Internal Carotid Artery Dissection After Childbirth

DAVID O. WIEBERS, M.D., AND BAHRAM MOKRI, M.D.

SUMMARY A 44-year-old woman developed a left cerebral infarction secondary to internal carotid artery dissection 6 days after childbirth. A cesarean section had been carried out after 14 hours of strenuous unsuccessful labor. Although in the past some authors have implicated oral contraceptives as a cause for carotid dissection, carotid dissection associated with childbirth has not been previously described.

DISSECTIONS OF INTERNAL CAROTID ARTERIES (ICAs) occur most frequently in patients less than 50 years of age. Ipsilateral head and face pain, with or without neck pain, is the most common sign. Other common manifestations include oculosympathetic paresis, focal cerebral ischemic symptoms, and bruits.1-12 Although many of the dissections are thought to occur spontaneously, the role of trivial trauma such as coughing, straining, and abrupt or exaggerated neck movements or neck postures cannot be entirely excluded. In some cases there is evidence of an arterial disease such as fibromuscular dysplasia,3-13 or cystic medial necrosis.1-2,7,11 Spontaneous carotid dissection has also been described in association with Marfan’s syndrome.10 Traumatic dissections of the ICAs have been well recognized as the result of penetrating trauma such as that caused by an angiographic needle, or as the result of blunt injuries associated with such factors as motor vehicle accidents and whiplash injuries, chiropractic manipulations, falls, strangulation, and sports activities.1,5,21-28

We report the occurrence of ICA dissection after childbirth. In this patient none of the previously recognized predisposing factors were present.

From the Department of Neurology, Mayo Clinic and Mayo Foundation, Rochester, Minnesota.
Address correspondence to: David O. Wiebers, M.D., Mayo Clinic, 200 First Street SW, Rochester, Minnesota 55905.
Received March 26, 1985; accepted September 9, 1985.

Report of Case

The patient was a 44-year-old right-handed white woman, gravida II, para II. The first pregnancy was uneventful and ended in a normal vaginal delivery of a healthy baby. The second pregnancy, which took place 22 years later, was uncomplicated except that this otherwise healthy woman, into the 8th month of her pregnancy, developed a flu-like illness for 1 week from which she completely recovered. The labor began spontaneously at 37 weeks, but vaginal delivery was not successful; after 14 hours, a cesarean section had to be carried out. This was accomplished without complications under general anesthesia on January 14, 1983, and the patient and her normal baby did well.

In the morning of the 6th day after the childbirth, the patient awoke with a moderately severe left-sided headache. She went back to sleep but when she awoke again about 3 hours later, she noted inability to speak and profound right-sided weakness involving the face and arm more than the leg. There was moderately severe right hemiparesis, left oculosympathetic palsy, and severe aphasia. A computed tomographic (CT) scan of the head later that day showed an area of decreased attenuation in the left posterior frontal and anterior temporal regions, suggestive of cerebral infarction. The patient was treated with intravenous heparin and over the following 2 weeks the neurologic deficits improved to the point of a slight to moderate right hemiparesis and slight to moderate aphasia.
She was subsequently referred to a larger medical facility where a cerebral arteriogram was obtained on February 4, 1983. This demonstrated an elongated irregular segment of the cervical portion of the left ICA (fig. 1), suggestive of mural dissection of this vessel. Intracranially, there was occlusion of the proximal branches of the left middle cerebral artery, suggestive of distal embolization (fig. 1). A superficial temporal artery to middle cerebral artery bypass procedure was advised, but it was deferred by the patient.

Over the next 4 months, the patient's neurologic deficits gradually improved. On June 8, 1983, the patient was referred to the Mayo Clinic. Neurologic examination revealed slight right upper extremity weakness and sensory deficits, especially distally, and a mild residual aphasia. CT scan of the head demonstrated an area of infarction in the left posterior frontal and anterior temporal regions (fig. 2). Ocular pneumoplethysmography and periorbital Doppler ultrasonography were normal. Findings from an electrocardiogram, cardiac sector scan, clotting studies, and measurement of serum cholesterol level were all normal. Serum triglycerides were increased to 176 mg/dl (greater than 99th percentile rank). A digital subtraction angiogram demonstrated a normal-appearing left carotid bifurcation and minimal irregularity of the cervical portion of the left ICA (fig. 3), compatible with the residual of an old carotid dissection. No further treatment or diagnostic intervention was recommended. The patient's neurologic status has continued to improve, with near resolution of the right hemiparesis and aphasia as of December 15, 1984.

