ScientificScholar®
Knowledge is power
Publisher of Scientific Journals

www.surgicalneurologyint.com

Surgical Neurology International

Editor-in-Chief: Nancy E. Epstein, MD, Clinical Professor of Neurological Surgery, School of Medicine, State U. of NY at Stony Brook.

SNI: Neurovascular

Editor
Kazuhiro Hongo, M.D
Shinshu University, Matsumoto, Japan

SNI
Open Access

Case Report

Cerebral venous thrombosis of the sphenoparietal sinus: A case report

Camille K. Milton[1], David L. Gordon[2], Chad A. Glenn[1], Andrew K. Conner[1]

Departments of [1]Neurosurgery, [2]Neurology, University of Oklahoma Health Sciences Center, Oklahoma City, Oklahoma, United States.

E-mail: Camille K. Milton - camille-milton@ouhsc.edu; David L. Gordon - david-gordon@ouhsc.edu; Chad A. Glenn - chad-glenn@ouhsc.edu; *Andrew K. Conner - andrew-conner@ouhsc.edu

***Corresponding author:**
Andrew K. Conner,
Department of Neurosurgery,
University of Oklahoma Health Sciences Center, Oklahoma City, Oklahoma, United States.

andrew-conner@ouhsc.edu

Received : 08 February 2021
Accepted : 18 March 2021
Published : 03 May 2021

DOI:
10.25259/SNI_126_2021

Quick Response Code:

ABSTRACT

Background: Cerebral venous thrombosis (CVT) is a rare cause of stroke that preferentially affects reproductive aged females and patients with hereditary or acquired thrombotic risk factors. The superior sagittal sinus and transverse sinus are the two most common sites for thrombus formation.

Case Description: We report a case of CVT arising in a very rare location, the sphenoparietal sinus. A 32-year-old woman with a history of factor V Leiden mutation and multiple prior episodes of venous thromboembolism presented with a new-onset seizure, headache, and emesis. CT angiography ultimately revealed thrombosis of the left sphenoparietal sinus. The patient received anticoagulation with apixaban with resolution of symptoms and without complications.

Conclusion: This case serves as an uncommon example of sphenoparietal sinus thrombosis managed with novel oral anticoagulant treatment.

Keywords: Anticoagulant agents, Cerebral venous sinus thrombosis, Cerebral venous sinuses, Thrombolytic therapy, Thrombophilia

INTRODUCTION

Cerebral venous thrombosis (CVT) is a relatively rare condition accounting for 0.5% of stroke cases.[3] Previously identified risk factors for the development of CVT include female sex-specific factors (oral contraceptive use, pregnancy, and hormone therapy), hereditary thrombophilia (factor V Leiden, prothrombin G20210A, antithrombin deficiency, and protein C/S deficiency), infectious disease of the head and neck, and systemic disease (cancer, myeloproliferative neoplasms, nephrotic syndrome, systemic lupus erythematosus, etc.).[14,16,17]

CVT most commonly arises within the dural venous sinuses, but may also affect the superficial cortical veins or the deep venous system.[2,16] Thrombi commonly involve more than 1 venous site and the superior sagittal sinus and the transverse sinus are the two most commonly affected locations.[2,9]

We report a case of CVT localized to the sphenoparietal sinus occurring in a woman with factor V Leiden mutation. The clinical presentation, diagnostic evaluation, and management of this unusual diagnosis are described. In addition, we discuss the significance of this case in the context of CVT literature.

CASE REPORT

A 32-year-old woman was transferred to our service from an outside hospital emergency department after presenting with a new-onset complex-partial seizure with secondary generalization, headache, and emesis. The patient had a history of factor V Leiden mutation, cigarette smoking, and obesity (BMI 40.6). She had suffered a miscarriage and multiple prior episodes of venous thromboembolism with subsequent placement of an IVC filter. Six months before presentation, the patient had discontinued warfarin anticoagulation for stated financial reasons.

Five days before presentation, the patient awoke with a left frontal headache accompanied by nausea and vomiting. These symptoms persisted and, on the day of presentation, she experienced a complex partial seizure with secondary generalization. The seizure was manifested by expressive aphasia, right hand numbness, and left head deviation culminating in generalized tonic-clonic activity and a postictal state lasting several minutes.

