

SCLEROTHERAPY FOR MANAGEMENT OF INTRATHECAL PUMP SEROMA FORMATION: A CASE SERIES

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Background: Intrathecal drug delivery systems (ITDDS) are an option for the treatment of chronic pain syndromes or spasticity that are refractory to other conservative measures; however, they are not without complications. Seroma formation is one of the possible complications following implantation of an ITDDS.

Case Report: We present 3 separate cases of patients with recalcitrant seroma formation at their IT pump sites that were successfully treated with doxycycline pleurodesis.

Conclusions: Pump site seroma formation is a possible complication following implantation of an ITDDS. Typically, these are self-limiting, but if not addressed can result in complications which include pain, infection, and difficulty filling. We propose a case series of 3 patients who suffered from recurrent seroma formation following ITDDS implantation that were successfully treated with doxycycline-based sclerotherapy.

Key words: Intrathecal drug delivery systems, seroma, pleurodesis, chronic pain, case report

BACKGROUND

For the management of chronic pain syndromes (i.e., cancer/non-cancer pain) or spasticity secondary to neurologic insult that has received inadequate conservative treatment, intrathecal drug delivery (ITDD) is a viable option (1). This therapy utilizes a delivery system to administer either opioids, local anesthetic medications, or nonopioid medications for pain control into the thecal space via a catheter to improve efficacy of the drug (2). However, during and following the procedure of implantation of this therapy, complications do arise. Seroma formation is a protentional complication following intrathecal drug delivery system (ITDDS) implantation (3). These serosanguinous fluid collections are typically self-limiting and are usually not clinically significant; however, since large seroma formations are ideal mediums for potential bacterial growth, they must be aspirated and drained if they persist (4). Typically, these seromas can remain present for approximately 1-2 months while staying asymptomatic (5). For recurring or symptomatic seromas, one option is sclerotherapy of

the ITDDS pocket. The literature currently cites multiple options for sclerotherapy, which is superior in treatment of seromas, that include talc, tetracyclines, ethanol, erythromycin, OK-432, or fibrin glue, etc (4); however, to our knowledge, there has been no established literature for the treatment of seroma formation following implantation of ITDDS. The use of the protocol stated below stemmed from a discussion in a target drug delivery Google Group by Dr. Lisa Stearns.

In this case series, we present 3 cases of recurrent seromas related to IT pump placement that were recalcitrant to aspiration, drainage, and binding, now successfully treated with sclerotherapy. Informed consent was not obtained due to the retrospective nature of chart review.

CASE PRESENTATION

Case 1

A 58-year-old woman with a significant past medical history of prior cervical and lumbar spine surgeries

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resulting in worsening back pain requiring ITDDS implantation with pump placement in the abdomen. ITDDS was replaced due to a malfunctioning catheter, which was complicated by superficial swelling following the procedure. This was diagnosed as likely seroma formation through sonographic imaging. The fluid pocket was initially drained via a 20G needle, which aspirated 50 mL of straw-colored fluid, indicating seroma. Upon follow-up 2 months later, seroma had reformed, and the patient was scheduled for a sclerotherapy procedure for elimination of the seroma. During the procedure, repeat aspiration resulted in 125 mL of clear fluid, then the seroma was injected with 30 mL of 1,000 mg doxycycline diluted in 20 mL 0.25% bupivacaine and 10 mL sterile normal saline. Patient tolerated the procedure well with complete resolution of the seroma upon subsequent follow-up clinic visits.

Case 2

A 72-year-old man with a significant past medical history of failed back surgery syndrome status post L4-L5 posterior lumbar interbody fusion, C5-C6-C7 anterior cervical discectomy and fusion, T10-T11 discectomy, L2-L3 laminectomy, and chronic pain resulting in ITDDS implantation. ITDDS was replaced following the presence of a catheter-tip granuloma by neurosurgery, which postoperatively was complicated in an edematous structure formation distal to ITDDS. This was identified as a pump pocket seroma under ultrasound imaging, and with an 18G needle, 600 mL of bloody-tinged fluid was removed. This procedure was duplicated multiple times without resolution of seroma. The patient was then given 1,000 mg of doxycycline mixed with 10 mL normal saline and 20 mL of 0.25% bupivacaine for a total solution volume of 30 mL and injected into the seroma pocket. For complete resolution of the seroma, the patient's seroma pocket was injected under ultrasound guidance one month later with 1,000 mg of doxycycline in 30 mL of 0.5% bupivacaine for a total solution volume of 30 mL. Patient tolerated both procedures well with complete resolution of the seroma and no complications.

Case 3

A 67-year-old man with a significant past medical history of failed back surgery syndrome and chronic lumbar radiculopathy with resultant ITDDS placement was found to have a spontaneous fluid pocket overlying the IT pump, visualized under ultrasound guidance,

upon presentation for pump medication refill. With an 18G needle, approximately 38 mL of yellow-clear fluid was extracted, indicative of seroma formation. At a one-month follow-up, seroma persisted and again 27 mL was extracted; however, a 30 mL solution of 0.5% bupivacaine mixed with 1,000 mg of doxycycline was then injected in the capsule pocket. Approximately 4 months later at follow-up, the patient describes no edematous symptoms and physical exam reveals complete resolution of the seroma with no complications following sclerotherapy with doxycycline.

CONCLUSIONS

IT pump site seroma formation and its subsequent management has not been well described in the literature, although it has been documented as a potential complication (3). Noted in Panchal et al (5), most cases of seroma formation following pump placement are self-limiting and typically resolve within a few weeks; however, it must be noted that seroma fluid within the formed pocket is an ideal medium for bacterial growth. Typically, puncture and drainage are not recommended due to the self-limited nature of these fluid collections (5). Along with potentially being a nidus for infection, these seromas can also cause the patient significant discomfort and can make ITDDS refills quite challenging.

The literature on seroma management is sparse, limited mostly to the field of plastic surgery and from the management of pleural effusions (4). In one systematic review (4), several agents have been studied for the management of seromas, each being used as a sclerosing agent. These agents are used to initiate a fibrotic response to effectively close the dead space formed by the pocket (4). In each of the above-stated cases in this series, we chose to use doxycycline as the sclerosing agent. This antibiotic was utilized due to its availability within our clinic and its minimal side-effect profile. In the above cases, doxycycline was used as the sclerosing agent with no side effects reported by patients and with complete resolution of the seroma in all cases. Continued research for the development of a treatment protocol for such seromas within the field of interventional pain medicine is needed. In addition, further studies need to investigate the efficacy of alternative sclerosing agents for the management of refractory seromas related to ITDDS implantation. Overall, we initially recommend the utilization of doxycycline for such seromas due to its availability and low side-effect profile.

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