Prehospital thrombolysis of acute myocardial infarction in dextrocardia

Colin Mitchell, Zane Perkins

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A 65-year-old man complaining of a 20 min history of non-radiating, retrosternal chest pain was attended by a paramedic within 10 min of the emergency call. Cardiac risk factors included hypertension, hypercholesterolaemia and a family history of ischaemic heart disease. Medical history revealed dextrocardia. Clinically he was pale and diaphoretic with nausea. Non-invasive blood pressure was 128/86 mm Hg, pulse rate 64 beats/min, respiratory rate 12 breaths/min and oxygen saturations were 100%. Supplemental oxygen, aspirin (300 mg orally) and glyceryl trinitrate (400 µg sublingual) were administered. A 12 lead electrocardiogram (ECG) was performed with routine positioning of the limb leads and reversal of the precordial leads (V1R–V6R) (fig 1). Due to the dextrocardia, assistance was requested in the interpretation of the ECG. The ambulance was mobilised towards hospital and a doctor met up with them en route. The ECG demonstrated a postero-inferior ST segment elevation myocardial infarction. Inverted P waves in I and aVL indicated “normal” positioning of the limb leads. Thrombolysis was initiated as no primary coronary intervention centre was available. Intravenous heparin (5000 U) and reteplase (10 U) were administered 55 min after pain commenced. The patient experienced relief of chest pain with improvement in his clinical condition. Later in the day, recurrence of symptoms resulted in transfer for rescue angioplasty. An angiogram revealed mid vessel stenosis of a dominant right coronary artery which was stented. An echocardiogram confirmed a hypokinetic posterior-inferior segment. The patient made a complete recovery.

DISCUSSION

Dextrocardia is a condition in which the anatomical location of the heart is in the right hemithorax with the apex directed towards the right. This rare clinical phenomenon has a reported incidence of 1–2 per 10 000 live births.¹ It is most commonly associated with situs inversus, a condition in which there is a complete mirror image of all thoracic and abdominal organs.

Other presentations include isolated dextrocardia (without situs inversus) and levocardia, in which the heart is normally positioned in the left hemithorax and there is rotation of the abdominal viscera.

Confusion may arise in these instances regarding lead placement and ECG interpretation. This may lead to misdiagnosis or, as

in this case, delay in treatment. Routine lead placement in the presence of dextrocardia will show right axis deviation and inverted P and T waves in lead I (similar to accidental limb lead reversal) with poor R wave progression across the precordial leads.

If dextrocardia is suspected or confirmed, the Society for Cardiological Science and Technology recommend a second ECG should be taken, placing the precordial electrodes on the right hemithorax using the same intercostal spaces and anatomical landmarks (V1R–V6R) without changing the position of the limb leads.² In this situation the limb leads continue to remain inverted, alerting clinicians to the abnormal heart location. The newly positioned precordial electrodes will show appropriate R wave progression, allowing interpretation.

Reversal of both limb and precordial leads will result in “normalisation” of the entire ECG, allowing for standard interpretation. However, this must be clearly documented on the ECG to avoid possibly overlooking the underlying dextrocardia.

It would appear that despite visceral rotation, clinical presentation of an acute coronary syndrome is similar to that of a normally positioned heart, with retrosternal chest pain radiating most commonly to the left arm and jaw.

In a cardiac arrest associated with a shock sensitive rhythm, there is no evidence to support ideal pad placement when using an anterolateral approach.³ Suffice to say, time wasted working out correct placement might have a greater impact on patient outcome. While one could consider a right sternal and right apical approach, a standard right sternal and left apical placement might minimise time lost to working out correct pad placement without impacting on defibrillation success rates.⁴

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Figure 1 Initial prehospital ECG.

REFERENCES

- 1 Fuster V, Alexander RW, O' Rourke R. *Hurst's the heart*, 11th ed. McGraw-Hill, 2004:1830–31.
- 2 Society for Cardiological Science and Technology. *Consensus guidelines on performing a resting 12 lead ECG*, 2006; appendix A.
- 3 Cattermole G, McKay N. A case of dextrocardiac ventricular fibrillation arrest. *Emerg Med J* 2006;**23**:147–8.
- 4 Gornek B, Kuskus S, Kudaiberdieva G, et al. Electrical cardioversion of atrial fibrillation in a case of dextrocardia. *Can J Cardiol* 2004;**20**:819–21.

IMAGES IN EMERGENCY MEDICINE

Ping-pong fracture

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A 7-week-old baby boy involved in a road traffic accident was brought to the accident and emergency department. A right-sided skull depression was palpated during the secondary survey. An emergency computed tomographic scan

showed a depression of the parietal bone with no fracture line (fig 1). The patient was transferred to a paediatric neurosurgical centre where the indentation was lifted surgically.

Ping-pong fracture occurs in newborn and young infants, when the skull is relatively very soft and resilient and is able to indent without a break in the bone. It is so called due to its similarity to indentation produced on a ping-pong ball. Ping-pong fractures have been described in birth injuries, and accidental and non-accidental injuries.¹ They are seldom associated with intracranial injury. It can be treated conservatively or surgically depending upon the severity of depression.

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REFERENCE

- 1 Wheeler DS, Shope TR. Depressed fracture in a 7-month-old who fell from bed. *Paediatrics* 1997;**100**:1033–4.

Figure 1 Computed tomographic scan showing a depression of the parietal bone with no fracture line in a 7-week-old baby boy.