At the outside hospital emergency department, she received levetiracetam 1500 mg BID and CT head imaging revealed two small areas of hypodensity in the left subinsular and frontal opercular areas. The patient was then transferred to our tertiary care institution for definitive management. On arrival, the patient's neurological examination was intact and she reported a severe (8/10) headache. MRI imaging performed at our institution revealed increased FLAIR signal indicative of vasogenic edema. DWI and ADC findings in this area were thought to represent acute hemorrhage and not acute ischemia. CT head angiography was then performed, revealing CVT of the left sphenoparietal sinus. Imaging findings are shown in [Figures 1 and 2].

The patient continued to receive levetiracetam 1500 mg BID initiated at the outside hospital emergency department and began apixaban 5 mg BID with a recommendation to continue this medication lifelong. The patient was followed clinically, and no posttreatment imaging studies were performed. Following a 3-day hospital stay, the patient reported a significant reduction in headache severity and was discharged home.

DISCUSSION

While the presentation of CVT is highly variable, it commonly produces one of the following clinical syndromes: (1) intracranial hypertension (headache, papilledema, and visual disturbance), (2) focal neurologic syndrome (focal deficits and seizures), or (3) encephalopathy.[2,5,7] As many of these presentations are nonspecific, clinical suspicion for the diagnosis necessitates confirmatory neuroimaging with either MRI/MR venogram or CT/CT venogram.[5,9] Due to increased recognition of the diagnosis and advances in early detection and treatment, long-term prognosis for CVT has improved.[14] Since the 1960s, mortality rates for CVT have declined from 20% to 50% reported by early case series to current estimates of 5–10%.[6,16]

The anatomy of the sphenoparietal sinus, first identified by Breschet in 1829, has received limited attention from the medical literature.[4,19] A detailed anatomic report of 15 cadaveric specimens found that the sphenoparietal sinus most commonly originates at the lateral tip of the lesser wing of the sphenoid and terminates at the cavernous sinus in close proximity to the course of the ophthalmic nerve.[19] Although variations exist, the sphenoparietal sinus most commonly receives blood from the Sylvian vein and drains into the cavernous sinus.[19] Notably, some consider the term "sphenoparietal sinus" a misnomer as modern anatomic studies have not demonstrated any consistent connections to the parietal portion of the middle meningeal veins.[13,19]

Our review of the English language literature for reports of sphenoparietal sinus thrombosis identified only one previously published case. In 2018, Di Caprera *et al*. reported a case of sphenoparietal sinus thrombosis found in a 38-year-old Italian woman with no identifiable risk factors.[8] The patient presented with a week-long history of medication-resistant headache and was initially misdiagnosed with primary subdural hemorrhage.[8] Following thrombus identification on MR venography, the patient was treated with low-molecular-weight heparin and discharged after an uncomplicated 10-day hospital stay.[8] Our reported case is distinguished from the case of Di Caprera *et al*. by the fact that intraparenchymal hemorrhage rather than subdural hemorrhage was initially identified. Furthermore, our case is the first report of sphenoparietal sinus thrombosis successfully managed with direct oral anticoagulant (DOAC) administration.

Low-molecular-weight heparin followed by warfarin administration remains the standard of care for CVT,[15] however, DOACs represent a promising new management option that avoids the risk of major bleeding, intracranial hemorrhage, or heparin-induced thrombocytopenia.[12] A recent systematic review evaluating the efficacy and safety of DOACs compared to Vitamin k antagonists (VKAs) identified comparable rates of thrombus recanalization, excellent functional outcomes, and lower rates of major bleeding.[11] At present, only one randomized clinical trial comparing VKA and DOAC treatment of CVT has been completed.[10] This study found that both dabigatran and warfarin may be safe and effective for the prevention of recurrent venous thrombotic events in patients who have experienced CVT.[10] Other clinical trials assessing rates of mortality, venous thrombotic events, symptomatic intracranial bleeding, and major extracranial bleeding in CVT patients treated with DOACS versus standard therapies are currently underway.[1,18]

