

Fatal air embolism during female autoerotic practice

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Summary. Air embolism has been described in pregnant women and is a classic cause of death during attempted abortion by syringing. Death was caused by the introduction of an amount of air sufficient to cause a substantial air lock in the heart, pulmonary trunk or arteries. If the surface of the placenta has been stripped by the syringe, venous spaces are opened and air can pass into the circulation. Orogenital sex with vaginal insufflation can also cause air embolism during pregnancy. We report a case of air embolism in a 40-year-old non-pregnant woman subsequent to vaginal insertion of a foreign body (carrot) for an autoerotic purpose. The mechanism is roughly similar to syringing, the foreign body acting like a piston to displace a sufficient amount of air. In the present case, the endometrium stripping was probably due to the presence of an intrauterine device. As such risks may often be encountered and as, to our knowledge, no similar case has previously been reported, we may speculate if such air embolisms are underdiagnosed or dissimulated by the partners when questioned by the medical rescue teams.

Key words: Autoerotic practice – Air embolism

Zusammenfassung. Verschiedene Formen der Luftembolie bei schwangeren Frauen sind bekannt, z.B. im Rahmen von Abtreibungsmaßnahmen und auch bei orogenitalen sexuellen Praktiken. Dargestellt wird der Fall einer tödlichen Luftembolie bei einer 40 Jahre alt gewordenen nicht-schwangeren Frau im Rahmen autoerotischer Handlungen mit einer Karotte. Das Eindringen von Luft über das Endometrium wurde wahrscheinlich durch Mikroläsionen aufgrund eines intrauterinpressars begünstigt.

Schlüsselwörter: Autoerotische Praktiken – Luftembolie

Introduction

Autoerotic asphyxia has been reported mainly in men (Walsh et al. 1977) and seldom occurs among women (Byard and Bramwell 1988; Sass 1975; Danto 1980). Constriction of the neck is used by people engaged in self-masturbation in order to induce hypoxia, which is believed to enhance sexual gratification. Asphyxial deaths mostly occur accidentally when ropes passed around the neck cannot be removed when necessary (Polson et al. 1985). Other means, such as plastic bag asphyxiation (Polson et al. 1985) and nitrous oxide inhalation (Leadbetter 1988) may be used for the same purpose. To our knowledge, no case of death due to air embolism during female masturbation or sexual intercourse in non-pregnant females has been published. We report an unusual autoerotic death due to an air embolism during insertion of a foreign body into the vagina of a non-pregnant woman.

Case report

The body of a 40 year-old white woman (1.68 and 78 kg) was discovered lying naked on her bed. A carrot was lying between her thighs. There was no sign of disturbance in the bedroom and no pornographic documents were found near the deceased. External examination of the body failed to disclose any signs of violent injury. Neither a rope nor any other airway obstructive device was found near the body. Dark posterior lividities were observed.

Autopsy findings

Autopsy was performed 18h after discovery of the corpse. Gross examination showed disseminated petechiae over all the organs. After clamping of the vessels, the heart was removed and dissected in a water basin; many air

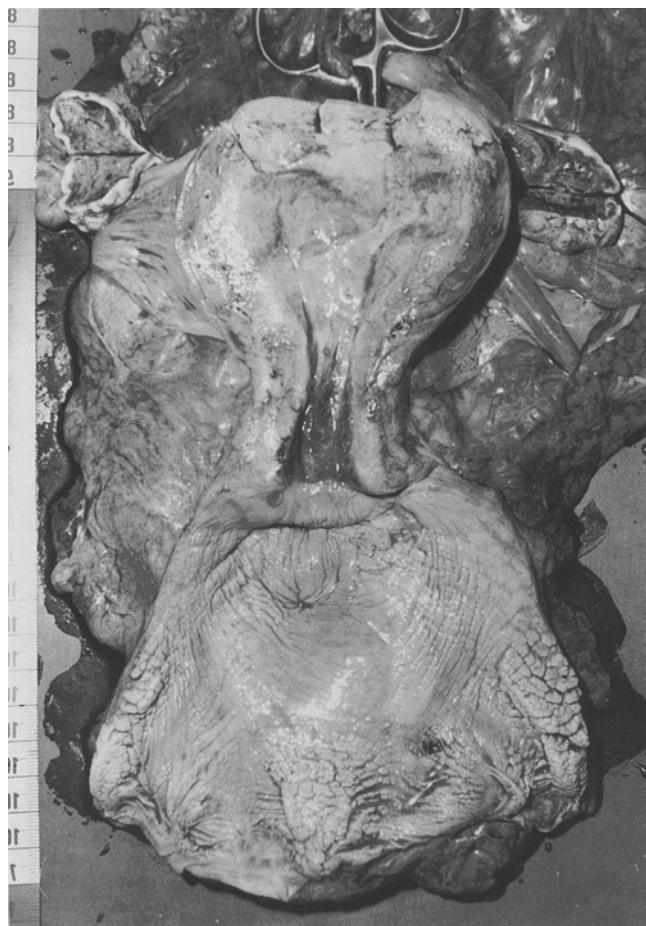


Fig. 1. Aspect of the uterus, cervix and vagina after evisceration. The cervix has a reddish aspect but shows no erosion. The endometrium also does not present any macroscopic defect

