Novel diagnostic procedure

A fateful kiss: the use of CT coronary angiogram in the diagnosis of non-cardiac chest pathology

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Summary

A 34-year-old dental nurse presented with a 2-day history of retrosternal chest pain that was constant and 'burning' in nature. She was otherwise fit and well, no significant prior medical history and no ischaemic heart disease risk factors. Clinical examination was entirely normal apart from pyrexia of 38.3°C. Admission ECG showed ST depression in the inferior and anterolateral leads suggestive of myocardial ischaemia, consequently a CT coronary angiogram (CTCA) was performed. This showed normal coronary arteries, incidental distal oesophageal thickening was seen. Further history taking revealed that her youngest daughter had recently suffered from cold sores. The patient went on to have a diagnostic procedure, an oesophagogastroduodenoscopy. Biopsies confirmed acute oesophagitis with features suggestive of herpes virus infection. The patient responded promptly to oral acyclovir. This case highlights the value of CT coronary angiogram in identifying non-cardiac pathology in patients with a low pretest probability of coronary artery disease.

BACKGROUND

CT coronary angiogram (CTCA) has a number of uses, from estimating cardiovascular risk in asymptomatic individuals to identifying coronary stenoses in patients with chest pain. This case report highlights the ability of CTCA to diagnose non-cardiac chest pathology.

The concept of the non-cardiac read on CT angiogram is by no means novel yet its value is debated.¹ Provided a large field of view is taken during routine scanning (from skin to skin in the irradiated area) the analysis of extra cardiac structures is possible. Cardiologists reading the scans limit their assessment to the heart. Radiologists, on the other hand, will perform a non-cardiac read to look at other structures that may aid in making a diagnosis (table 1). The prevalence of significant extra cardiac findings requiring long-term follow-up can be up to 23% (table 2),²⁻³ however, follow-up with further investigations is often costly and can have little clinical significance in the long term. Specific groups of patients who are likely to benefit from non-cardiac read are those with acute chest pain and a low-intermediate pretest probability of coronary artery disease.¹ In these patients there is a reasonable chance that CT will discover a non-cardiac cause for their chest pain. This case report demonstrates the use of CT angiogram in this scenario (table 1).

Table 1 List of possible incidental findings on CT angiogram¹

- ▶ Benign lung nodules
- ▶ Pneumonia
- ▶ Emphysema
- ▶ Pulmonary embolism
- ▶ Aortic dissection
- ▶ Aortic aneurysm

CASE PRESENTATION

We report the case of a previously fit and well 34-year-old dental nurse who presented with a 2-day history of retrosternal chest pain. The pain was constant and 'burning' in nature with intermittent exacerbations in severity. It was not positional or pleuritic and she had no history of previous episodes or preceding infection. It was not relieved by glyceryl trinitrate. She had some nausea and shortness of breath with the pain but no vomiting. Apart from her asthma, she had no relevant medical history and no ischaemic heart disease risk factors. She was a non-smoker, drank 4–6 units of alcohol per week and lived a hectic lifestyle looking after her husband and two children. Apart from a pyrexia of 38.3°C, clinical examination was entirely normal. There was no evidence of autoimmune disease.

DIFFERENTIAL DIAGNOSIS

- ▶ Acute coronary syndrome
- ▶ Myocarditis/pericarditis
- ▶ Viral oesophagitis

Table 2 Prevalence of significant non-cardiac findings on cardiac CT¹

Study ²⁻⁷	Significant findings* (%)
Law <i>et al</i>	19
Koonce <i>et al</i>	18.4
Kawano <i>et al</i>	1.1
Kirsch <i>et al</i>	11
Haller <i>et al</i>	4.8
Onuma <i>et al</i>	22.7

*Definition of 'significant' findings varied from study to study but broadly qualified as requiring clinical/imaging follow-up or causing an immediate change in management.

Figure 1 ST depression in the inferior (II, III, aVF) and anterolateral (V4, V5, V6) leads, suggestive of myocardial ischaemia.

INVESTIGATIONS

Initial work-up consisted of routine blood tests that revealed a haemoglobin of 13.8 g/dl, white blood cell count $11.5 \times 10^9/l$, C-reactive protein 14.2 mg/dl and a troponin I, which was not detected. All biochemical parameters were within normal limits. No abnormalities were detected on chest radiograph and blood cultures grew no organisms after 5 days of incubation. The admission ECG (figure 1) showed ST depression in the inferior and anterolateral leads, suggestive of myocardial ischaemia. On referral to the Cardiology team, a CTCA was carried out (figure 2). The radiologist reported normal-looking coronary arteries but commented on a degree of distal oesophageal thickening warranting further follow-up. Additional history taking revealed that 1 week previously, her youngest daughter had been suffering from cold sores affecting her mouth and lips. On this basis, viral oesophagitis entered the differential diagnosis. The patient had an oesophagogastroduodenoscopy (OGD) that revealed very severe, ulcerated oesophagitis extending from the level of the hypopharynx to about 35 cm within the oesophagus. Features were not suggestive of reflux disease. OGD-guided biopsies of the distal oesophagus confirmed acute oesophagitis with features suggestive of herpes virus infection (figure 3).

