Management of Horner's Syndrome and Hemiparesis Occurring After Thoracic Epidural Placement

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Background:
The central nervous system is surrounded and protected by three layers of connective tissue, the meninges. The meninges from deep to superficial are pia mater, arachnoid and dura mater [1]. Epidural catheter placement is commonplace due to the benefits of regional anesthesia and analgesia. It has a good safety profile but rare complications such as an unintentional subdural injection can occur by breaching the dura with the epidural needle or by migration of the epidural catheter. The subdural space is a potential area between the dura mater and the arachnoid, that contains only small amounts of serous fluid and thus allows the dura and arachnoid to move over each other[2]. The incidence of unintended subdural blockade after attempting an epidural procedure ranges from 0.82% to 13.2% [3]. Subdural blockade can present with a delayed onset of extensive neural block (in the absence of subarachnoid injection) with marked hypotension, and possible intracranial tracking which can lead to dyspnea and loss of consciousness. Accidental subdural injection has been proposed as the cause for the occasional "failed spinal" after an intrathecal block [2][4].

Case description
We present an interesting case of a 24 year old male with multiple gunshot wounds to the chest, resulting in comminuted fractures of proximal left 7th & 10th ribs with massive hemothorax. He was brought emergently to the OR for damage-control thoracotomy with multiple pneumorrhaphies. On postoperative (post injury) day 1, he then returned to the operating room for a re-exploration of the chest and definitive closure. On postinjury day 4, the acute pain service was consulted due to continued inadequate chest pain control. Initially, the patient’s pain was managed with a single shot paravertebral block. On review the following day, he had achieved adequate but short-lived pain relief. The decision was made to proceed with a thoracic epidural. In the absence of contraindications to the procedure, the T5-T6 interspace was identified and a thoracic epidural catheter was placed via a right paramedian approach. Epidural test dose was negative. About 3 hours after the procedure, the patient was noted to have left upper and lower extremity weakness, left facial droop with associated left Horner’s syndrome (left ptosis and miosis). Further examination revealed marked decrease sensation to cold and painful stimuli on the entire left side of the body. The patient remained hemodynamically stable with a normal level of consciousness. Aspiration of the catheter was negative for CSF. These findings suggested a subdural catheter placement. After discussion with the patient, the catheter was pulled back 1 cm and the infusion
was paused. On review 2 hours later, he had improved motor strength and partial return of sensation, with resolution of ptosis, facial droop and miosis. The symptomatic improvement with pausing the infusion made a diagnosis of stroke or epidural hematoma unlikely, so the infusion was restarted at a lower rate. Once the block was reestablished, the patient achieved adequate pain control with a block localized to the thorax. Sensory and motor exams continued to be within normal limits. The catheter was eventually removed on catheter day 4 once the patient was transitioned to oral and intravenous analgesia.

Discussion

Epidural anesthesia is performed due to its ability of generate a reliable form of anesthesia, improved operative conditions and also good analgesia.

One of the shortcomings of an epidural placement is an unilateral anesthetic blockade which can be secondary to:

- patient position (i.e. lateral decubitus),
- paramedian position of the epidural catheter
- overthreaded catheter
- subdural placement/migration of the epidural catheter [4],
- migration of the epidural catheter to spinal or paravertebral space [7]
- plica dorsalis medialis (a midline septum between the epidural space and the ligamentum flavum)[5][6].

Literature review of the subdural placement or migration of the epidural catheter reveals an incidence of 0.82% but more recent radiologic studies have found that it could be up to 13.2%[3]. This misplacement of the catheter can create a wide variety of clinical presentations that could mimic an accidental spinal injection, hematoma formation or even a stroke. It presents with an extensive and delayed (10-30 mins) sensory and motor block, along with intracranial tracking that could result in a hypotension and in severe cases dyspnea and loss of consciousness. Horner’s syndrome is characterized by miosis, ptosis and anhidrosis secondary to blockage of sympathetic fibres at the level of from C8-T1 level. The presence of Horner’s after a neuraxial anesthesia is benign, but it represents cranial migration of the local anesthetic and a possible sign of impending cardiorespiratory collapse. The incidence of Horner’s syndrome after epidural anaesthesia is unknown. The obstetric population is at risk (8), due to the physiologic changes during pregnancy including increased intraabdominal pressure with a decreased epidural space that increases the anesthetic cephalad migration (9). In the presented case, the development of Horner’s syndrome in combination with a unilateral block was most likely a subdural migration of the epidural catheter with cephalad tracking. The absence of profound cardiorespiratory instability makes the possibility of a misplaced spinal catheter less probable. Currently there are no clear guidelines on subdural block or Horner’s management post epidural placement. After reviewing the literature on this matter, the main recommendation is to stop the epidural infusion, discontinue the epidural catheter and replace it in another space if still indicated.(10, 11,12). We have shown a
novel alternative to manage this complication in the absence of hemodynamic compromise. Stopping the infusion is mandatory, followed by a neurologic assessment to rule out more serious conditions like epidural hematoma or stroke. The epidural infusion could be restarted after pulling the catheter approximately 1 cm and at a lower rate with close monitoring of the patient’s cardiovascular and respiratory status.

References:

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