

ATHEROSCLEROSIS – COMPETING FACTOR IN THE THANATOGENESIS OF ACCIDENTAL VIOLENT DEATHS CASE REPORT

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Abstract: The forensic autopsy in accidental violent deaths has a determining role in establishing the cause of death. We are presenting the case of a 77 year-old female found dead at her house under suspicious conditions. The purpose of this article is to underline the importance of the pathological background of the victim in the thanatogenerating mechanism. On performing the necropsy examination, it was established that the death intervened in the context of an abdominal trauma by animal hoof kicking. The advanced atheromatosis was a competing factor in the producing of post traumatic lesions (rupture of left internal iliac artery). Therefore, the biological particularities of the victim influenced the internal response of the lesions and determined their unfavourable evolution.

Cuvinte cheie: moarte violentă, traumatism, ateroscleroză, leziuni vasculare

Rezumat: În morțile violente accidentale, autopsia medico legală are un rol hotărâtor în stabilirea cauzei morții. Vom prezenta cazul unei persoane de sex feminin în vârstă de 77 ani găsită decedată la domiciliu în condiții suspecte. Scopul articolului este de a sublinia importanța terenului patologic al victimei în mecanismul tanatogenerator. Cu ocazia efectuării examenului necropsic s-a stabilit că decesul a survenit în contextul unui traumatism abdominal prin lovire cu copită de animal. Ateromatoză avansată a reprezentat un factor concurator în producerea leziunilor posttraumatice (ruptură de arteră iliacă internă stângă). Astfel, particularitățile biologice ale victimei au influențat răsunetul intern al leziunilor și au determinat o evoluție nefavorabilă a acestora.

INTRODUCTION

Accidental violent death occurs incidentally, without the following or expectation of the fatal end: home, road, work accidents etc. The form of fault is the guilt, either of the person itself or of the author's. Violent death has a special forensic significance, investigation of the causes and circumstances of occurrence is a must, the forensic medical examination having a determining role.(1,2)

The traumatic lesions can be caused by different mechanisms which can act individually or associated: active hitting with a hard body, passive hitting against a hard body, compression - squeezing – crushing between two hard bodies/plans, stinging - stabbing, cutting – sectioning – splitting, tearing – breaking, dragging – scratching.(1,2,3) In case of abdominal traumas, the lesions can concern the digestive organs, the blood vessels, the kidneys and the spleen, rupture of blood vessels (abdominal aorta and its branches, the inferior vena cava and its branches) and an lead to hemoperitoneum and/or retroperitoneal hematoma with unfavourable evolution.(4,5)

The arterial plaque is a solution of complete or incomplete continuity of the arterial wall, produced by a breaking, tearing, stinging, sectioning-cutting mechanism, being able to determine, depending on the calibre of the injured vessel, an ischemic or hemorrhagic syndrome, the death intervening at once, if the vascular calibre is large, by internal or external bleeding or slowly, by hemorrhagic shock.(1,2,4)

The production of vascular plaques is also favoured by the biological particularities of the person. Thus, in case of a person who has blood vessels atheromas, the increase of the

atheroma plaque, the localization in the arterial tree, the physical characteristics of the atheromatous plaque, the dissolution and disorganization of the intima caused by the mass of extracellular lipids, represent a favourable background both for the external traumatic lesions and for the fibrin plaquetary thrombotic complications from the level of the unstable cracked plaque.(6,7,8,9)

Atherosclerosis is a complex process of multiple factors, in whose evolution participates in a continuous interaction the cells of the vascular endothelium as well as those from the blood current (endothelial cells, fibroblasts, smooth muscular cells, macrophages, lymphocytes, platelets, cytokines).(6) The endothelium malfunction is determined by different risk factors and could induce the apparition of an inflammatory chronic answer. The lesion types of atherosclerosis differ depending on the evolution stage, there being 8 stages of development of the atherosclerotic plaque, the atheroma plaque being the characteristic lesion alongside with the modification of the elastic arteries' components.(6,7,8) The fibro – atheromatous plaque is the attribute of the vascular intima and can be accompanied or not by changes of the media and adventitia, being a metabolically active lesion, the monocytes enter and exit this level determining the cholesterol LDL direction in relation with the lesion.(6) Among the ATS risk factors alongside with hyperlipidemias, sugar diabetes, other associated diseases, obesity, gender, family history, social factors, old age represent the attribute of this pathology. The affected arteries are big arteries (aorta, iliac artery) and the muscular ones, big and medium (the coronary, cerebral, femoral

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arteries). According to their frequency, atherosclerotic lesions are located mainly at the level of the abdominal aorta, at the junction of the iliac arteries and the emergence of the collaterals.(10)

In this article, we are presenting the case of a female found dead at home in suspicious conditions. The purpose of this article is to underline the importance of the pathological background of the victim in the production of the post traumatic vascular lesions and implicitly in the thanatogenesis.

CASE PRESENTATION

We are presenting the case of a female, D.E., aged 77, found dead in the animal stable of her house.

