

## Lumbar pseudomeningocele after spinal surgery: case report

F.M. Gramada<sup>1</sup>, D. Haba<sup>2</sup>

“N. Oblu” Hospital Iasi

<sup>1</sup>1<sup>st</sup> Neurosurgical Department; <sup>2</sup>Neuroradiological Departement

### Abstract

Among the intraoperative complications of lumbar spinal surgery the most frequently is incidental dural tear, which is encountered in 10% of the primary interventions and a double number of cases in relapses. This paper describes a case followed 10 months with repeated MRI imaging demonstrating the effectiveness of percutaneous evacuating puncture of pseudomeningocele followed by lumbar compression and 3 days bed rest in Trendelenburg position. The paper presents also other methods of treatment described in the literature: the role of prophylactic antibiotherapy, blood patch, bed rest in Trendelenburg, lumbar drainage and surgical revision.

**Keywords:** back surgery complications, pseudomeningocele, lumbar cerebrospinal fluid (csf) fistula, incidental durotomy

Based on a recent operated case complicated with pseudomeningocele we try to analyze the characteristics of this pathology and its treatment.

### Case presentation

Patient GV, woman, 47 years was operated in August 2009 for left herniated lumbar disc L3/L4 and L4/L5, realized by left L3 and L4 hemilaminectomies and the ablation of L3/L4 and L4/L5 hernias. Evolution was favorable until November

2010 when the patient returns with left lombosciatic pain. MRI revealed lumbar hernia recurrence at L3/L4. She was operated practicing the ablation of L3/L4 disc hernia by enlarging left L3 hemilaminectomy. During discal content emptying maneuvers there was a breach of the anterior dura face, and we tried to close it with muscle and gelspon. The patient presented in postoperative evolution a subcutaneous lumbar fluctuant mass at the operative site without csf leak out. In January 2011 an MRI examination revealed the existence of a pseudomeningocel with size of 6.3 / 2.7 / 2.3 cm located at the level of left hemilaminectomies (Figure 1). Under bed rest and intravenous infusion, the symptoms (headache, local lumbar expansion) improved. Clinical favorable evolution until March 2011 when she returns for recurrence of symptoms, MRI revealing persistent fluid collection at the same dimensions (Figure 2). We practiced one percutaneous puncture in the collection and we evacuated 70 ml of cerebrospinal fluid. After that the patient was immobilized 3 days in bed rest in Trendelenburg with compressive abdominal corset. In May 2011 lumbar MRI shows important reduction of the dimensions of the fluid collection (Figure 3). The last lumbar MRI was performed at the end of August 2011 which confirmed the disappearance of fluid collection (Figure 4).

