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CASE REPORT Open Access

Bilateral, sub-acute subdural hematoma following intra-thecal baclofen pump insertion: case report and literature review

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Abstract

Background: Intra-thecal baclofen pump has been proven a safe and effective treatment of spasticity. Subdural hematoma has been rarely described following intra-thecal drug delivery device insertion.

Case presentation: We report on the rare case of a 45-year-old male with multiple sclerosis who presented with symptoms of intra-cranial hypotension 1 month after insertion of an intra-thecal baclofen pump for severe spasticity. Non-contrast head computerized tomography scan revealed bilateral, sub-acute, subdural hematomas. Due to the nature of the patient's symptoms suggesting intra-cranial hypotension, surgical repair of the cerebrospinal fluid leak only was initially performed. However, after an initial improvement, the patient experienced increasing in severity headache and worsening tetraparesis. Subsequently, the patient underwent burr hole evacuation of the subdural hematomas with improvement of his symptoms. On the 6-week follow-up, he reported no headache and he was able to walk with assistance.

Conclusion: Subdural hematomas should be considered in all patients presenting with new neurologic deficits or persistent headache following intra-thecal drug delivery device insertion. Early recognition and appropriate management of this rare but potentially life-threatening complication is of great importance to improve prognosis and patient outcomes.

Keywords: Intra-cranial hypotension, Intra-thecal drug delivery device, Cerebrospinal fluid leak, Subdural hematoma

Background

Intra-thecal baclofen pump (ITB-pump) provides a safe and effective treatment of cerebral and spinal spasticity [1–3]. However, complications following ITB-pump insertion are not uncommon [1, 3]. These are classified as procedure-related, device-related, and drug-related [4]. Subdural hematoma requiring neurosurgical intervention has been rarely described and has been attributed to cerebrospinal fluid (CSF) leakage causing intra-cranial hypotension, brain sagging, and tearing of the bridging vessels [5, 6].

We report on a patient managed in our department due to CSF leak and bilateral sub-acute subdural hematomas after ITB-pump insertion and review the available English literature on the management of this rare but potentially life-threatening complication.

Case presentation

A 45-year-old male was referred to the Neurosurgical Emergency Room due to a 7-day history of increasing in severity, postural headache, and multiple episodes of vomiting during the last 48 h. His past medical history was significant for multiple sclerosis causing severe spastic quadriparesis. One month prior to presentation, he underwent ITB-pump placement in another hospital. Following the procedure, he was able to ambulate with assistance. His current medications were fampridine 10 mg once per day, escitalopram 10 mg bid, and solifenacin 5 mg once per day.

On admission he was alert, oriented with a Glasgow Coma Scale 15/15 and baseline spastic quadriparesis. He reported multiple episodes of vomiting and headache which increased in the visual analog pain rating score

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from 2/10 in the supine to 9/10 in the upright position. Admission head, non-contrast, computerized tomography (NC-CT) scan was significant for bilateral, supratentorial, sub-acute subdural hematomas (Fig. 1a). Due to the nature of the headache suggesting intra-cranial hypotension and the reported improvement of the patient's quality of life following ITB-pump insertion, we decided to preserve the ITB-pump, surgically repair the CSF leak, and manage the subdural hematomas conservatively. Under general anesthesia, the lumbar wound was opened and CSF leak was identified around the catheter. Purse-string sutures were placed around the catheter with control of the leak, and the surgical wound was closed in a multilayer fashion. No new neurologic deficit was noted post-operatively, and the patient was transferred to the neurosurgical ward with instructions for hydration, analgesics, and bed rest for 3 days. The immediate post-operative period was uneventful. However, on the 4th post-operative day and prior to mobilization, the patient demonstrated worsening tetraparesis and complained of severe headache. A head NC-CT scan was obtained which was unchanged in comparison to the admission head NC-CT scan. However, due to worsening of the patient's symptoms, bilateral burr hole evacuation of the subdural hematomas was done (Fig. 1b). Immediate improvement of the symptoms was noted post-operatively, and the patient was discharged 8 days later to the referring rehabilitation center. On the 6-week-follow-up, he was able to walk with assistance and he reported complete resolution of his headache.

Discussion

CSF leak is a well-described complication of ITB-pump insertion and is particularly common in pediatric patients [1, 3]. It usually presents with signs and symptoms of intra-cranial hypotension such as orthostatic headache, neck pain, nausea, vomiting, dizziness, vertigo, and visual disturbances [5, 6]. Spinal CSF leak may lead to brain sagging causing tearing of bridging veins subsequently resulting in subdural hematoma [7, 8]. This mechanism is supported by reports of subdural hematomas complicating spinal surgery with CSF leak [7], lumbar puncture [8], spinal epidural anesthesia [9], lumbar myelography [10], and percutaneous epidural neuroplasty [11].