Discussion

Pregnancy and the puerperium increase the risk of focal ischemic cerebrovascular events. Based on a comparison of the incidence of cerebral infarction in serial pregnancies to the incidence of cerebral infarction in the general population, it has recently been estimated that pregnancy increases the likelihood of

![Figure 1. Arteriogram demonstrating an elongated irregular segment of the cervical portion of the ICA (lower arrows). Intracranially, there is occlusion of the proximal branches of the left middle cerebral artery suggesting distal embolization (upper arrow).](http://stroke.ahajournals.org/)

![Figure 2. CT scan of the head demonstrating an area of infarction in the left posterior frontal and anterior temporal regions.](http://stroke.ahajournals.org/)
cerebral infarction approximately 13 times the expected rate.39

Until recently it was thought that cerebral venous thrombosis was the cause of the majority of focal ischemic lesions in pregnancy. However, over the past 15 years, the available data suggest that arterial occlusions account for approximately 60% to 80% of these lesions.30-32 The arterial occlusions tend to occur during the 2nd and 3rd trimesters of pregnancy and in the 1st week after delivery, whereas the venous occlusions tend to occur 1 to 4 weeks after childbirth.

To our knowledge, the case reported here represents the first case of documented ICA dissection as the underlying cause of stroke in association with pregnancy. A case of post partum vertebral artery dissection has been previously reported.33 The first clinical manifestation of ICA dissection in this case was a unilateral headache. After a delay period of less than 3 hours, a cerebral infarction occurred most likely from distal embolization to proximal branches of the left middle cerebral infarction. After a delay period of less than 3 hours, a cerebral infarction occurred most likely from distal embolization to proximal branches of the left middle cerebral artery. The syndrome of hemicrania and delayed focal cerebral ischemic symptoms is a rather common mode of presentation of ICA dissections.34,35 The angiographic features of ICA dissections are now well recognized.4,9,34 In this case the findings were typical of ICA dissection with distal embolization. The follow-up digital subtraction angiogram showed partial resolution of the internal carotid abnormalities, an observation which is commonly made in follow-up of patients with ICA dissections.5,34,36

The exact mechanism of dissection in this patient is uncertain. There was no convincing evidence of significant neck trauma or local infection near the carotid artery. However, the trauma associated with straining during the period of attempt at vaginal delivery may have played a role. Whether or not an underlying arterial disease was also present is open to speculation. The hypercoagulable state which exists during pregnancy and for the first 4 weeks of the puerperium37,39 is likely to have contributed to the formation of a thrombus at the dissection site and subsequent distal embolism. This hypercoagulable state seems to be due to increases in fibrinogen and clotting factors 7, 9, and 11, along with decreased blood coagulation factor inactivation. Similar effects have been noted with the use of birth control pills.40-42 Although some have suggested oral contraceptives may be a contributing factor in the production of carotid dissection, this has never been well substantiated.

References
earlier with bilateral spontaneous dissections of the bilateral spontaneous dissections of the renal arteries. We describe a patient we had seen and isolated spontaneous dissections of both renal arteries are rare. We describe a patient we had seen and isolated spontaneous dissections of both renal arteries.

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**Spontaneous Dissections of the Renal Arteries in a Patient With Previous Spontaneous Dissections of the Internal Carotid Arteries**

**BAHRAM MOKRI, M.D., ANTHONY W. STANSON, M.D., AND O. WAYNE HOUSER, M.D.**

**SUMMARY** An otherwise healthy 35-year-old woman suffered spontaneous dissections of both internal carotid arteries. She made an excellent recovery but was left with occlusion of the left internal carotid artery and a residual subcranial dissecting aneurysm of the right artery — both were asymptomatic. Eight years later, spontaneous dissections of both renal arteries occurred. The exact nature of the underlying arterial disease is not clear. Although fibromuscular dysplasia is suspected, other undetermined arteriopathy cannot be excluded.

SPONTANEOUS DISSECTIONS of the cervical segments of the internal carotid arteries are uncommon, and isolated spontaneous dissections of both renal arteries are rare. We describe a patient we had seen earlier with bilateral spontaneous dissections of the internal carotid arteries who 8 years later developed bilateral spontaneous dissections of the renal arteries.

To our knowledge, such an association has not been previously reported.

**Report of a Case**

In early June 1975, at the age of 35 years, an otherwise healthy right-handed woman experienced a deep-seated pain in the right ear and became aware of a small pulsatile mass in the right side of her neck and a loud bruit over the entire right side of her head. Within ½ hour the pain involved the right side of her head and face. Within 12 hours, she noted drooping of the right upper lid. Symptomatic treatment was not helpful. Neurologic evaluation led to transfemoral bilateral ca-
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D O Wiebers and B Mokri

Stroke. 1985;16:956-959
doi: 10.1161/01.STR.16.6.956

Stroke is published by the American Heart Association, 7272 Greenville Avenue, Dallas, TX 75231
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Print ISSN: 0039-2499. Online ISSN: 1524-4628

The online version of this article, along with updated information and services, is located on the World Wide Web at:
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