Conservative Management of a Baclofen Pump Catheter Break

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Introduction

The treatment of Failed Back Surgery Syndrome (FBSS) or Post Laminectomy Syndrome has changed significantly with the advent of implantable Drug Administration System (DAS, Opiate Pump). Studies have shown that DAS is successful in reducing pain and improving the quality of life in patients with a multitude of concerns, from cancer related pain, spasticity and cerebral palsy to failed back surgery syndrome.[1,7]

In addition, long term DAS use has proven to be to less inferior to oral medication management and can provide more stability throughout a patient's spectrum.[4] A DAS pump catheter is typically inserted from the mid to lower lumbar region in a paramedian approach and guided intrathecally to lower thoracic vertebrae region to address lower extremity spasticity or cervical region to address upper and lower extremity spasticity. An intrathecal catheter is relatively free from compression and damage. The present case describes a patient with chronic pain due to intrathecal catheter fragmentation and subsequent migration of the distal potion into her cervical spine region. She has undergone several neurosurgical assessments, deemed inoperable and currently managed through conservative measures.

Case Description

A 69-year-old female who presented with neck pain and a significant neurosurgical history. She underwent a cervical laminectomy and cervical spinal fusion on C5-C7 in 2003 due to disk herniations and spinal stenosis. Her post op course and follow ups were complicated by chronic pain culminating in an intrathecal drug administration system implantation for post cervical laminectomy syndrome in 2007. On arrival to our clinic she endorsed progressive neck pain and paresthesia of the arms. There was no history of trauma and she has undergone several interventional pain treatments over the years without any prolonged benefit. A thorough investigation of the baclofen pump revealed that it has not been refilled in sometime, decreasing our concerns for toxicity and withdrawal. The vitality of the intrathecal catheter became a question of concern, so we proceeded with imaging of the cervical spine, which reported the upper tip of the intrathecal catheter extending to the C1/C2 level, with a break of the catheter at the T8-T9 level.

In order to remove the migrated portion of the broken catheter, surgical intervention would be required. Several neurosurgical evaluations and recommendations were obtained with an overall inoperable census as the risk of removing the catheter tip from the cervical spine region outweighed the benefits. The baclofen pump is no longer in use and she is currently maintained with medical management for her chronic pain and spasticity. No further neurological symptoms have been endorsed and she has remained stable on her current treatment plan.

Discussion

Sudden changes in a patient's chronic pain levels who was previously maintained through an Intrathecal drug delivery system should raise clinical alarms and requires further investigation. Errors in the DAS can occur in a multitude of locations, due to its dual structure investigation of the abdominal pump and throughout the length of the catheter system is required. These errors can be electrical, administrative or mechanical as in our case. A catheter break can occur along the entire length, from proximal attachment to the baclofen pump to the distal intrathecal catheter.

A pump or reservoir is usually inserted surgically, generally in the right lower abdominal region under a layer of subcutaneous tissue. This allows the pump restricted mobility in a surgically placed pocket, allows protection from outside elements and provides an access point for future refills. The proximal portion of the intrathecal catheter is attached to the pump itself; excess catheter tubing is placed posterior to the pump itself to allow for body dynamics without leading to a dislocation at the primary hub. The catheter is then tunneled around the ipsilateral flank towards the lower lumbar region to allow for a paramedian approach for intrathecal placement. Once the insertion area of interest has been identified, the distal portion of the catheter will be inserted intrathecally to the spinal cord level that is initiating pain.

The pump and catheter system can have a multitude of complications ranging from infections, cerebrospinal fluid leakage, foreign body reaction, post insertion headaches, migration of equipment and catheter breaks.[3,8] With catheter related malfunction being the most common[5,9] (Table 1).

Catheter Related Complications	1. Breaks 2. Migration 3. Obstruction 4. Kinking 5. Dislodgement
Pump Related Complications	1. Alarm errors 2. Memory errors 3. Rotational deficits 4. Abnormal infusion rate 5. Battery malfunction
Systems or Procedural Complications	1. Infection 2. CSF leakage 3. Overdose/Withdrawal 4. Pharmacological side effects 5. Programing errors

(Table 1)

As in our case, catheter breaks are of acute concern due to the likelihood of toxicity or withdrawal. Evaluation of stability is critical to prevent respiratory depression related to toxicity or seizures related to withdrawal.[6] In a stable patient, initial investigation is normally directed towards a targeted assessment of a viable catheter system over the pump itself to rule out kinking, obstruction or breaks.[2] Contrast guided CT of the vertebral column or a contrast dye study with fluoroscopic guidance will further guide treatment options. [5] If the catheter has become dislodged at the pump hub or anchor point with little migration in a cephalad direction, reattachment and investigation of initial deficit is warranted. Although, catheter breaks within the canal are of higher risk, further assessments by the physician who implanted the device or by a neurosurgeon is recommended. Catheters that have resided in the spinal canal for several months have a higher likelihood of adhesion development, limiting removal options due to the elevated risk of damaging fibers of the spinal cord on attempted explantation. Therefore, the overall census or recommendation is to leave the fragmentated segment alone or within the canal and focus on stabilization of pain concerns while maintaining close follow up in order to monitor for acute neurological deficits.

Conclusion

This case illustrates a drug delivery system catheter break, which can complicate the management of chronic pain and provide avenues for new neurological deficits. The central aggravating factor in our case revolved around chronic neck pain secondary to catheter migration. As opposed to more acute presentations revealing respiratory depression from toxicity or seizures related to withdrawals. Generally, catheter breaks do not provide a grim prognosis, but rapid assessment and interpretation are a priority in such cases. Imaging provides a valuable resource for confirmation of a working diagnosis and neurosurgical evaluation is a priority in determination risk and benefits related to explantation of a broken intrathecal catheter. In addition, education of symptoms related to complications and close follow ups in the initial period further assist in the continued dialogue of patient-physician relations and overall management.

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