Subdural hematomas following insertion of an intrathecal drug delivery device have been rarely described [5, 6, 12, 13] (Table 1). Treatment of such hematomas should be individualized and based on patient presentation and co-morbidities. Our patient presented with symptoms of severe intra-cranial hypotension and bilateral sub-acute subdural hematomas. Accordingly, we decided to repair the spinal CSF leak expecting that restoration of the intra-cranial pressure would allow for conservative management of the hematomas. However, despite initial improvement, the patient developed persistent headache and worsening tetraparesis requiring bilateral evacuation of the subdural hematomas. Velarde et al. [12] reported on a case of bilateral, chronic subdural hematoma 4 days following insertion of an intrathecal drug delivery device managed with epidural blood patch correction of the spinal leak without evacuation of the hematoma. Lad et al. [5] reported on a female patient who underwent bilateral subdural hematoma evacuation 1 month following insertion of an ITB-pump and experienced multiple recurrences during the same admission. An epidural blood patch was then performed with resolution of the patient symptoms. Magro et al. [6] described the case of a female patient who presented with symptoms of intra-cranial hypertension due to bilateral sub-acute subdural hematoma 6 weeks after the placement of an ITB-pump. Since the hematomas were thought to originate from the initial lumbar puncture, the patient was managed with hematoma evacuation

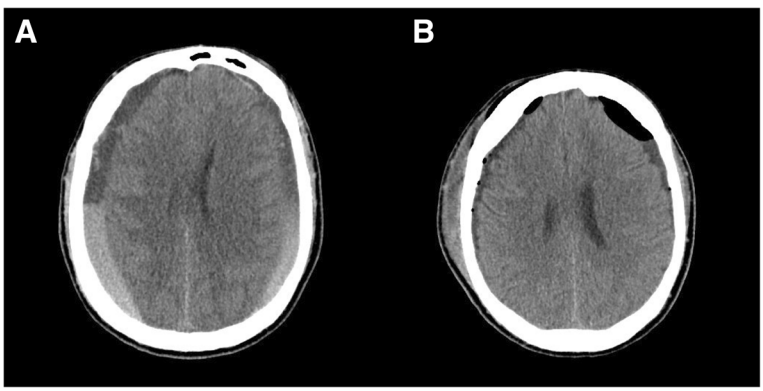

Fig. 1 Pre- and post-operative non-contrast head computerized tomography scan. Legend: Non-contrast, axial, head computerized tomography scan (**a**) significant for bilateral sub-acute subdural hematomas with mass effect on the midline structures and (**b**) following bilateral burr hole evacuation of the hematomas

Table 1 Reported cases of subdural hematoma following insertion of an intra-thecal drug delivery system

Author/year	Age/sex	Type of IT-DDS	SDH Rx	CSF leak Rx	IT-DDS preservation	Outcome
Velarde et al. [12]	58/M	IT-morphine pump	Conservative	Epidural blood patch	Yes	Good
Lad et al. [5]	62/F	IT-baclofen pump	Evacuation	Epidural blood patch	Yes	Good
Magro et al. [6]	41/F	IT-baclofen pump	Evacuation	N/A	Yes	Good
Srinivasan et al. [13]	39/M	IT-morphine pump	Evacuation	Epidural blood patch	Removed	Good
Current case	45/M	IT-baclofen pump	Evacuation	Surgical repair	Yes	Good

CSF cerebrospinal fluid, *F* female, *IT* intra-thecal, *IT-DDS* intra-thecal drug delivery system, *M* male, *N/A* not applicable, *Rx* treatment, *SDH* subdural hematoma

alone. Srinivasan et al. [13] reported on a patient who presented with persistent headaches 2 weeks after insertion of an intra-thecal morphine pump that did not respond to multiple epidural blood patches and hematoma evacuation but responded to removal of the intra-thecal drug delivery device. Nevertheless, irrespective of the management chosen, all reported patients achieved good outcomes with no mortality and intra-thecal drug delivery device preservation reported in three out of four patients.

Conclusion

In conclusion, subdural hematoma should be considered in all patients with persistent headaches or a change in the neurologic examination following implantation of an intra-thecal drug delivery device. Early recognition and management of this rare but potentially life-threatening complication is of utmost importance to achieve good patient outcomes.

Abbreviations

CSF: Cerebrospinal fluid; F: Female; IT: Intra-thecal; ITB-pump: Intra-thecal baclofen pump; IT-DDS: Intra-thecal drug delivery system; M: Male; N/A: Not applicable; NC-CT: Non-contrast computerized tomography; Rx: Treatment; SDH: Subdural hematoma

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Authors' contributions

SP conceived the study and wrote the manuscript. KB assisted in the preparation of the manuscript. All other authors critically reviewed the manuscript. All authors approved the final version of the manuscript and agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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Availability of data and materials

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Ethics approval and consent to participate

Not applicable.

Consent for publication

Written informed consent was obtained from the patient for publication of this case report and accompanying images.

Competing interests

The authors declare that they have no competing interests.

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