Country cardiograms case 42: Answer

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Figure 1 (on page 25) shows normal sinus rhythm, at a rate of 97 beats/min. The QRS duration is increased at 0.15 seconds, with right bundle branch block morphology; PR and QT intervals are normal. Left axis deviation is present, with an axis of –70°, indicating that a left anterior fascicular block is also present, and thus a bifascicular block is present. (Axis in the presence of a right bundle branch block is best calculated by using only the initial 0.06 seconds of the QRS complex and ignoring the wide terminal deflection.)

R-wave progression from V4 through V6 appears abnormal. The ST-segment and T-wave changes that are present in V1–V3 are typical of the secondary changes that occur with a right bundle branch block. ST-segment elevation of 0.5 mm is present in lead III, with even less ST elevation in leads II and aVF. There are no reciprocal ST-segment changes in leads I or aVL.

The presence of a right bundle branch block does not constitute a barrier to the diagnosis of myocardial infarction, although it is clearly helpful to know which ST-segment and T-wave changes are usually associated with it. In this patient, the abnormal R-wave progression is unusual and could conceivably represent some form of anterior myocardial damage and be a "Q wave equivalent." The slight ST-segment elevation in the inferior leads clearly merits further attention and repeat electrocardiograms (ECGs), but the diagnostic criteria for inferior ST-segment elevation myocardial infarction (1 mm elevation in 2 out of 3 inferior leads) are not met. Thrombolysis is therefore not indicated at this point, although a 15-lead ECG, showing leads V4R, V8 and V9, would be useful.

If a left bundle branch block were present, the situation would be more challenging because the ST-segment changes of infarction often cannot be reliably identified, and a left bundle branch block produces considerable ST-segment and T-wave changes of its own. Criteria for thrombolysis therefore include the presence of a new left bundle branch block in the presence of a clinical presentation typical of myocardial infarction. In a case such as this, if a new left bundle branch block were documented, consideration would be given to thrombolysis.

However, there is much more to the assessment of severe chest pain than consideration of thrombolysis. An unusual feature in this presentation is the presence of a heart murmur that is suggestive of aortic regurgitation. This should prompt consideration of other causes of chest pain. Pulmonary embolism and aortic dissection are 2 other causes of sudden, severe chest pain. Thrombolysis may be beneficial in the former, but is likely to have a catastrophic outcome in the latter.

In a remote emergency department with limited resources, chest radiography

"Country cardiograms" is a regular feature of *CJRM*. We present an electrocardiogram and discuss the case in a rural context. Please submit cases to Suzanne Kingsmill, *CJRM*, 45 Overlea Blvd., P.O. Box 22015, Toronto ON M4H 1N9; cjrm@cjrm.net.

has an important role to play in the management of severe chest pain. Its potential benefits must be balanced with acceptance of the inevitable delays that it causes, and the virtual impossibility of achieving the goal of a door-to-drug time of 30 minutes if thrombolysis is administered.

In presentations with an apparently obvious diagnosis (clinical picture and clear electrocardiographic evidence of ST-segment elevation that meets diagnostic criteria), thrombolysis is therefore appropriate without the need for radiography. Yet when criteria are not met or are equivocal, or the diagnosis is not clear, chest radiography can help in the diagnosis and in avoiding potentially disastrous treatment.

Chest radiography in this patient showed a markedly widened mediastinum. Aortic dissection extending proximally to the aortic root was subsequently confirmed on computed tomographic angiography after the patient was transferred to a regional centre.

Routine measurement of blood pressure and checking of pulses in both arms should form part of the initial assessment of a patient presenting to the emergency department with chest pain. These measures may help detect instances of aortic dissection that result in a substantial difference in pressure between the right and left arm as a result of involvement of the brachiocephalic or left subclavian arteries, respectively.

The presentation of aortic dissection may include hypertension or hypotension or, as in this patient, normal blood pressure. The murmur of aortic regurgitation is a common finding in proximal aortic dissection that extends to the aortic root. Involvement of the coronary ostia may cause genuine ischemic changes to appear on the electrocardiogram, and may even cause ST-elevation myocardial infarction. There are no specific electrocardiographic findings in aortic dissection, although changes of left ventricular hypertrophy may be present. Proximal dissections can also result in hemopericardium and the associated electrocardiographic changes of low voltage.

Thrombolysis remains potentially the most effective intervention that can be performed in small, remote communities in instances of severe chest pain. This patient's case may serve as a reminder to adhere to the criteria for administering thrombolytics and to always consider causes of severe chest pain other than myocardial infarction.

For the question, see page 25.

Country Cardiograms

Have you encountered a challenging ECG lately?

In most issues of *CJRM* an ECG is presented and questions are asked.

On another page, the case is discussed and the answer is provided.

Please submit cases, including a copy of the ECG, to Suzanne Kingsmill, Managing Editor, *CJRM*, 45 Overlea Blvd., P.O. Box 22015, Toronto ON M4H 1N9; cjrm@cjrm.net

Cardiogrammes ruraux

Avez-vous eu à décrypter un ECG particulièrement difficile récemment?

Dans la plupart des numéros du *JCMR*, nous présentons un ECG assorti de questions. Les réponses et une discussion du cas sont affichées sur une autre page.

Veuillez présenter les cas, accompagnés d'une copy de l'ECG, à Suzanne Kingsmill, rédactrice administrative, *JCMR*, 45, boul. Overlea, C. P. 22015, Toronto (Ontario) M4H 1N9 ; cjrm@cjrm.net