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A case of sudden death by decidual cell embolism

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Summary. A 35-year-old multipara died suddenly of a pulmonary embolism about 12 h after delivery. The morphological features and the entry site of the emboli into the circulation suggested that they were decidual cells. Intact decidual cells accounted for only a minority of the emboli: the great majority were cells that had lost their nuclei and/or had been fragmented. The presence of embolized areas, accompanied by fibroblasts and newly formed capillaries, suggested that the embolization process had started before the beginning of labor. However, no symptoms suggesting embolism had been recorded on the clinical chart.

Key words: Sudden death, by decidual cell embolism – Decidual cell embolism

Zusammenfassung. Eine 35jährige Mehrgebärende verstarb plötzlich und unerwartet ungefähr 12 Std nach der Entbindung. Die Todesursache war Lungenembolie. Arterien und Arteriolen in der Lunge wurden von Emboli verschlossen. Auf Grund von morphologischen Merkmalen und Beobachtungen über die Eintrittsstelle in die Zirkulation wurden Deciduazellen als Emboli identifiziert. Intakte Zellen waren wenig nachweisbar. Die meisten Emboli bestanden aus kernlosen Zellen oder Fragmenten von Zellen. Aus dem Vorhandensein einer Organisation in einigen verschlossenen Gefäßen ließ sich vermuten, daß die Embolie mehrere Tage überlebt wurde. Aber kein klinisches Zeichen der Embolie wurde in der Krankenkarte aufgezeichnet.

Schlüsselwörter: Plötzlicher Tod, Lungenembolie durch Deciduazellembolie – Deciduazellembolie

Introduction

Sudden maternal death during labor, delivery and the immediate post-partum period is rare. However, when death occurs then, the bereaved may suspect

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that the medical treatment was inadequate because the deceased patient has usually been in the hospital and death was not expected. In such a situation, the autopsy plays a critical role in elucidating the cause of death. We performed an autopsy on a puerpera who had died suddenly about 12 h after parturition. We diagnosed the cause of death as a pulmonary embolism made up of decidual cells. We consider such embolisms to be extremely rare and worth reporting.

Case report

The patient was a 35-year-old multipara. She had been prematurely delivered of a 1.9 kg child a year previously. On 23 May 1987, she was told at a hospital that she was in the 3rd month of pregnancy. The estimated date of confinement was 30 December 1987. According to the clinical chart, no abnormal signs had been detected until 11 November. On the early morning of that day, she complained of a sensation of fullness in the abdomen and of genital hemorrhage, and she was immediately hospitalized with a diagnosis of threatening premature delivery. At that time, the cervix had not yet fully dilated. Ritodrine hydrochloride was infused in order to inhibit uterine motility. At about 4:30 a.m. on the 13th, she was delivered of a 2.3 kg child after artificial rupture of the fetal membranes. Although the baby showed a moderate degree of respiratory distress syndrome at birth, she survived. No abnormal staining of the amniotic fluid was noticed. No abnormal hemorrhage was observed either during or after delivery. The patient seemed to be recovering smoothly. The patient complained of a pain in the left lower quadrant of the abdomen twice around noon; both times analgesics were administered. No obstetric abnormality that might have caused the pain was detected at that time. The doctor who attended the patient ascribed the cause of the pain to uterine contraction. The pain was relieved by about 2:00 p.m. The patient was seen to be sleeping normally at about 4:50 p.m. One hour later, however, she was found by her husband to be pale and apparently apneic. Resuscitation was attempted immediately but without success. The autopsy was performed about 40 h after death.

Autopsy findings

Externally, there was neither injury nor any sign of blood loss. Internally, there were marked changes in the lungs and kidneys. Macroscopically, the lung (left lung 400 g; right lung 480 g) showed a moderate degree of edema and congestion. Microscopically, it showed edema and congestion, as well as leukocyte accumulation in many arteries (Fig. 1). The most remarkable microscopic finding was, however, the presence of massive emboli within the lumens of many arteries; they ranged widely in size. The great majority of emboli were cells that had lost their nuclei and/or had been fragmented (Fig. 2). Intact cells accounted for only the minority of the population of the emboli. An intact cell was far larger than tissue macrophages. The cytoplasm was stained red with eosin and the nucleus, which contained a nucleolus, was large and relatively clear (Fig. 3). The cell bore some similarity to a hepatocyte, but the former was larger and had a more deeply stained cytoplasm. We compared the cell in question with the recidual cells remaining in the uterus and determined that it was also a decidual cell. A few, large multinucleated cells were also observed. Small capillaries had been formed in some embolized areas (Fig. 4). A few fibroblasts were observed there. No keratin squamae were observed in the pulmonary vessels. Alcian blue and mucicarmine staining was negative.

