

Case Report

Kwang-Yeol Park, M.D.¹Young Baeg Kim, M.D.²

A Case of Myelopathy after Intrathecal Injection of Fluorescein

We present a case with seizure, confusion, hypesthesia and paraplegia after intrathecal injection of fluorescein. A 41-year-old man was admitted to our institution for the management of the CSF leakage. Intrathecal injection of fluorescein was performed and he complained of severe pain and numbness in the lower extremities at the end of the injection. Four hours later, he exhibited confusion, paraparesis and two episodes of generalized seizures. Two days later, he showed paraplegia and all sensory modalities below the T12 level were absent. Spine magnetic resonance imaging revealed myelopathic change in the lower thoracic spinal cord. There was no improvement of weakness and sensory deficits in lower extremity even 14 days after fluorescein injection. We speculated that thoracic myelopathy was associated with the intrathecal injection of fluorescein. In spite of its rarity, the complication after intrathecal injection of fluorescein could be serious. Thus, obtaining an informed consent with discussion with patient before the procedure is mandatory.

KEY WORDS : Fluorescein · Intrathecal · Myelopathy.

Departments of Neurology¹
Neurosurgery²
College of Medicine
Chung-Ang University
Seoul, Korea

INTRODUCTION

In patients with a suspected cerebrospinal fluid (CSF) leakage, intrathecal injection of fluorescein has been used to identify the site of the leak for over 40 years^{7,10-12}. Accurate localization of the CSF leakage or the exclusion of the CSF leakage is essential for the management of these patients^{4,5}. However, in spite of its clinical usefulness, fluorescein has not been approved for intrathecal injection for the rare, but serious side effects^{1,5}. Paraparesis, numbness, and seizure are frequently reported to be associated with intrathecal use of fluorescein^{1,2,5,8,10,11,13}. But, myelopathy in patient with intrathecal injection of fluorescein has not been reported.

Here, we report a case of myelopathy after intrathecal injection of fluorescein.

CASE REPORT

A 41-year-old man was admitted to our institution for the management of the CSF leakage. The patient had a brain hemorrhage and multiple fractures due to fall down 19 months prior to admission. He had complained of intermittent watery rhinorrhea and hyposmia since the accident. Orbital computed tomography (CT) revealed a bony defect in the right inferior orbital wall and nasal septal deviation to left. However, the CSF leakage was not evident on endoscopic examination. Because we could not exclude the possibility of the CSF leakage, transnasal endoscopic repair of skull base defect after intrathecal injection of fluorescein (Fluorescite[®], Alcon Laboratories, Inc., Texas, USA) was arranged. He was fit-free although he had been maintained on valproate since his trauma.

A lumbar puncture at L4-5 was performed and 0.5 ml of 10% fluorescein mixed with 5 ml of CSF was injected. At the end of the injection, he complained of severe pain and numbness in the lower extremities. The pain became tolerable after injection of dexamethasone and ketorolac. Thereafter, he underwent endoscopic surgery under general anesthesia and skull base repair was done successfully. Postoperative recovery was uneventful except for the voiding difficulty. Four hours after the fluorescein injection, he exhibited confusion, paraparesis and two episodes of grand mal seizures. The lorazepam and phenytoin were injected intravenously. Although we could not assess motor power exactly due to seizures and lorazepam, he could elevate extremities against gravity. His mental status improved gradually afterwards. Two

- Received : November 19, 2007
- Accepted : November 30, 2007
- Address for reprints :
Young Baeg Kim, M.D.
Department of Neurosurgery
College of Medicine
Chung-Ang University
224-1 Heukseok-dong,
Dongjak-gu, Seoul 156-755, Korea
Tel : +82-2-6299-1607
Fax : +82-2-821-8409
E-mail : ybkim1218@cau.ac.kr



Fig. 1. Two days after intrathecal injection of fluorescein, whole spine magnetic resonance imaging shows ill-defined increased signal intensity in spinal cord on T2-weighted images ranging from T7 to T11 vertebral level (A). Axial scan reveals the intramedullary lesion with an irregular and vague margin (B). There is no evidence of cord swelling or abnormal enhancement (C).

days after the fluorescein injection, a neurologic examination revealed aggravated lower extremity weakness (Medical Research Council grade I). Pain, temperature, position, and vibration sensation were almost absent below the T12 level. The knee jerks and ankle jerks were not elicited and Babinski sign was not noted. Whole spine magnetic resonance imaging (MRI) showed ill-defined increased signal intensity in spinal cord on T2-weighted images ranging from T7 to T11 vertebral level (Fig. 1A). Axial scan revealed the intramedullary lesion with an irregular and vague margin (Fig. 1B). There was no evidence of diffuse cord swelling or abnormal enhancement (Fig. 1C). Brain MRI showed no interval changes, compared with previous brain MRI performed one month ago. Repeated lumbar puncture revealed pleocytosis (50/mm³, neutrophil, 93%) and elevated protein (223 mg/dl) in the CSF. Cultures of CSF were negative. In spite of the steroid pulse therapy, paraplegia and sensory deficits showed no change even 14 days after fluorescein injection.

DISCUSSION

Here, we present a case with seizure, confusion, hypesthesia and paraplegia after intrathecal injection of fluorescein. Whole spine MRI revealed myelopathic change in the lower thoracic spinal cord. We speculated that thoracic myelopathy was associated with the intrathecal injection of fluorescein.