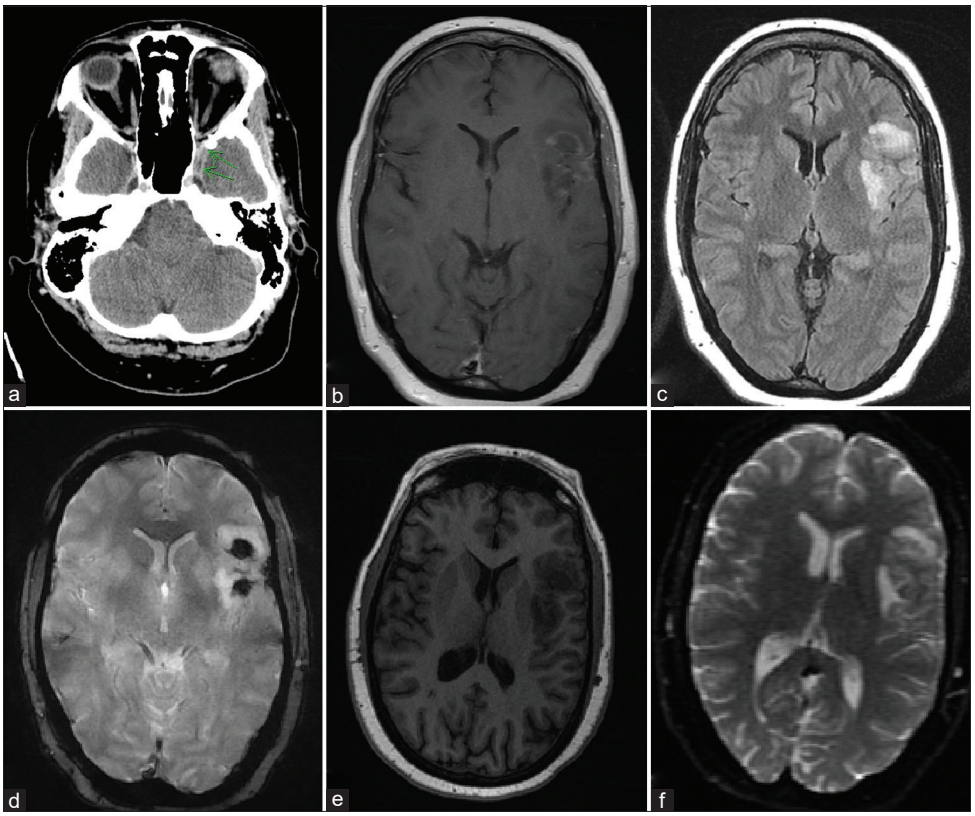

Figure 1: Delayed postcontrast head CT obtained with CT angiography showing suggestion of a filling defect (arrows) in the region of the left sphenoparietal sinus (a), T1 with contrast (b), T2 flair (c), GRE (d), FSPGR BRAVO (e), and DWI (f) MRI sequences demonstrating findings of FLAIR hyperintensity, diffusion restriction, susceptibility blooming, and mild enhancement in the region of the left frontal-temporal operculum and insula indicative of venous infarct.

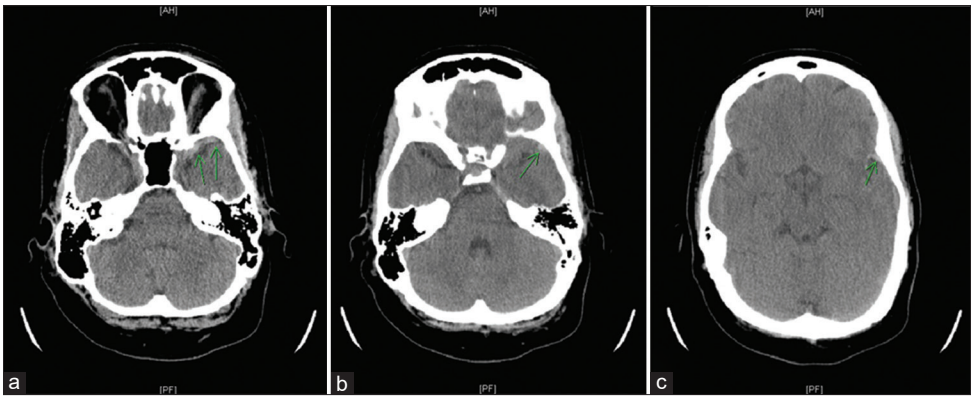

Figure 2: Noncontrast head CT obtained with CT angiography demonstrating tubular hyperdensity indicated by arrows (a-c) adjacent to areas of hypoattenuation in the left frontal operculum, temporal operculum, and insula.

