravenous therapy with 5-fluorouracil he developed central chest pain radiating into the

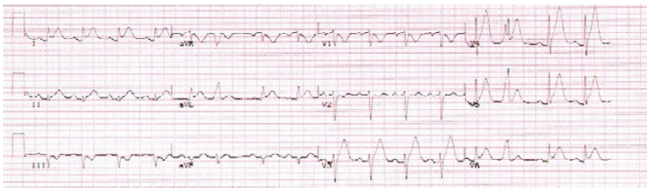

Figure 1
ECG taken at time of chest pain

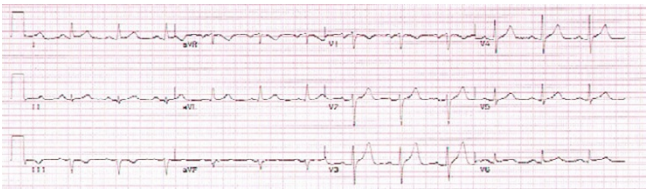

Figure 2
ECG after pain resolved

left arm and associated with nausea and sweating. An electrocardiogram showed ST segment elevation in leads I, aVL and V6 and hyperacute T wave changes in leads V3-V6 (figure 1). The episode lasted thirty minutes with discontinuation of the 5-fluorouracil infusion and administration of sublingual glyceryl trinitrate producing both symptomatic relief and resolution of the electrocardiographic changes (figure 2).

Six hours later, he had a second episode of chest pain associated with similar electrocardiographic changes. On this occasion, he was treated with aspirin 300 mg and intravenous diamorphine, again resulting in resolution of the pain and the changes on the electrocardiogram within twenty minutes. A presumptive diagnosis of coronary artery spasm was made and transfer to our coronary care unit was arranged for further management.

He was stable on transfer and pain-free. Cardiovascular examination was normal. He was treated with oral nitrates and calcium channel antagonists. Serial serum cardiac enzymes and serum troponin I levels were normal. Past medical history included a diagnosis of myocardial infarction seven years previously. There was no history of angina. Maturity onset diabetes mellitus was diagnosed within the past year. He had no history of hypertension, had never smoked tobacco and had no family history of ischaemic heart disease. Serum cholesterol was 4.36 mmol/.

There were no further episodes of chest pain and he proceeded to coronary angiography. This revealed minor irregularity in the left anterior descending artery at the origin of the first diagonal branch. The left main coronary, left circumflex and right coronary arteries were normal (Figures 3 & 4). Left ventriculography showed hypokinesis of the anterior wall. The relative normality of the coronary arteries supported a diagnosis of 5-fluorouracil-induced coronary artery spasm. The history of a myocardial infarction in his past medical history in light of the findings at coronary angiography may indicate an underlying tendency to coronary vasospasm in this man. He was transferred back to the oncology unit for further management of his carcinoma. It was advised that if further chemotherapy was indicated, then an agent other than 5-FU should be used.

Discussion

We have presented a case of severe cardiotoxicity occurring in a gentleman receiving 5-FU chemotherapy for squamous cell carcinoma of the anus. The case is unusual in that the presentation mimicked an acute myocardial infarction, with ST segment elevation noted on the electrocardiogram.

Coronary artery spasm has been postulated as a possible mechanism for cardiotoxicity, based mainly on the finding of clinical and electrocardiographic evidence of reversible ischaemic heart disease in the absence of coronary atherosclerosis on angiography. Furthermore, coronary artery spasm has been documented angiographically following intravenous 5-FU administration

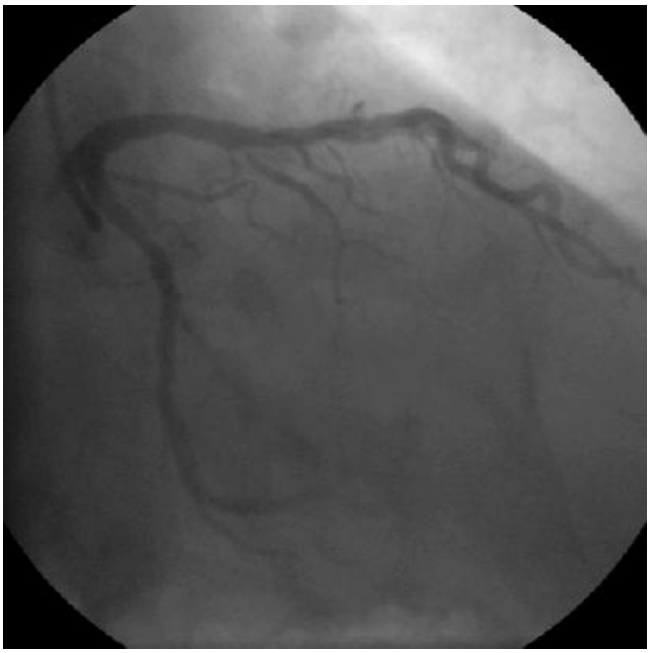

Figure 3
Left coronary angiogram

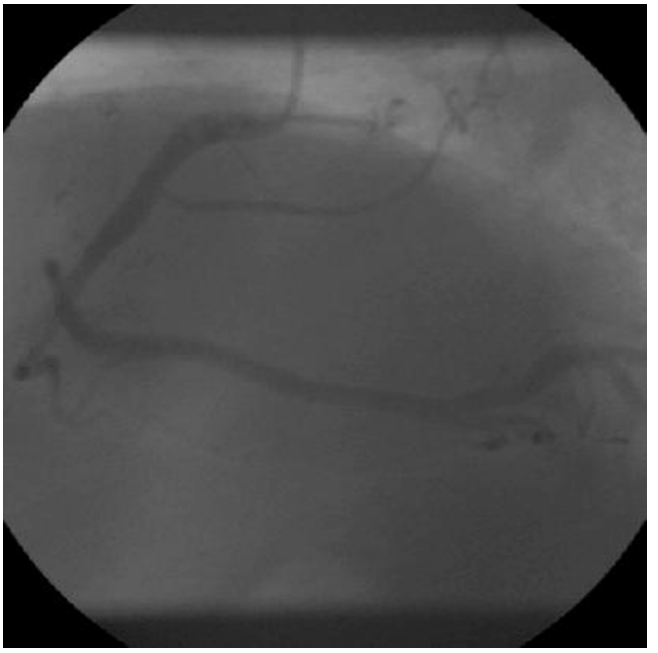

Figure 4
Right coronary angiogram

[6], and prophylaxis with calcium channel antagonists has been successfully employed in preventing recurrence [7].

An alternative suggested mechanism is that 5-FU may cause metabolic changes producing hypoxia within myocardial cells, therefore imitating ischaemic heart disease [8].

Repeated exposure to 5-FU following an episode of cardiotoxicity carries a risk of relapse of between 82 and 100% of case and therefore it is advised that the drug should not be re-administered in this group of patients [9].

Note
Written consent for publication of the case was obtained from the patient

Competing interests
None declared

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