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Atrioesophageal fistula: clinical status and past medical history as the key to proper radiological assessment

Przetoka przedsionkowo-przełykowa — stan kliniczny oraz historia choroby jako klucz do postawienia rozpoznania w badaniu obrazowym

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Abstract

Atrioesophageal fistula is an extremely rare, but a life-threatening complication of percutaneous ablation. With an increasing prevalence of atrial fibrillation and an increasing number of percutaneous ablation procedures following it, awareness of catheter ablation complications and their detection should be raised.

A 69-year-old male, with a history of atrial fibrillation was admitted with a suspicion of a stroke. The patient was treated with percutaneous ablation 27 days earlier in a different hospital. On admission, in addition to the neurological symptoms, moderately increased inflammatory markers and a low-grade fever were found. During the hospitalisation, a prompt inflammatory markers elevation was observed and the patient's condition had gradually worsened. Sepsis was diagnosed and a broad-spectrum antibiotic therapy was administered. On the 6th day of hospitalisation the patient went into cardiac arrest. Cardiopulmonary resuscitation was successful and return of spontaneous circulation occurred. An electrocardiogram showed changes typical for ST elevation myocardial infarction. An emergent coronary angiogram showed no significant stenosis in any of the coronary arteries. In a follow-up, brain non-enhanced brain computed tomography (NECT) air emboli were detected. A chest NECT was performed and revealed free gas within the left atrium and in the pericardial cavity, which in juxtaposition with the patient's medical history suggested presence of an atrioesophageal fistula. Despite all taken measures, the patient died. An autopsy confirmed atrioesophageal fistula connecting oesophagus with left atrium.

The purpose of this case is to raise awareness of percutaneous ablation complications among both clinicians and radiologists. It emphasizes how crucial precise clinical data and imaging exams are in diagnosing atrioesophageal fistula.

Key words: atrioesophageal fistula, percutaneous ablation, cerebral air embolism, atrial fibrillation, stroke

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Introduction

Atrial fibrillation (AF) is the most common sustained cardiac arrhythmia. Its prevalence is increasing [1], therefore the number of catheter ablation (CA) procedures is rising. This entails a greater chance of encountering CA complications in daily practice. The overall complication rate for CA is estimated up to 14% [2].

Atrioesophageal fistula (AEF) is an extremely rare, but life-threatening complication of CA. In most reported cases

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Figure 1. Initial brain computed tomography (CT) showed subtle loss of grey-white matter differentiation in the right frontal lobe (arrow)

symptoms of AEF's presence occur with a delay after CA and present as an unspecific combination of clinical features, making AEF a diagnostic challenge.

Case report

A 69-year-old male, with a history of AF, treated with rivaroxaban and multiple CA procedures, was admitted with left-sided hemiparesis and mixed non-fluent aphasia. The patient underwent the last CA by pulmonary vein isolation procedure 27 days prior in a different hospital.

On admission the following were found: low-grade fever of 37.4°C, elevated inflammatory markers — white blood cell 10.2 G/L (n = 4.0–10.0), C-reactive protein (CRP) 20.7 mg/L (n < 5.0). Chest X-ray showed no significant abnormalities.

Non-enhanced brain computed tomography (NECT) demonstrated subtle loss of grey-white matter differentiation in the right frontal lobe — a suspicion of an early ischemic stroke was raised (Figure 1).

Several hours after the admission the patient's condition worsened and rapid elevation of inflammatory markers was observed — white blood cell to 24.6 G/L, CRP 48.5 mg/L. Empirical antibiotic therapy was administered. Polymerase chain reaction tests ruled out influenza, coronavirus disease 2019 (COVID-19), and respiratory syncytial virus infections.

In the blood culture test *Streptococcus mitis*, an oral colonizer was detected and infective endocarditis was suspected. A transthoracic echocardiogram did not reveal any vegetations on valves.

