

Olgu Sunumu

Intrathecal Chemoterapy Application Under C- Arm Fluoroscopy in a Patient With Tethered Cord Syndrome

Gözen ÖKSÜZ¹®, Can ACIPAYAM²®, İdris ALTUN³®, Bora BİLAL¹®,
Aykut URFALIOĞLU¹®, Mahmut ARSLAN¹®, Hafize ÖKSÜZ¹®

¹ Kahramanmaraş Sutcu Imam University Department of Anesthesia and Reanimation, Kahramanmaraş

² Kahramanmaraş Sutcu Imam University Department of Pediatric Hematology/Oncology, Kahramanmaraş

³ Kahramanmaraş Sutcu Imam University Department of Neurosurgery, Kahramanmaraş

Tethered cord syndrome is defined as the condition of a low conus medullaris below L2 vertebral level or a filum terminale thicker than 2 mm. The objective of this case report is to present the experience of intrathecal chemotherapy under C -armed double screen fluoroscopy planned for a patient with Non-Hodgkin lymphoma (NHL) who was diagnosed with tethered cord syndrome. A 10-year old boy, weighing 50 kg with tethered cord syndrome was consulted to our clinic for methotrexate (MTX) injection due to NHL. The application was planned under C- armed double screen fluoroscopy, because the conus medullaris terminated below L4 vertebral body. After vertebrae and conus medullaris were viewed under C- armed double screen fluoroscopy and intervention was carried out between L4 and L5 vertebrae using a spinal needle. After free cerebrospinal fluid (CSF) flow was observed coming out from the spinal needle, 1.5 ml CSF was taken to be sent for the histopathological analysis and MTX was then intrathecally administered. In conditions requiring regional anesthesia and intrathecal drug administration, but having situations such as tethered cord syndrome which can complicate the application, safely performed procedure under C- armed double screen fluoroscopy can reduce the complications.

Keywords: Tethered cord syndrome, intrathecal, Non-Hodgkin lymphoma

J Nervous Sys Surgery 2016;6(1-2):58-60

Tethered Kord Sendromlu Hastada C Kollu Floroskopi Altında İntratekal Kemoterapi Uygulaması

Konus medullarisin, L2 vertebra seviyesinin altına uzandığı veya filum terminalenin 2 mm'den kalın olduğu durum, Tethered cord sendromu olarak adlandırılır. Pediatrik Hematoloji-Onkoloji Kliniği'nde non-hodgkin lenfoma (NHL) nedeniyle, intratekal kemoterapi tedavisi planlanmış ve tethered kord sendromu tanısı konulmuş olguda, c kollu floroskopi altındaki intratekal kemoterapi verilmesi deneyiminin sunulması amaçlandı. Tethered kord sendromu olan 50 kilo ağırlığında, 10 yaşında bir erkek çocuk, NHL nedeniyle intratekal metotreksat (MTX) enjeksiyonu için kliniğimize konsülte edildi. Konus medullaris L4 vertebra korpusunda bittiği için intratekal enjeksiyon uygulaması C kollu floroskopi ile planlandı, Asepsi sağlanması ardından, vertebra- lar, konus medullaris c kollu floroskopi altında görüldü ve L4-L5 vertebra- lar arasında spinal iğne ile girişim yapıldı. Spinal iğneden serbest beyin-omurilik sıvısı (BOS) akışı görüldükten sonra, patolojiye gönderilmek üzere 1,5 ml BOS alınıp, daha sonra da MTX intratekal olarak verildi. Rejyonel anestezinin veya intratekal ilaç uygulamalarının yapılmasının zorunlu olduğu, ancak beraberindeki tethered kord sendromu gibi uygulamada ciddi zorluklar yaşanabilecek durumlarda c kollu floroskopi altında güvenle yapılan girişim, komplikasyonları azaltabilir.

Anahtar kelimeler: Tethered kord sendromu, intratekal, Non-Hodgkin lenfoma

J Nervous Sys Surgery 2016;6(1-2):58-60

Alındığı tarih: 22.09.2017

Kabul tarihi: 01.01.2018

Yazışma adresi: Dr. Öğr. Gör. Gözen Öksüz, 12 Şubat Mah. 1003 Sok. Dream City D Blok D: 2 Kahramanmaraş

e-mail: gozencoskun@gmail.com

Yazarların ORCID ID bilgileri:

G. Ö. 0000-0001-5197-8031, C. A. 0000-0002-6379-224X, İ. A. 0000-0003-4263-766X, B. B. 0000-0003-3884-8042

A. U. 0000-0002-0657-7578, M. A. 0000-0002-2820-1547, H. Ö. 0000-0001-5963-6861

INTRODUCTION

Malignancies of lymphoid series originate from lymphocytes, a type of white blood cells. Lymphomas histopathologically are divided into two categories as Hodgkin lymphomas (HL) and Non-Hodgkin lymphomas (NHL) and they are classified according to the site of involvement as nodal and extranodal ⁽¹⁾. Because involvement of the central nervous system may be frequently encountered, NHL treatment and prophylaxis may require intrathecal chemotherapy at repeated doses ⁽²⁾. Tethered cord syndrome is mentioned in cases of a low conus medullaris below L2 vertebral level or a filum terminale thicker than 2 mm. In this syndrome orthopedic disorders, pain, vertebral deformities, motor and sensory deficits and urinary system dysfunction may develop or any pathology may not exist ⁽³⁾. The objective of this case report is to present the experience of intrathecal chemotherapy under C- armed double screen fluoroscopy in a pediatric patient with Non-Hodgkin lymphoma (NHL) who was at the same time diagnosed as tethered cord syndrome on central nervous system magnetic resonance imaging (MRI).

