

## Commentary

In the article, “Multiple intracranial hemorrhages in pregnancy: A common autoimmune etiology,” the authors present a case of multiple acute intracerebral hemorrhages in a pregnant patient.<sup>[1]</sup> As seen by the magnetic resonance imaging (MRI) scans, there were several hemorrhages scattered throughout the cerebrum, a couple of which were rather large with surrounding edema. The authors are to be commended on the care of this patient and the use of medical management to effect an excellent outcome for the mother and child. This patient is unusual in that she had no past medical history that would suggest the diagnosis of systemic lupus erythematosus (SLE). When one first sees the MRI scans that show the multiple hemorrhages, one would consider embolic phenomenon with hemorrhagic conversion or venous sinus occlusion leading to venous congestion and hemorrhagic infarcts. However, the magnetic resonance venography scans did not demonstrate any sign of venous drainage abnormalities. The laboratory tests were able to confirm the diagnosis of SLE. The thrombocytopenia was postulated to be an underlying cause of the multiple hemorrhages.

Pregnancy-related strokes are rare. In a large study by Leffert *et al.*, 330 pregnant and 10,562 nonpregnant women in the age range of 18–44 years were identified with hemorrhagic stroke. The category of hemorrhagic stroke patients tended to be younger and had fewer risk factors and had a lower mortality when compared to their nonpregnant counterparts.<sup>[2,3]</sup> The hemorrhagic strokes include aneurysmal subarachnoid hemorrhages, arteriovenous malformations, and intracerebral hemorrhages. In this paper by Pahadiya *et al.*,<sup>[1]</sup> the pattern of bleeding seen on the MRI scans clearly rules out the aneurysms or arteriovenous malformations (AVMs), which have their own distinctive radiographic appearances.<sup>[4,5]</sup> In an earlier study by Skidmore *et al.*, a large database of pregnant patients from three large hospitals who had suffered a stroke was examined. They identified 21 patients with an ischemic stroke and 11 with a hemorrhagic stroke. Interestingly, they found that 36% of these had an underlying arteriovenous malformation as the etiology of the bleed. They identified one patient with SLE as a risk factor.<sup>[6]</sup>

Gao *et al.* discussed the clinical characteristics and risks factors of intracranial hemorrhage in patients with SLE.

They examined the patient records from 1994 to 2012 at the Peking Union Medical College Hospital and found that the incidence of SLE with intracranial hemorrhage was only 0.39%. Headache was the most common presenting symptom (53.5%). The in-house mortality was 23.1%. Thrombocytopenia was the independent risk factor for intracranial hemorrhage in the presence of SLE.<sup>[7]</sup> There was no mention of pregnancy as a risk factor in this paper.

SLE can lead to a vasculitis that results in venous and arterial thrombotic events, the rates of which are 25–50 times higher than seen in the general population.<sup>[8]</sup> This may occur systemically at multiple sites, thus explaining the finding of multiple intraparenchymal hemorrhages in the current case report. The thrombocytopenia likely contributed to the hemorrhagic transformation. These hemorrhages were a couple of centimeters in diameter and exhibited mass effect and cerebral edema. With spontaneous (hypertensive) hemorrhages of the basal ganglia, the intracranial pressures are usually in the normal range; however, the mass effect can be substantial and in combination with the surrounding edema, which can lead to significant morbidity and mortality. Traumatic intracerebral hemorrhages may also have mass effect from the blood and surrounding edema.<sup>[9]</sup> With both spontaneous and traumatic intracerebral hemorrhages, the edema is mediated by the inflammatory cascade. One wonders if the surrounding edema in the case of SLE is different given its autoimmune nature.

Neurosurgical treatment for intracerebral hemorrhages can be lifesaving and can decrease the local mass effect of the blood and surrounding edema rapidly. Options include a decompressive craniectomy with duraplasty or craniotomy with evacuation of the hemorrhage. Either of these is invasive with inherent risks to the patient and fetus, and these surgical measures were successfully avoided by the authors of this case report. We have found that the BrainPath<sup>®</sup> minimally invasive approach is quite effective for rapidly and focally removing intracranial hemorrhages using stereotactic guidance.<sup>[9]</sup> This may be a consideration in patients such as this one who have high surgical risks. Fortunately, the authors were able to treat this medically, and she (and her child) had no neurologic sequelae.

Jefferson W. Chen

Department of Neurological Surgery, Division of Neurotrauma,  
University of California Irvine, Orange, California 92868, USA

**Address for correspondence:**

Dr. Jefferson W. Chen,  
Department of Neurological Surgery, Division of Neurotrauma,  
University of California Irvine, 200 S. Manchester Blvd,  
Suite #210, Orange, California 92868, USA.  
E-mail: jeffewc1@uci.edu

## References

1. Pahadiya HR, Lakhotia M, Gandhi R, Choudhary A, Madan S. Multiple intracranial hemorrhages in pregnancy: A common autoimmune etiology. *J Neurosci Rural Pract* 2016;7:290-4.
2. Leffert LR, Clancy CR, Bateman BT, Cox M, Schulte PJ, Smith EE, *et al.* Patient characteristics and outcomes after hemorrhagic stroke in pregnancy. *Circ Cardiovasc Qual Outcomes* 2015;8 6 Suppl 3:S170-8.
3. Leffert LR, Clancy CR, Bateman BT, Bryant AS, Kuklina EV. Hypertensive disorders and pregnancy-related stroke: Frequency, trends, risk factors, and outcomes. *Obstet Gynecol* 2015;125:124-31.
4. Lv X, Li Y. The clinical characteristics and treatment of cerebral AVM in pregnancy. *Neuroradiol J* 2015;28:385-8.
5. Lv X, Liu P, Li Y. The clinical characteristics and treatment of cerebral AVM in pregnancy. *Neuroradiol J* 2015;28:234-7.
6. Skidmore FM, Williams LS, Fradkin KD, Alonso RJ, Biller J. Presentation, etiology, and outcome of stroke in pregnancy and puerperium. *J Stroke Cerebrovasc Dis* 2001;10:1-10.
7. Gao N, Wang ZL, Li MT, Han SM, Dang YQ, Zhang FC, *et al.* Clinical characteristics and risk factors of intracranial hemorrhage in systemic lupus erythematosus. *Lupus* 2013;22:453-60.
8. Hinojosa-Azaola A, Romero-Diaz J, Vargas-Ruiz AG, Nuñez-Alvarez CA, Cicero-Casarrubias A, Ocampo-Torres MC, *et al.* Venous and arterial thrombotic events in systemic lupus erythematosus. *J Rheumatol* 2016;43:576-86.
9. Chen JW, Paff MR, Abrams-Alexandru D, Kaloostian SW. Decreasing the cerebral edema associated with traumatic intracerebral hemorrhages: Use of a minimally invasive technique. *Acta Neurochir Suppl* 2016;121:279-84.

This is an open access article distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 3.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as the author is credited and the new creations are licensed under the identical terms.

Access this article online	
<b>Quick Response Code:</b>	<b>Website:</b> www.ruralneuropractice.com
	<b>DOI:</b> 10.4103/0976-3147.178673

**How to cite this article:** Chen JW. Commentary. *J Neurosci Rural Pract* 2016;7:295-6.