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# Spinal cord intramedullary hemorrhage (hematomyelia) after use of sildenafil: A very rare complication

## Çok nadir bir komplikasyon; Sildenafil kullanımı sonrasi gelişen spinal kord intramedüller kanaması (hematomiyeli)

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**Abstract**
Sildenafil's complications include intracranial hemorrhage along with others, however, spinal cord intramedullary hemorrhage (Hematomyelia) after using sildenafil has not been previously reported. We herein present the case of a 50-year-old male patient who was referred to the Neurology department with pain and numbness radiating to the left arm after use of sildenafil. He was diagnosed with hematomyelia after various diagnostic tests. Other pathologies that might have caused hematomyelia were ruled out.
**Keywords**: Intramedullary hemorrhage, Hematomyelia, Cervical cord, Sildenafil

**Öz**
Sildenafil kullanımının çeşitli komplikasyonlarının yanında intrakranial kanamaya da neden olduğunu gösteren olgular bildirilmiş olmasına rağmen, sildenafil kullanımı sonrası spinal kord intramedüller kanaması (Hematomyelia) henüz bildirilmemiştir. Bu olguda, sildenafil kullandıktan sonra sol kola yayılan ağrı ve uyuşukluk şikayetleri ile nöroloji kliniğine başvuran 50 yaşında erkek hastadan bahsedildi. Görüntüleme yöntemlerinden sonra hematomiyeli tanısı aldı. Sildenafil kullanımı dışında hematomiyeliye neden olabilecek diğer patolojiler ekarte edildi.
**Anahtar kelimeler**: İntramedüller kanama, Hematomiyeli, Servikal kord, Sildenafil

## Introduction

Sildenafil (UK-92,480), an orally active, selective inhibitor of phosphodiesterase type 5 (PDE-5), is a crucial regulator of cyclic guanosine monophosphate (cGMP). Its initial target at manufacturing was the corpus cavernosum in males. It causes muscle relaxation, vasodilatation, and penile erection by increasing cGMP and nitrous oxide (NO) in the smooth muscle of the corpus cavernosum [1]. Side effects include flushing, headache, nasal congestion, and changes in pulmonary blood flow, which shows that the vasodilatory effects are not confined to the corpus cavernosum [2,3]. Despite the lack of evidence confirming the exact cause of bleeding, there is enough data to suggest that sildenafil can cause the atraumatic hematomyelia [4-6]. Spinal cord intramedullary hemorrhage (Hematomyelia) after sildenafil use has not yet been reported. We herein present the case of a 50-year-old male patient who was referred to the Neurology department with pain and numbness radiating to the left arm after use of sildenafil. He was diagnosed with intramedullary hemorrhage of the cervical cord (hematomyelia) after various diagnostic tests.

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## Case presentation

A fifty-year-old male patient was admitted to the Neurology Department with neck pain radiating to the left arm and shoulder and numbness which started 7-8 days ago after using 100 mg sildenafil thrice at short intervals. The physical examination and laboratory tests were normal. Cervical computerized tomography (CT) imaging revealed hyperdense intramedullary hemorrhage at between C2-C6 levels (Figure 1). Cervical magnetic resonance imaging (MRI) was recommended for differential diagnosis, which revealed subacute intramedullary hemorrhage with hyperintense, non-restricted lesions extending between C2-C6 levels in T1, T2 and diffusion-weighted images (Figure 2-3) respectively, which were non-enhancing after administration of intravenous contrast agent (IVCA). Lumbar puncture (LP) was performed for cytological examination, in which there were no significant findings. Contrast-enhanced cranial MRI performed for demyelinating disease showed no pathology, and all markers were negative for vasculitis. Steroid pulse therapy was planned for 7 days. The patient's complaints regressed after medical treatment and the control cervical MRI obtained after ten days showed a decrease in the hemorrhage. He was then discharged with recommendations (Figure 4). Follow-up MR imaging after 4 weeks showed that intramedullary hemorrhage had decreased, and cord swelling had resolved. Dual phase CT imaging did not reveal any vascular anomalies. Consequently, this case was evaluated as a complication of sildenafil use. The patient's complaints had completely resolved after 9 months and follow-up cervical MRI showed a significant decrease in hemorrhagic findings (Figure 5).