CASE REPORT

A 10-year-old 160 cm-tall boy weighing 50 kg was being followed up in the pediatric hematology-oncology clinic with the diagnosis of NHL and therefore scheduled for intrathecal methotrexate (MTX) injection. Upon the failure of the attempt made by the pediatric hemato-oncolog, patient's intrathecal spinal cord magnetic resonance imaging was performed. Patient's physical examination and laboratory outcomes were normal but tethered cord syndrome with a conus medullaris ending below L4 vertebral corpus was found on MRI (Figure 1). Patient was consulted by hemato-oncologist in our clinic. Because of intrathecal chemotherapy might be difficult to perform due to tethered cord syndrome and after



Figure 1. MR image of tethered cord patient.

potential complications were assessed, we decided to perform the procedure in the operating room under C- armed double screen fluoroscopy. After patient's family was informed about risks of the procedure and gave informed consent, the child was taken into the operating room. Patient who underwent routine monitoring [Electrocardiography, non-invasive blood pressure (NIBP), pulse oximetry (SpO₂)] had a NIBP of 110/65 mm-Hg, a heart rate of 84/min and a SpO₂ of 96%. After the preparation of proper equipment and C- armed double screen fluoroscopy, patient was administered 1.5 mg intravenous midazolam and 2 mg/kg ketamine and was turned to his side. Asepsis was achieved with povidone iodine and the region was covered with sterile drape, then vertebrae and conus medullaris of the patient were seen under C- armed double screen fluoroscopy and the intervention was carried out between L4 and L5 vertebrae with 26-gauge Atraucan[®] 50 mm spinal needle (Braun, Melsungen, Germany). The needle was simultaneously viewed with C- armed double screen fluoroscopy during the procedure. After free cerebrospinal fluid (CSF) flow coming from the needle was

observed, 1.5 ml CSF was taken to be sent for histopathological analysis and then MTX was administered intrathecally by an anesthetist. The patient who was taken to the recovery room after the procedure and had normal hemodynamic values and neurologic examination was referred to the ward.

This procedure was repeated for a total of 12 times, each time with sedation in the operating room by the anesthetist and was performed under C- armed double screen fluoroscopy.

DISCUSSION

Spinal and epidural interventions are considered to be contraindicated in patients with tethered cord syndrome and inferiorly localized conus medullaris, because of the possibility of damage to the spinal cord.

Upon numbness in the lower extremities was observed in a patient known to have a conus medullaris ending at L4-L5 vertebral corpus received combined spinal epidural anesthesia, MRI was ordered which revealed evidence of injury and edema in the spinal cord⁽⁴⁾. Kim J et al, reported that neuroaxial procedures should not be performed especially in children with urogenital anomalies requiring ultrasonography during caudal anesthesia and in cases such as tethered cord in which deformities may be seen in the conus medullaris of the spinal cord. Indeed they cancelled caudal anesthesia in one of their pediatric patients scheduled for anesthesia, because they observed tethered cord syndrome⁽⁵⁾. Tethered cord syndrome was found in 4 patients in another study where 259 children with urogenital anomalies were radiologically screened, emphasizing the importance of imaging methods in these patients⁽⁶⁾.

Given that tethered cord is not uncommon; in the conditions requiring intrathecal administration

of medication in cases of tethered cord requiring a neuroaxial procedure and having inferiorly localized conus medullaris as in our patient; care should be taken to establish diagnosis with radiologic imaging before application so as to perform the procedure safely.

Considering that intrathecal drug administration in this patient with NHL and tethered cord syndrome might lead to spinal cord damage, intrathecal procedure was safely performed through simultaneous visualization of the needle and vertebral levels under C- armed double screen fluoroscopy.

CONCLUSION

In conditions requiring regional anesthesia or intrathecal drug administration, but having situations such as tethered cord syndrome which can complicate the application, procedures safely performed under C- armed double screen fluoroscopy can reduce the complications.

REFERENCES

1. Swerdlow S. WHO Classification of Tumours of Haematopoietic and Lymphoid Tissues 4. ed. 2008, Lyon, France: IARC pres.
2. Abramson JS, Hellmann M, Barnes JA, Hammerman P, Toomey C, Takvorian T, et al. Intravenous methotrexate as central nervous system (CNS) prophylaxis is associated with a low risk of CNS recurrence in high-risk patients with diffuse large B-cell lymphoma. *Cancer* 2010;116:4283-90. <https://doi.org/10.1002/cncr.25278>
3. Kılıçkesmez Ö, Barut Y, Tasdemiroglu E. Erişkin gergin omurilik sendromunda MRG bulguları. *Tanışal ve Girişimsel Radyoloji* 2003;9:295-301.
4. Wood GG, Jacka MJ. Spinal hematoma following spinal anesthesia in a patient with spina bifida occulta. *Anesth.* 1997;87:983-4. <https://doi.org/10.1097/0000542-199710000-00035>
5. Xue JX, Li B, Lan F. Accidental conus medullaris injury following combined epidural and spinal anesthesia in a pregnant woman with unknown tethered cord syndrome. *Chin Med J* 2013;126:1188-9.
6. Kim J, Shin S, Lee H, Kil HK. Tethered spinal cord syndrome detected during ultrasound for caudal block in a child with single urological anomaly. *Korean J Anesthesiol.* 2013;64:552-3. <https://doi.org/10.4097/kjae.2013.64.6.552>