



Case Report

Rivaroxaban-induced acute cervical spine epidural hematoma: Report of a case and review

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ABSTRACT

Background: Spontaneous spinal epidural hematomas (SEHs) due to the utilization of factor Xa inhibitors are rare.

Case Description: A 66-year-old female presented with a Brown-Sequard syndrome attributed to a cervical epidural hematoma secondary to the utilization of rivaroxaban, one of the factor Xa inhibitors. Following a cervical laminectomy for the evacuation of the hematoma, the patient completely recovered.

Conclusion: A spinal hemorrhagic event should be suspected in patients receiving factor Xa inhibitor drugs. Here, we had an elderly female on rivaroxaban experienced the acute onset of neck/back pain associated with a Brown-Sequard syndrome. A literature review showed that this is the seventh example of SEH occurring as a result of the use of anticoagulation drugs (OACDs; e.g., including Xa inhibitors).

Keywords: Anticoagulant, Factor Xa inhibitors, Rivaroxaban, Spinal epidural hematoma

INTRODUCTION

Factor Xa inhibitor drugs, the newer oral anticoagulants, are increasingly utilized for the prevention of stroke in nonvalvular atrial fibrillation and the prevention/treatment of DVT and pulmonary emboli.^[10] The first example of a spinal epidural hematoma (SEH) due to these types of oral anticoagulants was reported by Jager *et al.*, in 2012.^[6] Since then, only five additional cases have been published.^[1,2,5,8,9] Here, we present the seventh example of a cervical SEH that required emergent evacuation.

CASE REPORT

A 66-year-old female presented acutely with neck pain/back pain and a classic Brown-Sequard syndrome of 1 day's duration. The patient was taking rivaroxaban (15 mg, daily) and low-dose aspirin for atrial fibrillation. An emergent cervical MRI disclosed a dorsal-lateral C3-C6 cervical epidural mass. It was isointense on T1 weighted and hyperintense on T2-weighted MRIs; these findings were compatible with an acute cervical/SEH [Figure 1]. Rivaroxaban was discontinued

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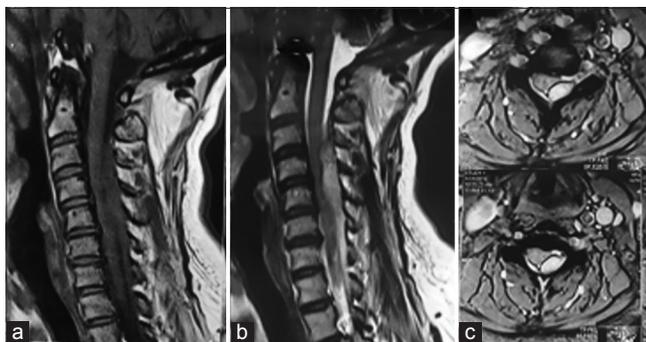


Figure 1: Preoperative cervical magnetic resonance imaging: (a) T1-weighted sagittal shows an isointense mass compressing the cord, (b) in T2 weighted, the mass is hyperintense compatible with acute hematoma, (c) The mass is biconvex in T2-weighted axial view compatible with epidural hematoma.

immediately, and she was given three units of fresh frozen plasma (FFP). She underwent a C3 to C5 laminectomy for the evacuation of a large right posterolateral epidural clot 36 h later [Figure 2]. Postoperatively, the patient made a dramatic recovery and was discharged on the 5th hospital day. The MRI performed on the 12th postoperative day showed resolution of the hematoma [Figure 3]. Two weeks later, rivaroxaban (10 mg daily) was restarted by her cardiologist; at the 6-month follow-up visit, she remained asymptomatic.

DISCUSSION

Etiology of SEH with Xa inhibitors

Factor Xa inhibitors are newer oral anticoagulant drugs which block thrombin formation, prevent conversion of fibrinogen to fibrin, and, hence, inhibit thrombus formation.^[10] These drugs include rivaroxaban, dabigatran, and edoxaban, along with several others; rivaroxaban is the most extensively prescribed. However, similar to other anticoagulants, they may cause bleeding, including SEH.^[1,2,5,6,8,9] The dose of rivaroxaban in which SEH may occur varies from 10 to 20 mg. Further, the risk of SEH is increased with the simultaneous use of aspirin as in this case.^[10] In addition, some think that lower doses of rivaroxaban should be utilized in elderly patients and/or in those receiving amiodarone.

