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Case Report

Spontaneous spinal epidural hematoma: Magnetic resonance imaging for diagnosis and patient management in two cases

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As far as operative indications for spinal epidural hematoma are concerned, symptoms and duration from onset are thought to be quite important. However, magnetic resonance imaging (MRI) intensity of the hematoma could be a key factor in determining the need for operative intervention. Here, we discuss two cases of spinal epidural hematoma. One was the operative case of a 71-year-old man who presented with left leg paresis. On the initial spinal MRI, a low-iso T1-weighted image (WI) showed a slight high-iso T2WI heterogenous intensity and a thick epidural mass that had compressed the spinal cord dorsolaterally from the C7 to T5 levels. The mass was diagnosed as a cervicothoracic epidural hematoma in the acute phase as coagulation seemed to be starting. Five hours after presentation, his symptoms evolved into complete paraplegia; therefore, decompression laminectomy and hematoma evacuation was performed. The other case was that of a 68-year-old woman with severe neck pain. The initial MRI demonstrated a T1WI iso, T2WI high homogenous intensity epidural mass from the C2 to T4 levels. A spinal epidural hematoma in the hyperacute phase was diagonesd. Conservative treatment was recommended, and her symptoms and hematoma almost disappeared within three days. When coagulation or organization of the hematoma has not started, its absorption might be expected at an early stage. MRI appearances, including hematoma intensity, combined with simultaneous clinical information might be very important for surgical decision making and predicting prognosis in cases of spinal epidural hematomas.

Key words: Spinal epidural hematoma, MRI intensity, surgical decision making.

INTRODUCTION

Spinal epidural hematomas, which usually occur in the cervical and thoracic regions, are comparatively rare pathologies causing compression of the spinal cord. Patients with this condition often require emergency attention because the hematomas can trigger acute neurological deficits (Hsieh et al., 2006; Miller et al., 2010). However, there are some cases in which patients demonstrate only mild neurological deficits or

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non-progressive deficits, and can be treated conservatively. Particularly, some spinal epidural hematoma cases with rapid clinical and radiological resolution have been reported (Buyukkaya et al., 2014; Kim et al., 2005). A patient with rapid hematoma resolution and another with progressive deficits requiring surgical intervention were encountered. These two cases suggested the importance of hematoma properties and intensity on MRI in the process of surgical decision making.

CASE REPORTS

Case 1

A 71-year-old man presented with a chief complaint of paraplegia. Initially, he suffered from sudden left leg paresis and had gone to another hospital. Brain computed tomography (CT) was performed, and no abnormality was found. Right leg paresis developed about 4 h later. On admission, he showed manual muscle testing (MMT) grade 2 paresis below both iliopsoas muscles. He also had hypesthesia below his mammary region. His past medical history was significant for hypertension, atrial fibrillation and cardiogenic cerebral embolism, and he was being treated with oral aspirin and warfarin (coumadin 2 mg daily). Spinal MRI at that time demonstrated a T1WI low-iso, T2WI slight high-iso intensity thick epidural mass mass measuring maximum 10×12 mm in the axial plane that had compressed the spinal cord dorsolaterally from the C7 to T5 levels (Figure 1). Judging from the MRI, it was thought that this represented a cervicothoracic epidural hematoma in the acute phase as coagulation was beginning. His blood pressure was 166/100 mmHg and his prothrombin time and international normalised ratio were 59.9 seconds and 2.74, respectively. The coumadin was stopped and 20 mg of menatetrenone was injected to reverse the anticoagulant effect. Because his symptoms progressed to complete paraplegia about 5 h after his arrival, hematoma removal was performed another 3 h later. Laminectomy from C7 to T4 was done, and a hard, dark hematoma was completely resected. There was no apparent vascular malformation. Although, the patient went through rehabilitation for six months, his MMT grade 2 paraplegia and bladder dysfunction remained.

Case 2

A 68-year-old woman came to our hospital with severe, sudden neck pain. She was just sitting and listening to a song without any abnormal neck movement at the time. Her blood presssure on admission was 164/75 mm Hg, and her prothrombin time and international normalised ratio were 69.7 s and 1.20, respectively. Her platlet count was normal. She had no chronic disease such as hypertension, and no medication such as anticoagulant drugs. She had no loss of sensation or other deficits on admission. Brain CT showed no intracranial hemorrhage. Spinal MRI one hour after the onset demonstrated a T1WI iso-, T2WI high-intensity homogenous intensity epidural mass measuring maximum 8×9.5 mm in the axial plane from the C2 to T4 levels compressing the spinal cord (Figure 2). A spinal epidural hematoma in the hyperacute phase was diagnosed. She was followed up without surgical intervention. Her neck pain decreased substantially the following day, and it disappeared within three days after admission. Most of the hematoma regressed on her follow-up MRI obtained almost three days after the initial MRI (Figure 3). Later, cranial and spinal angiography were performed, and no abnormal vascular malformation was detected. She was discharged at two weeks.

