

Embolism of Heart Tissue to the Middle Cerebral Artery as a Complication of Heartsurgery

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Summary. After suture closure of an intraarterial septal defect an atrio-ventricular block occurred in a 6 years old child. Therefore, the suture was removed and the defect closed by a Dacron patch. The sinus rhythm returned. After the operation convulsions occurred, the patient died after 16 h which was considered to be due to cerebral air embolism. Autopsy confirmed a correct operation, but the right middle cerebral artery has been found to be completely occluded by heart muscle and pericardial fat tissue.

Key words: Tissue embolism – Congenital heart disease – Open heart surgery – Tissue embolism

Zusammenfassung. Bei einem 6jährigen Kind trat nach Vernähung eines Vorhofseptumdefekts ein atrioventrikulärer Block auf. Deshalb wurde die Naht wieder gelöst und der Defekt durch eine Dacron-Plastik gedeckt. Der Sinusrhythmus kehrte zurück. Nach der Operation traten Krämpfe auf. Tod 16 Std später. Verdacht auf Luftembolie des Gehirns. Die Sektion wies saubere Verhältnisse im Operationsgebiet nach. Die rechte mittlere Hirnarterie war auf einer Länge von 2 bis 3 mm durch Herzmuskel- und Herzfettgewebe verstopft.

Schlüsselwörter: Gewebeembolie – angeborener Herzfehler – Operation am offenen Herzen, Gewebeembolie

Various tissues may enter the circulation and cause infarction. The commoner embolising tissues include fat, liver and amniotic fluid. Cerebral embolism of cardiac muscle is a recognised complication of open heart surgery.

Besznyák states that in 13 out of 60 autopsies on patients dying following open heart surgery the cause of death was cerebral or pulmonary embolism. In one case of cerebral embolism, thrombus had formed post-operatively in the left ventricle. During operations on the right heart, pulmonary embolism can occur in the absence of congenital heart disease. In cases where septal defects are present, systemic embolism may follow right heart surgery.

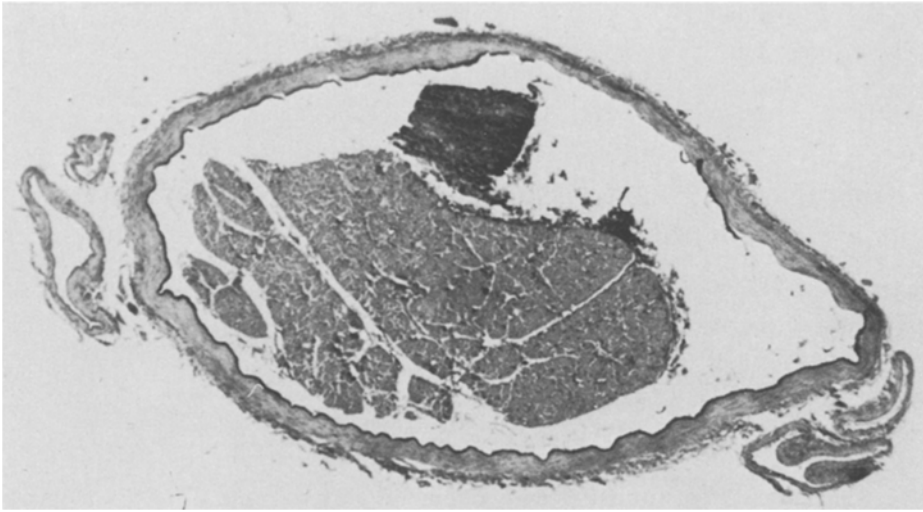


Fig. 1. Cerebral right middle artery occluded by muscle embolism, 30:1

The increasing number of operations now carried out to correct congenital heart defects and the various complications which may arise from such surgery justify the following case report:

A.J. a 6-year-old boy was admitted to hospital for closure of an interatrial septal defect. On clinical examination there was hypertrophy of both sides of the heart. On the left side a sighing systolic murmur was present in the precordial area and the 1st pulmonary sound was accentuated. The ECG showed left and right ventricle strain. An interatrial septal defect was detected on the phonocardiogram.

The operation was commenced by canalising the ascending aorta, the left atrium and both vena cava followed by total cardiac bypass.

The septal defect was exposed through the right atrium and found to be of the inferior caval type. It was closed by continuous suture. After closure an atrio-ventricular block developed. The suture was removed and the defect closed by a Dacron patch. Sinus rhythm returned. Air bubbles were observed in the coronary arteries and these were removed by needle puncture and perfusion.

After closure of the thoracotomy incision the patient became rigid and convulsed. Death occurred 16 h later in circulatory and respiratory collapse considered by the surgeons to be due to a cerebral air embolism.

The autopsy confirmed that the operation was technically correct. The incision in the right atrium had been closed by a continuous suture and a 1 cm interatrial defect at the site of the foramen ovale had been closed by a Dacron patch sutured on its right side. No old or recent thrombosis in the region of the operation was identified.

Examination of the brain revealed total occlusion of the right middle cerebral artery for a distance of 2—3 mm by a firm reddish-grey embolism. Upon microscopy it was found that the artery was completely occluded by an embolism of

pericardial fat and myocardium (Fig. 1). The embolism had clearly arisen from the surgical incision in the atrium.

Discussion

Embolism is a recognised complication of heart surgery. In this case the cerebral embolism of myocardial tissue complicated the surgical closure of an interatrial septal defect and accounted for the acute neurological symptoms which preceded death.

The risk of such a complication may be reduced by the use of an adequate filter. In spite of such precautions, however, detached fragments of heart tissue may enter the left heart unobserved and pass into the systemic circulation. This sequence of events would appear to have occurred in this case.

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Received June 28, 1978