Giant gallbladder with stones complicated with cholecardia syndrome: A case report

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SUMMARY

Cholecardia syndrome refers to a complication of gallbladder and biliary diseases (GBDs) caused by acute or chronic cholecystitis, characterised by symptoms similar to coronary heart disease. The severity of cardiac symptoms is positively correlated with the condition of GBDs. Most patients with Cholecardia syndrome have no organic lesions in their hearts, and their cardiac symptoms are relieved or even completely recovered with the effective therapy of GBDs. We report a case of a 71-year-old man who presented with Cholecardia syndrome caused by cholecystitis. The patient presented with angina pectoris mainly characterised by chest distress and pain, and no organic lesions were found on cardiac examination. The cardiac symptoms disappeared completely through the treatment of the gallbladder by relieving spasm with medicines and surgery. The aim of this publication is to remind clinical physicians that when receiving patients with biliary diseases accompanied by cardiac symptoms, detailed history and thorough physical examinations are quite necessary, which could lead to a consideration of Cholecardia syndrome.

INTRODUCTION

Gallbladder diseases (GBDs) are one of the most common digestive diseases. The connections between GBDs and several organs other than the liver have gradually surfaced, accompanied by the changes in people's diet structure and the continuous improvement of medical diagnosis technology. Among them, Cholecardia syndrome, which takes the heart as the important target of GBDs complications, has been paid close attention. However, there are still no systematic reports about its corresponding clinical manifestations and pathogenesis. Cholecardia syndrome often occurs with acute onset of GBDs. The clinical manifestations and electrocardiogram (ECG) changes of Cholecardia syndrome are very similar to those of coronary heart disease. Patients often do not have organic lesions of their heart, and the cardiac symptoms almost always disappear automatically after the treatment of GBDs. In clinical practice, it is necessary to differentiate it from organic heart disease.

CASE PRESENTATION

A 71-year-old man, with a history of hypertension for ten years, takes 5mg amlodipine besylate orally every day, and his blood pressure (BP) is well controlled at ordinary times. He has neither a history of diabetes nor coronary heart disease. He suffered precordial pain radiating to the left back and left upper limb, chest distress, dyspnoea, and sweating, accompanied by nausea and acid reflux for a week. The symptoms often occurred 2 hours after dinner and lasted for 4-6 hours, which could not be alleviated by taking nitroglycerin. The patient came to the emergency department at the onset of the symptoms, with a pulse rate of 78/min and a BP of 136/89 mmHg. There was no scleral icterus and no protrusion in the precordial area. The lung auscultation was normal bilaterally. There was a regular rhythm with no pathological murmurs in the area of each heart valve. The abdomen was flat, and there was tenderness in the right upper quadrant, accompanied by rebound pain and local muscle tension. The Murphy sign was positive, and the fundus of the gallbladder could be palpated at the right subcostal. The patient had a fever of 38.1℃ without rigour. His white blood cell count (WBCs) was 16.7 x 10^9/L, C-reactive protein (CRP) was 225mg/L, haemoglobin level was 125g/L, platelet count (PLTs) was 166 x 10^9/L, total bilirubin level (TB) was 20μmol/L, glutamic-pyruvic transaminase level (GPT) was 41U/L, glutamic oxaloacetic transaminase level (GOT) was 36U/L, γ-glutamyl transferase level (GGT) was 209U/L, cardiac troponin level T (cTnT) was 0.012ng/ml, creatine kinase isoenzyme level (CK-MB) was 2.93ng/ml, N-terminal pro-brain natriuretic peptide level (NTproBNP) was 320pg/ml. The abdominal CT scan is shown in Figure 1, and the chest CT scan was normal. The abdominal ultrasound showed the gallbladder effusion and enlargement with a giant gallstone, and the length of the gallbladder was 172mm with 63mm in width, which presented with cholecystitis by the wall of the gallbladder 6mm in thickness. The ECG showed ST segment changes of II, III, AVF, and V2-V6 (horizontal or slightly elevated, Figure 2a). Nevertheless, there were no significant abnormalities found in cardiac ultrasound, coronary CTA, and coronary angiography. After the application of scopolamine or triphenyl phenol, the above symptoms of the patient were relieved. During hospitalisation, the above symptoms occurred intermittently, and the ECGs rechecked during the onset were the same as Figure 2a. When there were no symptoms, the ECG showed as Figure 2b (lowering of T-wave of II, III, and AVF). Both ECGs in figures 2a and 2b were done before surgery. On the 5th day after admission, laparoscopic cholecystectomy (LC) was performed, and it was confirmed that the anterior wall of the gallbladder was perforated with wrapping of the greater omentum. The biggest size of the gallbladder stone was 68 x 54 mm, and the bile culture was negative. The patient did not

