Troubleshooting for Intrathecal Therapy

Physicians involved in intrathecal therapy must be knowledgeable in identifying and managing potential intrathecal drug delivery system (IDDS) problems. Catheter-related problems represent the majority of system-related issues. These include catheter tip migration, kink or block, fracture of catheter, inadvertent puncture, or loosening of connections. Catheter migration has been reported in more than 10% of patients and catheter obstruction was reported in more than 25% in earlier studies. It should be noted that improvements have been made in catheter and relayed ted accessories design. However, it is not known if these improvements will translate into lesser hardware complications.

A lesser cause of IDDS malfunction involves pump motor stall. This complication is readily revealed upon interrogation of the pump and rarely by performing a rotor study under fluoroscopy. Motor stalls occur temporarily following an MRI, and pumps should be routinely interrogated after MRI imaging. Prolonged motor stall following MRI is exceedingly rare. However, the majority of pump motor stalls occur spontaneously, at a rate of 2.4% with FDA-approved drug monotherapy and 7% with off-label medication at 78 months after implant.

Sudden interruption of intrathecal medication infusion can result in serious adverse effects. This is especially concerning with baclofen withdrawal, which may be life threatening and sometimes fatal. Clonidine and opioid withdrawal can result in serious morbidity and occasional mortality. Hence, it is important to expeditiously diagnose IDDS dysfunction resulting in intrathecal infusion interruption and to understand the urgency for intervention depending on medications used. Of note, sudden interruption of ziconotide or bupivacaine infusion does not result in withdrawal.

Diagnosing interruption in intrathecal infusion in a timely fashion is essential to ensuring an optimal outcome. If pump interrogation reveals motor stall, imminent pump replacement may be necessary. Given apparently functioning pump, investigation of catheter function is warranted. This may be done by imaging or special catheter function studies.

- Imaging studies such as X-ray or CT scan may be of low yield. However, they may be important in delineating catheter tip position and occasionally diagnosing catheter interruption or fracture.
- Radioisotope studies may reveal catheter malfunction. However, they are not as timely or as specific as a catheter contrast agent study (also known as pump-o-gram).
- In this test (pump-o-gram), the catheter access port is accessed with a proper size/type needle. Aspiration is attempted first:
- If cerebrospinal fluid (CSF) is obtained upon aspiration (> 0.3 ml), then the catheter system may be uninterrupted and it may be safe to inject contrast.
- If CSF is not aspirated, then it is important to consider a number of parameters before deciding whether it is safe or not to inject the contrast. It may be prudent, while consenting the patient for a pump-o-gram, to explain that admission to the hospital may be needed. Prior to considering injecting the intrathecal catheter with contrast, it is essential to take into consideration the patient’s clinical status and previous exposure to the pump medications, the dead space within the catheter, the type of medication in the pump/catheter and hence the amount of medication present in the catheter. Based on that information, the patient may need to be admitted and observed/supported.