Ann Med Res

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Annals of Medical Research

journal page: annalsmedres.org

Intraventricular migration of intraocular silicone oil: A rare case with computed tomography and magnetic resonance imaging findings

Ali Salbas [a],*, Bilgenur Aksoy [a], Mustafa Fazil Gelal [a]

[a]*Izmir Katip Celebi University, Ataturk Training and Research Hospital, Department of Radiology, Izmir, Türkiye*
**Corresponding author: dralisalbas@gmail.com (Ali Salbas)*

Cite this article as: Salbas A, Aksoy B, Gelal MF. Intraventricular migration of intraocular silicone oil: A rare case with computed tomography and magnetic resonance imaging findings. *Ann Med Res*. 2025;32(11):518–520. doi: 10.5455/annalsmedres.2025.08.215.

ABSTRACT

Intraocular silicone oil (SiO) is widely used as a long-term internal tamponade agent in the surgical treatment of various vitreoretinal disorders. A rare but diagnostically critical complication of SiO is its migration into the brain ventricles. Although few such cases have been reported, this condition may mimic serious pathologies, such as intraventricular hemorrhage. In this case report, intraventricular migration of SiO was identified in an 81-year-old woman with a history of vitreoretinal surgery for diabetic retinopathy–related retinal detachment. The patient presented with dizziness, imbalance, and nausea, and neuroimaging revealed hyperdense layering within the bilateral frontal horns on noncontrast brain computed tomography. These findings may mimic acute intraventricular hemorrhage, highlighting the importance of clinical and radiological correlation for accurate differential diagnosis. Additionally, the patient was concurrently diagnosed with a cerebellar infarction. Awareness of this rare complication may help prevent unnecessary interventions and potential treatment errors in patients presenting with stroke-like symptoms.

Keywords: Intraventricular migration, Silicone oil, Retinal surgery, Intraventricular silicone oil, Neuroimaging

Received: Aug 04, 2025 **Accepted:** Oct 27, 2025 **Available Online:** Nov 25, 2025

INTRODUCTION

Intraocular silicone oil (SiO) is a material widely used as a long-term internal tamponade in the surgical treatment of various vitreoretinal diseases, particularly complicated retinal detachments [1,2]. Its primary indications include proliferative vitreoretinopathy, retinal detachments secondary to diabetic retinopathy, and traumatic retinopathies [2]. The viscosity of SiO and the duration it remains in the eye are key factors that directly influence the risk of developing complications [1]. The most frequently reported ocular complications are cataract, glaucoma, keratopathy, and silicone oil emulsification [2]. The migration of SiO into the ventricular system is another rare but diagnostically important complication [3].

Williams et al first reported the migration of SiO into the ventricles in 1999 [4]. A recent review noted that to date, only 32 cases of intraventricular SiO migration have been reported in the literature [5].

SiO intraventricular migration is mostly asymptomatic and is often incidentally detected during brain imaging performed for unrelated reasons [3]. However, on computed tomography (CT), it may appear as hyperdense layering that can mimic intraventricular hemorrhage (IVH), posing a risk for misdiagnosis and potentially unnecessary interventions [6]. Therefore, a history of previous vitreoretinal surgery plays a critical role in accurately interpreting these imaging findings.

In this case report, we present the intraventricular migration of SiO in a patient with a history of vitreoretinal surgery for diabetic retinopathy-related retinal detachment, who was simultaneously diagnosed with cerebellar infarction. The findings were demonstrated using CT and magnetic resonance imaging (MRI). Given the limited number of reported cases in the literature, this rare complication is shared for its potential to contribute to radiologic differential diagnosis and to emphasize its importance in clinical awareness. This case was considered worthy of reporting because it illustrates the concurrent intraventricular migration of silicone oil and cerebellar infarction, an uncommon coexistence that may lead to confusion in the diagnosis in the emergency setting. Furthermore, the case provides comprehensive radiologic correlation with both CT and MRI findings, reinforcing the value of

multimodality imaging in differentiating silicone oil migration from acute hemorrhagic conditions.

