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Hyperdense Middle Cerebral Artery Sign Together with Pulmonary Thromboembolism

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Summary

Background:

Hyperdense middle cerebral artery sign is an appearance of the middle cerebral artery on non-contrast-enhanced computed tomography. Embolic occlusion of the pulmonary arterial system is referred to as pulmonary embolism. When pulmonary embolism coexists with a patent foramen ovale, increased pressure in the right atrium may result in widening of the foramen and consequently, cause serious conditions due to paradoxical embolus. Coexistence of hyperdense middle cerebral artery sign and pulmonary thromboembolism is very rare in the literature.

Case Report:

We presented a 60-year-old female patient who had both hyperdense middle cerebral artery sign and pulmonary thromboembolism.

Conclusions:

To our knowledge, togetherness of hyperdense MCA sign and pulmonary thromboembolism is extremely rare in the literature. In our case, we found both pulmonary embolism due to DVT and paradoxical embolism due to existing patent foramen ovale.

MeSH Keywords:

Embolism, Paradoxical • Infarction, Middle Cerebral Artery • Pulmonary Embolism

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Background

Hyperdense middle cerebral artery (MCA) sign is an appearance of MCA on non-contrast-enhanced CT. Although not sensitive, it is a characteristic sign and vascular thrombosis in cases of a stroke [1]. Embolic occlusion of the pulmonary arterial system is referred to as pulmonary embolism. As thrombotic occlusion is the etiological factor in many cases, it is also referred to as pulmonary thromboembolism [2]. Patent foramen ovale is found in approximately 25% of population. Although it is an incidental finding without any clinical significance, many other medical conditions may accompany it and some of them may be fatal. When pulmonary embolism coexists with patent foramen ovale, increased pressure in the right atrium may result in the widening of the foramen and consequently, cause serious conditions due to paradoxical embolus [3,4].

To our knowledge, coexistence of hyperdense MCA sign and pulmonary thromboembolism is very rare in the literature. We reported on a case of a 60-year-old female patient who presented with loss of consciousness and had both hyperdense MCA sign and pulmonary thromboembolism.

Case Report

A 60-year-old female patient was admitted with loss of consciousness. On physical examination, she had swelling of her left leg. On venous Doppler ultrasound, acute venous thrombosis was found in the left superficial femoral vein (SFV). On non-contrast-enhanced CT scans, increased attenuation was found in both MCAs (Figure 1). On contrast-enhanced thorax CT, filling defects were found in both pulmonary arteries and their branches (Figures 2, 3). To find out the cause of MCA infarcts with pulmonary artery thrombosis, echocardiography was performed and patent foramen ovale was found.

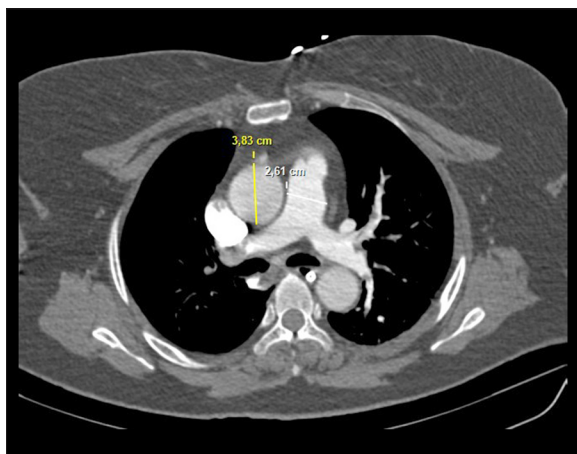


Figure 1. Axial non-contrast -enhanced CT of the brain demonstrates bilateral hyperdense MCA sign.

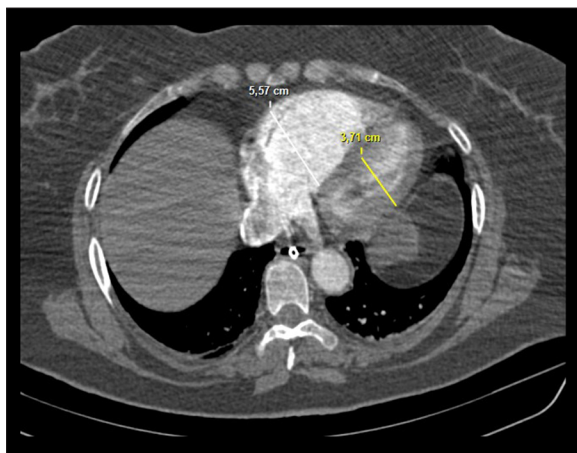


Figure 2. Axial contrast- enhanced CT of the thorax demonstrates thrombus in the right main pulmonary artery and left pulmonary artery branches. An area of pulmonary infarct is seen in the posterior segment of the right lung.

Discussion

Hyperdense MCA sign, seen on contrast-enhanced CT has a high specificity and positive predictive value in patients with stroke [1]. It should be taken into account that vascular calcifications and contrast -enhanced scans may also mimic this sign and can lead to misdiagnosis [5]. Increased attenuation in the proximal portion of MCA is related to thrombosis in the M1 segment. This sign is an early sign of MCA infarct. This sign is usually seen in the first 90 minutes of the ischemic event and it is of great importance that radiologists should recognize it [6,7].

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Figure 3. Follow-up head CT of the same patient demonstrates bilateral hypodense infarcts in both MCA territories.

Pulmonary embolus occurs when the thrombus in the lower extremities reaches pulmonary arteries. As a result, the right ventricle pressure increases, and if patent foramen ovale exists, a right- to- left shunt, causing paradoxical embolus, may occur. Paradoxical embolus is a rare entity and constitutes less than 2 % of all arterial emboli. Patent foramen ovale is found in approximately 30 % of patients with paradoxical embolism and patent foramen ovale is a risk factor for paradoxical embolism [8].

Conclusions

To our knowledge, coexistence of hyperdense MCA sign and pulmonary thromboembolism is extremely rare in the literature. In our case, we found both pulmonary embolism due to DVT and paradoxical embolism due to existing patent foramen ovale

Conflict of interest

None of the authors state a conflict of interest.

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