Interdisciplinary Neurosurgery 19 (2020) 100576

Contents lists available at ScienceDirect

Interdisciplinary Neurosurgery

journal homepage: www.elsevier.com/locate/inat

Case Reports & Case Series

Tonic-clonic seizures as a possible complication for cerebrospinal fluid leakage after intradural spinal surgery, a case report

P. Pisano (M.D.)[a], F. Guerrini (M.D.)[a,b,*], V. Custodi (M.D.)[a], M. Del Maestro (M.D.)[a], R. Galzio (M.D.)[a,b], S. Luzzi (M.D.)[a,b,c]

[a] Unit of Neurosurgery, Department of Surgical Sciences, IRCCS Policlinico San Matteo, Pavia, Italy
[b] Unit of Neurosurgery, Department of Clinical Surgical Diagnostic and Pediatric Sciences, University of Pavia, Italy
[c] Department of Emergency and Organ Transplantation, University "Aldo Moro", Bari, Italy

ARTICLE INFO

Keywords:
Pseudomeningocele
Seizures
Tethered cord
Spinal

ABSTRACT

Background: Cerebrospinal fluid leakage is a well-known spinal surgery complication, especially in adults population. Pseudomeningocele is its most common manifestation and it can bring to some conditions, such as intracranial hypotension, infections and wound healing complication. Epilepsy is not classically associated to CSF leakage. We described a case of a female patient who developed tonic-clonic seizures associated with a pseudomeningocele after a detethering surgery.

Case description: A 16 year old female was admitted to our department for surgical treatment of a tethered cord for a sacral lipoma. Her medical history was remarkable mental retardation with psychiatric disturbs and hypothyroidism. She underwent a surgical intervention for the detethering of conus and dura was closed by a suture and fibrin glue. During third postoperative day she started to suffer a severe occipital headache, followed by tonic-clonic seizures. During suture removal, a collection suspected for a pseudomeningocele was found and chemical and radiological exams confirmed the dubious. Despite a continuous bed rest, collection continued to form. So, we decided to perform a surgical revision and to close dural defect. After intervention, patient did not suffer postural headache anymore and after 3 and 6 months she was found in good health.

Conclusion: We described the importance of significant morbidity, i.e. that of tonic clonic seizures as a sign of an occult CSF leakage after spinal surgery. Here, hydrocephalus as a condition was present, the change in pressure of CSF can determine seizures as well as promote this complication. A pseudomeningocele is not a trivial complication.

1. Introduction

Cerebrospinal fluid leakage is a well-recognized complication after intradural spinal surgery, and may manifest as a pseudomeningocele or CSF leak through the skin incision. Some works reported the incidence in adults to be about 12–16%, and 7.1% in the pediatric population [1,2].

The most significant postoperative complications of cerebral fluid leakage include poor wound healing and/or wound dehiscence, wound infection, radiculopathy, meningitis and the syndrome of intracranial hypotension. The most common symptom is orthostatic headache [3].

In this work, we reported the case of a 16 years old female patient who developed a pseudomeningocele after a surgical intervention of a sacral lipoma complicated by tonic-clonic seizures.

2. Case report

A 16 year old female was admitted to our department for surgical treatment of a tethered cord for a sacral lipoma. Her medical history was remarkable for mental retardation with psychiatric disturbs and hypothyroidism. Under electrophysiological monitoring, after L5 laminotomy the dura was opened. A terminal lipoma was found and a piece-meal resection was performed. Finally, the untethering of the conus was carried out by the cutting of filum terminalis, that appeared lipomatosous and adherent to nerves roots. A primary dural closure with a running 6-0 Prolene suture was performed and patient remained into the bedroom for 48 h after intervention. During afternoon of the day after mobilization (third postoperative day), she started to suffer a severe occipital headache, followed by two episodes of tonic-clonic seizures. Brain CT scan was normal besides a slightly larger ventricular

* Corresponding author at: Unit of Neurosurgery, Department of Surgical Sciences, IRCCS Policlinico San Matteo, Pavia, Italy.
E-mail addresses: fragu21@gmail.com (F. Guerrini), v.custodi@smatteo.pv.it (V. Custodi), r.galzio@smatteo.pv.it (R. Galzio), s.luzzi@smatteo.pv.it (S. Luzzi).

https://doi.org/10.1016/j.inat.2019.100576
Received 3 June 2018; Received in revised form 8 August 2019; Accepted 26 August 2019
2214-7519/ © 2019 Published by Elsevier B.V.

