Lethal Vertebral Artery Dissection in Pregnancy

A Case Report and Review of the Literature

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Subarachnoid hemorrhage represents a rare event in pregnancy with a high mortality rate. We present the case of a 39-year-old pregnant woman who developed right vertebral artery dissection with subsequent massive subarachnoid hemorrhage with fatal outcome. The macroscopic and microscopic autopsy findings are described. A review of the literature with a discussion of the varied predisposing factors for vertebral artery dissection and subarachnoid hemorrhage and the rarity of these events in pregnancy is provided.

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Subarachnoid hemorrhage (SAH) in pregnancy is uncommon and carries a high mortality rate.1,2 Vertebral artery dissection is a rare cause of SAH and, to our knowledge, has not previously been reported as a cause of lethal SAH in pregnancy. We report the case of a 39-year-old pregnant woman who died from massive SAH caused by right vertebral artery dissection.

REPORT OF A CASE

A 39-year-old woman in her 39th week of pregnancy had been discovered apneic and unresponsive at home approximately 1.5 hours after she had complained of shortness of breath and headache. She had a past medical history of asthma. No other significant symptoms were reported by the family members. On the scene, the emergency medical services team had found the patient cyanotic, unresponsive, apneic, and in asystole with 4-mm fixed pupils. Resuscitative measures at the scene included intubation, intravenous fluid, bolus epinephrine administration, and cardiopulmonary resuscitation.

The patient arrived at the emergency department still in asystole. Atropine and intracardiac epinephrine were given and bilateral needle thoracostomies were performed to relieve possible tension pneumothorax. Because all resuscitative measures were without effect, emergency cesarean section was performed and a viable female infant was delivered. The mother was pronounced dead immediately thereafter. Complete autopsy was performed the next day.

PATHOLOGIC FINDINGS

Examination of the central nervous system revealed the presence of a large SAH at the base of the brain (Figure, a and b). The hemorrhage was located near the circle of Willis and extended into the fourth ventricle, slightly displacing the brainstem and symmetrically extending through the Sylvian fissure to cover the hippocampi, superior surfaces of temporal lobes and lateral bases of the frontal lobes, the occiput, and virtually the entire surface of the cerebellum. No aneurysms were identified during in situ examination or following dissection of the circle of Willis and the proximal branches from the base of the brain; however, asymmetry in the diameters of the vertebral arteries was noted (Figure, c). Gross examination of the right vertebral artery showed hemorrhage within the adventitia (Figure, c). Acute dissection and rupture of the artery were diagnosed by microscopic examination (Figure, d through f). The inflammatory reaction to arterial necrosis included a locally intense neutrophilic infiltrate with early leukocytoclasis, indicative of likely onset of dissection 1 to 2 days prior to death. Other significant findings at autopsy were renal glomerular and tubular abnormalities consistent with pre-eclampsia and hepatic steatosis. No left ventricular hypertrophy or other changes consistent with chronic hypertension were present.

COMMENT

To our knowledge, this is the first case to report vertebral artery dissection as a cause of lethal SAH during pregnancy. Previously reported cases of vertebral artery dissection occurring during pregnancy have all involved medical treatment, with favorable outcome for both mother and baby.3,4 Histopathologic features of the dissection in our case were consistent with onset 1 to 2 days prior to death. The patient’s apparent delay in recognizing or reporting symptoms in our case may underlie its lethal outcome.

The incidence of SAH is stable, at approximately 6 cases per 100,000 patient years. Case fatality is 50% overall.1 Subarachnoid hemorrhage in pregnancy is uncommon and has a high associated mortality. Pre-eclampsia may be a contributing factor because it has been linked to SAH and because hypertension is a risk factor for arterial dissection.1 An increase in intravascular volume, anatomic predisposition, and hormone-induced changes of the vascular wall integrity also are factors associated with pregnancy that have been proposed as predisposing to arterial dissection.3 Vertebral artery dissection has been described...
following chiropractic manipulation, yoga, exercise, violent cough, or rapid head turning. Excessive contralateral head rotation compresses the carotid or vertebral artery against bony structures, causing intimal tears and creating a lesion that gives rise to dissection. Predisposing conditions for development of arterial dissections also include chronic hypertension, Marfan syndrome, fibromuscular dysplasia, vasculitis, and cystic medial necrosis. None of these factors were identified in our case.

The proportion of all SAH cases that arise from a dissection...
ected vertebral artery is not known with certainty, but it is small. In a postmortem study of fatal SAH, dissection was found in 5 of 110 patients. The most common cause of SAH is rupture of a congenital saccular (berry) aneurysm, which occurs in 85% of identified cases. Idiopathic perimesencephalic hemorrhages are the next most common cause (10% of cases), and usually are associated with a history of hypertension. Other miscellaneous causes of SAH together account for the remaining approximately 5% of cases. Arterial dissection, in general, tends to be recognized more often in the carotid than in the vertebral artery; however, SAH secondary to arterial dissection occurs mostly with vertebral artery involvement.

Unilateral vertebral artery dissections may go unrecognized because of collateral circulation. Dissection may occur at any point along the course of the vertebral artery but it is most frequent in its distal end. Arterial compromise can result in brain injury by several mechanisms; therefore, signs and symptoms of vertebral artery dissection are diverse. Neck or occipital pain usually precedes symptoms of brain ischemia. Neurologic deficits that may accompany SAH from vertebral artery dissection are palsies of the ninth and tenth cranial nerves, secondary to subadventitial dissection or Wallenberg syndrome. The patient in our case apparently had no neurologic symptoms besides headache, despite autopsy findings suggesting occurrence of the dissection at least 24 hours prior to death.

In summary, we report the first case of spontaneous right vertebral artery dissection with secondary SAH with a fatal outcome. Only 2 cases of vertebral artery dissection associated with pregnancy or peripartum period have been reported. Both previously reported cases had a favorable outcome with medical management. The lethal outcome in our case may have been related to absent or ignored clinical symptoms.

References