

CASE REPORT

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Unexpected Sudden Death from Coronary Sinus Thrombosis. An Unusual Complication of Central Venous Catheterization*

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ABSTRACT: Coronary sinus thrombosis is an unusual but potentially serious complication of the use of central venous devices. We report a fatal case of coronary sinus thrombosis in relation to a malpositioned central venous catheter. The death occurred very soon following the beginning of symptoms and the cause could not be suspected. Direct trauma of the catheter on the coronary sinus endothelium seems the most probable cause of the thrombosis.

KEYWORDS: forensic science, central venous access devices, coronary sinus thrombosis, cardiac tamponade, sudden death

The insertion of central venous lines is a common procedure in the management of a great variety of patients. Complications are unusual, but infections, pneumothorax, hemothorax, brachial plexus injury, and malpositioning of the catheter may occur. Location of the catheter tip in the right cardiac chambers increases the chances of serious complications, including coronary sinus thrombosis. Although it may be asymptomatic (1), very few fatal cases have been reported (2-6).

We report a case of sudden death from coronary sinus thrombosis in relation to central venous catheterization.

Case Report

A firework that exploded in the hands of a 9-year-old boy caused severe injuries to both hands. He was admitted to our hospital with amputation of four fingers of the right hand and two of the left. The

left ocular globe was severely destroyed and needed removal, and the right showed corneal burning. Because of the several surgical interventions needed, a central venous line was placed in the superior vena caval vein. Clinical and analytical evolution was favorable until the 23rd day, when the patient experienced a vomiting episode and complained of epigastric pain. Physical examination at the time revealed slight dyspnea, with no other abnormal finding. However, one hour later the patient suddenly collapsed and, although immediate resuscitation maneuvers were performed for 45 min, he died.

A postmortem examination was performed. External examination showed satisfactory evolution of the injuries caused by the accident. Internal findings were irrelevant, except for the heart, where pericardial effusion of 150 mL of clear transparent fluid was noted. The pericardium showed no abnormalities. The heart was normal on external examination and its weight (165 g) was into the range of normality. However, inspection of the endocardial aspect of the chambers disclosed the existence of a slight elevation in the right atrium, in close proximity to the orifice of the coronary sinus. On serial sectioning, the coronary sinus showed occlusive thrombosis extending for 2.5 cm from the atrial ostium.

Histopathological examination confirmed the thrombus (Fig. 1), which was only partially organized. The greater part was constituted of fibrin and firmly attached to some areas of the wall of the coronary sinus. The sections corresponding to the proximal third of the vein showed a prominent inflammatory infiltrate into the wall with intimal erosion and granulation tissue formation (Fig. 2). Stains for microorganisms (PAS and Gram) were negative. Moreover, occasionally fibrin microemboli were demonstrated in the small vessels of both lungs (Fig. 3), but they were not present in other organs.

Comments

Coronary sinus thrombosis is a rare event usually associated with invasive procedures (3,6). Many cases are asymptomatic and only angiographically demonstrated (1), but exceptions occur, resulting in death from myocardial ischemia (2,5,6), cardiac tamponade (3), or sudden death without other morphological evidence (4).

The first question arising from this case is the ultimate cause of death. Since 150 mL of fluid in the pericardium of a 9-year-old boy

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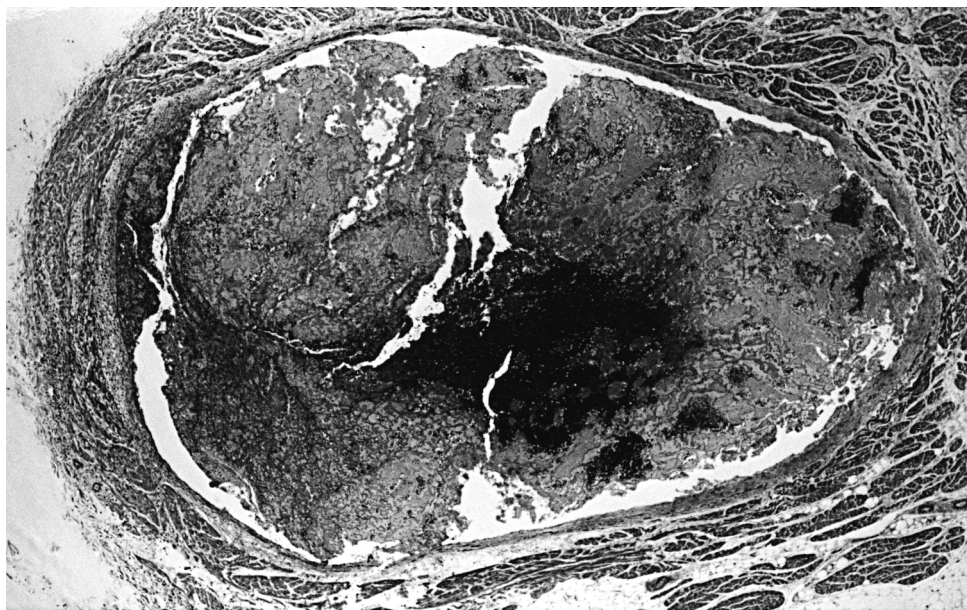


FIG. 1—Low-power view of the coronary sinus. The lumen is completely occupied by a fibrin thrombus, partially attached to the intima (H&E $\times 25$).