Despite the broad-spectrum antibiotic therapy, further increase of inflammatory markers was observed, CRP value 144.6 mg/L, procalcitonin level 47.705 ng/mL indicating a high chance of severe sepsis.

Chest computed tomography (CT) showed pulmonary consolidations, bilateral pleural effusion, cardiomegaly, and pulmonary interstitial oedema. No embolic occlusion of the pulmonary arteries was detected (Figure 2).

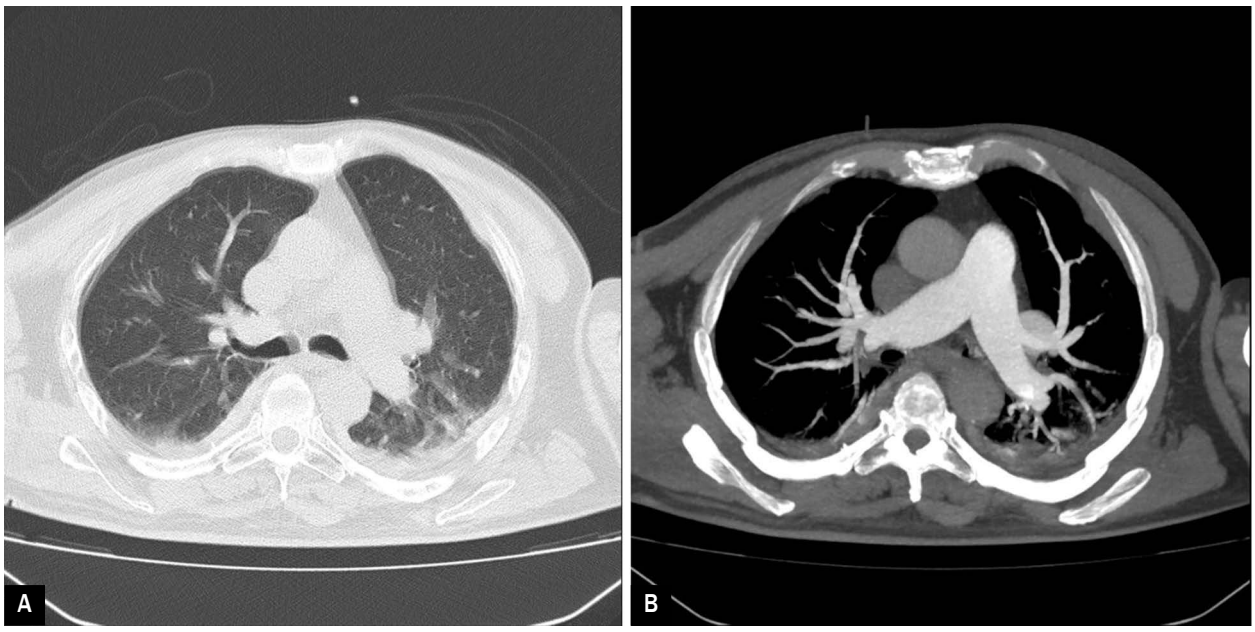

Figure 2A. Chest computed tomography (CT) with motion artifacts showed bilateral pleural effusion and pulmonary consolidations; **B.** CT pulmonary angiography in maximum intensity projection (MIP) excluded embolic occlusion of the pulmonary arteries

