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Case reports

Lethal myocardial infarction subsequent to compression of the left anterior descending coronary artery induced by traumatic hematoma

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Summary. Post-traumatic myocardial infarction is a well-known although rare complication of blunt chest traumas. In cases of proximally located damage to the coronary arteries, modern vascular surgery such as bypass operations may be lifesaving. In this paper we describe a case, where a healthy 35-year-old man developed a lethal myocardial infarction 8 days after a chest trauma caused by a moped. The ECG obtained 4 h after the accident showed extensive transmural ischemia of the anterior wall. At autopsy a hematoma originating from a side branch was found to compress the left anterior descending coronary artery immediately distal to its origin from the main stem. This finding suggests that bypass surgery could have saved the life of this young man. Patients with evidence of myocardial ischemia following chest traumas should be transferred to a cardiac center as early as possible.

Key words: Chest-trauma – Coronary artery compression – Hematoma – Post-traumatic myocardial infarction

Zusammenfassung. Der post-traumatische Myokardinfarkt ist eine gut bekannte, wenn auch seltene Komplikation nach stumpfem Thorax-Trauma. Bei einer Lokalisation des Schadens im Bereich der proximalen Koronararterien kann die moderne Gefäßchirurgie, wie z. B. Bypass-Operationen, lebensrettend sein. Wir beschreiben einen Fall, bei welchem ein gesunder, 35 Jahre alter Mann 8 Tage nach einem Brustkorbtrauma durch Moped-Unfall einen tödlichen Myokardinfarkt erlitt. Ein bereits 4 Stunden nach dem Unfall aufgenommenes EKG zeigte eine extensive transmurale Ischämie der Vorderwand. Bei der Obduktion wurde ein von einem Seitenast ausgehendes Hämatom gefunden, welches den Ramus interventricularis anterior unmittelbar nach seinem Ursprung komprimierte. Dieser Befund läßt daran denken, daß eine Bypass-Operation das Leben dieses jungen Mannes hätte retten können. Patienten mit Zeichen des Myokardinfarkts nach Brustkorbtrauma sollten so bald als möglich in ein Herzzentrum transportiert werden.

Schlüsselwörter: Brustkorbtrauma – Kompression der Koronarartrie – Hämatom – Posttraumatischer Myokardinfarkt

Case reports

A 35-year-old healthy man was hit frontally by a moped while walking on a dark road. He lost conscious for a few minutes. On arrival to the local hospital, he complained of chest and leg pains. Physical examination and chest radiographs showed no evidence of fracture of the sternum or the ribs, and no signs of pulmonary affection.

The patient still complained of chest pains 3 hours later and electrocardiography showed evidence of extensive anterior transmural infarction with 3–7 mm S–T segment elevations in leads I, AVL and V_1–V_4 and Q-waves in V_1–V_3. Creatinine kinase levels from the first and second day of admission were 7500, 4400, 3750 U/l and additionally iso-B enzyme levels of 320, 230, 145 U/l. Thrombolytic therapy could not be given due to the trauma.

On the fifth day an echocardiogram showed moderate pericardial effusion, and he was transferred to a cardiac center.

Repeated echocardiography confirmed the presence of a hemodynamically insignificant pericardial effusion. The left ventricle was dilated, with akinesia and hypokinesia of the major part of the anterior and lateral wall.

Because extensive myocardial infarction was manifest at the time of admission, the patient was only treated symptomatically with drugs, including beta-blockers.

On the eighth day after the accident he suddenly collapsed with rupture of the myocardium and cardiac tamponade. Resuscitation was attempted but with no effect.