TREATMENT

The patient was treated with a complete course of oral acyclovir (200 mg 5 times a day for a total of 5 days) and she fully recovered.

OUTCOME AND FOLLOW UP

The patient was reviewed in clinic a few weeks later and was fully recovered. Follow-up OGD was not performed. At present, she is fit and well.

DISCUSSION

Herpes simplex oesophagitis most commonly occurs in immunocompromised patients, such as those with HIV, and is usually secondary to reactivation of the virus. It is

rare in the immunocompetent patient when it is more often acute, self-limiting and the result of primary infection. Our case is an unusual presentation of HSV oesophagitis, even in the immunocompetent population, for several reasons. Typically, presenting symptoms consist of a triad of odynophagia, fever and retrosternal chest pain—in order of prevalence.⁸ However, this patient did not complain of odynophagia or any previous reflux disease. Furthermore, previous case reports highlight the

Figure 2 CT coronary angiogram acquisition: axial slice through the lower mediastinum at the level of the left ventricle showing diffuse thickening to the wall of the lower oesophagus.

Figure 3 Microscopic view of severe, acutely inflamed squamous oesophageal mucosa with associated ulcer slough and numerous neutrophils. A few superficial cells show nuclear irregularity and some homogenisation of the chromatin.

predominance of men over women by as much as 3:1.⁹ In this case the history of the daughter's cold sores and the findings on CT angiogram prompted a search for the diagnosis. The endoscopic findings in this case were classical of HSV infection in a healthy individual. The mid-distal oesophagus is the most common site of infection in these patients, and ulcers are often multiple, shallow and can be discrete or coalesce.⁹ Interestingly, the incidence of prior exposure to family members with oral herpetiform lesions is as much as 24.3% in these cases.¹⁰

The use of acyclovir in the treatment of immunocompetent patients is not evidence based. As the condition is rare within this cohort, no randomised control trials have been conducted. Nonetheless, prompt use of acyclovir is said to reduce the length of illness and the risk of complications in this group and so it is often used in practice.⁸ Healthy individuals are also less likely to suffer from extraoesophageal herpetic lesions, have a lower risk of complications—such as oesophageal haemorrhage and perforation—and a lower risk of recurrence if they are treated with medical therapy.⁹ In this case, the use of acyclovir was successful in resolving the patient's symptoms within days and she fortunately suffered no immediate complications. Follow-up is crucial in all patients, possibly necessitating a repeat OGD in a few months time.

This case is the first to highlight the use of CTCA in the diagnosis of herpes oesophagitis, affecting an immunocompetent patient. It serves as a reflection point for both the use of this test in examining extra cardiac findings, and the importance of retaking a history to widen the differential diagnosis. This case also highlights that oesophageal pathology can cause changes in the ECG. It has been speculated that this is either due to the proximity of the oesophagus to the heart or that acid reflux itself can trigger myocardial ischaemia in patients with concomitant coronary artery disease.¹¹ Changes in T-wave morphology and ST segments that alert the clinician to myocardial ischaemia may therefore be misleading.¹¹ However, these changes tend to resolve spontaneously and so we emphasise the importance of doing serial ECGs in patients whom you suspect to have myocardial ischaemia.

One of the challenges with the reporting of extra cardiac findings is the need for downstream testing and health anxiety, as most findings turn out to be benign. Offsetting this drawback is the use of CTCA as a first-line imaging tool in *patients with likely acute coronary syndromes*. Given that the differential diagnosis of chest pain is often broad and usually refers to the heart, gut and lungs, the promise of this test in the acute admissions setting is becoming more attractive as scanner technology improves.¹² While the role of CTCA in the diagnosis of acute chest pain in the emergency department has been the subject of much debate in the literature, it is regrettably outside the scope of this case report. Yet it is useful to consider in light of our main learning point; patients with atypical chest pain and a low-intermediate pretest probability of coronary artery disease may benefit from the analysis of extra cardiac structures on CT coronary angiogram and careful reading of scans by radiologists is invaluable to this end.

Learning points

- ▶ Thorough, repeated history taking, during a patient's hospital admission is the best way to formulate a working diagnosis.
- ▶ Patients with atypical chest pain and a low-intermediate pretest probability of coronary artery disease may benefit from the analysis of extra-cardiac structures on CT coronary angiogram.
- ▶ Consider the diagnosis of HSV oesophagitis in any patient who presents with odynophagia, fever and retrosternal chest pain—even in the seemingly immunocompetent host.
- ▶ Always ask about HIV risk factors or request an HIV test in patients found to have HSV infection.

Competing interests None.

Patient consent Obtained.

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