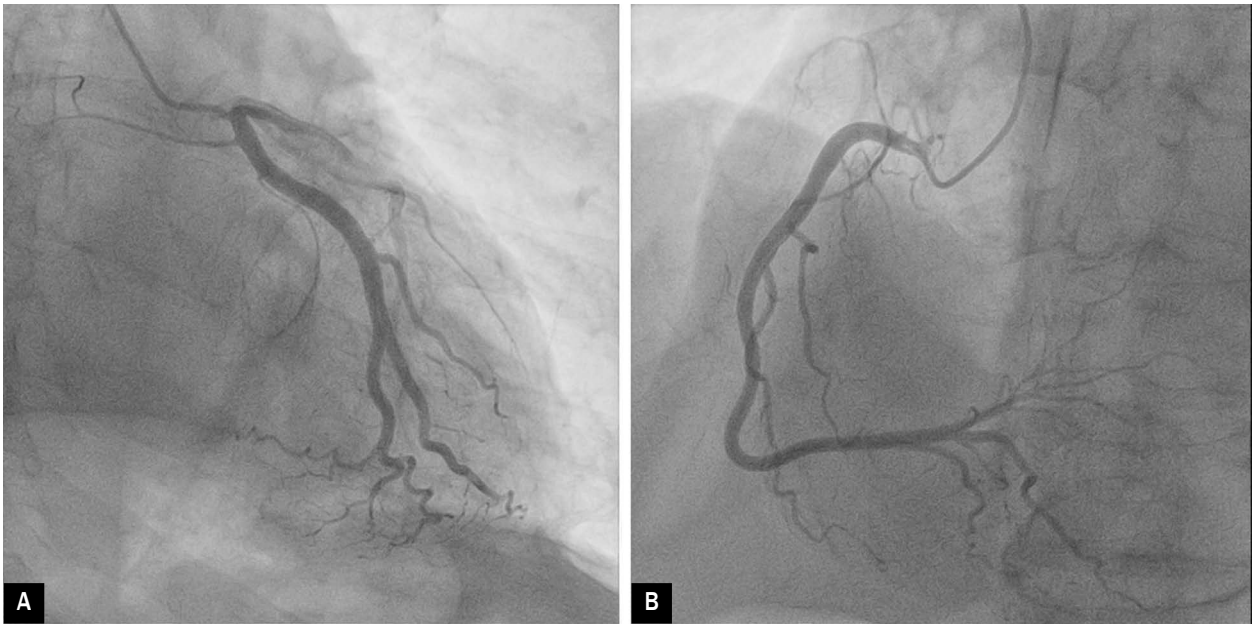

Figure 3A, B. Coronary angiography. No abnormalities on the left and right coronary artery angiography

The patient remained in a severe condition, on the 6th day went into cardiac arrest. Cardiopulmonary resuscitation was successful. An electrocardiogram showed changes typical for ST-elevation myocardial infarction. An emergent coronary angiogram showed no significant stenosis in any of the coronary arteries (Figure 3).

A follow-up brain NECT revealed hyperdense focal areas containing air densities, consistent with either intracranial haemorrhages or contrast extravasation after the coronarography. More areas were matching acute infarcts with mild right hemisphere oedema and hyperdense material involving its sulci that could correspond with subarachnoid haemorrhage or contrast staining after the angiography. These findings could have been caused by the introduction of air during the coronarography or a cardiopulmonary resuscitation (CPR) injury, therefore requiring chest imaging. Chest NECT showed no signs of injuries, but revealed gas within the left atrium and in pericardial cavity (Figure 4).

Based on the patient's medical history, air presence in the pericardium and left atrium AEF was suspected.

The patient remained in severe condition. Despite all taken measures, the patient died. An autopsy confirmed AEF connecting oesophagus with left atrium.

Discussion

Identification of air bubble in an imaging exam requires a close correlation between acquired images and clinical data. In the presented case air embolism differential diagnosis began with detecting air in a brain NECT. Given the history of CPR and coronarography preceding the brain CT, a likely cause of cerebral air embolism was either a CPR injury where positive pressure manoeuvres ruptured small pulmonary arteries or an introduction of air during cardiac catheterisation [3, 4]. Since air emboli occurred within less than a month of CA procedure AEF should also be included in the differential diagnosis. Even though AEFs are an extremely rare complication of CA, with a frequency rate of less than 0.1% [5], they are reported to be the second most frequent cause of death associated with CA of AF. Mortality rate is between 55% and 71% [6, 7].

