

CASE REPORT

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Sudden Death in Police Pursuit*

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ABSTRACT: A rare complication of sickle cell trait is sudden death and collapse. Military recruits, pilots, and subjects exposed to hypoxic stress such as high altitude and experiencing sudden cardiorespiratory collapse as a result of sickle cell trait have been well described. This is a case of a 13-year-old black male who collapsed after a police pursuit and was found to have sickle cell trait and microscopic evidence of asthma.

KEYWORDS: forensic science, forensic pathology, sickle cell trait, sudden death, police pursuit

Sudden death in police pursuit and in custody often involves drugs such as cocaine, physical restraint, or natural disease. More recently, even “non-lethal” methods of restraint, such as pepper spray and stun guns, have caused or contributed to in-custody deaths (1–5). Whatever the cause, certain police custody deaths generate great community interest and pressure to blame police. Unexpected in-custody deaths have caused police departments in south Florida and around the nation to alter their restraint policies and also their pursuit policies due to tragic traffic incidents. In order to protect the public, these policies limit the intensity of the pursuit in certain circumstances. Despite all these precautions, deaths will inevitably occur as well as the political pressure for answers.

Case Report

The deceased was a 13-year-old black male who was a passenger in a reportedly stolen van attempting to elude police. The police were reportedly following, not pursuing, the van when the driver of the van lost control, causing the vehicle to roll several times ejecting the deceased. The deceased, apparently uninjured, ran from the scene, climbed over a six-foot (1.8 m) chain-link fence leading to a golf course, ran approximately 50 yards (45 m), and then suddenly collapsed and became unresponsive. Emergency personnel arriving at the scene found the victim deceased.

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Autopsy

The deceased was a well-nourished, well-developed, 64 in. (162.5 cm), 122 lb (55.3 kg) black male who appeared appropriate for the reported age of 13 years. Dicing injuries were present on the right side of the face. The left hand had a superficial abrasion on the palm and a detached nail of the fifth digit. The only remarkable gross internal findings were an obviously congested liver and congested cerebral vessels. The spleen was unremarkable.

Microscopic Examination

Examination of the heart (including the conduction system), liver and brain revealed no anomalies other than severe vascular congestion with sickled cells packed in most blood vessels (Fig 1). The liver sinusoids were remarkably congested with sickled cells (Fig 2). The lungs had congested vessels, thickened bronchial basement membranes, peribronchial smooth muscle hypertrophy, and rare mucus plugging (Fig 3). Hemoglobin electrophoresis revealed the subject’s red blood cells contain 59% hemoglobin A1, 38% hemoglobin S, and 3% hemoglobin A2. The hemoglobin S was confirmed by a solubility test. Toxicology tests showed 0.03 g% ethanol in the blood. Nicotine was detected in the urine.

Discussion

This case is interesting and potentially troublesome in that it presents a 13-year-old black male with no significant trauma who, while being followed by police, was involved in a vehicular accident and, while running away, experienced a sudden cardiorespiratory arrest. After trauma was ruled out, the possibility of a medical reason for his sudden cardiopulmonary arrest was investigated. The deceased had never been diagnosed with sickle cell trait and had no family history of sickle cell anemia.

Sickle cell crisis and sudden death are more often associated with individuals with sickle cell disease than sickle cell trait; however, sudden collapse and even ischemic stroke (6) in individuals with sickle cell trait have been described. Sickle cell crisis occurs when individuals with sickle cell trait are exposed to hypoxic conditions, such as strenuous exercise, high altitude, or general anesthesia (7). Exertional collapse is more likely in individuals with poor physical conditioning, dehydration, or heat stress (8). Reduced exercise tolerance in those with sickle cell trait has been well documented (9). The mechanism of poor exercise tolerance in sickle cell trait may involve poor oxygen utilization, increased lactic acid production and/or excessive production of free radicals (10,11). Cardiopulmonary collapse involves packing of sickled cells in hepatic sinusoids