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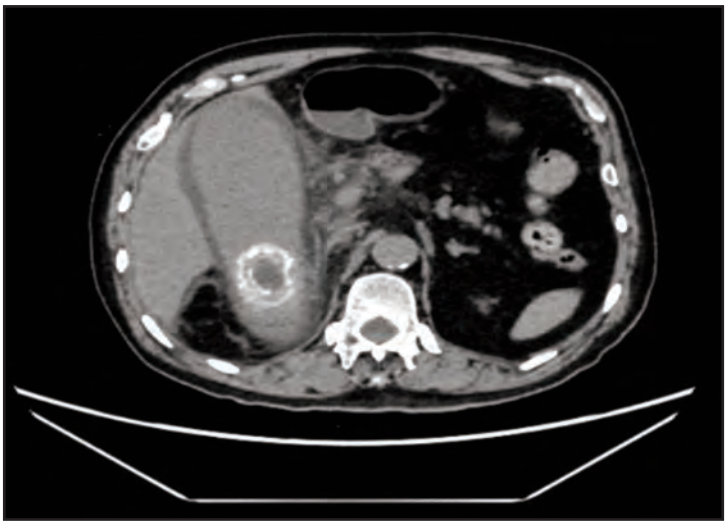

Fig. 1: Abnormal CT findings of a giant gallbladder with an impacted stone

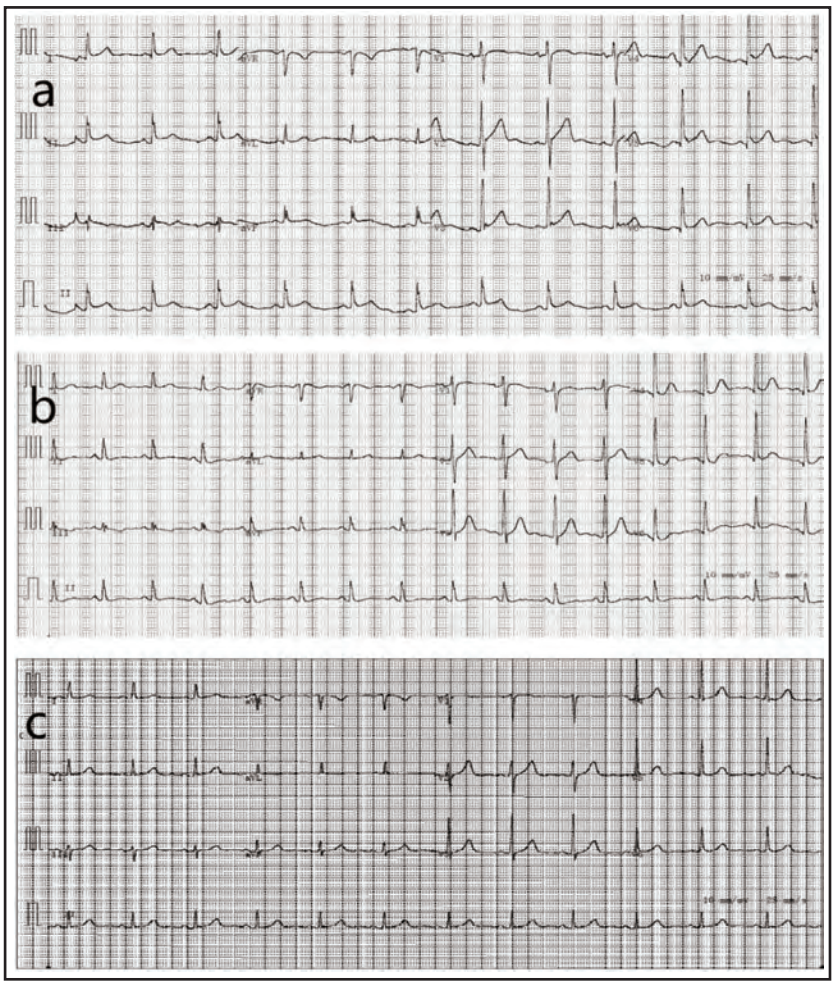

Fig. 2: a) ECG upon onset of symptoms, which showed ST segment changes of II, III, AVF, and V2-V6 (horizontal or slightly elevated); b) ECG before surgery, when the patient did not suffer from cardiac symptoms; c) normal ECG during follow-up

complain of any discomfort from the aforementioned symptoms from post-operation to the six-month follow-up, and the ECG follow-up was normal, as in Figure 2c.

