Reversible left ventricular dysfunction “takotsubo” cardiomyopathy associated with pneumothorax

Y J Akashi, M Sakakibara, F Miyake

An 83 year old woman presented to the emergency department with chest pain and dyspnoea. Chest radiography showed pneumothorax of the left lung. Arteries were normal on coronary angiography. Left ventriculography showed asynergy of apical akinesis and basal hyperkinesis. Within 18 days, the asynergy improved without any specific treatment. In the present case the left ventricular dysfunction may have been induced by altered catecholamine dynamics as a result of pneumothorax.

Reversible left ventricular asynergy, known as “takotsubo” cardiomyopathy, has been reported relatively often. However, a thorough survey of the literature found only one report of concomitant ventricular asynergy and pneumothorax.

CASE PRESENTATION
An 83 year old woman presented to the emergency department with chest pain and dyspnoea on exertion. She had experienced spontaneous pneumothorax of the right lung 50 years earlier. One day before presentation, she had a refractory cough and developed progressive dyspnoea. On admission physical examination revealed a blood pressure of 148/103 mm Hg, a temperature of 36.5°C, and tachypnoea. Laboratory tests found the following values: leucocyte count \(148 \times 10^3\) mm \(^3\), haemoglobin 1.31 g/l, platelet count 157 \(\times 10^9\) /l, creatinine kinase 377 U/l, creatine kinase MB 34 U/l, and C reactive protein 0.06 mg/l. Electrocardiography showed sinus tachycardia at 134 beats/min and ST segment elevation in leads V2 through V5 (fig 1A). Chest radiography showed pneumothorax of the left lung (fig 1B). Echocardiography showed akinesis of the left ventricle except the basal area. After insertion of a chest drain to the left thoracic cavity, pneumothorax of the left lung (fig 1B). Echocardiography showed pneumothorax of the left lung.

The exact mechanisms of left ventricular asynergy have not been clarified; however, multivessel coronary spasm or catecholamine cardiotoxicity has been suggested as an exciting cause.

In the present case, however, ST segment elevation persisted even after pneumothorax improved. We suggest that in the present patient left ventricular dysfunction was induced by altered catecholamine dynamics caused by the occurrence of pneumothorax, which could be an underlying stress to increase plasma noradrenaline.

DISCUSSION
In Japan, there have been a number of reports of reversible left ventricular dysfunction with symptoms similar to those of acute myocardial infarction but without coronary artery lesions even during the acute phase with ST segment elevation. This type of ventricular dysfunction manifests left ventricular wall motion abnormalities with apical akinesis and basal hyperkinesis, which generally return to normal within a few weeks. This reversible disease is also called “takotsubo” cardiomyopathy for the characteristic shape of left ventricular asyn-
geny; the Japanese word “takotsubo” means an octopus fishing pot with a round bottom and a narrow neck.

Left ventricular wall motion abnormalities have been observed, especially in elderly women over 60 years of age, and in most cases some physical or mental stress precedes the onset of the symptom. These cases are associated with several clinical events, such as myocardial stunning, subarachnoid haemorrhage, phaeochromocytoma, Guillain-Barré syndrome, and emotional stress. The exact mechanisms of ventricular asynergy have not been clarified; however, multivessel coronary spasm or catecholamine cardiotoxicity has been suggested as an exciting cause.

In the present patient, manifestation of coronary spasm was excluded after coronary angiography. Besides, spasm induced ventricular dysfunction is not consistent with patent coronary arteries during the acute phase with ST segment elevation. It is known that diffuse ST segment elevation can be caused by an altered immune response associated with infection. It is also known that catecholamine cardiomyopathy or a high concentration of plasma noradrenaline indicates ST segment deviation on an ECG. Furthermore, in the literature, we did find a case of left tension pneumothorax presenting elevated ST segments. In the present case, however, ST segment elevation persisted even after pneumothorax improved. We suggest that in the present patient left ventricular dysfunction was induced by altered catecholamine dynamics caused by the occurrence of pneumothorax, which could be an underlying stress to increase plasma noradrenaline.

Authors’ affiliations
Y J Akashi, M Sakakibara, F Miyake, Division of Cardiology, Department of Internal Medicine, St Marianna University School of Medicine, Kawasaki, Japan

Heart 2002;87:e1 [http://www.heartjnl.com/cgi/content/full/87/2/e1]
Figure 1  (A) ECG showing sinus tachycardia at 134 beats/min and ST segment elevation in leads V2 through V5. (B) Chest radiograph showing a pneumothorax of the left lung.

Figure 2  Coronary angiography showing no significant stenosis and left ventriculography showing asynergy of apical akinesis and basal hyperkinesis.

Figure 3  The initial change in ECG was noted 12 hours after admission. ST segment elevation in leads II, III, and aVF continued for two weeks followed by deep inverted T waves in all leads.
Correspondence to: Dr Y J Akashi, Division of Cardiology, Department of Internal Medicine, St Marianna University School of Medicine, 2–16–1 Sugao Miyamae-ku, Kawasaki-city, Kanagawa-prefecture, 216–8511, Japan; johnny@marianna-u.ac.jp

Accepted 8 October 2001

REFERENCES


Reversible left ventricular dysfunction "takotsubo" cardiomyopathy associated with pneumothorax
Y J Akashi, M Sakakibara and F Miyake

*Heart* 2002 87: e1
doi: 10.1136/heart.87.2.e1

Updated information and services can be found at:
http://heart.bmj.com/content/87/2/e1

These include:

**References**
This article cites 7 articles, 1 of which you can access for free at:
http://heart.bmj.com/content/87/2/e1#BIBL

**Email alerting service**
Receive free email alerts when new articles cite this article. Sign up in the box at the top right corner of the online article.

To request permissions go to:
http://group.bmj.com/group/rights-licensing/permissions

To order reprints go to:
http://journals.bmj.com/cgi/reprintform

To subscribe to BMJ go to:
http://group.bmj.com/subscribe/