Treatment of Cerebrospinal Fluid Leak During Spinal Cord Stimulator Implantation with Epidural Blood Patches

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INTRODUCTION

Spinal Cord Stimulation (SCS) is an effective therapeutic option for patients suffering from chronic pain syndromes, who have not obtained relief from more conservative measures. A potential complication associated with percutaneous SCS insertion includes dural puncture and cerebrospinal fluid (CSF) leakage. This complication can lead to postdural puncture headache (PDPH) and pose a challenge during SCS trials and implantation. Epidural blood patching is an effective treatment for PDPH. Our goal is to explore the role of epidural blood patches during SCS procedure, if a CSF leak is identified.

STUDY DESCRIPTION

A retrospective chart review was performed to identify patients who underwent SCS trials or permanent implantation from 2005 to 2010 at an academic and private outpatient surgical center. Of the 285 SCS procedures (160 trials, 125 permanent implantation), a total of 7 patients (3 males, 4 females) were found to have a CSF leak intra-operatively. Their ages ranged from 44 to 72 (average: 54). The level of leak was identified as T6-7 for 1 patient, and T11- 12 for the other 6 patients. 5 of these patients underwent an epidural blood patch to the contra-lateral side intra-operatively, after the SCS lead was appropriately inserted. 2 of the patients did not receive an intra-operative blood patch and were monitored for symptoms.

RESULTS

All five patients treated intra-operatively with an epidural blood patch sustained significant pain relief after the SCS trial or implantation. These patients did not experience any symptoms consistent with PDPH during the post-operative period. One of the five patients had a history of multiple lumbar surgeries in the past along with lumbar SCS placement for chronic refractory lower back and leg pain. This patient underwent thoracic SCS implantation for upper back pain which was not covered by lumbar SCS. This patient's CSF leak was treated with a contra-lateral epidural blood patch intra-operatively. He sustained significant pain relief from the permanent SCS implanted without symptoms of headache. The two patients who did not receive an intra-operative blood patch developed symptoms consistent with PDPH post-operatively. One of the patients was treated with conservative measures and her symptoms resolved. The second patient failed conservative treatment and received an epidural blood patch 1 week later. This patient had less than 50% reduction in her regular pain during the trial and therefore no permanent implantation was performed.

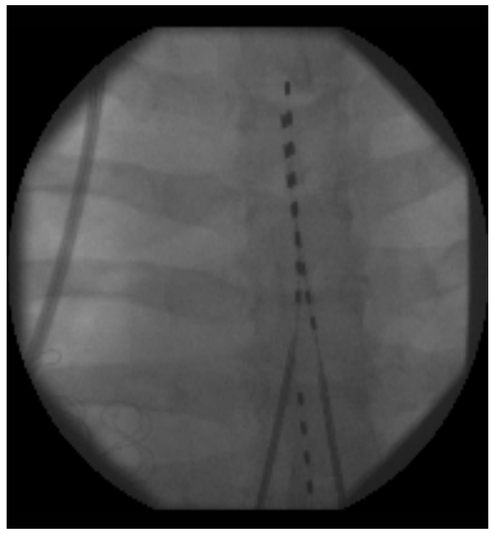

Figure 1: Placement of Thoracic SCS leads in a patient with previous Lumbar SCS leads.

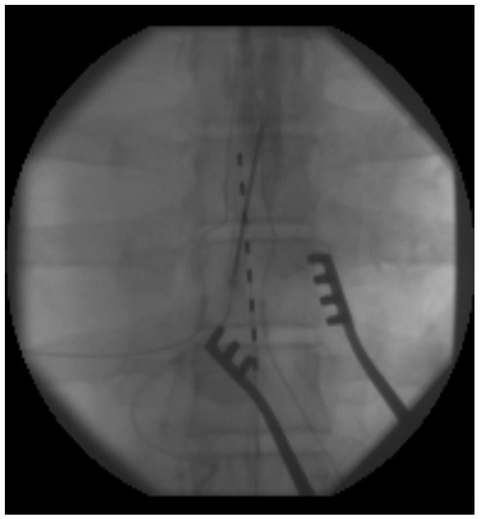

Figure 2: Contrast illustrating correct needle position prior to epidural blood patch at T6-T7 during spinal cord stimulator trial

DISCUSSION

Dural puncture is a well recognized possible complication following spinal cord stimulator procedures. The incidence for this complication has been reported to be 0.3-7% in prior studies[2,3,5]. We observed this complication in 2% of the patients undergoing SCS procedures. The management of patients with a CSF leak remains controversial. Previous suggestions include removing the leads and attempting SCS placment at a later date or delaying programming of the SCS until the PDPH has resolved[4]. In patients underoing spinal cord simulator trials, post-dural puncture pain could make it difficult to assess the efficacy of the spinal cord stimulator. One possible cause may be abberrant electrical conduction from the SCS because of the CSF leak[3]. Delayed treatment of a CSF leak may lead to PDPH and failure of the trial. This challenge has significant clinical and economic implications for the patient. Furthermore, it is important to identify patients who are at a greater risk for dural puncture prior to SCS procedures. In our study, one of the patients who experienced a dural puncture and CSF leak had a significant history of prior lumbar surgeries, increasing the potential for fibrosis and scarring. Pre-operative imaging to identify fibrosis might lead to prevention of dural punctures in these patients.

CONCLUSION

Our data is consistent with prior studies in demonstrating that the incidence of dural puncture and CSF leak with SCS procedures is rare. Based on our experiences, performing an epidural blood patch intra-operatively on the contra-lateral side under fluoroscopy could prevent PDPH. This treatment should especially be considered in patients underoing SCS trials in order to accurately assess the level of pain reduction. Patients with prior spine surgeries might pose higher risks for dural puncture and more extensive pre-operative assessment could be beneficial.

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