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CASE REPORT

Fatal bleeding from major femoral vessels: three case reports

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Abstract We present three unusual cases of fatal bleeding from eroded femoral blood vessels. Erosion was due to tumor metastases in one and abscess formation in two cases. Bleeding occurred from the femoral vein in two cases and from the femoral artery in one case. Extensive bloodstains at the death scene were suspicious of homicide, which was ruled out by medico-legal autopsy in all cases.

Keywords Forensic pathology · Femoral blood vessels · Bleeding · Intravenous drug abuse · Tumor metastases

Introduction

Fatal bleeding from femoral blood vessels is rare and can occur as a complication of intravenous drug abuse, coronary intervention by inguinal catheterization, or trauma [2, 5, 6, 8]. Femoral bleeding can be successfully treated, and fatalities are very rare. In some cases, involvement of major blood vessels is not known or expected. In these cases, death can occur suddenly and unexpectedly. Due to extensive bloodstains at the death scene, the suspicion of homicide might arise.

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Case reports

Case 1

A 45-year-old man was found dead in his flat, lying in a pool of blood. He had a history of rectal cancer, which had been surgically removed by rectectomy 5 years before his death. A wound was present in the right inguinal region, measuring 14×9 cm. In medico-legal autopsy, the inguinal region was infiltrated by tumor metastases with an erosion of the femoral vein (Fig. 1). Sparse postmortem lividity, pallor of the inner organs, and subendocardial hemorrhages were present as signs of major blood loss. Recurrence of the primary tumor or further metastases were not found. Histological examination of the metastases showed characteristic features of squamous cell carcinoma as diagnosed by a specialist pathologist (Fig. 2), in keeping with the medical history of rectal carcinoma, which had also been described as squamous cellular. Toxicology results were negative. Death was attributed to bleeding due to tumor erosion of the femoral vein.

Case 2

The body of a 41-year-old woman with a previous history of chronic intravenous drug and alcohol abuse was found dead on her bed. Large amounts of blood were found in the toilet and on the bathroom and bedroom floors (Fig. 3). The investigating police officers first thought of a criminal abortion, and consequently, a medico-legal autopsy was performed. Scars of the extremities and inguinal regions as signs of long-standing intravenous drug abuse were seen, and abscess formation was present in both inguinal regions (Fig. 4). The left femoral vein was eroded by the abscess. As signs of major blood loss, sparse postmortem lividity

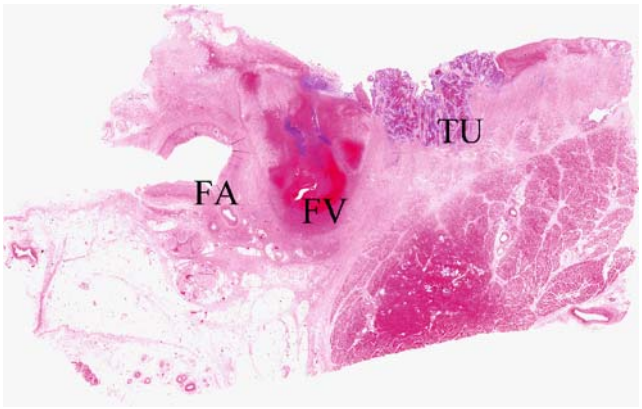

Fig. 1 Tumor erosion of the femoral vein in case 1. *FA* femoral artery, *FV* femoral vein, *TU* tumor metastasis

and subendocardial hemorrhages were found. Fatty liver was present as a sign of long-standing alcohol abuse. The blood alcohol test was negative. Toxicological investigations showed no signs of acute intoxication, but hair analysis proved long-standing chronic use of morphine derivatives and cocaine. Death was attributed to exsanguination from the left femoral vein after abscess erosion.

Case 3

The body of a 41-year-old man was found dead in the kitchen of his flat. Extensive blood staining was found in all rooms of the flat. A deep wound in the right inguinal region was thought to be a stab wound by the investigation police officers, thus raising the suspicion of homicide. In medico-legal autopsy, signs of long-standing intravenous drug abuse, namely fresh and old injection marks of the extremities, neck, and inguinal regions, were present. In the right inguinal region, an abscess with erosion of the femoral artery was found (Fig. 5). As signs of major blood loss,

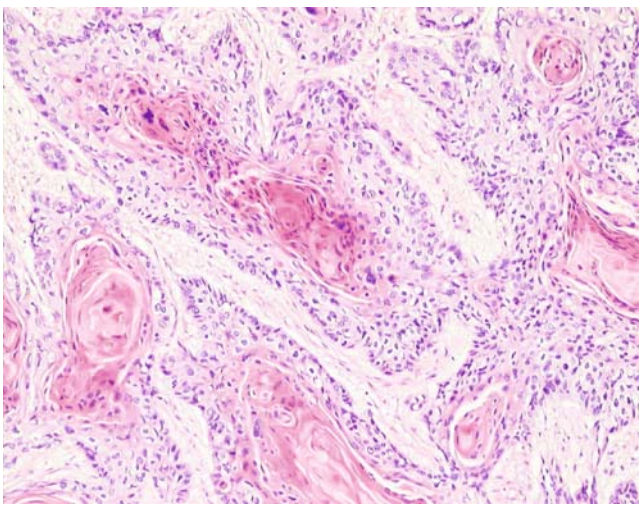

Fig. 2 Histological picture of the squamous cell carcinoma metastasis. H&E, ×100

Fig. 3 Death scene findings in case 2: extensive bloodstains in the kitchen

sparse postmortem lividity, pallor of the inner organs, and subendocardial hemorrhage were present. Toxicology revealed no signs of acute intoxication, but the hair was positive for morphine derivatives. The cause of death was exsanguination from the femoral artery due to abscess erosion.