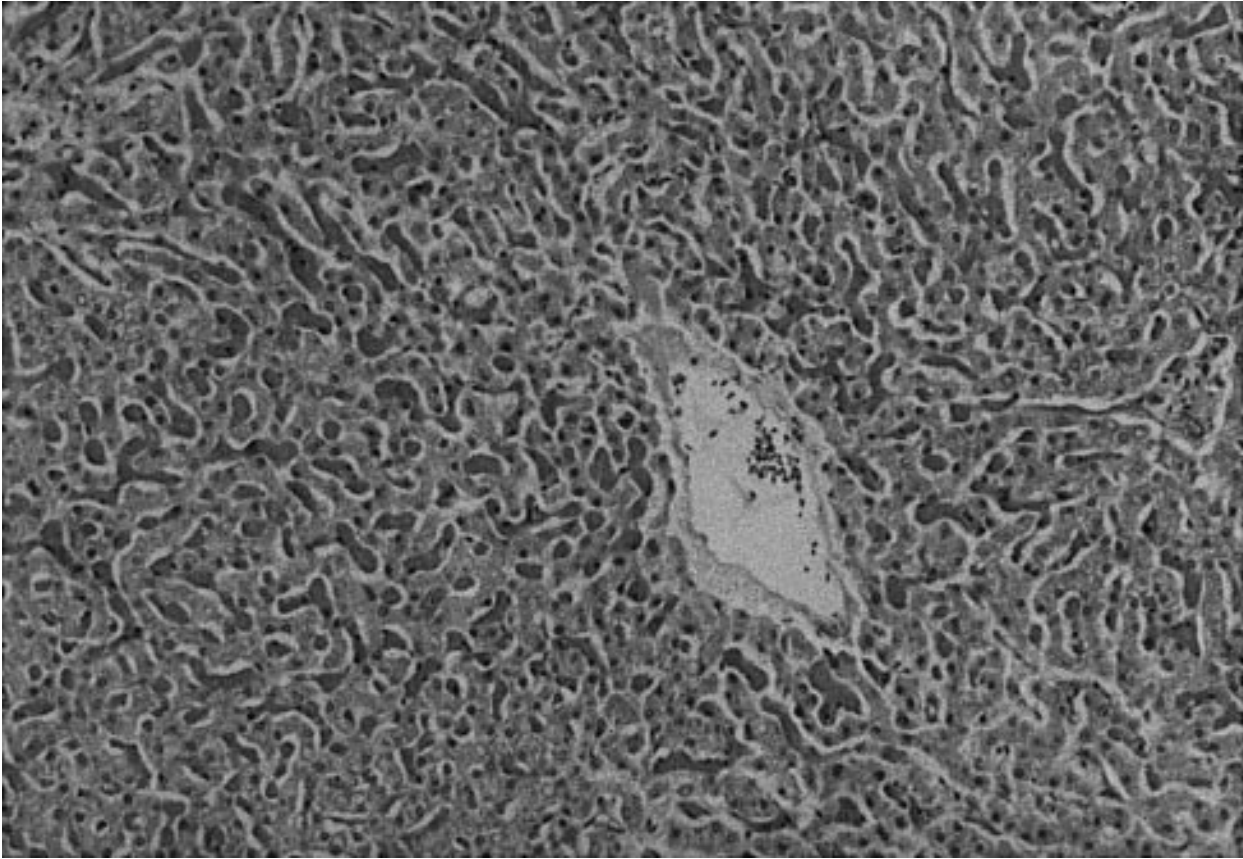


FIG. 2—Liver sinusoids packed with sickled cells ($\times 100$).

