

## Atypical Presentation of a Posterior Inferior Cerebellar Artery Stroke Found by Magnetic Resonance Imaging, on a Woman without Prior Known Comorbid on Implantable Contraception: A Case Report

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### Abstract

On average, every 40 seconds, someone in the United States has a stroke. Women have a higher lifetime risk of stroke, with 1 in 5 chances during age 55-75; but they have a lower age-adjusted incidence below this age range. Migraines and hormone-releasing contraception are two relevant risk factors that contribute to the development of a stroke in women. We present a case of a 37-year-old Hispanic woman with an implantable hormonal device (Implanon®) that developed a posterior inferior cerebellar artery infarct (PICA), and during evaluation a history of intermittent migraines was noted, which was not previously diagnosed or treated by a medical provider. Clinically, the patient presented with acute vertigo, severe headache and associated neck pain, nausea, vomiting and gait instability. Brain Magnetic Resonance Imaging (MRI) revealed an acute infarct involving the right PICA territory and neck MR angiography demonstrated absent visualization of the posterior inferior cerebellar arteries bilaterally. Historically hormonal contraception has been linked to increase risk of thromboembolic events, in particular when it was associated with high doses of estrogen. The newer hormonal contraception, which now has lower estradiol levels still, has a trend to increase risk of thromboembolic events, although the results from various studies are not that clear. This rationale makes it seem plausible that the answer relies on progestin's hemostasis effect. The combination of migraines and hormone-releasing contraception in woman <45 years of age, are not well described. We conclude that, although the hormonal implantable device and migraines individually increases the risk for cardiovascular events, their combined risk may be additive and should be considered in the appropriate clinical setting.

**Keywords:** Stroke; PICA; Implantable hormonal device

### Case Report

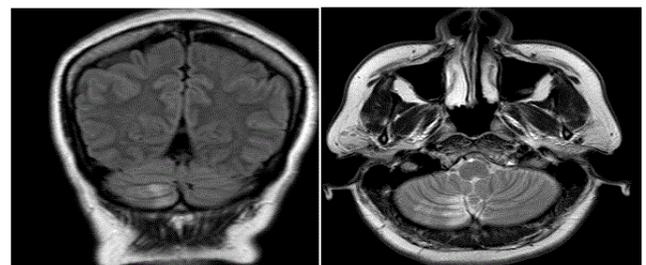
A 37 year old Latina woman with a known past medical history of chronic recurrent headaches, presented to the ED with sudden onset vertigo, gait instability, severe nausea, vomiting and occipital headaches that woke her up from her sleep. The patient went to bed at her usual time and was awoken a few hours later with dizziness, a transient episode of blurry vision and diaphoresis. Immediately after, she felt a sharp pain on her occipital area that radiated down to her neck, followed by several episodes of non-bloody, non-bilious vomitus. These symptoms persisted until she went to the hospital approximately 6 hours later.

At the Emergency Department her vomiting subsided following administration of meclizine tablet, IV ondansetron and IV fluids. Her triage vital signs were: BP: 126/76 HR 69 RR 19 and oxygen saturation of 99% on room air. Her pain score at the time was 5/10 and her oral Temperature was 98.1 F. Because of her report of vertigo and gait instability the stroke team was activated.

On initial physical examination the patient was lying comfortably in bed, alert and oriented to person, place and time. She had normal

extra-ocular movement, no nystagmus, dysarthria or dysmetria. She was ambulatory with no pertinent signs of gait disturbance.

Her Brain CT was negative for acute infarct, hemorrhage, space occupying lesion or midline shift. Her electrolytes, hepatic profile, lipid profile, urinalysis, urine toxicology, EKG and blood count were within normal limits. Her pregnancy test was negative. On further evaluation she was noted to have an implantable hormonal device (Implanon) in her left upper arm, which had been implanted 9 months prior to this event (Figure 1).



**Figure 1:** Cerebellar artery stroke found by magnetic resonance.

MRI of the brain was done as per Neurology team recommendations which revealed an acute infarct involving the right PICA territory. MRA of head and neck showed no vascular displacement, aneurysm or hemodynamically significant stenosis. There was incomplete posterior circulation with fetal origin of the posterior inferior cerebellar arteries with significant contribution from the anterior circulation posteriorly.

Over the next 24 hours after admission, there was no change in her mental status and physical examination. Studies for Hypercoagulability and Echocardiogram were normal.

After careful history was taken regarding the headaches, (Recurrent, lasting hours-days, associated with photophobia and phonophobia, alleviated by resting and sleep in a totally dark room, NSAID's only provided mild relief), the diagnosis of migraines was made. Because contraception can be associated with worsening migraines, The Implanon device was removed and she was started on Topamax. Secondary aggressive risk factor modification was initiated including statin and aspirin therapy [1-5].

After discharge, the patient followed up in the Medicine clinic, no recurrent dizziness or headaches have occurred and patient continues to function normal.