Literature review of SEH occurring with factor Xa

A review of literature revealed that factor Xa inhibitor-induced SEH is mostly seen in the elderly and more so in females rather than males [Table 1]. The majority of SEH occurred in the cervical or cervicothoracic regions; purely, thoracic and lumbar SEH were each found in one patient. Clinically, patients present with neurological deficits correlating with the hematoma location. SEH is best diagnosed with MR that typically shows a long biconvex

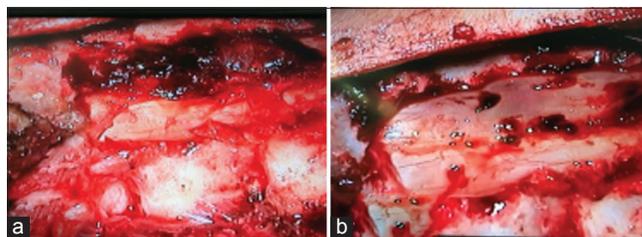


Figure 2: Intraoperative photograph: (a) the clot compressing the cord, (b) after removal of the clot.

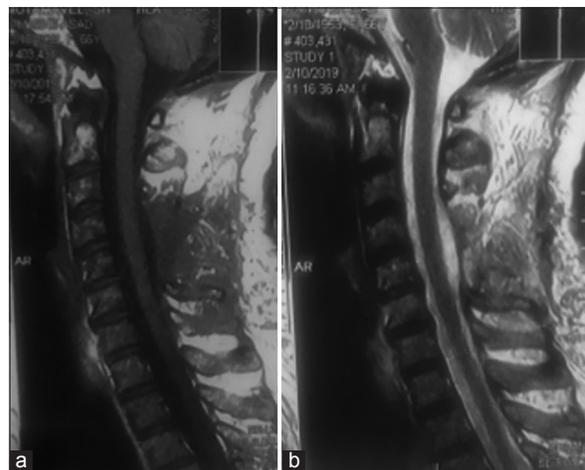


Figure 3: Postoperative magnetic resonance imaging (MRI): (a) T1-weighted and (b) T2-weighted cervical MRI shows acceptable decompression of the cord.

epidural mass with spinal cord compromise; hematomas appear isointense or hypointense on T1 and hyperintense on T2-weighted MRI images.^[7]

Treatment of SEH due to factor Xa

The management of SEH depends on the volume of the hematoma and the rapidity/severity of the neurological symptoms/signs.^[4,7] In patients with local pain but minimal clinical symptoms, conservative treatment may suffice.^[3] For those significant neurological deficits, emergent decompressive laminectomy for clot evacuation may be warranted.^[3,4,7]

Optimal surgical timing

Early recognition and surgical intervention for SEHs with neurologic compromise remain key to achieving a favorable outcome.^[4,7] The anticoagulation effect of rivaroxaban is expected to resolve fully within three to four half-lives.^[10] In young/middle-aged persons, rivaroxaban half-life is 8 h, while in the elderly, its half-life increases to approximately 12 h; therefore, the safe interval for surgery in the younger group will be 24–32 h after cessation of medication, but in

Table 1: Thorough information about seven cases with spinal epidural hematoma due to factor Xa inhibitors.

Case	Author	Year	Sex	Age	Location	Clinical picture	Management	Outcome
1	Jaeger <i>et al.</i> ^[6]	2012	Female	61	Cervicothoracic	Paraparesis	Conservative	Good
2	Radcliff <i>et al.</i> ^[9]	2014	Female	53	Lumbar	Cauda Equina	Laminectomy	Good
3	Bamps <i>et al.</i> ^[11]	2015	Male	70	Cervical	Quadriplegia	Laminectomy	Good
4	Ozel <i>et al.</i> ^[8]	2016	Female	69	Cervical	Quadripareisis	Conservative	Good
5	Ismail <i>et al.</i> ^[5]	2017	Male	72	Thoracic	Paraparesis	Laminectomy	Good
6	Goldfine <i>et al.</i> ^[2]	2018	Male	74	Cervical	Quadripareisis	Laminectomy	Good
7	Current case	2019	Female	66	Cervical	Brown-Sequard	Laminectomy	Good

the elder patients, it will be 36–48 h later.^[10] Nevertheless, those patients experiencing rapid neurological deterioration often warrant urgent/emergent surgery. Here, rather than reversing the Xa effect with the transfusion of FFP and prothrombin complex concentrate, the Xa inhibitor antidote (Adnexa) may be emergently administered to avoid delaying surgery.

Optimal time for restarting anticoagulant

In one study, the optimal timing for readministration of Xa anticoagulants was 2–3 weeks postoperatively.^[10]

CONCLUSION

For patients receiving factor Xa inhibitors, SEH should be included in the differential diagnosis where patients develop acute spinal/back pain and the onset of a significant neurological deficit. Performing immediate MR scans to document the location and severity of the SEH are critical. While those with lesser symptoms/signs may be managed conservatively, patients with significant neurological deficits may warrant urgent/emergent clot removal.

Declaration of patient consent

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

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Conflicts of interest

There are no conflicts of interest.

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