After intrathecal injection of fluorescein, paraparesis with loss of sensation or paresthesia has been frequently reported^{5,6,9-11}. Usually, these complications improved rapidly without residual deficit within a week and it was not easy to determine the neuroanatomical localization of paraparesis and sensory deficits^{5,6,9-11}.

However, there were two reports of persistent weakness^{5,11}. Placantonakis et al.¹¹ reported that three patients experienced persistent subjective lower extremity weakness and numbness. And, there was one case presented with paraplegia caused by spinal cord infarction after intrathecal injection of fluorescein according to the adverse events reports to fluorescein

manufacturers⁵. Our patient had persistent paraplegia and hypesthesia and we could confirm the presence of myelopathy on MRI. To the best of our knowledge, the radiological evidence of myelopathy has not been reported in patients with intrathecal injection of fluorescein.

In patient diagnosed as cord infarction after the intrathecal injection of fluorescein, a direct injury to the spinal cord or the large dose, 700 mg, of fluorescein was proposed as a cause⁵. In our case, cord lesion was distant from the site of lumbar puncture and spine MRI showed no evidence of traumatic cord injury. Therefore, the possibility of direct injury was very low. The used dose of fluorescein in our case is 50 mg. The risk of complication is higher in patients receiving higher or more concentrated dose^{3,5}. However, there are a small number of reports that minor reactions could occur at even low-dose or low-concentration fluorescein injection⁵. Moseley et al.¹⁰ also reported the lack of correlation among complication and the concentration of injected fluorescein. Taking relatively low dose and concentration in our patient into account, we presumed that myelopathy after intrathecal injection of fluorescein could be caused by idiosyncratic reaction.

Although it was believed that the use of lower dose and lower concentration of fluorescein could be generally safe, the intrathecal use of fluorescein was not absolutely safe^{1,3,11}. The intrathecal use of fluorescein was not approved officially^{5,12}. And, there has not been randomized trial of this technique. Therefore, this off-label use of fluorescein requires a specific informed consent. Discussion and documentation with the patient before the procedure seem mandatory^{5,12}.

CONCLUSION

The intrathecal injection of fluorescein could cause myelopathy. In patients with paraparesis after the intrathecal injection of fluorescein, spine MRI should be performed. Since the complication could be serious, specific informed consent before the procedure is mandatory.

References

1. Anari S, Waldron M, Carrie S : Delayed absence seizure : A complication of intrathecal fluorescein injection A case report and literature review. *Auris Nasus Larynx* 34 : 515-518, 2007
2. Coeytaux A, Reverdin A, Jallon P, Nahorv A : Non convulsive status epilepticus following intrathecal fluorescein injection. *Acta Neurol Scand* 100 : 278-280, 1999
3. Guimaraes R, Becker H : A new technique for the use of intrathecal fluorescein in the repair of cerebrospinal fluid rhinorrhea using a hypodense diluent. *Rev Laryngol Otol Rhinol (Bord)* 122 : 191-193, 2001
4. Hegazy HM, Carrau RL, Snyderman CH, Kassam A, Zweig J : Transnasal endoscopic repair of cerebrospinal fluid rhinorrhea : a meta-analysis. *Laryngoscope* 110 : 1166-1172, 2000
5. Keerl R, Weber RK, Draf W, Wienke A, Schaefer SD : Use of sodium fluorescein solution for detection of cerebrospinal fluid fistulas : an analysis of 420 administrations and reported complications in Europe and the United States. *Laryngoscope* 114 : 266-272, 2004
6. Kirchner FR : Use of fluorescein for the diagnosis and localization of cerebrospinal fluid fistulas. *Surg Forum* 12 : 406-408, 1961
7. Kirchner FR, Proud GO : Method for the identification and localization of cerebrospinal fluid, rhinorrhea and otorrhea. *Laryngoscope* 70 : 921-931, 1960
8. Locatelli D, Rampa F, Acchiardi I, Bignami M, De Bernardi F, Castelnuovo P : Endoscopic endonasal approaches for repair of cerebrospinal fluid leaks : nine-year experience. *Neurosurgery* 58 : ONS-246-256; discussion ONS-256-257, 2006
9. Mahaley MS Jr, Odom GL : Complication following intrathecal injection of fluorescein. *J Neurosurg* 25 : 298-299, 1966
10. Moseley JI, Carton CA, Stern WE : Spectrum of complications in the use of intrathecal fluorescein. *J Neurosurg* 48 : 765-767, 1978
11. Placantonakis DG, Tabae A, Anand VK, Hiltzik D, Schwartz, TH : Safety of low-dose intrathecal fluorescein in endoscopic cranial base surgery. *Neurosurgery* 61 : 161-165; discussion 165-166, 2007
12. Tabae A, Placantonakis DG, Schwartz TH, Anand VK : Intrathecal fluorescein in endoscopic skull base surgery. *Otolaryngol Head Neck Surg* 137 : 316-320, 2007
13. Wallace JD, Weintraub MI, Mattson RH, Rosnagle R : Status epilepticus as a complication of intrathecal fluorescein. Case report. *J Neurosurg* 36 : 659-660, 1972