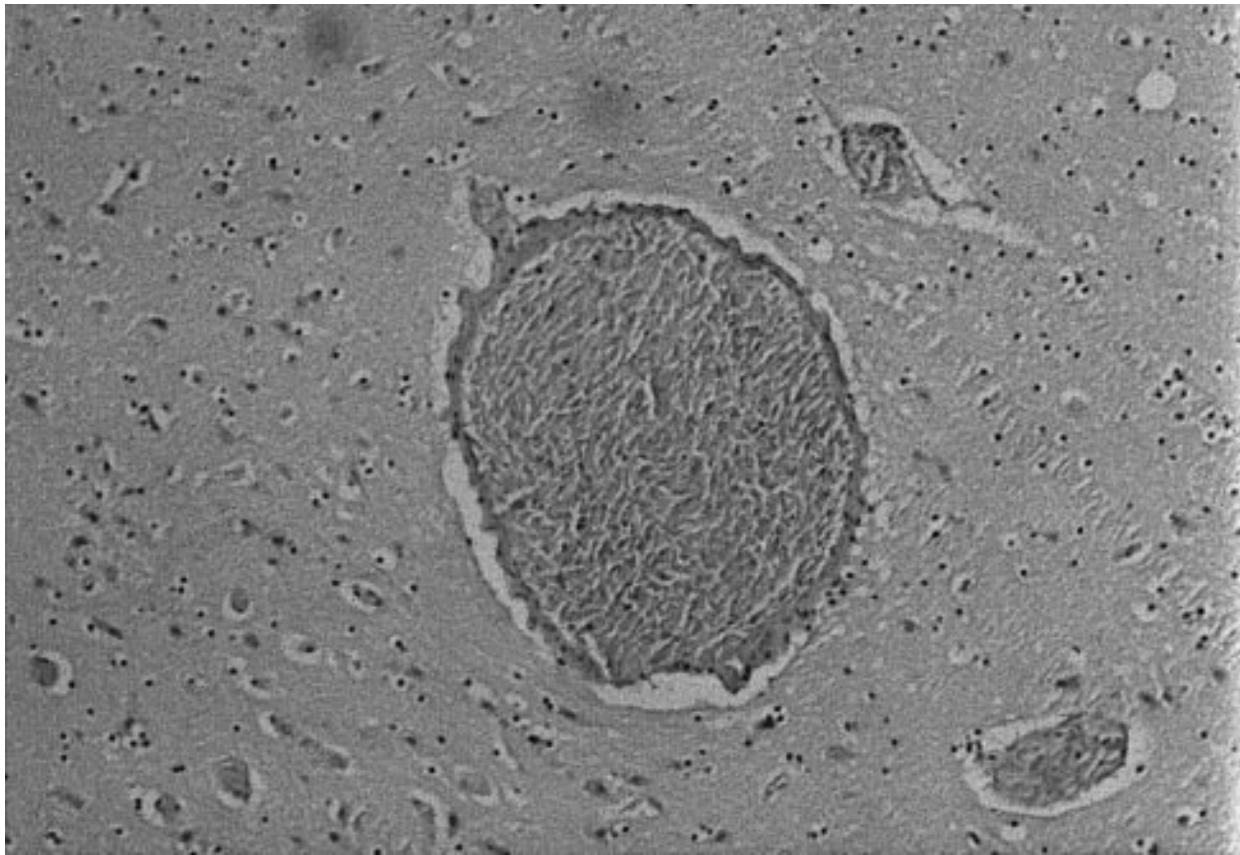


FIG. 1—Cerebral blood vessel packed with sickled cells ($\times 100$).

