

Spine Subdural Hematoma: a Rare Complication Associated with Vitamin K Antagonist (VKA)

Uri Adrian Prync Flato, Paulo Sérgio Rheder, Helio Penna Guimarães, Elias Silva Flato, Paulo Cretella
Hospital Villa Lobos, São Paulo, SP - Brazil

Spinal subdural hematoma (SSDH) is a rare condition, which is difficult to diagnose, related to Vitamin K Antagonist. This is a case report of a life-threatening situation in an octogenarian patient with a history of recent atrial fibrillation that received Vitamin K Antagonist (VKA) therapy. The history and the clinical assessment were normal at the admission, associated with increase in the coagulation parameters (INR >10). Twenty-four hours after the admission, the patient developed progressive tetraparesis and a Magnetic Resonance Imaging (MRI) was performed, disclosing the evidence of a SSDH (Figure 1). An emergency neurosurgical intervention was performed associated with normalization of the coagulation parameters. After the procedure, the patient presented improvement of the neurological symptoms.

Discussion

It is estimated that 2.5 million people¹ currently have atrial fibrillation in the USA, in whom treatment with vitamin K antagonists (VKA) implies in the relative decrease (RD) in cardiovascular events of 68%². With the increase in life expectancy, it is estimated that 10% of the world's population older than 80 years will present this heart arrhythmia.

Regarding the use of vitamin K antagonists (VKA), the clinical studies³ have demonstrated an incidence of major bleeding of 0.3%-0.5% a year and central nervous system bleeding of 0.2% a year. It is worth mentioning that these data were obtained from patients that were adequately managed and monitored regarding the anticoagulation parameter; in this scenario, some patients were excluded from the study: patients that abandoned the treatment during the initial study period (inclusion or Run-in phase), those excluded due to sociocultural questions, and a small number of patients in some subgroups

Key words

Hematoma, subdural spinal; spinal cord; blood coagulation.

with a high prevalence of cardioembolic complications, such as the elderly. Data from daily clinical practice, i.e., from "real-life patients", are probably higher than those previously reported; however, adequate evidence under a methodological point of view is not available and only retrospective studies with a small number of patients are considered for such. Abdelhafiz and Wheeldon⁴, in a retrospective study of patients using VKA, showed an incidence of major bleeding of around 3.4% a year, monitored in non-specialized outpatient clinics. The following are considered independent risk factors for bleeding associated to the use of VKA: intensity of the anticoagulant effect (INR >3.0), characteristics of the patient (age older than 75 yrs), use of drugs that interfere with the VKA and time of treatment. Due to the small number of octogenarian patients included in clinical studies of oral anticoagulants (OAC), this group endures reservations and suggestions of OAC with reduced therapeutic targets (INR 1.8-2.5). Its use must be based on socio-behavioral aspects and routine use of bleeding risk models⁵, to conduct the adequate therapy and decrease the risks to the patient. Recently, Hart et al⁶ carried out a randomized, double-blind study in octogenarian patients, comparing VKA vs aspirin and observed a decrease of 40% in ischemic cerebrovascular events associated to a similar rate of bleeding between the two groups.

The VKA management directives⁷ have been recently updated, especially regarding the use of this drug antidotes related to the patient's clinical presentation and the level of anticoagulation (Chart 1).

The complications related to this treatment can very often be devastating and perhaps, the implementation of educational measures, strategies to improve patients' adherence to VKA associated to the implementation of clinics that are specialized in anticoagulation can allow the therapeutic success as well as the decrease in severe adverse events.

The spinal subdural hematoma (SSDH)⁸ is an emergency situation and its prompt recognition and treatment are mandatory. In spite of the currently available imaging techniques, the delay in the recognition of the SSDH and the precision of the ideal diagnostic method are obstacles to be overcome. The main causes of this severe diagnosis are the use of oral anticoagulants, iatrogenic event during lumbar puncture, spinal trauma and tumors.

The clinical presentation varies from localized symptoms, vesical dysfunction, to unspecific symptoms such as lumbar pain, mimicking lumbosciatic syndrome. The extension of the hematoma, as well as its location in relation to the spinal cord, can lead to medullary compression syndrome and irreversible damage to the spinal cord, secondary to ischemia. The main

Mailing address: Uri Adrian Prync Flato •
Rua Artur de Almeida, 167 - Vila Mariana - 04011-080 - São Paulo, SP - Brazil
E-mail: uriflato@cardiol.br
Manuscript received July 18, 2008; revised manuscript received Augusto 27, 2008; accepted August 27, 2008.



Figure 1 - A - CT of normal cervical column; B- MRI: hyper-signal at saccular T2, located at C5-C6 and C6-T1 (arrows); associated image with intramedullary hyper-signal at C1-C2, corresponding to the medullary ischemia.