Typical, but unspecific symptoms of AEF include neurological, cardiac, gastroenterological disorders and signs of infection. The most common symptoms are neurological ones and fever, occurring with respectively 72% and 73% rates [6]. AEF signs usually occur after a patient is discharged from a hospital, thus it is easily overlooked. In most cases, including this one, symptoms of AEF occur at 2–4 weeks after the procedure [5].

Chest CT is suggested to be the method of choice in diagnosing AEF. It can present air within heart chambers, pericardium, or mediastinum, as well as abnormalities in the left atrium such as thrombi or esophageal changes. If the initial chest CT is insufficient a repeat chest CT is suggested. In the presented case only the second thoracic CT revealed free air.

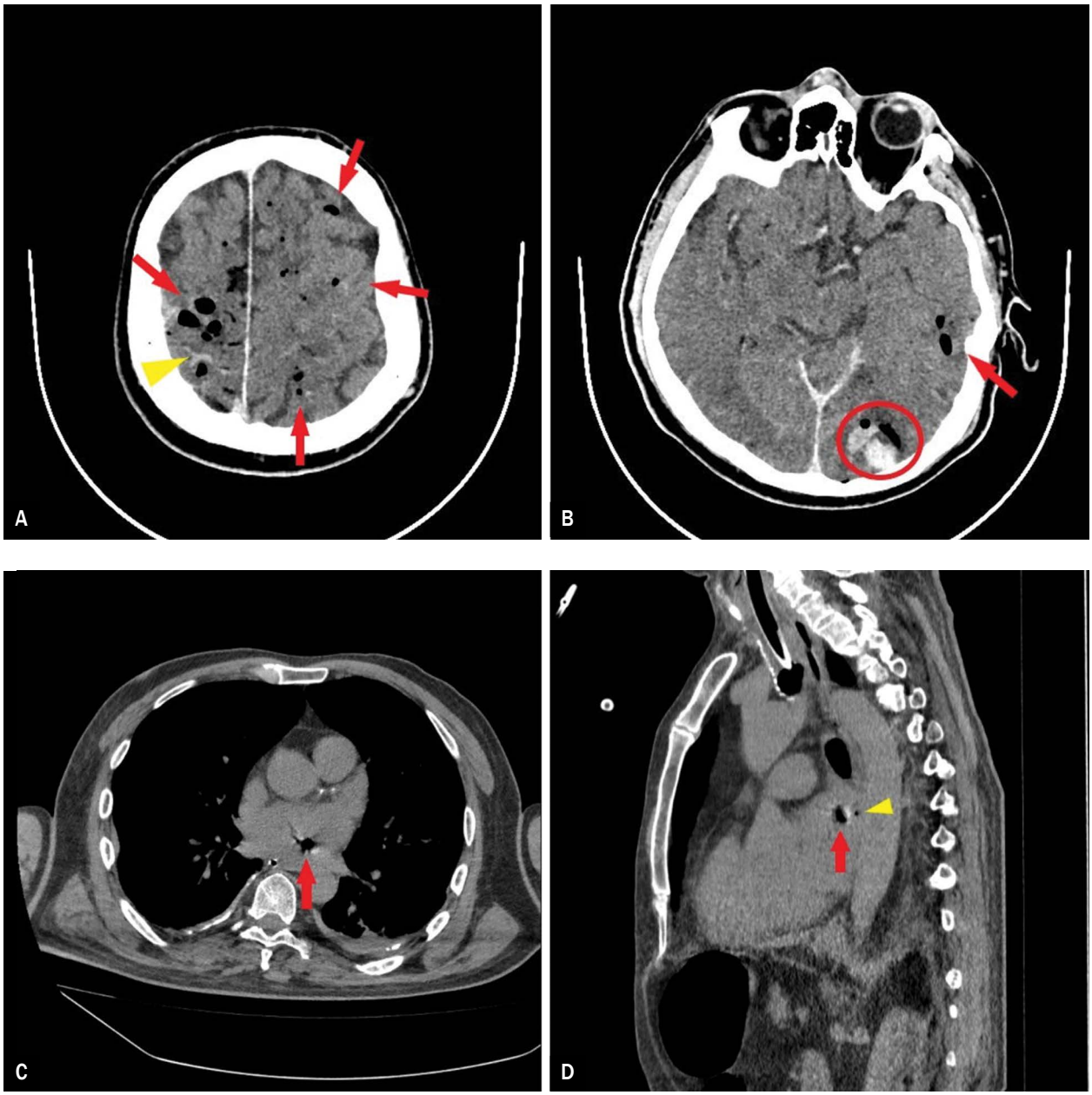

Figure 4A, B. A follow-up non-contrast brain computed tomography (CT) performed right after the coronarography: multiple cerebral and cerebellar air emboli (red arrows), hyperdense material in sulci of the right parietal lobe (arrowhead), focal hyperdense areas containing small air densities (circles); **C, D.** Non-contrast chest CT showed gas densities in the left atrium (red arrow) and pericardial cavity (yellow arrowhead) suggesting atrioesophageal fistula atrioesophageal fistula (AEF) presence

Conclusions

The purpose of this case is to raise awareness of percutaneous ablation complications among both clinicians and radiologists. It emphasizes how crucial precise clinical data and imaging exams are in diagnosing AEF.

Conflict of interest

The authors declare no conflicts of interest.

Funding

None.

Streszczenie

Przetoka przedsionkowo-przełykowa jest wyjątkowo rzadkim, ale stanowiącym zagrożenie życia powikłaniem po zabiegu ablacji przezskórnej. W związku z rosnącą częstością występowania migotania przedsionków, a co za tym idzie zwiększającą się liczbą wykonywanych zabiegów ablacji przezskórnej, powinna również wzrastać świadomość występujących powikłań po tym zabiegu oraz metod ich rozpoznawania.