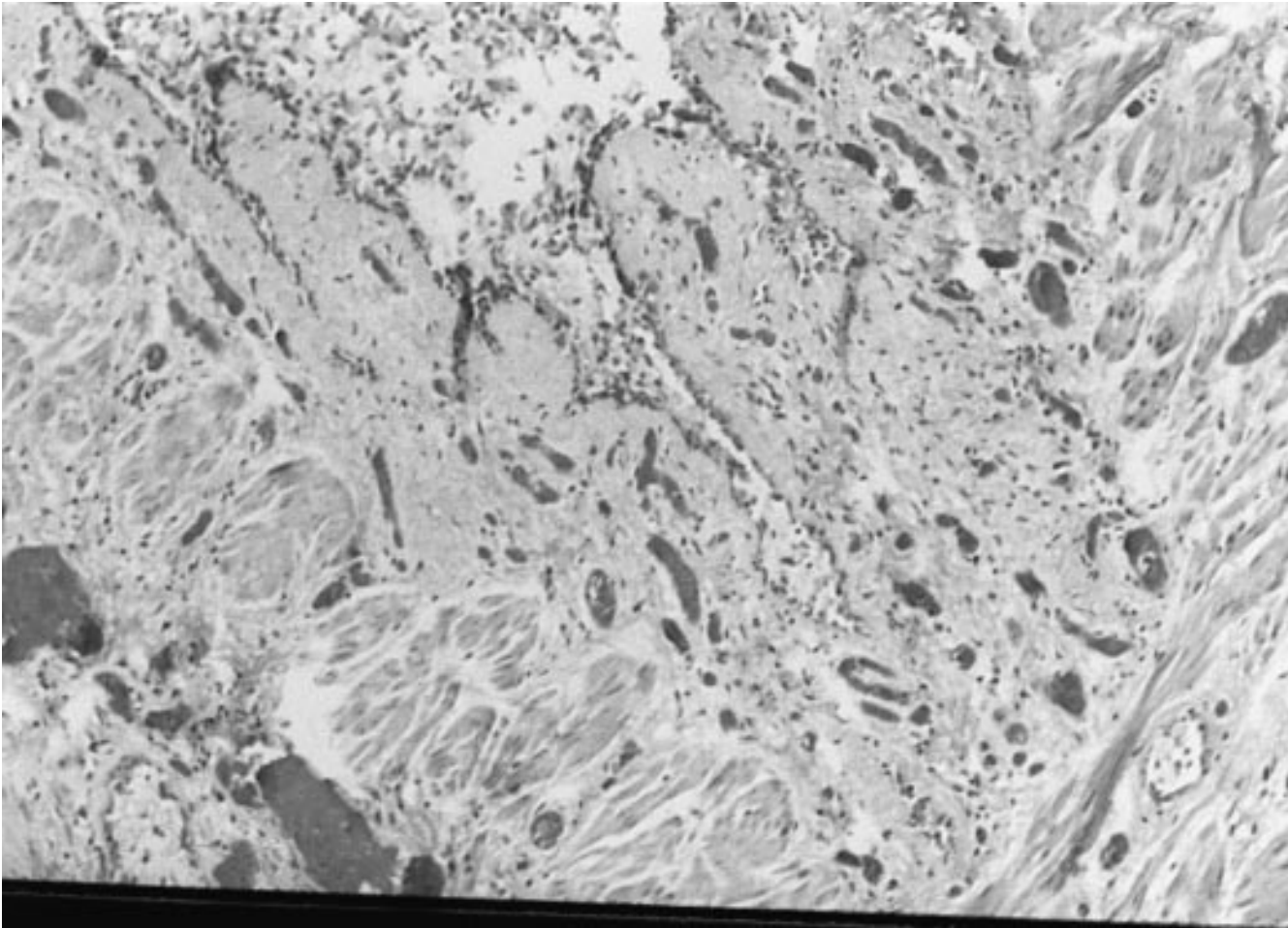


FIG. 3—Section of lung showing thickened bronchiolar basement membrane and smooth muscle hypertrophy ($\times 100$).

and other organs (12). Complications may include acute cardiac ischemia and arrhythmias, disseminated intravascular coagulation, and endothelial damage (8).

At autopsy, the liver was remarkably congested as were the cerebral vessels. Microscopically, the blood vessels of these organs as well as other organs were distended with sickled cells, typical findings in sickle cell crisis. Although histologic preparation of tissues can lead to postmortem sickling, especially in individuals with sickle cell trait, the findings in this case are typical of sickle cell crisis (12,13). Sickle cells occupied and markedly distended the luminal spaces of nearly every blood vessel examined. The microscopic findings led to the performance of a hemoglobin electrophoresis, which proved that the deceased had sickle cell trait.

Regarding the mechanism(s) causing the sickle cells crisis and sudden death, the cardiovascular stress of the pursuit would surely cause significant hypoxia in any person not accustomed to exertion.

Histology of the lungs indicated changes consistent with asthma (14). The thickened bronchial basement membranes, peribronchial smooth muscle hypertrophy, and rare mucus plugging were mild in severity. Indeed, the youth had no antemortem diagnosis of asthma nor any reported history of respiratory difficulty. He displayed none of the factors associated with sudden death from asthma. The deceased had nicotine in his urine and, thus, was likely a smoker, compounding his hypoxia during physical stress.

Acknowledgment

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