## Discussion

In the past when hormonal contraception included high doses of estrogen, there was a clear increase in the risk of thromboembolic events associated with their use. Estrogen, has been well described on its effects on hemostasis (increases levels of fibrinogen, coagulation factors VII, VIII, and X, and plasminogen), and its use is associated with lower levels of antithrombin III, protein S, and plasminogen activator inhibitor. Hormonal contraception has been also associated with decreased activated protein C resistance (APC resistance). The net effect of these procoagulant and anticoagulant changes is a small increase in coagulation. In review of 55 observational studies using the newer hormonal contraception, which now has lower estradiol levels, there was a trend towards increased risk of thromboembolic events but it did not reach statistical significance. However, it was noteworthy that the hormone that seemed responsible for the higher number of events was progestin [5-9]. There have been no reports that Implanon® increases risk of stroke, however, it does contain progestin so manufacturer's packing insert notes that it could be associated with increased risk in high risk patients [10].

Migraines are definitely a known risk factor for stroke, especially in younger women with aura. Results from a number of studies, in particular the CAMERA study, suggested that a combination of possibly migraine attack-related hypoperfusion and embolism is the likeliest mechanism of the infarction, as opposed to atherosclerosis or small-vessel disease. It also highlighted the fact that an infarct in the area of the posterior circulation, with the majority of cases affecting the cerebellum, was more prominent on those with migraines. Another point of great consideration was that despite posterior circulation affect young patients; it has a wide etiologic spectrum [11].

In patients presenting with an acute stroke, attention to secondary prevention and other cardiovascular complications is routinely warranted, yet it is not well-defined in younger population. Furthermore, early-stage posterior fossa ischemia is rarely seen by brain CT, which is the most commonly available initial imaging modality. Early correct diagnosis is crucial to identify and treat underlying vascular lesions and help prevent subsequent occurrences of stroke and improve patient's outcome [10-14].

Further research is needed to target therapy for predisposing condition. There is also a need to educate high-risk populations (such as those with previous history of migraine headache and on hormone-releasing contraception), to provide alternatives that may aid in prevention of cardiovascular events.

## References

1. Lopez AD, Mathers CD, Ezzati M, Jamison DT, Murray CJ (2006) Global and regional burden of disease and risk factors, 2001: systematic analysis of population health data. *Lancet* 367: 1747-1757.
2. Lidegaard Ø, Løkkegaard E, Jensen A, Skovlund CW, Keiding N (2012) Thrombotic stroke and myocardial infarction with hormonal contraception. *N Engl J Med* 366: 2257-2266.
3. ACOG Committee on Practice Bulletins-Gynecology (2006) ACOG practice bulletin. No. 73: Use of hormonal contraception in women with coexisting medical conditions. *Obstet Gynecol* 107: 1453-1472.
4. Peterson HB, Curtis KM (2005) Clinical practice. Long-acting methods of contraception. *N Engl J Med* 353: 2169-2175.
5. Curtis KM (2002) Safety of implantable contraceptives for women: data from observational studies. *Contraception* 65: 85-96.
6. Kruit MC, Launer LJ, Ferrari MD, van Buchem MA (2005) Infarcts in the posterior circulation territory in migraine. The population-based MRI CAMERA study. *Brain* 128: 2068-77.
7. Kochanek KD, Xu J, Murphy SL, Miniño AM, Kung HC (2011) Deaths: final data for 2009. *Natl Vital Stat Rep* 60: 1-116.
8. Go AS, Mozaffarian D, Roger VL, Benjamin EJ, Berry JD, et al. (2012) Heart disease and stroke statistic-2013 update: a report from the American Heart Association. *Circulation* 127: e6-e245.
9. Bushnell C, McCullough LD, Awad IA, Chireau MV, Fedder WN, et al. (2014) Guidelines for the prevention of stroke in women: a statement for healthcare professionals from the American Heart Association/American Stroke Association. *Stroke* 45: 1545-1588.
10. Edlow JA, Newman-Toker DE, Savitz SI (2008) Diagnosis and initial management of cerebellar infarction. *Lancet Neurol* 7: 951-64.
11. Amaya LE, Carlos Cantú (2005) Causes and Mechanisms of Cerebellar Infarction in Young Patients, Fernando Barinagarrementeria. *Cerebrovasc Dis* 20: 370-80.
12. Kumral E, Kisabay A, Ataç C, Calli C, Yuntun N (2005) Spectrum of the posterior inferior cerebellar artery territory infarcts. Clinical-diffusion-weighted imaging correlates. *Cerebrovasc Dis*. 20: 370-80.
13. Kruit MC, Launer LJ, Ferrari MD, van Buchem MA (2005) Infarcts in the posterior circulation territory in migraine. The population-based MRI CAMERA study. *Brain* 128: 2068-2077.
14. Conard J (1999) Biological coagulation findings in third-generation oral contraceptives. *Hum Reprod Update* 5: 672-680.