Fig. 1. Brain CT scan that shows the enlargement of ventricular system (already present at the admission).

system (already present at the admission) (Fig. 1). After 24 h of Intensive Care Unit, where treatment with carbamazepine was started, patient was extubated and sent back to the ward the following day. EEG did not show any focal critical activity (Fig. 2). There were no further seizures in the following days. Mobilization was recommenced and patient suffered mild nuchal headache only on postural adjustment. During suture removal, 8 days after surgery, a small collection was noticed in the more distal tract of the wound; chemical attitudes of aspirated liquid confirmed the suspect of CSF. The subcutaneous swelling regrew, and we performed an MRI that confirmed the presence of a pseudomeningocele with turbulence signs. (Fig. 3A–B). Then, we decided to undergo surgical revision of the wound and the dural fistula. A large defect was found and the dural defect was closed again with Prolene and the use of dural sealant. The patient stayed in bed for 5 days after the procedure. Mobilization was allowed on day 6 and she did not suffer orthostatic headache anymore. Sutures were removed on day 14 after second surgery. Patient was re-evaluated after 3 and 6 months from surgery and was found in good health; anti-seizure therapy was suspended after one month.

3. Discussion

CSF leak is a well-recognized but underestimated complication following intradural surgery with an incidence of 7,1% of CFS leak [2].

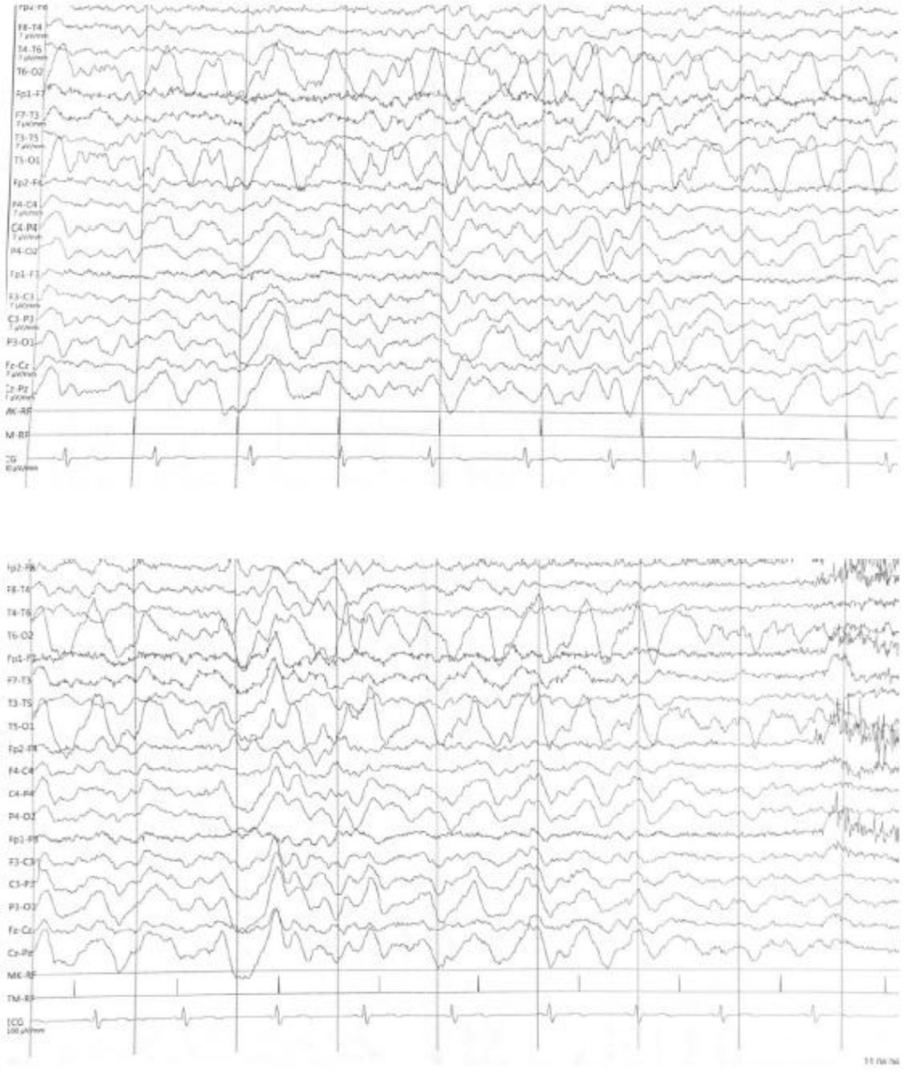

Fig. 2. EEG that does not show any critical activity.