Figure 1: Non contrast enhanced cervical CT (sagittal image) showed hyperdense intramedullary hemorrhage between C2-6 levels (arrows)

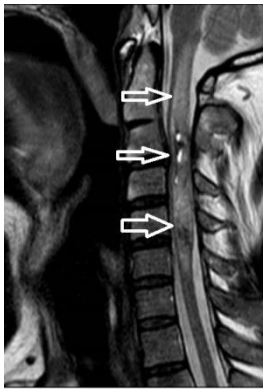

Figure 2: Sagittal T2-weighted magnetic resonance images of the cervical spine demonstrating intramedullary hemorrhage between C2-6 levels with abnormally increased T2 signalling and expansion of the cord (arrows)

Figure 3: Sagittal T1-weighted magnetic resonance images of the cervical spine demonstrating intramedullary hemorrhage between C2-6 levels with abnormally increased T1 signaling and expansion of the cord (arrows)

Figure 4: Sagittal magnetic resonance image of the cervical spine showing decreased intramedullary hemorrhage and expansion between C2-6 levels

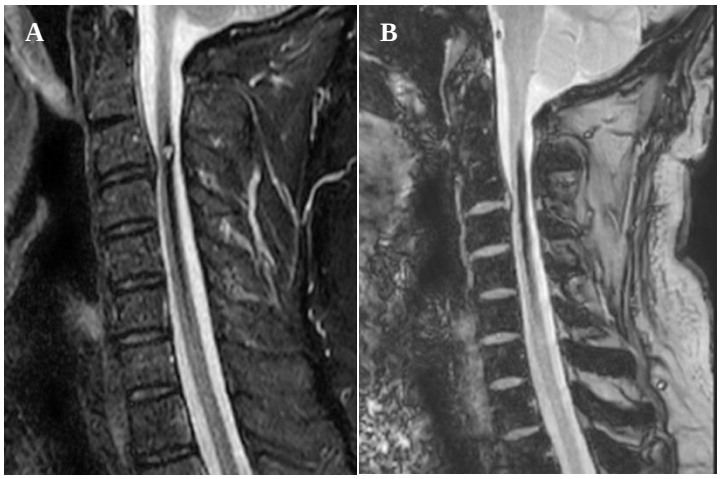


Figure 5: Follow-up magnetic resonance image, A, B: Sagittal STIR and T2-Gradient Echo resonance images of the cervical spine showing hypointense areas due to hemosiderin deposition in the old intramedullary hemorrhage area

## Discussion

Intraspinal hemorrhage is much less common than intracranial hemorrhage and may present as epidural, subdural, subarachnoid, or intramedullary bleeding with devastating consequences. Intramedullary hemorrhage, also known as hematomyelia, is the rarest form of intraspinal hemorrhage [7]. Since the first report of spontaneous hematomyelia by Richardson, few other case reports of hematomyelia have been described, most in relation to anticoagulant treatment [8].

Spinal cord hematoma or hematomyelia is an infrequently encountered condition that is the result of several unusual disease processes. The causes of spontaneous, nontraumatic spinal cord hematoma most commonly include vascular malformations of the spinal cord, followed by clotting disorders, inflammatory myelitis, spinal cord tumors, abscess, syringomyelia, and unknown etiologies [9,10].

Sildenafil (UK-92,480), an orally active, selective inhibitor of phosphodiesterase type 5 (PDE-5), is a crucial regulator of cyclic guanosine monophosphate (cGMP) and causes muscle relaxation, vasodilatation, and penile erection by increasing cGMP and nitrous oxide (NO) in the smooth muscle of the corpus cavernosum [1]. This drug also redistributes the arterial flow and decreases perfusion, which may lead to acute myocardial infarction. For the above-mentioned reasons, it lowers systolic blood pressure by 8 to 10 mmHg in clinical trials [11].

The enzyme inhibited by the drug, cyclic guanosine monophosphate-specific phosphodiesterase type 5 (PDE5), is

present at several other sites than the corpus cavernosum. Known side-effects of vascular smooth muscle relaxation caused by sildenafil include headache in 16%, facial flushing in 10%, and hypotension and dizziness in 2% of patients [2]. In-vitro research suggests that sildenafil can also inhibit PDE5-induced platelet aggregation [12].

In this case, we excluded the common causes of atraumatic hematomyelia, including vascular malformations (arteriovenous fistula, cavernoma, capillary telangiectasia, venous angioma), neoplasms, Gowers' intrasyringal hemorrhage, spinal radiation, coagulation and bleeding disorders [13,14], concluding that the hematomyelia of the patient was a complication of multiple sildenafil use in a short period of time.

Sildenafil is a potentially dangerous drug that can provoke life-threatening intracranial and subarachnoid hemorrhage. To the best of our knowledge, this case report presents the first case of hematomyelia after using sildenafil.

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