Infected Right Atrial Thrombus and Pulmonary Emboli Associated with a Perforated Jejunal Diverticulitis

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SUMMARY

We describe a patient with an infected right atrial thrombus and pulmonary embolism who died suddenly. Jejunal diverticulitis, which was found at autopsy, was suspected to be the source of the bacterial thrombus. The 41-year-old female patient was admitted because of dyspnea and syncopal attacks. Physical examination on admission revealed an obese woman with a body temperature of 36.5°C, systolic heart murmur and abnormal diastolic heart sound. Two-dimensional echocardiography revealed a strand-shaped mass in the right atrium. Lung blood perfusion scintigraphy revealed multiple perfusion defects in both lung fields. She suddenly developed severe dyspnea leading to death on the 6th hospital day. At autopsy, a strand-shaped organized thrombus was found in the right cardiac chambers. Microscopically, the thrombus was found to be infiltrated with numerous gram-positive cocci, leukocytes and a small number of gram-negative cocci. Most of the major pulmonary arterial branches were occluded by bacterial thromboemboli, and multiple pulmonary infarctions were found in both lungs. A perforating diverticulum with microabscess was found in the jejunal mucosa which was assumed to be the source of the bacterial thromboembolism. (Jpn Heart J 35: 107-111, 1994)

Key words: Pulmonary embolism Jejunal diverticulitis

FATAL pulmonary embolism has been suggested to be strongly associated with right cardiac thrombus.1) There are a few reports of septic pulmonary embolism secondary to an infected right cardiac thrombus in intravenous drug abusers.6) The patient in the present case had no history of drug abuse, and the source of bacterial thromboembolism was assumed to be the perforating jejunal diverticulitis.

CASE REPORT

A 41-year-old woman was transferred to Ryukyu University Hospital be-
cause of dyspnea and syncopal attacks in December 1988. Prior to that time she had been residing at a psychiatric hospital as a result of schizophrenia. Physical examination on admission revealed an obese woman with a height of 148 cm, weight of 73 kg and temperature of 36.5°C. A systolic heart murmur at the left sternal border was noted. A filling sound resembling a third heart sound was audible in early diastole. Physical examination of the abdomen was unremarkable. Careful examination of her extremities revealed no evidence of thrombophlebitis. Examination of the blood revealed a white cell count of 12,200 with 63% neutrophils. C-reactive protein was strongly positive (6+). Prothrombin and partial thromboplastin times and platelet count were within normal limits. A specimen of arterial blood revealed hypoxia; PaO₂ was 67 mmHg, PaCO₂ 33 mmHg and pH 7.465 when oxygen was administered at 5 l/min. Serum LDH level was elevated to 1023 IU/l. Serum GOT and GPT levels were 16 IU/l and 17 IU/l, respectively. A chest X-ray demonstrated cardiomegaly with a cardio-

![Figure 1](image-url)

**Figure 1.** Two-dimensional echocardiograms obtained in the subxiphoid view with schematic illustrations. A: Diastolic phase. An echo-dense mass (arrows) is protruding into the right ventricle across the tricuspid valve. B: Systolic phase. The mass is no longer visible in the right ventricle, but is visible in the right atrium.
Figure 2. Autopsy specimen of the right cardiac thrombus. A long, coiled thrombus (16.5 × 0.7 × 0.7 cm) is present in the right cardiac chamber.

thoracic ratio of 60% and enlargement of the main portion of the pulmonary artery. An electrocardiogram revealed normal sinus rhythm with right axis deviation and inverted T waves in all precordial leads. Two-dimensional echocardiography revealed a strand-shaped mass in the right atrium that prolapsed freely across the tricuspid valve into the right ventricle during diastole and reverted into the right atrium during systole (Figure 1). No obvious attachments of the mass to the right atrium or ventricle were detected. Although the left chamber was not dilated, the right ventricle was dilated, and the interventricular septum showed paradoxical motion. Lung blood perfusion scintigraphy revealed multiple perfusion defects in both lung fields. Lung ventilation scintigraphy was not performed because of dyspnea. We initially inferred an atrial tumor from the abnormal atrial mass. While waiting for surgery, the patient suddenly developed severe dyspnea leading to death on the 6th hospital day. At autopsy, a strand-shaped organized thrombus (16.5 × 0.7 × 0.7 cm) was found in the right cardiac chambers (Figure 2). There was no attachment of the thrombus to the endocardium. Microscopically, the thrombus was infiltrated with numerous gram-positive cocci and leukocytes and a small number of gram-negative cocci. Although the tricuspid valve was found to be uninvolved and appeared grossly normal, numerous microabscesses were found on the endocardial surface of the right ventricle. Most of the major pulmonary arterial branches were occluded by bacterial thromboemboli, and multiple pulmonary infarctions were found in both lungs. Numerous microabscesses and bacterial thrombi were found at the central and portal veins of the liver, microabscesses were found in the spleen as well. A perforating diverticulum with microabscess was found in the jejunal mucosa at approximately one meter analward from Treitz's ligament. No venous thrombosis in the leg or pelvic veins was found. The patient had never complained of abdominal pain.

As a result of the increased use of two-dimensional echocardiography, intra-cardiac thrombus is increasingly recognized before death in patients with pulmo-
nary embolism. Chakko et al\textsuperscript{1}) reported that the incidence of right cardiac thrombus in 477 consecutive autopsies was 6\%, of which 80\% were associated with pulmonary embolism. Right atrial thromboembolism results from two different pathophysiologic mechanisms. Primary right atrial thrombi are observed in low-output conditions such as cardiomyopathy, cardiac arrhythmias and enlarged right atrium, and in association with right heart catheterization (Swan-Ganz catheter, central venous alimentation, and transvenous pacemaker). Secondary right atrial thrombi develop as a result of embolism from systemic venous thrombi. Echocardiographically, primary right atrial thromboemboli are usually relatively immobile, not elongated, and attached to the atrial wall. Right atrial clots arising from peripheral venous sources, on the other hand, are generally very long, serpentine, and freely mobile, prolapse across the tricuspid valve and lack attachments.\textsuperscript{2)} In our patient, the thrombus found in the right heart was strand-shaped and mobile. No venous thrombosis in the leg or pelvic veins was found at autopsy. Rather, perforating jejunal diverticulitis and numerous bacterial thrombi in the liver and spleen were detected. Although we could not identify the bacterial species, it seems reasonable to assume that these bacterial thrombi secondary to perforating jejunal diverticulitis were the source of the thrombus found in the right heart. Jejunal diverticula were identified in fifty (0.26\%) of 19000 autopsy subjects,\textsuperscript{3)} and of 47 cases of jejunal diverticulosis reviewed by Steven et al,\textsuperscript{4)} three patients had diverticulitis associated with perforation. There are few case reports of echocardiographic detection of bacterial right cardiac thrombus associated with pulmonary infarction. One such patient reported by Lam et al\textsuperscript{5)} was an intravenous heroin abuser. Jaffe et al\textsuperscript{6)} reviewed 17 cases of septic pulmonary emboli, 13 of which were associated with a history of intravenous drug abuse. On the other hand, intravenous drug abuse is much less widespread in Japan than the United States and Europe. Our patient was not a drug abuser, and the perforating diverticulitis was assumed to be the source of the bacterial thromboembolism.

\textbf{REFERENCES}

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