DISCUSSION

Spinal epidural hematomas are classified mainly into two categories—hematoma without an identified etiology, that is, “spontaneous,” or hematoma with an identified etiology, such as hemophilia, neoplasia, arteriovenous malformation, trauma, postoperative complications or anticoagulation therapy (Beatty and Winston, 1984). Many of these spontaneous epidural hematomas may result from coughing, sneezing, or straining, which may cause the transmission of increased pressure from abdominal or thoracic veins to the subdural venous plexus via valveless connecting vessels (Anderson and Donaldson, 1989). On the other hand, some authors have supposed the spinal artery is the ruptured vessel because the pressure in the venous plexus is lower than that in the epidural space, and clinically deteriorating neurological deficits occur rapidly (Beatty and Winston, 1984).

The commonly recommended treatment for spinal epidural hematoma is surgical decompression. In the case of a patient with neurologically progressive deficits, immediate decompression is thought to be very important. However, several authors have reported cases of spontaneous recovery, including both spontaneous and traumatic spinal epidural hematomas (Aoki et al., 2012; Buyukkaya et al., 2014; Kim et al., 2005; Hentschel et al., 2001). In particular, there are some cases of rapid hematoma resolution. Buyukkaya et al. (2014), reported a 46-year-old patient with a C5-T1 nontraumatic epidural hematoma with spontaneous resolution within 48 h, both clinically and radiologically. Kim et al. (2005), also presented a case of a patient with traumatic cervical epidural hematoma with early neurological improvement on the first day and resolution of the dorsal epidural hematoma within three days. With regard to the mechanism of spontaneous resolution, Inamasu et al.

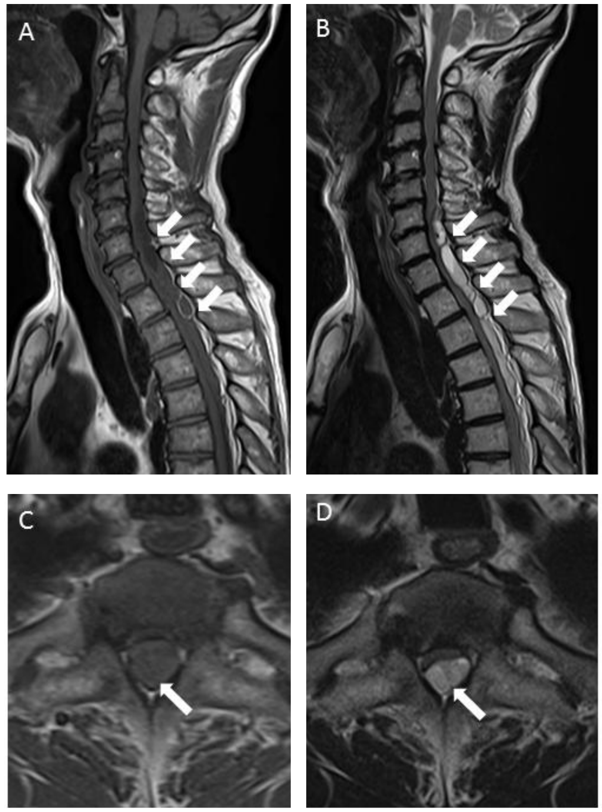


Figure 1. The T1- (A, C) and T2- (B, D) weighted images of the initial spinal MRI show a thick epidural hematoma compressing the spinal cord dorsolaterally. C and D are axial images of the T1 level. There are septa in the hematoma (arrows) and hematoma showed mixed intensities both in T1 and T2 images

(2000), suggested that leakage of the liquid hematoma through the intervertebral foramen leads to spontaneous decompression of the spinal neural structures. Other study (Hentschel et al., 2001) think that spread of the hematoma along the spinal epidural space, is a plausible explanation for spontaneous recovery.