Chart 1 - Conducts suggested by the 8th edition of the American College of Chest Physicians (Directives based on Clinical Evidence)

Therapeutic index (INR)- clinical presentation	Intervention
INR > therapeutic dose, but < 5; absence of bleeding	Withdraw the next dose or reduce dose and monitor more frequently
INR > 5 < 9; absence of bleeding	Withdraw the next two doses, monitor more frequently (suggested within 24 h) and use vitamin K (oral), from 1 to 2.5 mg in patients at high risk of bleeding
INR > 9; absence of bleeding	Withdraw VKA, monitor within 24 h, use high doses of Vitamin K (oral), 2.5 to 5 mg, expecting to reduce INR within 24 h; if necessary, use additional dose of Vitamin K
INR > 10, severe bleeding*	Withdraw VKA and use 10 mg of intravenous vitamin K (slow infusion) associated to fresh frozen plasma or Cryoprecipitate or recombinant Factor VII
Life-threatening bleeding**	Withdraw VKA and use 10 mg of intravenous vitamin K (slow infusion) associated to fresh frozen plasma or Cryoprecipitate or recombinant Factor VII

INR - international normalized ratio; * severe bleeding - central nervous system or retroperitoneal bleeding that requires hospital admission and blood transfusion; ** life-threatening bleeding - bleeding that requires surgical or angiographic intervention, presents with cardiorespiratory arrest and irreversible sequelae.

factors related to irreversible spinal cord injury are: time of medullary compression (start of the symptoms > 12 hours) and the delay in the surgical treatment for decompression. The gold standard for the diagnosis of medullary structure alterations is the magnetic resonance imaging (MRI)^{9,10}; usually, it is impossible to differentiate between spinal subdural and epidural hematomas in their hyperacute phases (< 12 hours); however, through the multiplane reconstruction one can visualize, through sagittal slices, its entire head-caudal extension.

The therapeutic options described in the literature in cases of SSDH are: initial reversion of the precipitating cause, such as total reversion of the anticoagulation, decompressive surgical treatment (laminectomy, incision in the dura-mater and thrombus removal), percutaneous drainage and/or conservative treatment.

Conclusion

This case demonstrates the impact of hypercoagulation on

an octogenarian individual, associated to a rare complication, difficult to diagnose and that requires rapid interventions. We conclude that the suspicion of medullary involvement in anticoagulated patients that present minimal neurological symptoms must be considered, particularly when safety ranges of INR values (2-3,5) are above the expected ones.

Potential Conflict of Interest

No potential conflict of interest relevant to this article was reported.

Sources of Funding

There were no external funding sources for this study.

Study Association

This study is not associated with any post-graduation program.

References

1. Go AS, Hylek EM, Phillips KA, Chang Y, Henault LE, Selby JY, et al. Prevalence of diagnosed atrial fibrillation in adults: national implications for rhythm management and stroke prevention; the AnTicoagulation and Risk Factors in Atrial Fibrillation (ATRIA) Study. *JAMA*. 2001; 285: 2370-5.
2. Schulman S, Beyth RJ, Kearon C, Levine MN; American College of Chest Physicians. Hemorrhagic complications of anticoagulant and thrombolytic treatment*American College of Chest Physicians Evidence-Based Clinical Practice Guidelines (8th Edition). *Chest*. 2008; 133 (6 Suppl.): 257S-298S.
3. Risk factors for stroke and efficacy of antithrombotic therapy in atrial fibrillation: analysis of pooled data from five randomized controlled trials. *Arch Intern Med*. 1994; 154: 1449-57.
4. Abdelhafiz AH, Wheelton NM. Results of an open-label, prospective study of anticoagulant therapy for atrial fibrillation in an outpatient anticoagulation clinic. *Clin Ther*. 2004; 26: 1470-8.
5. Beyth RJ, Quinn LM, Landefeld CS. Prospective evaluation of an index for predicting the risk of major bleeding in outpatients treated with warfarin. *Am J Med*. 1998; 105: 91-9.
6. Hart RG, Pearce LA, Aguilar, MI. Adjusted-dose warfarin versus aspirin for preventing stroke in patients with atrial fibrillation. *Ann Intern Med*. 2007; 147: 590-2.
7. Ansell J, Hirsh J, Hylek E, Jacobson A, Crowther M, Palareti G, et al. Pharmacology and management of the vitamin K antagonists. American College of Chest Physicians Evidence-Based Clinical Practice Guidelines (8th Edition). *Chest*. 2008; 133: 160S-198S.
8. Braun P, Nogués-Melendez P, Fornas G, Guijarro C, Latorre O. Hyper acute spinal subdural haematoma: MRI features in two cases. *Eur J Radiol Extra*. 2005; 55: 5-10.
9. Post MJ, Becerra JL, Madsen PW, Puckett W, Quencer RM, Bunge RP. Acute spinal subdural haematoma: MR and CT findings with pathologic correlates. *Am J Neuroradiol*. 1994; 15 (10): 1895-905.
10. Pedraza Gutiérrez S, Coll Masfarré S, Castaño Duque CH, Suescún M, Rovira Cañellas A. Hyper acute spinal subdural haematoma as a complication of lumbar spinal anaesthesia: MRI. *Neuroradiology*. 1999; 41: 910-4.