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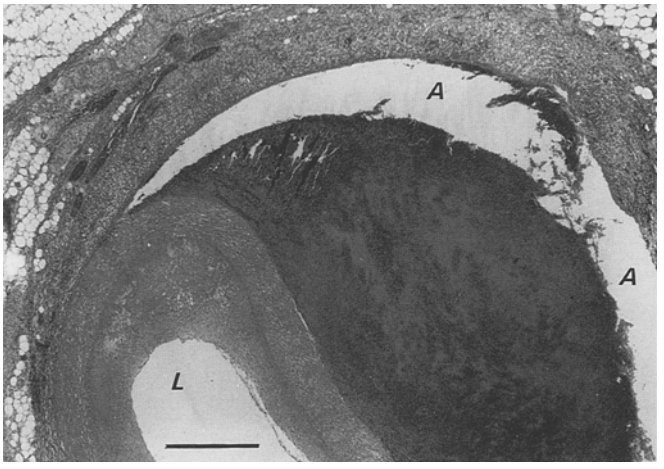

Fig. 1. Left anterior descending coronary artery with extensive hematoma in the wall. L = arterial lumen, A = shrinkage during preparation. *Bar* = 720 μm

Autopsy. The heart was enlarged, measuring approx. 14 × 12 cm, and weighing 690 g. A continuous layer of fibrinous tissue covered the surface of the heart and a major part of the myocardium, apart from the apical region, was replaced by newly infarcted tissue but without signs of preexisting disease or direct heart muscle contusion. A spontaneous rupture was found in the infarcted myocardium 22 mm above the apex, and the pericardial sac contained 0.5 l blood.

A few millimeters distal to the origin of the left anterior descending coronary artery (LAD) a 2 cm long hematoma was found surrounding the LAD and the origin of the first diagonal branch. The compression from the hematoma occluded the LAD almost completely but no thromboses or aneurysms were found.

On the thorax an approximately 11 × 7.5 cm large purple and green-yellowish bruise was located 7 cm above the right papilla mammae and extending to the presternal region. The sternum was fractured with minimal fresh bleeding around the fracture, which was probable due to the resuscitation. Only superficial lesions were found on the extremities.

Microscopical examination. Cross-sections of the LAD at the site of the offspring of the first diagonal branch demonstrated bleeding in the common adventitia penetrating the outer, but not the inner layers of the external elastic membrane (Fig. 1).

Atheromatosis could not be demonstrated, and the amount of elastin was found to be normal. Infarcted areas of the myocardium, 5–8 days old, were found in both ventricles.

Discussion

Post-traumatic myocardial infarction has been described following chest traumas in traffic-accidents [2, 3], rugby injuries [4] and fall traumas [5]. Chest pains usually develop immediately but may be delayed up to 15 days after the trauma [6]. Several underlying mechanisms have been proposed [1]: 1) Coronary heart diseases, either diffuse or isolated, complicated by hemorrhage into a plaque or spasms, 2) coronary thrombosis due to direct vascular trauma, 3) spasm in normal coronary arteries, 4) rupture in the wall of a previously normal vessel, 5) dissection aneurysm, and 6) coronary embolization.

The present case history illustrates a blunt chest trauma by a moped causing an extensive and lethal myocardial infarction subsequent to a centrally located occlusive compression of a normal coronary artery.

Cardiovascular techniques such as coronary by-pass operations [7] and percutaneous transluminal coronary angioplasty [5] have recently been reported as useful in certain cases of injuries to coronary arteries. These operations can also be combined with fibrinolytic therapy [7].

In the present case the regional hospital correctly refrained from fibrinolytic therapy due to the trauma, but from the postmortem examination it could be anticipated that removal of the hematoma or perhaps more likely, coronary by-pass surgery performed within the first hours following the trauma, might have saved the life of this young man especially since the clinical picture and in particular, the ECG strongly suggested a centrally located occlusion of the LAD even a few hours after the accident.

Since it is of vital importance that treatment is performed without delay [8], we conclude that in patients with even apparently mild blunt chest traumas an ECG should be performed on arrival at a hospital. If either clinical or electrocardiographical signs of cardiac ischemia are present, immediate transfer to the nearest cardiac center should be performed for further considerations.

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