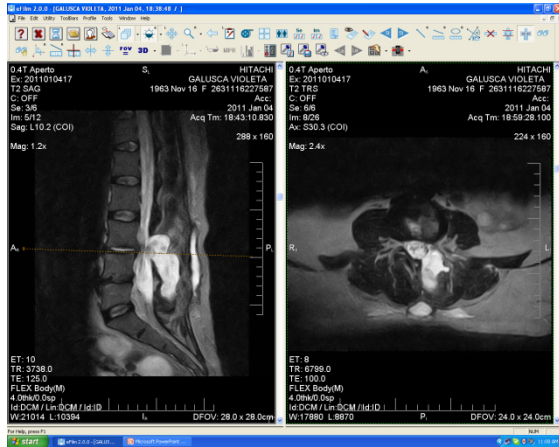


Figure 1 Lumbar pseudomeningocele 6,3/2,7/2,3 cm

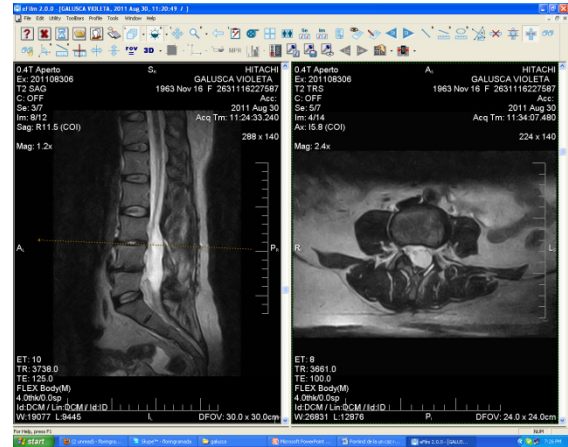


Figure 4 Absence of csf collection

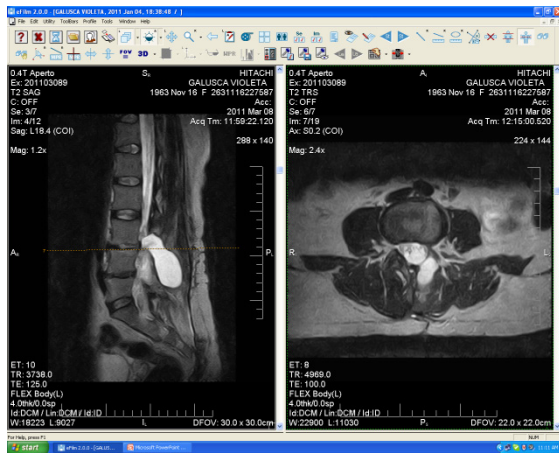


Figure 2 Persistent of csf collection dimensions

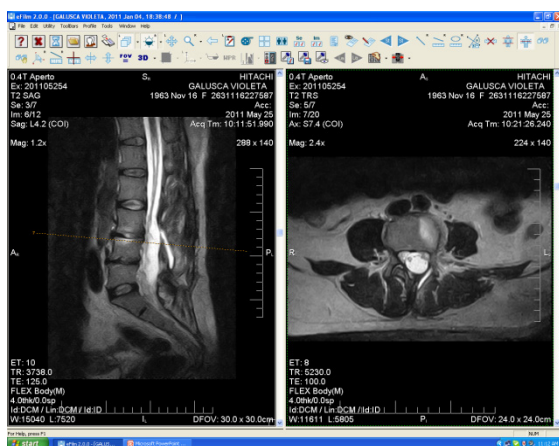


Figure 3 Important diminution of collection dimensions

## Discussion

Producing a breach in the spinal duramater in the spinal interventions is an unwanted but possible complication, reported in the literature in various percentages. Morgan-Hough et al., in 2003, on a statistic of 531 operations for lumbar disc herniation reported 46 (8.7%) complications with 29 dural tears (5.5%) with 3 cases of occurrence of pseudomeningocele who needed reintervention (9).

Jones et al. reveals in the literature an incidence of this complication of 0.3-13%, with 4% on he's own statistic (6).

Jankowitz et al. has in 4835 cases of lumbar surgery 547 (11.3%) patients with an intraoperative incidental durotomies with a frequency of 9% at the first surgery and 21% at relapse (5).

The occurrence of dural tears during surgery for a herniated lumbar disc may occur in various situations: after a myelography or spinal puncture, after an aggression caused by a bone fragment, maneuvering of an inappropriate tool or excessive traction of the root.

If the crack is located on lateral or posterior side of dura-mater a suture it's possible coupled with a muscle patch. For lesions located above the suture is impossible and the only attitude that can be used is the application intraoperatively of muscle or fibrin patch. These cases are those which may be followed by pseudomeningocele or external lumbar CSF fistula. The risk of fistula increases in cases with imperfect suture of aponeurosis or skin (2). Because at lumbar level the tension inside dura is higher especially in orthostatic position, the mechanisms permitting the closure doesn't realize its purpose. This liquid in tension force and realize a new "way" trough exterior and so external fistula appear.

There is the possibility that the cerebrospinal fluid fistula close spontaneously if dural defect is not important and the patient is kept at least 3 days in the Trendelenburg position to provide fluid pressure loss at the lumbar level. Among the factors that influence the producing of dural tears include the existence of a connective tissue of bad quality after irradiation, infection, treatment with cortisone or in case of relapse.

Clinical signs relevant for the existence of a cerebrospinal fluid leak after lumbar spinal intervention are postural headache and low back pain persisting. At the local level may not be any pathological signs. In same cases there is a palpable fluctuating mass under the surgical scar with increasing dimensions in the moment of cough or vertical standing in pseudomeningocele or there is leakage of fluid through wound in fistula. This last possibility is the most dangerous because the possibility of developing meningitis (1, 3, 7).

