

Difficulty in Lumbar Puncture of a Patient With an Intrathecal Baclofen Pump and Possible Meningitis

Elisabeth Arndal*

¹Department of Ear-Nose and Throat, Head and Neck Surgery, Rigshospitalet, Blegdamsvej, Denmark

Article Information

Received date: Aug 29, 2016

Accepted date: Oct 05, 2016

Published date: Oct 10, 2016

*Corresponding author

Elisabeth Arndal, Department of Ear-Nose and Throat, Head and Neck Surgery, Rigshospitalet, Blegdamsvej, Denmark, Tel: +45 26804286; Email: elisabetharndal@hotmail.com

Distributed under Creative Commons CC-BY 4.0

Keywords Baclofen; CSF sample; ITB therapy; Meningitis; Lumbar puncture

Abbreviations CSF: Cerebrospinal Fluid; ITB: Intrathecal Baclofen Pump; UTI: Urinary Tract Infection

Abstract

Background: Patients with intrathecal baclofen pumps have a known increased risk of meningitis. Optimal antibiotic treatment targets the bacteria found in the Cerebro Spinal Fluid (CSF). However a lumbar puncture in patients with an intrathecal pump may result in damage to the spinal catheter by the needle and treatment failure.

Aims of the study: We report at case of a 32-year-old man with possible meningitis. He had spastic hemiplegia and epilepsy after a head trauma and was treated with baclofen via an intrathecal pump.

Methods: A CSF sample was needed for a specific diagnosis but the location of the spinal catheter hindered a safe lumbar puncture. A search of the current literature did not reveal that special equipment for drawing CSF directly from the pump was available. Therefore the patient was treated with antibiotics according to best practice.

Results: The lack of available literature on the subject and special equipment resulted in a suboptimal diagnosis. As a CSF sample was never obtained targeted antibiotic treatment was not possible.

Conclusion: Preferably the patient should be referred to a specialized hospital where a CSF sample can be drawn directly from the pump. Local hospitals should have the necessary equipment available or a standard procedure for referral to a specialist department for complicated cases. If this is not possible the authors suggest that patients with intrathecal pumps have an x-ray which may visualize the location of the spinal catheter during a lumbar puncture and use a small gauge needle. A post discharge pump checkup is also advised.

Introduction

Treatment with an Intrathecal Baclofen Pump (ITB) (Figure 1) is recommended for patients with severe spasticity or dystonia due to post traumatic cerebral and/or spinal cord injury, multiple sclerosis, cerebral palsy and stroke sequelae. ITB is the ultimate treatment when oral spasmolytics are inefficient or cause unacceptable side effects. The ITB pump is surgically installed subcutaneously in the abdomen and the pump catheter is tunneled under the skin until it reaches the lumbar spinal cord. The catheter is placed in multiple subcutaneous loops before being inserted into the spinal canal by the neurosurgeon. The point of entry into the spinal canal varies from L2-5 and the catheter is then inserted in a cranial direction up to Th12 or higher. ITB patients have an increased risk of meningitis after pump implantation. Other complications include wound infection and catheter / pump malfunction [1-7].

Suspected meningitis requires acute therapy and Gold standard dictates a lumbar puncture to get a Cerebro Spinal Fluid (CSF) sample in order to secure the diagnosis. The correct diagnosis will secure a targeted antibiotic treatment against the causative bacteria. Lumbar puncture is normally done in the intervertebral spaces from L3 and distally. However in patients with intrathecal pumps the catheter is placed in the same area and may thus hinder lumbar puncture and the procedure may damage the catheter leading to leakage and failure of the antispasmodic therapy, resulting in withdrawal symptoms with severe spasticity and even delirium. Damage to the catheter would therefore also increase morbidity and require surgical treatment, which would have to be postponed until the patient no longer had infections.