The upper half of the left kidney (weight 290 g) was markedly swollen and extremely soft. Small white areas were scattered over the surface. A section of the swollen part revealed a cavity, which measured about 5.5 cm at the largest diameter and contained approximately 50 ml of reddish viscous fluid, probably blood. The pelvis was not dilated. Microscopically, the cavity was surrounded by a rim of necrotic tissue. The intact renal tissue was separated from the necrotic tissue by fibrous tissue, and neither leukocytes nor giant cells were observed. Nothing suggested the nature of the original disease leading to fibrosis and cavity formation. Casts were present in the tubuli of both kidneys.

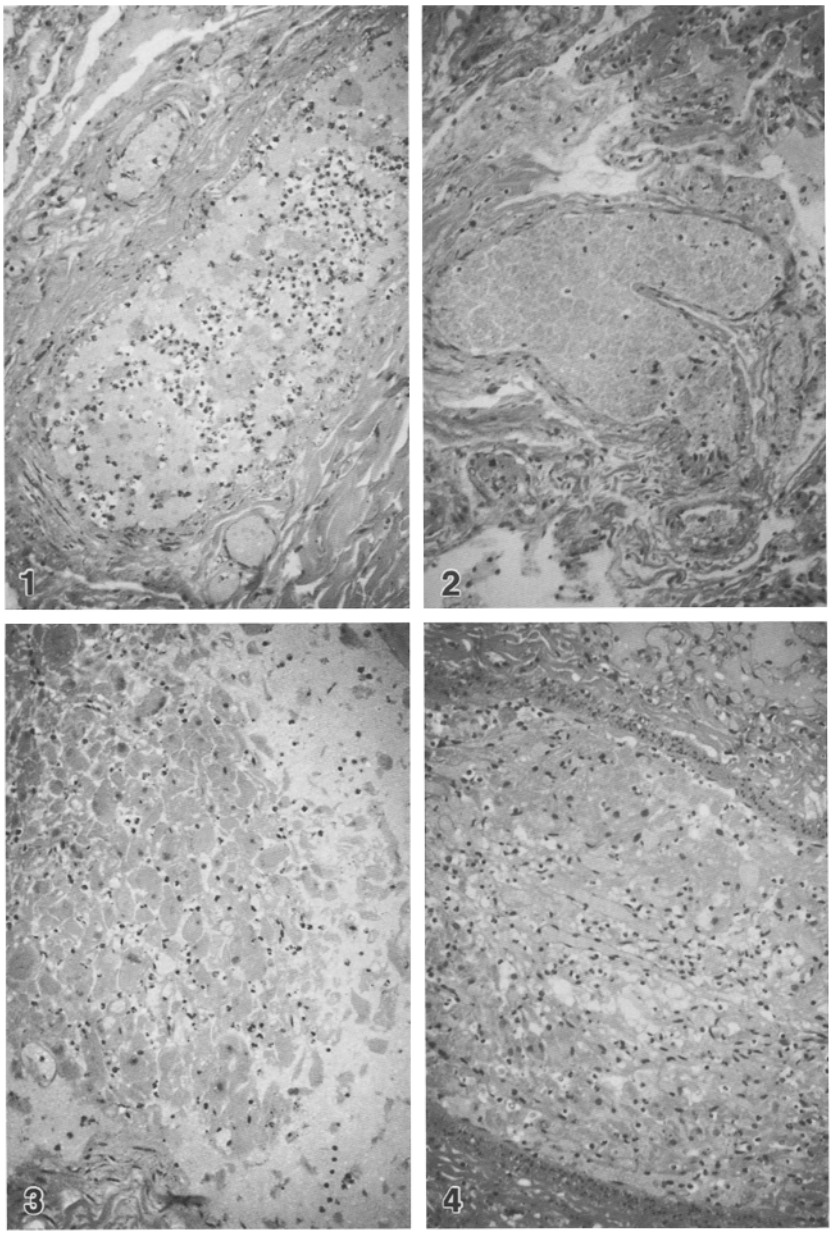

Fig. 1. Coexistence of emboli and leukocytes in a pulmonary arteriole. Almost all embolie are disintegrated (× 100)

