

# Cardiac tamponade after plastic surgery of pectus excavatum

## Tamponada serca po plastyce szewskiej klatki piersiowej

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### Abstract

Pectus excavatum is the most common type of congenital chest wall abnormality (90%), occurs in an estimated 1 in 300–400 births, with male predominance (male-to-female ratio of 3:1). The exact mechanism involved in this abnormal bone and cartilage overgrowth is not known, and, to date, no known genetic defect is directly responsible for the development of pectus excavatum. Despite the lack of an identifiable genetic marker, the familial occurrence of pectus deformity is reported in 35% of cases. The main aim of the thesis was to present an ill patient, who was surgically treated because of pectum excavatum.

Key words: pectus excavatum, Nuss procedure, Ravitch technique

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### Introduction

The most common chest wall malformation and one of the most frequent major congenital anomalies is pectum excavatum (PE) [1]. PE is characterised by variable depression of the sternum and lower costal cartilages. This anomaly can be evident early in life and is three times more common in boys than in girls. PE often occurs in association with scoliosis and Marfan syndrome [2]. Treatment of severe cases can involve either invasive or non-invasive techniques or a combination of both. Surgical treatment include Ravitch technique and Nuss procedure, which is preferred method in children. The Ravitch technique is an invasive surgery, which consists of removal abnormal rib cartilage while preserving the perichondrium, allowing regrowth of rib cartilage to the sternum in a more anatomic fashion [3]. The another way to treat PE is Nuss procedure – the stainless steel bar located in the chest to create scaffolding for sternum [4].

### Case report

23-year-old man with left-side pneumothorax was admitted to Thoracic Surgery Department urgently (Figure 1). When he was 18 years old, he was subjected to corrective surgery of pectum excavatum by Ravitch technique. After a year, the relapse of the deformation was observed. Initially pneumothorax was treated with pleural drainage, but some difficulties with reexpansion of the lung caused that surgical treatment was scheduled. After discussing the problem with the patient, he underwent two simultaneous surgeries: the emphysematous bulla was removed using videothoracoscopic method, furthermore, pectus excavatum was operated with the use of Nuss procedure (Figure 2). The patient was discharged home in a good general condition. Ambulatory control showed a full expansion of the lung and the stability of the chest bones scaffolding. Twelve days later, the patient was admitted again because of dyspnea, pain in the chest and pericardial rub. The patient had an episode of atrial

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Figure 1. Chest X-ray: left-side pneumothorax



Figure 2. Chest X-ray: cardiomegaly and stainless steel bar

fibrillation converted to sinus rhythm with cardioversion. In a computed tomography (CT), hydrothorax and large amount of pericardial fluid were found. At the Cardiac Surgery Department a fenestration of pericardium was performed and the bloody fluid was obtained. Additionally, a drainage of left pleural cavity was needed and the stainless steel bar had to be removed from the chest. In the postoperative period occurred: atrial fibrillation, fever and diaphragm fibrillation,



Figure 3. Two-dimensional transthoracic echocardiography (TTE 2D): parasternal long axis view, fluid in pericardium



Figure 4. Three-dimensional transthoracic echocardiography (TTE 3D): parasternal long axis view, fluid in pericardium

which was showed in transoesophageal echocardiography (TEE). The targeted antibiotics were administrated. Four days after the operation, the control CT showed a haematoma in pericardial sac. The patient was operated again – sternotomy, removal of haematoma and the irrigation of the pleural cavities were performed. In the postoperative period – for two days the patient was ventilated in IPPV mode, several episodes of atrial fibrillation were noted. In control transthoracic echocardiography (TTE), transoesophageal echocardiography (TEE) significant improvement was observed and the patient was discharged. Two weeks later he was admitted to hospital again due to signs of severe heart failure. Chest radiography showed fluid in the left pleural cavity. Echocardiography revealed clotting haematoma in pericardium (maximum dimension  $4.9 \times 12.9$  cm), fluid in pleural, abdominal cavities, large breathing variability of mitral inflow, wide vena cava inferior and inappropriate motion of interventricular septum (Figures 3, 4). Clinical picture and echocardiographic findings suggested strongly constrictive pericarditis. The patient was consulted by cardiac surgeon,

who recommended conservative treatment. Pharmacologic treatment of heart failure was continued. Four weeks later the patient was much improved and now he stays in good condition (NYHA I/II class).

## Results

Surgical treatment of pectum excavatum should be performed in childhood, because it is possible to avoid post-operative complications [5]. The presented case report shows how important transthoracic echocardiography is in postoperative control.

Constrictive pericarditis is chronic inflammation of the sac-like covering of the pericardium with thickening and scarring. This disease is very hard to diagnose and the most important examination is echocardiography [6].

In our opinion, rapid resolution of heart failure with generalised fluid retention and described echocardiographic features is consistent with diagnosis of transient constrictive pericarditis.

## Conflict of interest(s)

The authors declare no conflict of interest.

## Streszczenie

Szewska klatka piersiowa to najczęstsza (90%) wrodzona deformacja ściany klatki piersiowej występująca w przypadku 1 na 300–400 urodzeń, częściej u osób płci męskiej (proporcja płci męskiej do żeńskiej wynosi 3:1). Dokładny mechanizm powodujący nieprawidłowy wzrost kości i chrząstek nie jest znany. Nie wykryto dotychczas żadnego defektu genetycznego, który mógłby się bezpośrednio wiązać z rozwojem tej deformacji. Mimo braku określonego wskaźnika genetycznego dane literaturowe wskazują na rodzinne występowanie szewskiej klatki piersiowej w 35% przypadków. Głównym celem niniejszej pracy jest przedstawienie przypadku chorego poddanego leczeniu chirurgicznemu z powodu szewskiej klatki piersiowej.

Słowa kluczowe: szewska klatka piersiowa, zabieg Nussa, metoda Ravitcha

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