This "spreading theory" was supported by a study performed by Groen (2004) who reported that the mean length of the hematoma was significantly higher in nonoperative cases compared to operative cases of spontaneous spinal epidural hematoma (5.4 versus 4.2 vertebral segments). Based on this study, it is believe that MRI appearances and intensity of the hematoma are very important in predicting "spreading" and "resolution". Table 1 shows the progression of MRI intensity of a hematoma over time. In the first 24 h after the onset of symptoms, spontaneous spinal epidural hematoma is usually isointense on T1-weighted images and hyperintense on T2-weighted images, compared to the spinal cord (Lovblad et al., 1997). Soon after, the hematoma gives slightly decreased signal intensity on T1-weighted images and is hypointense on T2-weighted images, reflecting the presence of deoxyhemoglobin, which represents the beginning of coagulation.

The mixed-intensity and multilocular hematoma seen on the MRI in Case 1 suggested that coagulation was progressing, and we could not expect more hematoma "spreading" or early "resolution." Symptoms of the patient at that time were also progressing, so immediate decompression was needed. Consequently, surgical decompression should have been performed earlier than we did in this case. On the other hand, Case 2 showed a "spreading" homogenous hematoma in the hyperacute phase, which indicated that early "resolution" could still be expected. If any new neurological deficits had arisen, immediate follow-up MRI would have been necessary to confirm the intensity of the hematoma. Except for MRI, myelography and CT can be used to diagnose spinal epidural hematomas. Myelography shows a narrowing of the contrast dye, and CT shows an epidural bleed as a hyperdense mass. However, both of them are limited utility in terms of differential diagnosis, and cannot be used to determine when bleeding commenced compared to MRI (Buyukkaya et al., 2014; Boye and Schumacher,

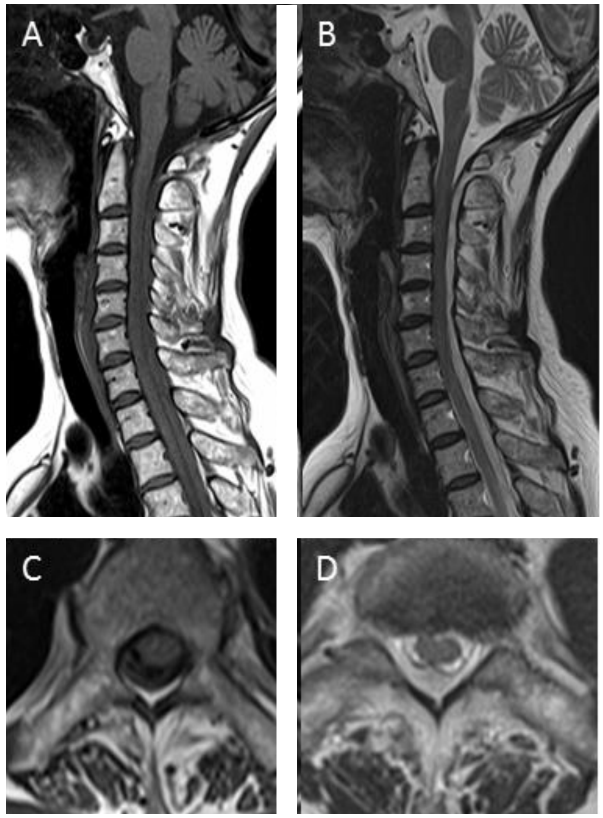


Figure 2. The T1- (A, C) and T2- (B, D) weighted images of the initial spinal MRI show a thick homogenous epidural hematoma compressing the spinal cord dorsally. C and D are axial images of the T1 level.