bubbles were seen mostly originating from the right cavities of the heart (weight 350 g). There was no macroscopic evidence of myocardial infarction or fibrosis. The lungs were heavy (850 g right, 840 g left), congested and oedematous. The inferior vena cava also contained many air bubbles. Examination of the genitalia revealed no evidence of inflammatory reaction or traumatic injury. The subserous surface of the uterus was congestive. The uterine cavity was empty except for a copper intrauterine device (IUD). The cervix was gaping, easily admitting two fingers and had a reddish aspect with no erosion (Fig. 1). The endometrium was inconspicuous, but the muscular wall was thick and showed many dilated blood vessels. No defects were observed on closer examination of the endometrium. The ano-rectal examination revealed no abnormalities. A mild diffuse subarachnoid haemorrhage was observed and the brain was oedematous. The cut surface of the white matter showed multiple small petechial haemorrhages. Cutting through the brain tissue also revealed a small amount of blood in the fourth ventricle. A serum ethanol test was performed and was found to be negative. Urine was screened for benzodiazepines and phenothiazines by TDX and was found to be negative.

Microscopical findings

Microscopical examination of the heart revealed no infarction. The coronary arteries showed neither fibrous thickening nor lipid deposit. An important finding was the presence of pronounced oedema mixed with congestion of the lungs. The muscular wall of the uterus showed dilated vessels without any other abnormality. Other organs showed only various degrees of hyperaemia.

Examination of the carrot

The carrot was 17 cm long, and its diameter ranged from 2.5 cm at the tip to 4 cm at the base. It was not peeled and no could be seen macroscopically. Numerous samples were taken from various parts of the carrot by gently scraping the surface. Cytological examination of PAP-stained slides showed an admixture of vegetable fibres and normal Malpighian cells with *Lactobacillus vaginalis*, and the result was estimated to be class I (PAP test).

Discussion

The autopsy should be more extensive in cases of air embolism. The heart should be examined *in situ* while the heart sac is filled with water and a quantitative and qualitative analysis of the expelled gases should be carried out. This procedure would be useful for forensic cases. In the present case, an air embolism was found to be the cause of death. All the scientific examinations used were indicative of this. Cases of fatal air embolism in women have been reported in the medical literature and all concern pregnant women, mostly during criminal abortion (Polson et al. 1985) or during old-fashioned gynaecological treatment for trichomoniasis, in which powder insufflators were used (Brown 1943; Breyfogle 1945), or when air is propelled into the vagina during the course of unusual sexual behaviour (Barriot 1989).

Oral vaginal insufflation is probably an uncommon practice, and Barriot reports only 14 cases published in the medical literature since 1936. But in most of these cases, the partner did not inform the emergency personnel of the previous orogenital sex play (Barriot 1989; Elam 1986) and an aetiological diagnosis may only be reached by means of subsequent direct questioning of the male sexual partner. Aronson and Nelson (1967) even reported cases where subjects admitted to this sexplay only after being charged with murder or criminal abortion.

Air under positive pressure is introduced through the endometrium into dilated vessels of the uterine wall. Once the air has entered the venous drainage of the uterus, progression via the inferior vena cava is rapid (Aronson and Nelson 1967; Tedeschi 1977). If large amounts of air reach the heart rapidly, the air bubbles prevent the blood from flowing into the pulmonic artery. Subsequently ventricular failure, increase in venous pressure, decrease in peripheral arterial blood pressure and cyanosis, dyspnea, cerebral anoxia and ultimately cardiac arrest will be induced (Tedeschi 1977).

Non-fatal air embolism can be explained by the passage of smaller amounts of air into the vessels and therefore into the right cavities of the heart, but intensive care is necessary and neurological deficits may persist (Barriot 1989; Fike 1985; Bernhardt 1988; Bray et al. 1983). Interaction of the air with blood products, especially platelets, causes release of a variety of vasoactive substances (Fike 1985).

Often brain purpura is found, involving spherical haemorrhages which are mainly irregularly distributed in the cerebrum where microthrombi have been occasionally been detected. The distribution of the haemorrhages may be associated with the circulatory condition of the brain (Janssen 1984).

The initial introduction of air into the uterus is possible in the pregnant female when the surface of the placenta has already been injured. The amount of air introduced during abortion using Higginson's syringe (about 100 cm³) is sufficient to result in fatal air embolism (Polson et al. 1985).

Penetration by the syringe acts like a piston, pushing the air from the vaginal cavity into the uterus under positive pressure. In the present case, the penetrating carrot, which is similar in shape to a Higginson's syringe, propelled the air through the damaged endometrium, which could have been due to the intrauterine contraceptive device.

To our knowledge, no case of air embolism caused by an intravaginal foreign body in a non-pregnant female has previously been reported. It is noteworthy that this practice is common and is even used by women with an IUD in the uterine cavity.

We have demonstrated that fatal air embolism can occur during such sexplay. It is our opinion that many such cases may be dissimulated in reports to the medical rescue teams to avoid social stigma or further police investigation and may appear in epidemiological data as a component of sudden natural deaths.

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