DISCUSSION

Cholecardia syndrome refers to the clinical syndromes of angina pectoris, arrhythmia, and abnormal ECG caused by GBDs. Desai et al.[1] first used the term "cholecardia" to describe heart dysfunction caused by excess bile acid in 2017. The symptoms such as angina pectoris, chest distress, and palpitation caused by Cholecardia syndrome are characterised by a long attack time, which can last for several hours, often accompanied by arrhythmia.[2] ECG shows myocardial ischaemia changes, and the heart symptoms are often severe. Especially after eating a fatty diet, the onset of symptoms begins, always accompanied by cholecystitic presentation such as nausea, vomiting, abdominal distension, and pain in the right upper abdomen. Nitroglycerin almost failed to relieve the symptoms; however, atropine, hyoscyamine, and phloroglucinol can relieve it.[3]

The main pathogenesis of Cholecardia syndrome is unknown nowadays. Cholelithiasis and coronary heart disease have many common predisposing factors in aetiology, such as abnormal lipid metabolism, especially the increase of cholesterol, which is the basis of gallstone disease and atherosclerosis. Obesity, diabetes, less physical activity, and eating too much animal fat or foods rich in cholesterol are common predisposing factors. It is believed that biliary hypertension can cause coronary artery constriction, then coronary blood flow reduced, and finally lead to myocardial ischemia and angina pectoris in certain conditions. The fact that the heart is innervated by the T2 to T5-6 spinal nerves, and the gallbladder is innervated by the T4-5 to T9 spinal nerves. But the distribution of sensory nerve innervation is diffuse, intersecting at T4-5 and overlapping at T4-5. Therefore, when the pressure inside the bile duct increases or bile duct spasms or stimulated by bile acid salt, the spinal cord (T4-8) nerve reflex can be regulated resulting in excitation of vagus nerve.[4] After excitation of the vagus nerve, myocardial activity and myocardial oxygen consumption decreases, and partial pressure of oxygen in myocardial tissue increases. This indirectly causes coronary artery contraction, offsetting the vasodilation effect of the vagus nerve on coronary arteries.[5] Indirect constriction of coronary arteries leads to a decrease in coronary blood flow, which suppresses myocardial contraction and reduces cardiac output. The blood pressure then drops, and coronary blood flow reduces. Myocardial hypoxia results in angina pectoris, arrhythmia and abnormal ECG, which are the main mechanisms of Cholecardia syndrome. Studies have shown that certain efferent fibres in the vagus nerve of the abdomen, other than cholinergic ones, can promote the release of certain humoral factors in the organ.[5-7] These vasoactive factors can directly affect the function of the heart. Biliary tract infection has serious interference on myocardial metabolism, mainly concentrated in two aspects: one is the influence of the infection factors themselves; The second is the indirect impact caused by liver dysfunction. The biliary suppurative inflammation is a mixed infection. The types of bacteria are extremely complex. Once the biliary hypertension is formed, it is easy to spread and become sepsis. The damage to the myocardium is not only due to bacterial toxicity, but also includes body temperature, electrolytes, internal environment, serum pH, serum osmotic pressure and interference with immune response.

Cholecardia syndrome often occurs with acute onset of GBDs. Patients often do not have organic lesions of their heart, and the cardiac symptoms almost always disappear automatically after the treatment of GBDs. Therefore, the focus of treatment should be on treating GBDs, and the related cardiovascular manifestations generally do not require special management. Patients should undergo surgical therapy actively if their conditions are not too bad. According to research, cardiac symptoms completely disappeared after surgery in 90% of patients with Cholecardia syndrome.[7] Therefore, Cholecardia syndrome is not a contraindication but an indication for surgery. Patients who cannot undergo surgery should choose ultrasound-guided percutaneous transhepatic gallbladder drainage (PTGBD), or endoscopic retrograde cholangial pancreatography (ERCP), or percutaneous transhepatic cholangial drainage (PTCD).[8,9] In this condition, coronary vasodilators and antiarrhythmic drugs should be administered appropriately.

CONCLUSION

Detailed history and thorough physical examinations are quite necessary, which could lead to a consideration of Cholecardia syndrome. For patients with chest pain and dynamic ECG changes, acute coronary syndrome still needs to be differentiated, which is combined with coronary CTA or coronary angiography. For patients with a clear diagnosis, dynamic follow-up of ECG and myocardial enzyme spectrum is still necessary after biliary therapy.

CONFLICT OF INTEREST

The authors declared that they have no conflict of interest.

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