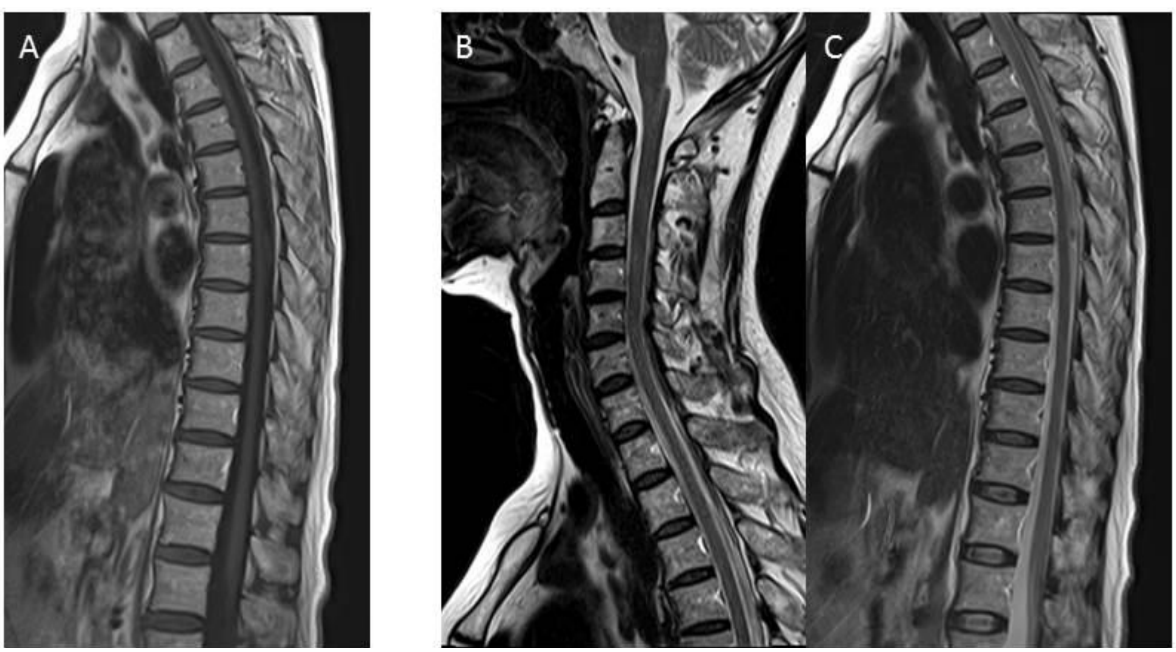


Figure 3. The T1- (A) and T2- (B,C) weighted images of the spinal MRI 67 h from the onset, demonstrate nearly complete resolution of the hematoma.

Table 1. Progression of MRI Intensity of hematomas over time and relationship between hemoglobin.

Parameter	Hyperacute	Acute	Subacute		Chronic
Hb	Oxy-	Deoxy-	Met-	Free met-	Hemosiderin
T1	→	↘	↑	↑	↓
T2	↑	↓	↓	↑	↓

Hb：hemoglobin.

2009). Therefore, it is believe that MR imaging can provide useful information about the age and appearances of epidural spinal hematomas.

Conclusion

Comparison of these two cases suggests that MRI appearances and intensity of a hematoma could be an important factor in surgical decision making for the treatment of spinal epidural hematomas. MRI reveals the position, size, and location of the lesion, and provides information about the degree of spinal cord compression. Combined with simultaneous clinical information, it is believed this will help neurosurgeons make appropriate surgical decisions.

Conflict of interests

The authors have not declared any conflict of interests.

REFERENCES

Anderson TJ, Donaldson IM (1989). Spontaneous resolution of cervical spinal epidural haematoma. Postgrad Med. J. 65:488-490.

Aoki Y, Yamagata M, Shimizu K, Ikeda Y, Nakajima F, Ohtori S, Takahashi K (2012). An unusually rapid spontaneous recovery in a patient with spinal epidural hematoma. J. Emerg. Med. 43(2):e75-79.

Beatty RM, Winston KR (1984). Spontaneous cervical epidural hematoma. A consideration of etiology. J. Neurosurg. 61:143-148.

Boye S, Schumacher J (2009). Diagnosis of vertebral canal haematoma by myelography and spiral computer tomography in a patient with an implantable cardioverter-defibrillator contraindicating magnetic resonance imaging. Br. J. Anaesth. 103(1):137-138..

Buyukkaya R, Aydin O, Hakyemez B, Seref D (2014). Rapid spontaneous recovery after development of a spinal epidural hematoma: A case report. Am. J. Emerg. Med. 32(3):291.e1-3.

Groen RJ (2004). Non-operative treatment of spontaneous spinal epidural hematomas: a review of the literature and a comparison with operative cases. Acta. Neurochir. (Wien) 146:103-110.

Hentschel SJ, Woolfenden AR, Fairholm DJ (2001). Resolution of spontaneous spinal epidural hematoma without surgery: report of two cases. Spine (Phila Pa 1976) 26:E525-527.