As a history, from the Police investigation data, we understand that “the victim was found dead by her daughter, in the stable (cows) that belongs to her home”. She called Mobile Emergency Service for Resuscitation and Extrinsic service. From the discussion with the victim’s daughter, we understood that the time interval between the moment the daughter had talked for the last time with her mother and the moment she found her mother was of approx. 1 hour. The victim was in back fallen position, with unperceived pulse, with no reactions to verbal stimuli, the small chair she used to seat on was tipped over beside her. From the emergency pre-hospital sheet, it results the presumptive diagnosis: Non-resuscitable heart attack. Craniocerebral trauma? Thoraco abdominal trauma? There were performed CPR manoeuvres. There was prescribed a forensic autopsy to establish the cause of death.

At the external necropsy examination, we wrote down as signs of external violence the following: at the level of the abdomen, in the mesogastric region, in a left paramedian infra-umbilical plan, 4/5 cm greenish purplish ecchymosis (figure no. 1); at the level of the elbows bilateral brown purplish ecchymosis centered by excoriated plaques, right thigh, inferior 1/3, posterolateral side, another purplish ecchymosis.

Figure no. 1. Abdominal ecchymosis



As miscellaneous signs, we considered: very little represented muscular adipose tissue, with pale yellowish teguments; loose abdomen, increased in volume, with greenish purplish teguments, inhomogeneous, with many stretch marks; varicose inferior members.

Subsequent to the necropsy examination, it was established the following macroscopic anatomopathological diagnosis: Ecchymosis. Excoriated plaques. Post-operative abdominal old scar. Varicose veins. Leptomeningeal and cerebral edema. Pleural adhesions. Anthracosis. Pulmonary edema and emphysema. Coronary myocardial sclerosis. Hematic infiltrations at the level of the anterior abdominal wall. Hemoperitoneum. Retroperitoneal hematoma. Blood infiltration in mesentery. Blood infiltration in the abdominal loose tissues. Rupture of left internal iliac artery. Iliopsoas muscles with blood infiltration. Pancreas contusion. Left perirenal contusion. Fatty

liver dystrophy. Pyelonephritis. Generalized atherosclerosis – calcified atherosclerotic plaques. Old cholecystectomy.

At the level of the left internal iliac artery, at 1 cm below the split from the left iliac artery, there is a solution of linear continuity with irregular margins, with blood infiltration, which contains 2/3 of the vessel circumference, concerning the entire vascular wall. On section, both at the level of the iliac artery and of the abdominal aorta, at the level of the lumen, there are several whitish yellowish calcified deposits up to 2/1,5 cm which are predominant in the lumen; the vascular lumen is very narrow (figure no. 2).

Figure no. 2. Rupture of left internal iliac artery, retroperitoneal hematoma, blood infiltrations



On the occasion of performing the necropsy, there were requested as complementary examination the determination of the alcohol concentration in the body (the value was 0,00g‰) as well as a histopathological exam which confirmed the rupture at the level of the left internal iliac artery, there were several vascular calcified atheromatous plaques, pancreatic and mesenteric contusion.

Case discussion. The presented case raises several problems, both from the legal point of view and from the medical point of view: the way the lesions were produced, the legal classification of the offence, if the age factor and the accessory biological particularities had a role in the thanatogenerating mechanism, which was the victim’s position in the moment of lesions occurrence.

First of all it is the problem of evaluating the way the traumatic injury at the level of the abdomen (ecchymosis) was produced. This could have been produced by hitting with or against hard bodies. Considering its morphology and internal response at the level of the intra-abdominal organs and vessels, we think it was produced by hitting with a hard body but with a small to medium surface and with increased force. Another problem arises: was it a home accident (cow hoof kick) or she was the victim of a human aggression? Considering the necropsy results, the onsite examination and the investigation data, we think that the person under discussion was the victim of a home accident (there are several witnesses who claim that the deceased did not suffer any trauma during the 24 hours prior to her death and in that morning, she was in the stable alone with the animals and at a certain moment they heard a scream).

The old age, the underweight size and the advanced atherosclerosis represented competing factors in the unfavourable evolution of the post-traumatic lesions. It is known that vascular elasticity decreases a lot once with the apparition of fibrous lipid atheromas.(6,7,8) Therefore, the biological particularities of the victim influenced the internal response of the lesions and determined an unfavourable evolution. Another problem brought in forth was the victim’s position at the moment of lesions occurrence: possibly sitting position (according to the examination on site, sitting on a small chair).

Conclusions:

Corroborating the necropsy data, the information of the onsite investigation and the paraclinical examinations, it was established that the death of D.E. was a violent one. It was caused by a hemoperitoneum occurred in the evolution of an abdominal trauma with rupture of left internal iliac artery due to animal hoof kick in a person with generalized atheromatosis. The traumatic lesions found on the autopsy could have occurred as follows: the lesions at the level of the abdomen – by animal kick - are from the day of death and they have a thanatogenerating role, and the ecchymosis at the level of the members were caused by falling and are also from the day of death, they did not have a thanatogenerating role and in case of survival, they would have needed 2-3 (two-three) days of medical care.

In conclusion, we can say that the atheromatous background in vascular traumas is an aggravating factor and in such cases it is required a special attention, not only during the necropsy examination but also during the onsite investigation to show the real forensic cause of death.

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