Fig. 3. Spine MRI that shows the pseudomeningocele (A) with signs of turbolence (B).

It seems associated with some factors, like a previous spine surgery, the use of a dural graft and the type of dural suture. Other factors that could represent a risk for the development of a CFS leak are the age, with older people who are more prone to develop this complication, and the type of disease. In fact, detethering seems to be associated with an higher risk. To avoid this complication, in case of spinal dural opening we usually apply fibrin glue over suture. Then, every layer (muscle and subcutaneous tissues) is closed separately and anchored one to each other to avoid dead spaces. Moreover, patient remains into the bed for 48 h at least. Nonoperative management should be the initial approach, with surgery reserved to refractory cases [4].

In this work, we described the case of a 16 years old female patient who was admitted to our department for the treatment of a tethered cord. After an initial good postoperative course, she develop an occipital headache followed by tonic-clonic seizures. A subsequent brain CT scan did not show any sign of intracranial hypotension. After a short period in the Intensive Care department, where an antiseizures therapy was started, she came back to our ward. Before dischargement, during surgical wound suture removal, a subcutaneous small collection was discovered, and a percutaneous puncture revealed that the liquid aspirated was CSF. So, a conservative management was undertaken but, given the persistence of headache and the wound build-up, we decided to make a surgical reparation of dural defect. During revision, we added a dural sealant (TachoSil®, Takeda, Osaka, Japan) after fibrin glue application. The choice to not place a lumbar drainage was dictated by the fact that signs of turbulence were present on MRI, suggesting an active leakage.

Three- and six-months follow-up showed the resolution of headache and, gradually, antiseizures therapy was stopped.

While pseudomeningocele has been described as a complication of detethering procedures [1], tonic-clonic seizures are not classically reported as complication of pseudomeningocele. Someone could argue that seizures were related to her hydrocephalus but our patient had never suffered seizures and she developed critical activity in the third postoperative day, the day after beginning of mobilization. Moreover, previously, she started to suffer an occipital headache. To our knowledge, only one case report is available in literature. Hamdan et al. [5], in their work of 2018, reported the case of a 26 years old female patient who, after a lumbar disk herniation surgical treatment, began to suffer episodes of black-out while she sitting or lying on her back, with CSF pressure changes and, consequently, brain hypoxia as possible cause of seizures. Our patient did not suffer a giant pseudomeningocele. On the contrary, when the first seizure occurred, no direct or indirect signs of CFS leak were present, and critical activity started after some hours of mobilization. So, in a situation of a delicate preoperative condition (hydrocephalus), the changement of CSF pressure between supra and infratentorial could have determined an alteration into the brain circulation with a diffuse altered metabolism of neurons and, finally, the trigger of seizures. On the contrary, subsequent crisis could have been triggered or promoted by a pre-existing hydrocephalic condition. So, an hypoxic-swelling process can be involved.

4. Conclusion

We described the case of patient treated for the release of a tethered cord who developed a pseudomeningocele and a tonic-clonic seizure as a possible consequence. We described the importance of significant morbidity, i.e. that of tonic clonic seizures as a sign of an occult CSF leakage after spinal surgery. Here, hydrocephalus as a condition was present, the change in pressure of CSF can determine seizures as well as promote this complication. A pseudomeningocele is not a trivial complication.

Declaration of competing interest

We declare, under our own responsability, that there is no conflict of interest about this work.

References

[1] A.H. Sin, G. Caldito, D. Smith, M. Rashidi, B. Willis, A. Nanda, Predictive factors for dural tear and cerebrospinal fluid leakage in patients undergoing lumbar surgery, J Neurosurg Spine. 5 (3) (2006 Sep) 224–227.
[2] V. Liu, C. Gillis, D. Cochrane, A. Singhal, P. Steinbok, CSF complications following intradural spinal surgeries in children, Child Nerv System 30 (2) (2014 Feb) 299–305.
[3] D.M. Sciubba, R.M. Kretzer, P.P. Wang, Acute intracranial subdural hematoma following a lumbar CSF leak caused by spine surgery, Spine. 30 (24) (2005 Dec 15) E730–E732.
[4] S. Udayakumaran, C.T. Rathod, Tailored strategies to manage cerebrospinal fluid leaks or pseudomeningocele after surgery for tethered cord syndrome, World Neurosurg. 114 (2018 Jun) e1049-e56.
[5] A. Hamdan, A. Saxena, G. Rao, M. Ivanov, Compression of a giant pseudomeningocele causing transient anoxic seizures-a case report, Acta Neurochir. 160 (3) (2018 Mar) 479–485.