Confirmation of these conditions shall be made by nuclear magnetic resonance which shows a sub/supra-aponeurotic fluid (hypo signal in T1 and hyper signal in T2). Sometimes it is useful a simple myelography or (better) combined with computer tomography to specify the location of the dural defect through which cerebrospinal fluid flows (4). In case of exteriorization of leakage the confirmation is made by detection of beta 2-transferrin existing in cerebrospinal fluid (10). In case with metallic instrumentation is helpful an ultrasound examination.

Conservative treatment consists of bed rest in Trendelenburg position and abdominal binders and focal compression. Antibiotic prophylaxis has a questionable role (3), instead applying a percutaneous epidural blood patch is confirmed to be effective in 50%. Some authors use external drainage to 5 days with the known risks of infection (11).

If the above methods are inefficient (Jankowitz et al. 11.7%) we hate to use radical treatment: the surgical suture use nonresorbable 4-0 to 7-0 wire with or without patch of fascia, dura mater or other agents such gelfoam or muscle (8). The suture must be not too close, determining a compression on the nerve.

In the case presented above a contributing factor to produce the crack is the presence of the dural periduroradicular scars, in which situation the dissection of the adhesions can be difficult. Usually a simply application of muscular tissue with/or fibrin at the level of breach is sufficient to avoid the accumulation of csf. In cases with visible defect of dural wall we use suture with non-resorbable material. In our case this wasn't possible because the defect was sited anterior. Conservative

treatment was not effective, as evidenced the MRI images effectuate a few months away. In this case we chose to do before surgery a single transcutaneous evacuation which allowed removal of 70 ml of fluid, followed by bed rest in Trendelenburg and the local compression. Both MRI controls performed immediately and after a few months showed that the fluid collection was almost entirely disappeared and the patient's symptoms had improved. We believe that this gesture of percutaneous evacuation is a method that can be effective in some cases rebel to conservative treatment measures.

### References

1. Aldrete J. A., Ghaly R.: Postlaminectomy pseudomeningocele. An unsuspected cause of low back pain. *Reg. Anesth.* 1995, 20, 1, 75-79.
2. Couture D., Branch Jr. Ch. L.: Spinal Pseudomeningoceles and Cerebrospinal Fluid Fistulas: Pathophysiological Features., *Neurosurg. Focus*, 2003,15,6,1-5.
3. Eljamel M. S.: Antibiotic prophylaxis in unrepaired CSF fistula. *Br. J. Neurosurg.*, 1993, 7, 5, 501-505.
4. Hawk M. W., Kim K. D.: Review of spinal pseudomeningoceles and cerebrospinal fluid fistulas. *Neurosurg Focus*, 2000, 9, 1, Article 5, 1-8.
5. Jankowitz B. T., Attenberry D. S., Gerszen P. C., Karausky P., Cheng B. C., Faught R., Welch W. C.: Effect of fibrin glue on the prevention of persistent cerebral spinal fluid leakage after incidental durotomy during lumbar spinal surgery. *European Spinal Journal* 2009, 18, 8, 1169-1174.
6. Jones A. A., Stambough J. L., Balderston R. A., Rothman R. H., Booth Jr. R. E.: Long-term results of lumbar spine surgery complicated by unintended incidental durotomy. *Spine* 1989, 14, 4, 443-446.
7. Leis A. A., Leis J. M., Leis J. R.: Pseudomeningoceles: a role of mechanical compression in the treatment of dural tears. *Neurology* 2001, 56, 8, 1116-1117.
8. Maycock N. F., van Essen J., Pfitzner J.: Post-laminectomy cerebrospinal fluid fistula treated with epidural blood patch. *Spine* 1994, 19, 19, 2223-2225.
9. Morgan-Hough C. V. J., Jones P. W., Eisenstein S. M.: Primary and revision lumbar discectomy. *J. Bone Joint Surg.* 2003, 85-B, 871-874.
10. Reisinger P. W., Hochstrasser K.: The diagnosis of CSF fistulae on the basis of detection of beta 2-transferrin by polyacrylamide gel electrophoresis and immunoblotting. *J. Clin Chem Clin Biochem.* 1989, 27, 3, 167-172.
11. Waisman M., Schweppe Y.: Postoperative cerebrospinal fluid leakage after lumbar spine operations. Conservative treatment. *Spine*, 1991, 16, 52-53.