Discussion

Undiagnosed organ pathology can lead to sudden death by bleeding and can thus gain forensic relevance [4, 10]. Likewise, undiagnosed malignant tumors can lead to sudden death [7]. Sudden death by bleeding due to tumor erosion of the femoral vein, however, has not been reported so far. Vascular complications that have been described in intravenous drug users who inject into the groin region include venous thrombosis, arteriovenous fistula, mycotic aneurysm, dissecting hematoma, and pseudoaneurysm formation [1–3, 6, 9]. If a pseudoaneurysm is present, symptoms may lead to the diagnosis, and therapeutic intervention may prevent major bleeding [2, 6, 9]. In the

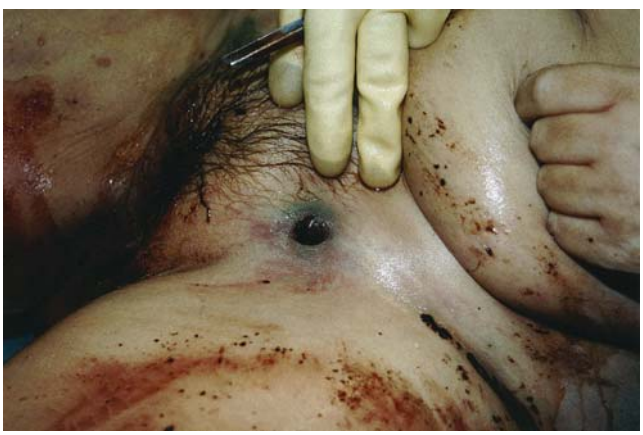

Fig. 4 Macroscopic aspect of abscess in case 2

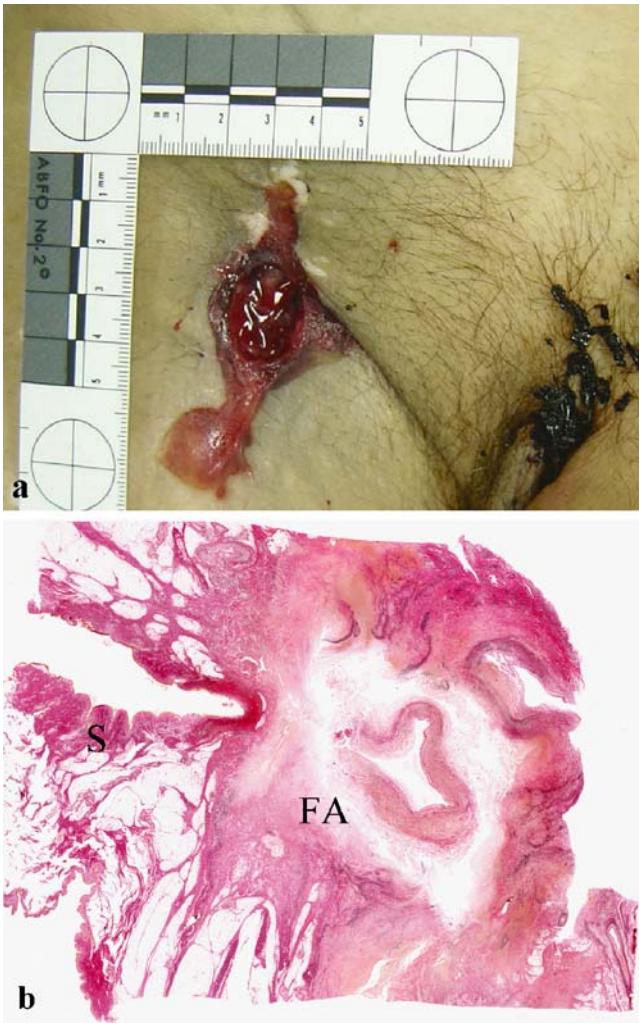

Fig. 5 Abscess erosion of the femoral artery in case 3. **a** The macroscopic aspect was first interpreted as a stab wound by the investigating police officers, **b** histologic picture, EvG staining. *FA* femoral artery, *S* skin surface

two cases presented here, no signs of pseudoaneurysm were present. Furthermore, there had been no drug injection directly before the onset of bleeding. Thus, rupture of eroded blood vessels can occur spontaneously, without a preceding trauma of injection, leading to sudden, unexpected death.

In all cases presented here, the findings at the scene with extensive bloodstains and injuries of the deceased were suggestive of homicide. A death scene investigation by a forensic specialist, which could have been beneficial for ruling out homicide, was not performed in any of the cases. We suggest that a forensic death scene investigation should be performed in all cases where fatal bleeding is suspected. It has been reported previously that sudden death by fatal bleeding in outpatients may occur preferably in individuals who are socially isolated and rarely see a physician, so that the social and medical history are often unknown [11], which is confirmed by the cases presented here. This makes it especially important to perform a medico-legal autopsy in these cases to clarify the circumstances of death.

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