CASE REPORT

An 81-year-old woman presented to the emergency department with a 2-day history of nausea, dizziness, and imbalance. Her medical history included bilateral hip prosthesis surgery, hypertension, and type 2 diabetes mellitus. On physical examination, the patient's gait was ataxic toward the right. Laboratory findings were unremarkable. Electrocardiography (ECG) and transthoracic echocardiography revealed no pathological findings suggestive of a cardioembolic ischemic stroke.

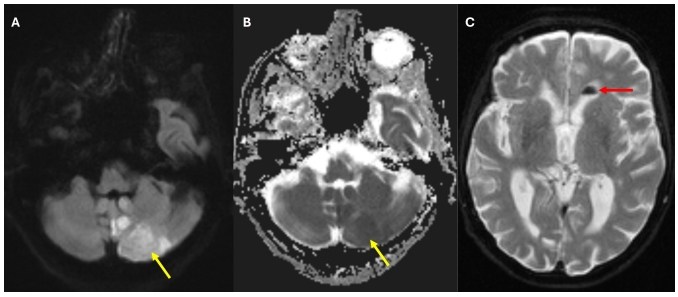

Figure 1. (A) Diffusion-weighted imaging (DWI) and (B) apparent diffusion coefficient (ADC) maps demonstrate diffusion restriction in the left cerebellar hemisphere within the territory of the posterior inferior cerebellar artery (PICA), consistent with early-stage infarction (yellow arrows). (C) Axial DWI (b = 0) sequence reveals a non-dependent, layering hypointense area in the frontal horn of the left lateral ventricle (red arrow), suggestive of migrated intraventricular silicone oil. DWI, diffusion-weighted imaging; ADC, apparent diffusion coefficient.

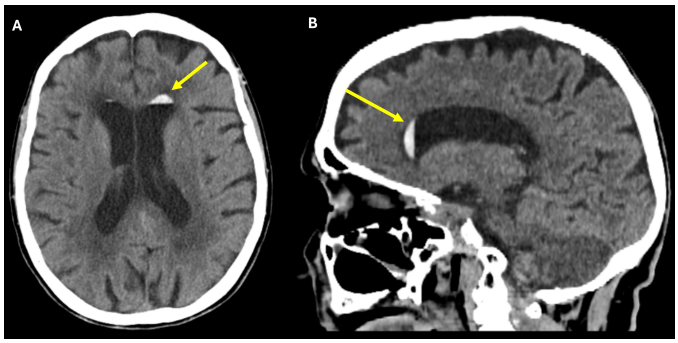

Figure 2. Non-contrast axial (A) and sagittal (B) computed tomography images show a non-dependent, layering hyperdense material in the frontal horn of the left lateral ventricle (yellow arrows). Given that the scan was acquired in the supine position, this appearance is considered atypical for intraventricular hemorrhage.

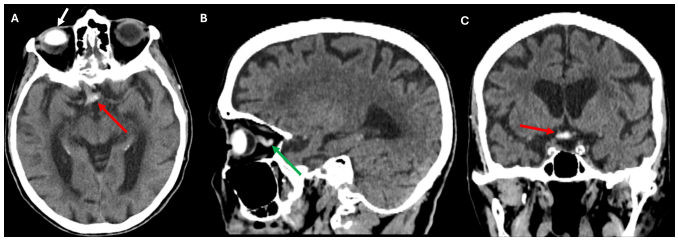

Figure 3. Noncontrast axial (A), sagittal (B), and coronal (C) computed tomography images. Hyperdense intraocular material consistent with silicone oil is observed in the right globe (white arrow, A). Hyperdense foci representing migrated silicone oil are observed at the optic chiasm level (red arrows, A and C). In addition, a hyperdensity consistent with silicone oil is observed along the right optic nerve course (green arrow, B).

Diffusion-weighted imaging (DWI) on MRI revealed diffusion restriction in the left cerebellar hemisphere, consistent with an early-stage infarction in the posterior inferior cerebellar artery (Figure 1). Additionally, a non-dependent, layering hypointense area was observed in the frontal horn of the left lateral ventricle on both apparent diffusion coefficient (ADC) and DWI (b = 0) sequences. Non-contrast brain CT revealed hyperdense layering within the frontal horns of the bilateral lateral ventricles (Figure 2). In the supine-positioned scans, the localization of the layering in the frontal horns was considered atypical for IVH. This hyperdensity was observed to extend along the optic chiasm and the right optic nerve (Figure 3). The presence of hyperdense surgical material within the right bulbus oculi prompted a more detailed investigation of the patient's ophthalmological history. According to the information obtained, approximately 7 years prior, the patient had undergone vitreoretinal surgery at another institution due to tractional retinal detachment secondary to diabetic retinopathy, during which intraocular SiO was injected as a tamponade agent.