Case

A 32-year-old man with an ITB due to a right sided spastic hemiplegia and epilepsy after a gunshot wound to the head, was admitted to the emergency department at 2am with acute signs of meningitis. Symptoms included mental confusion, generalized seizures, fever, elevated infection parameters, redness and swelling of the skin above the lumbar spine. The patient received continuous baclofen infusion via an intrathecal pump as oral anti spasmolytic treatment had been inefficient. The ITB had recently been surgically replaced and during the hospital stay the patient had developed a Urinary Tract Infection (UTI) which was being treated with oral antibiotics according to the urine culture results. The symptoms had progressed in spite of oral antibiotics. The patient had a history of hospital admittance due to UTI but symptoms had never been this severe. Therefore the

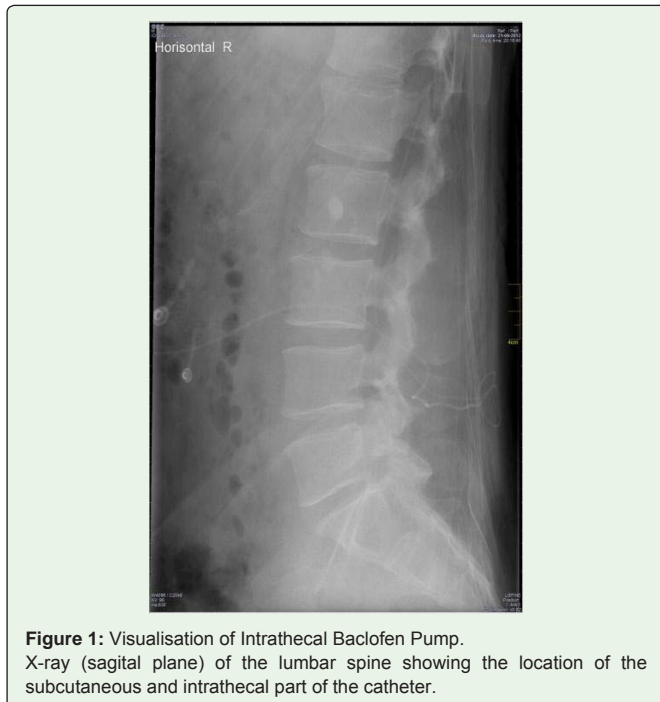


Figure 1: Visualisation of Intrathecal Baclofen Pump.
X-ray (sagittal plane) of the lumbar spine showing the location of the subcutaneous and intrathecal part of the catheter.

tentative diagnoses were sepsis originating from the urinary tract or meningitis. A lumbar puncture was needed to secure the diagnosis, but the presence of the ITB pump catheter meant that there was a risk of puncturing or severing the catheter during the “blind” needle puncture. The regional neurosurgery department was consulted and an x-ray of the lumbar spine was recommended in order to visualize the location of the pump catheter. The x-ray (Figure 1) showed that the catheter had multiple subcutaneous loops at L4-5 level, entered the spinal canal at L3-4 and continued cranially to Th12-L1 level. Thus the catheter hindered clear access to the exact area where the lumbar puncture should be performed.

X-ray (sagittal plane) of the lumbar spine showing the location of the subcutaneous and intrathecal part of the catheter.

After conferring with the head department of neurology and neurosurgery it was deemed too risky to perform a lumbar puncture because there was no experience with lumbar puncture in ITB patients. An online search of the literature did not reveal any articles on the subject.

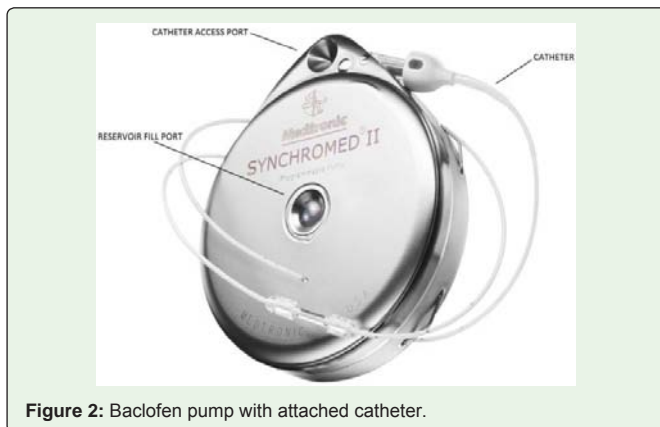


Figure 2: Baclofen pump with attached catheter.

The patient received aggressive i.v. broad spectrum antibiotics covering both a urinary tract and cerebral focus. A CFS sample was never procured and no secure diagnosis was reached. The patient was treated on suspicion alone. The patient improved over the next couple of days and was then discharged with oral antibiotics.