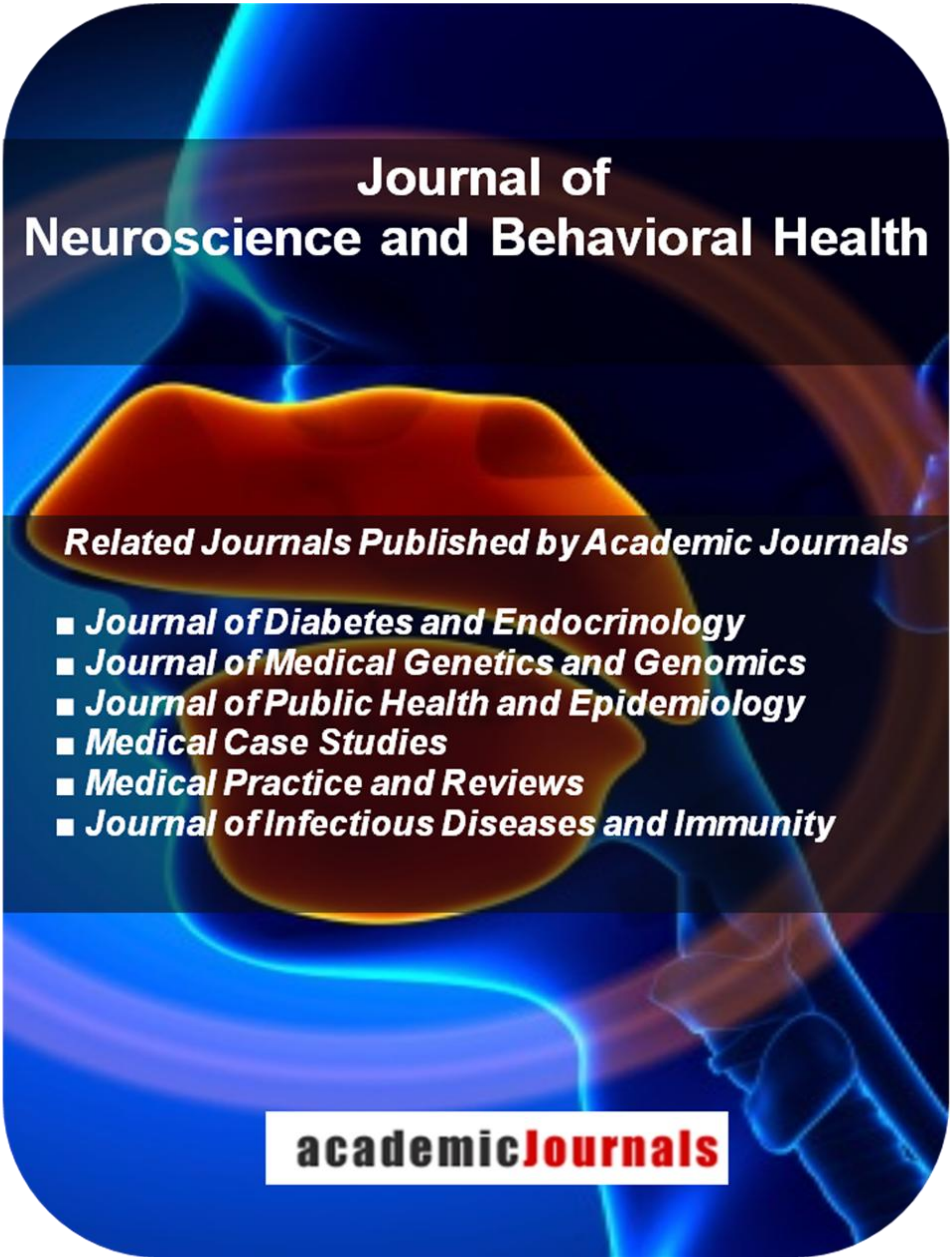
Hsieh CT, Chang CF, Lin EY, Tsai TH, Chiang YH, JU DT (2006). Spontaneous spinal epidural hematomas of cervical spine: report of 4 cases and literature review. Am. J. Emerg. Med. 24(6):736-740.

Inamasu J, Hori S, Aoki K, Aikawa N, Maruiwa H, Toyama Y (2000). Spontaneous spinal epidural hematoma. Am. J. Emerg. Med. 18:837-9.

Kim IY, KIM SH, KIM JH, LEE JK (2005). Rapid spontaneous resolution of a traumatic cervical epidural haematoma. Br. J. Neurosurg. 19:451-2.

Lovblad KO, Baumgartner RW, Zambaz BD, Remonda L, Ozdoba C, Schroth G (1997). Nontraumatic spinal epidural hematomas. MR features. Acta. Radiol. 38(1):8-13.

Miller JB, Khalsa G, Vohra T (2010). Spontaneous spinal epidural hematoma presenting as flank pain and constipation. Am. J. Emerg. Med. 28(4):536.e3-5.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