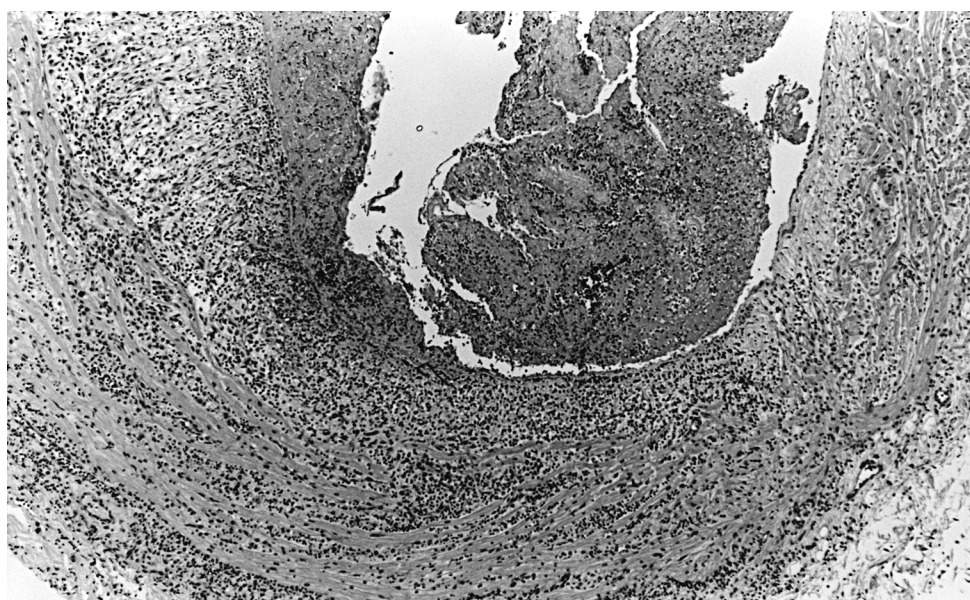


FIG. 2—Wall of the coronary sinus showed a prominent inflammatory infiltrate in the area where the thrombus was adhered, suggesting this was the point where the thrombosis was initiated (H&E $\times 40$).

is clearly excessive, cardiac tamponade is one possibility, which only exceptionally has previously been reported (3). Although collateral circulation with anterior cardiac veins and thebesian veins do exist, thrombosis of the coronary sinus seems sufficient to justify the fluid accumulation (3,5). Nevertheless, we do not know the rate of accumulation, which is the most critical parameter involved in the production of cardiac tamponade. But the fact that the thrombus was partially organized raises the possibility of a progressive accumulation. If this were the case, myocardial ischemia could be an alternative explanation for the sudden death. The absence of histopathological changes resulting from ischemia is easily ex-

plained by the short interval of survival after the onset of the complication (probably one hour before death when the patient's suddenly feeling ill coincided with the extension of the thrombus to complete occlusion of the sinus coronary lumen).

We could reasonably attribute the origin of the thrombus to the direct trauma of the catheter in the atrial orifice of the coronary sinus. The finding of intimal erosion and granulation tissue formation in the histopathological study helps to confirm this hypothesis. In this respect, it is worth noting that the control chest X-ray was revised to check the location of the catheter, which was placed in the inferior vena caval vein. However, when the catheter was relo-

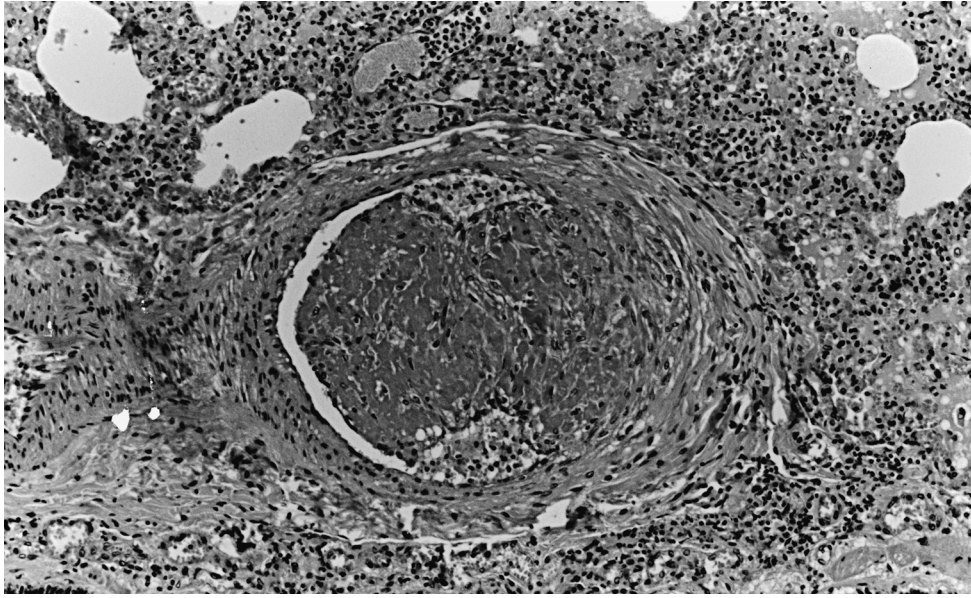


FIG. 3—Example of a fibrin microembolus. They were randomly distributed in both lungs with different grades of organization (H&E $\times 200$).

cated no new radiographic control was carried out. Infection of the catheter does not seem feasible, based upon the clinical picture and the negativity of stains for microorganisms, although catheter tip culture was not performed. The origin of pulmonary fibrin thrombi was attributed to embolization of fragments broken off from the proximal portion of the coronary sinus thrombus.

We think that this case is illustrative in two aspects. First, apart from the possibility of infection, the long permanence of central venous catheters is not exempt from serious risk. Secondly, a strict X-ray control of central venous catheters is desirable to avoid situations such as that described here which, depending upon circumstances, could imply a lawsuit for professional irresponsibility.

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