Fig. 2. Arteriole occluded with emboli. Emboli are fragmented cells (× 100)

Fig. 3. Emboli in the pulmonary arteriole. A few intact cells considered to be deciduals cells are observed (× 100)

Fig. 4. Organized emboli in small pulmonary artery. Newly formed capillary are observed (× 200)

Macrosopic examination showed that the liver (weighing 1900 g) showed moderate congestion. Microscopically, a few small arteries were occluded, with fine fragments resembling those observed in the pulmonary vessels and, as seen in the lungs, small numbers of fibroblasts were observed.

The uterus measured 20 × 13 × 4 cm. The fundus was 12 cm above the pubic symphysis. A solid tumor, which turned out to be a myoma and measured 5 × 2 × 2 cm, was present on the anterior surface of the uterus. The placenta was no longer present. No lacerations were observed in the endometrium. The spleen showed moderate congestion. No pathological changes worth mentioning were recognized in the other organs. The concentrations in the blood of the drugs that had been administered to the patient were all below toxic levels (pentazocine, 0.45 μg/ml; diazepam, 0.22 μg/ml; indometacin, 8.8 μg/ml).

Discussion

Pulmonary embolism is a cause of sudden unexpected death. However, not all pulmonary emboli are fatal; the fatality depends on the size of the occluded vessel and on the status of the patient's cardiovascular system. We considered that the embolism grade in our patient was so severe that it caused her death. We concluded that the immediate cause of death was acute cardiac failure.

The emboli in a pulmonary embolism are most commonly thrombi; however, that was not the case in this patient. We diagnosed the emboli as decidual cells on the basis of the morphological features and the entry site of the emboli into the circulation. The endometrium was considered to be the most likely entry site.

Decidual cell embolism is an extremely rare, fatal complication during pregnancy and/or delivery. So far only a few cases have been mentioned in the literature (Lattes et al. 1956; Wright and Heard 1976); however, none of them have been published in a complete form. Lattes et al. (1956) introduced a case examined by Godman involving the sudden death of a young woman during delivery. The distribution of the emboli, however, differed from that in our subject. Godman observed many emboli in the capillaries of the alveolar septa. On the other hand, we found emboli in vessels larger than capillaries.

Old, organized emboli are frequently found in the lung. We concluded that the presence of embolized areas, accompanied by fibroblasts and small capillaries, showed that such emboli persisted longer than several days. Therefore, non-fatal emboli probably occurred before the beginning of labor. However, no symptoms suggesting the onset of an embolism were recorded on the clinical chart. We conclude that fatal embolization occurred after delivery. However, we cannot suggest what signs and symptoms heralded the fatal embolization. If there were any, they may have developed during the 1-hour period during which the patient was not being closely observed. The abdominal pain complained of around noon was probably not related to embolization but instead due to the pathological changes in the left kidney.

Although the accumulation of leukocytes in the pulmonary vessels suggests the presence of amniotic embolism (Steiner and Lushbaugh 1941), no amniotic components were detected. In contrast to our case, a few cases have been reported (Park 1954; Hartz 1956) in which decidual cells were confined to the extravascular tissue in the lung. They were found by chance in young women

who died of causes other than pulmonary embolism during pregnancy or after delivery. The researcher concluded that the cells were carried from the uterus by the bloodstream.

Placenta cell embolism (*Plazentarzellenembolien,* Ceelen 1931) is similar to decidual cell embolism in that the emboli originate in the uterus. Placenta cell embolism is also rare and the embolus is the syncytium, which can usually be differentiated from the decidual cell on the basis of the morphological features.

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