



## Pathology Biology Section – 2010

### G61 Fatal Cardiac Perforation During Percutaneous Treatment in Iliac Artery Occlusion

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After attending this presentation, attendees will have learned of an extremely rare complication of percutaneous transluminal angioplasty (PTA) and stenting for iliac artery occlusive disease; attendees will also understand the cause of the error and verify the professional liability profiles derived from this case.

This presentation will impact the forensic science community by reminding researchers of this rare complication and the opportunity to avoid this event.

Only a complete forensic approach by means of autopsy and microscopy examination led to the conclusion for cardiac tamponade due to left ventricular wall rupture.

Aortoiliac occlusive disease (AIOD) is a common manifestation of atherosclerosis that may lead to lower limb ischemia. In this case the Trans Atlantic Inter-Society Consensus (TASC) offers guidelines for the treatment of such disease. In particular total unilateral iliac occlusions should be treated by primary stenting, reducing the risk of embolisation in iliac stenoses, and moreover the periprocedural morbidity and mortality rates. In addition, primary stenting is indicated in the presence of specific risk factors as ulcer/gangrene, smoking history, and chronic renal failure with hemodialysis. Following these directives the use of endovascular interventions for arterial occlusive lesions continues to increase consequently causing the detriment of open surgical revascularization. A careful evaluation of the various restraining parameters should precede the choice of surgical approach, to ensure the selection of the most suitable technique in each individual patient on the grounds of clinical presentation of the disease. For example, TASC lesions type A or B are best treated with angioplasty and stenting, while TASC lesions type C and D show better results with surgical treatment.

Technically PTA provides for an ipsilateral, or less frequently contralateral, common femoral artery access, crossing the lesion with a guide wire, dilating the vessel with an angioplasty balloon catheter and placing a self-expandable stent. Sometimes a brachial approach is preferred, especially when many lower limb vessels are impaired. In this kind of approach it is important to pay attention at some neurological complications (i.e., hematoma that compresses the brachial plexus leading to a sensory-motor deficit) and vascular ones (i.e., pseudoaneurysm, local thrombosis or distal embolism) which have a low incidence, estimated between 2 and 13,4% (Tsetis et al, 2008).

A 68-year-old male smoker presented to the hospital with a history of bilateral and severe lower limb arterial disease. He was suffering a left common iliac arterial occlusive lesion as showed by the arteriographic examination. The patient was treated with PTA and stenting through the left brachial artery, instead of contralateral femoral approach, due to the presence of small lesions in the right leg vessels. During the procedure, the radiologist used videoscopic to help to see the part of the iliac artery concerned the occlusion without following the entire route taken by the guide wire. By doing this he did not notice that he had taken a wrong direction, passing through the ascending aorta and then going into the cardiac chambers; in a second attempt he finally was able to enter the descending aorta and reach the left common iliac artery where the stent was successfully located.

Two hours after PTA the patient suddenly died. An autopsy was arranged for investigating any professional liability profiles. A complete postmortem examination was performed three days after death.

External examination was insignificant. The internal examination revealed a cardiac tamponade without identifying the breaking point, but with evidence of hemorrhagic infiltration area in the epicardium and throughout the thickness of the myocardium at the distal part of the left ventricle. At the aortic cone level a small area of hemorrhagic infiltration, in contact with the fibrous pericardium, was found. The presence of a correctly positioned stent in the left common iliac artery was observed. Other findings concerned polyvisceral congestion, cerebral, and pulmonary edema.

The histological heart examination, performed with routine hematoxylin-eosin, revealed hemorrhagic dissection of myocardial tissue at left ventricle level consistent with a rupture of the heart, excluding natural causes of death as myocardial infarction.

In conclusion, the cause of death was attributed to a cardiac tamponade due to traumatic left ventricular rupture during PTA procedure.

This case, which has attracted medicolegal interest because of medical liability profiles that were assumed as the doctors' fault, shows a fatal PTA complication particularly uncommon, as reported by literature. The complications rate for angioplasty selective stenting, indeed, is generally very low both for perioperative deaths (0,03-0,06% - Aburahma et al, 2007) and immediate total complications (0,7% - Kudo et al, 2005).

**Iliac Artery Occlusion, Percutaneous Transluminal Angioplasty, Fatal Left Ventricular Rupture**