Discussion

ITB patients pose a dilemma in the diagnostics of meningitis because they have a higher risk of these infections and complications, furthermore the location of the catheter may prevent lumbar puncture. They are therefore more likely to suffer from incomplete diagnostics and receive “untargeted” treatment based solely on the clinical suspicion.

We therefore find a need for further literature on the subject.

We suggest the following procedure for lumbar puncture in ITB patients, based on the equipment available at the hospital where the patient is admitted. Preferably the patient should be admitted to the department administering the ITB treatment.

A special 24-gauge needle can be inserted into the catheter access port of the baclofen pump

The pump has a main port in the middle for refilling the reservoir in the pump and a catheter access port where a special needle can gain access to the catheter and thereby extract CSF for diagnostics (Figure 2). A template can be placed on the skin over the pump and help locate the access port.

Lumbar puncture with a regular needle

Only the older catheters are radiopaque. Since 2012 the Ascenda catheter (Medtronic) has been introduced and is only radiopaque at the spinal tip. However many of the older catheters may still be used, because revisions of baclofen pumps often leave the catheters in place if they are well functioning. An x-ray will help visualize the localization of the catheter and may reveal a catheter free area where the needle can be inserted. The risk of damaging or severing the catheter is also minimized by using a 27G Touhey Pencil Point needle (smallest atraumatic needle available). The catheter is normally placed in the midline and a paramedian access will also minimize possible contact with the catheter. Afterwards the patient should be monitored for occurrence of spasticity, baclofen withdrawal or other signs of pump malfunction. Suspicion of catheter damage should be conferred with the neurologic department in charge of ITB patient treatment in order to test the pump.

Neurosurgical preference

If technically possible, the neurosurgeon should have the area for lumbar puncture in mind, preferably avoiding to insert the catheter at the L3-4 level and place the subcutaneous loops laterally to the spine (which may however migrate). This would reduce the risk of contact with the catheter during a lumbar puncture.

Conclusion

Preferably the patient should be admitted to the department administering the ITB treatment where a special needle, that can access the catheter and thereby CSF is available. If this is not possible then an x-ray should always be performed to determine pump

and catheter localization, which can be helpful regarding catheters implanted before 2012. A lumbar puncture with a paramedian access with a 27G Touhey Pencil Point needle is recommended. The patient should always be conferred with the nearest neurology department with ITB patient experience. All patients should be monitored for development of pump failure after puncture. Getting a CSF sample is gold standard but technical difficulty in procuring it should not postpone necessary treatment.

References

1. Teddy P, Jamous A, Gardner B, Wang D, Silver J. Complications of intrathecal baclofen delivery. *Br J Neurosurg.* 1992; 6: 115-118.
2. Awaad Y, Rizk T, Siddiqui I, Roosen N, McIntosh K, Waines GM. Complications of intrathecal baclofen pump: prevention and cure. *ISRN Neurol.* 2012; 2012: 575168.
3. Wunderlich CA, Krach LE. Gram-negative meningitis and infections in individuals treated with intrathecal baclofen for spasticity: a retrospective study. *Dev Med Child Neurol.* 2006; 48: 450-455.
4. Kolaski K, Logan LR. A review of the complications of intrathecal baclofen in patients with cerebral palsy. *Neuro Rehabilitation.* 2007; 22: 383-395.
5. Haranhalli N, Anand D, Wisoff JH, Harter DH, Weiner HL, Blate M, et al. Intrathecal baclofen therapy: complication avoidance and management. *Childs Nerv Syst.* 2011; 27: 421-427.
6. Malheiro L, Gomes A, Barbosa P, Santos L, Sarmiento A. Infectious complications of Intrathecal Drug Administration Systems for Spasticity and Chronic Pain: 145 Patients From a Tertiary Care Center. *Neuromodulation.* 2015; 18: 421-427.
7. Wang ZM, Law JH, King NK, Raieswaran DK, Soh S, Rao JP, et al. Treatment of severe, disabling spasticity with continuous intrathecal baclofen therapy following acquired brain injury; the experience of a tertiary institution in Singapore. *Singapore Med. J.* 2016; 57: 8-12.