On the basis of these findings, it was concluded that SiO within the bulbus oculi had migrated along the optic nerve sheath into the subarachnoid space and subsequently into the intraventricular system. Because the patient presented beyond the accepted time window for intravenous tissue plasminogen activator (tPA) administration, no thrombolytic therapy was initiated. Instead, treatment was continued with 100 mg/day acetylsalicylic acid.

No stroke-related complications developed during six-day hospitalization. The patient was discharged with appropriate recommendations with stable neurological and general condition. A signed informed consent form was obtained from the patient on May 15, 2025. This case report was prepared following the CARE (CAse REport) Guidelines [7,8].

DISCUSSION

Although the intraventricular migration of intraocular SiO is a rare complication, it holds critical diagnostic significance. To date, this condition has been reported in the literature in a few cases [5]. Although the lateral ventricles are the most commonly involved sites, cases with involvement of the third and fourth ventricles have also been described [3].

According to the literature, intraocular SiO migration following ocular injection typically occurs over a period ranging from several months to years (6–120 months). It is usually incidental and asymptomatic [3]. However, on radiological imaging, it may appear as hyperdense layering that can mimic intraventricular hemorrhage, posing a significant diagnostic

https://doi.org/10.5455/annalsmedres.2025.08.215

pitfall—particularly for radiologists, neurosurgeons, and neurologists. In our case, intraventricular migration of silicone oil following vitreoretinal surgery for diabetic retinopathy-related retinal detachment was identified through both CT and MRI. On CT scans, the hyperdense materials observed within the ventricles exhibited characteristic features such as nondependent positioning, providing important clues for differential diagnosis.

These findings can mimic acute hemorrhage due to their similar density, as overlapping Hounsfield Unit (HU) values may complicate the diagnostic process. However, radiological features, such as a globular shape, mobility, and nondependent positioning within the ventricle, are valuable clues for differential diagnosis [3,5]. In addition, the presence of a chemical shift artifact on MRI is considered a significant indicator of intraventricular SiO [9]. Therefore, in patients with a history of vitreoretinal surgery and intraocular SiO injection, the combined assessment of CT and MRI findings is crucial when hyperdense intraventricular lesions are observed, as it significantly impacts clinical management.

A detailed medical history regarding prior vitreoretinal surgery is of critical importance for diagnostic accuracy in elderly patients presenting to the emergency department with stroke-like symptoms. This is because intraventricular SiO can be misinterpreted as intraventricular hemorrhage , potentially leading to the contraindication of thrombolytic therapies such as intravenous tPA. Such a misdiagnosis may result in a fundamental error that significantly alters the patient's treatment course. Although tPA was not indicated in the presented case, overlooking this differential diagnosis in similar clinical scenarios may lead to inappropriate treatment planning. Written informed consent for publication of this case report and accompanying images was obtained from the patient.

CONCLUSION

In conclusion, although the intraventricular migration of SiO is extremely rare, it presents with characteristic and distinguishable radiological features when recognized. Careful correlation of clinical history with imaging findings is essential to avoid misdiagnosis with serious conditions, such as intraventricular hemorrhage, thereby reducing unnecessary interventions and treatment-related errors.

Informed Consent: Written informed consent for publication and accompanying images was obtained from the patient.

Peer-review: Externally peer-reviewed.

Author Contributions: Concept/Design: A.S and B.A.; Data Collection/Processing: A.S., M.F.G and B.A.; Analysis/Interpretation: A.S.; Literature Review: A.S and B.A.; Writing: A.S.; Critical Review: A.S. and M.F.G

Conflict of Interest: None declared by the authors.

Financial Disclosure: The authors declare that none.

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https://doi.org/10.5455/annalsmedres.2025.08.215