Pacjent w wieku 69 lat z migotaniem przedsionków w wywiadzie został przyjęty do szpitala z powodu podejrzenia udaru mózgu. Pacjent 27 dni wcześniej przebył zabieg ablacji przezskórnej. Przy przyjęciu stwierdzono również umiarkowanie podwyższone laboratoryjne wskaźniki stanu zapalnego oraz stan podgorączkowy. W trakcie hospitalizacji zaobserwowano gwałtowne narastanie wykładników stanu zapalnego oraz stopniowe pogarszanie się ogólnego stanu chorego. Rozpoznano sepsę i włączono szerokospektralną antybiotykoterapię. Szóstego dnia hospitalizacji doszło do zatrzymania krążenia. Rozpoczęto resuscytację krążeniowo-oddechową, która przywróciła spontaniczne krążenie. W wykonanym badaniu elektrokardiograficznym zaobserwowano cechy zawału serca z uniesieniem odcinka ST. Pilna koronarografia nie wykazała jednak zmian w naczyniach wieńcowych. Wykonano kontrolne badanie tomografii komputerowej (CT) głowy bez podania środka kontrastowego, które wykazało obecność zatorów powietrznych. Badanie CT klatki piersiowej bez podania środka kontrastowego ujawniło obecność wolnego gazu w lewym przedsionku oraz osierdziu, co w zestawieniu z wywiadem chorobowym pacjenta wskazało na możliwą obecność przetoki przedsionkowo-przełykowej. Mimo wszystkich starań pacjent zmarł. W badaniu autopsyjnym potwierdzono obecność przetoki przedsionkowo-przełykowej między lewym przedsionkiem a przełykiem.

Celem przedstawienia tego opisu przypadku było pogłębieine wiedzy o powikłaniach po zabiegu przezskórnej ablacji, zarówno wśród klinicystów, jak i radiologów. Wskazuje on, jak ważna jest rola danych klinicznych oraz badań obrazowych w rozpoznaniu przetoki przedsionkowo-przełykowej.

Słowa kluczowe: przetoka przedsionkowo-przełykowa, ablacja przezskórna, mózgowy zator powietrzny, migotanie przedsionków, udar mózgu

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