CONCLUSION

We have described an uncommon case of CVT of the sphenoparietal sinus successfully managed with DOAC administration. While rare, one should consider the diagnosis of sphenoparietal sinus thrombosis in patients presenting with signs and symptoms of CVT and the characteristic imaging findings reported herein.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

REFERENCES

1. A Clinical Trial Comparing Efficacy and Safety of Dabigatran Etexilate with Warfarin in Patients with Cerebral Venous and Dural Sinus; 2019. Available from: https://www.clinicaltrials.gov/show/nct02913326. [Last accessed on 2021 Jan 31].
2. Agrawal K, Burger K, Rothrock JF. Cerebral sinus thrombosis. Headache 2016;56:1380-9.
3. Bousser MG, Ferro JM. Cerebral venous thrombosis: An update. Lancet Neurol 2007;6:162-70.
4. Breschet G. Research of the Anatomy, Physiology, and Pathology of the Venus System with Special Emphasis on the Veins of Bones. Paris: Villeret et Rouen; 1829.
5. Bushnell C, Saposnik G. Evaluation and management of cerebral venous thrombosis. Continuum (Minneap Minn) 2014;20:335-51.
6. Coutinho JM, Zuurbier SM, Stam J. Declining mortality in cerebral venous thrombosis: A systematic review. Stroke 2014;45:1338-41.
7. Coutinho JM. Cerebral venous thrombosis. J Thromb Haemost 2015;13 Suppl 1:S238-44.
8. di Caprera E, de Corato L, Giuricin V, Pensabene MC, Marfia G, Melis M, *et al*. Cerebral venous thrombosis presenting like a subdural hemorrhage at magnetic resonance imaging: An Italian case report. Eur J Radiol Open 2018;5:31-4.
9. Dmytriw AA, Song JS, Yu E, Poon CS. Cerebral venous thrombosis: State of the art diagnosis and management. Neuroradiology 2018;60:669-85.
10. Ferro JM, Coutinho JM, Dentali F, Kobayashi A, Alasheev A, Canhão P, *et al*. Safety and efficacy of dabigatran etexilate vs dose-adjusted warfarin in patients with cerebral venous thrombosis: A randomized clinical trial. JAMA Neurol 2019;76:1457-65.
11. Lee GK, Chen VH, Tan CH, Leow AS, Kong WY, Sia CH, *et al*. Comparing the efficacy and safety of direct oral anticoagulants with vitamin K antagonist in cerebral venous thrombosis. J Thromb Thrombolysis 2020;50:724-31.
12. Patel SI, Obeid H, Matti L, Ramakrishna H, Shamoun FE. Cerebral venous thrombosis: Current and newer anticoagulant treatment options. Neurologist 2015;20:80-8.
13. Ruíz DS, Fasel JH, Rüfenacht DA, Gailloud P. The sphenoparietal sinus of breschet: Does it exist? An anatomic study. AJNR Am J Neuroradiol 2004;25:112-20.
14. Sader N, de Lotbiniere-Bassett M, Tso MK, Hamilton M. Management of venous sinus thrombosis. Neurosurg Clin N Am 2018;29:585-94.
15. Saposnik G, Barinagarrementeria F, Brown RD Jr., Bushnell CD, Cucchiara B, Cushman M, *et al*. Diagnosis and management of cerebral venous thrombosis: A statement for healthcare professionals from the American heart association/American stroke association. Stroke 2011;42:1158-92.
16. Silvis SM, de Sousa DA, Ferro JM, Coutinho JM. Cerebral venous thrombosis. Nat Rev Neurol 2017;13:555-65.
17. Silvis SM, Middeldorp S, Zuurbier SM, Cannegieter SC, Coutinho JM. Risk factors for cerebral venous thrombosis. Semin Thromb Hemost 2016;42:622-31.
18. Study of Rivaroxaban for CeREbral Venous Thrombosis; 2019. Available from: https://www.clinicaltrials.gov/show/nct03178864. [Last accessed on 2021 Jan 31].
19. Tubbs RS, Salter EG, Wellons JC 3rd, Blount JP, Oakes WJ. The sphenoparietal sinus. Neurosurgery 2007;60 Suppl 2:ONS9-12; discussion ONS12.

How to cite this article: Milton CK, Gordon DL, Glenn CA, Conner AK. Cerebral venous thrombosis of the sphenoparietal sinus: A case report. Surg Neurol Int 2021;12:197.