

CASE REPORT

Epidural anesthesia ending in an unintended subdural block: a case report

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ABSTRACT

Although epidural anesthesia is routinely practiced in all of the major clinical settings, accidental subdural block still remains its poorly understood complication which haunts anesthesiologists with its variable clinical presentation. A 40 years old patient given thoracic epidural anesthesia developed an episode of hypotension along with numbness in both arms and legs with sensory block upto C6 dermatome and some motor weakness, after giving loading dose of local anesthetic solution. She was successfully managed. Hence, patients receiving epidural anesthesia should be closely observed for any such untoward complication.

Key words: Subdural block; Anesthesia, Epidural; Accidental; Cholecystectomy

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INTRODUCTION

Between the arachnoid mater and dura mater lies a potential space with minimal serous fluid known as subdural space.¹ The incidence of inadvertent subdural blockade is reported to be 0.82%, whereas recent studies using radiographic evaluation indicates higher incidence of one to 13%.² This case illustrates a situation where epidural block was complicated by a presumed subdural or multicompartamental block. Only few practitioners are familiar with most of its clinical presentation, as the presentation may be quite variable.

CASE REPORT

A 40 year female, ASA II, was undergoing open cholecystectomy. Patient was shifted to the operating room and standard monitoring including ECG (lead II), NIBP, and SpO₂ were instituted. Lactated ringer's solution was started through 18G IV cannula. With the patient in sitting position, T9-T10 epidural space was identified with loss of resistance to air technique with an 18G Tuohy needle after 2 attempts. Needle bevel was oriented cephalad by an experienced anesthetist. A 20G epidural catheter (closed tip, 3 lateral eyes, B. Braun Pvt. Ltd. Germany) was inserted to a depth of 4 cm with minimal resistance without eliciting

paraesthesias. Following negative aspiration for blood and CSF, a test dose of 3 ml of inj. lignocaine 2% + adrenaline (1:200,000) was injected and epidural catheter secured. After negative test dose 12 ml of ropivacaine 0.5% was injected by incremental injections over 6 minutes after patient returned to the supine position. About 6 minutes later T4 sensory level was attained and surgery started. Supplemental intravenous sedation was given with inj. midazolam 1 mg.

After half an hour upon completion of surgery, patient's BP dropped down to 82/45 mmHg and heart rate to 60 bpm. Sensory testing revealed T1 level. Considering allergic reaction to local anesthetics as a first possibility, patient was given fluid bolus along with inj. pheniramine maleate (AvilTM) and inj. hydrocortisone followed by inj. mephentermine; and the BP increased to 96/50 mmHg. After observing for 10 minutes with stable hemodynamics patient was shifted to post anesthesia care unit (PACU). At this time patient began to notice numbness and weakness in both her arms and legs. Sensation to cold revealed block upto C6 level and she felt weakness during shoulder shrug. The patient's sensorium remained appropriately alert throughout and during subsequent neurologic assessment. Pupils were equal and reactive. Horner's syndrome was not

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seen. Block regressed over next 2 hours and her vital signs remained stable thereafter. Total crystalloids administered were 1700 ml. A visit next day revealed patient returning to normal activity with no neurologic sequelae or deficits.

DISCUSSION

Epidural blocks occasionally have atypical spread, caused by an accidental injection either into the subarachnoid or subdural space. Subarachnoid injection has profound hemodynamic changes and dense sensory-motor block.³ In subdural block onset is slow, lasting for few hours with subsequent complete recovery. As drug pools posteriorly with sparing of anterior nerves roots so sensory level may be high, inadequate or completely absent while sympathetic and motor functions are usually spared or affected minimally.¹

The subdural space is a narrow potential space, extending from S2 vertebra into the cranial cavity.¹ Hence brainstem involvement is a possibility with apnea and profound bradycardia. Using electron microscopy, Reina et al, observed that arachnoid mater has an inner trabeculated portion and outer compact laminar portion attached to the dura. Between them lies a dura-arachnoid interface where this space may appear, as neurothelial cells tend to break up upon pressure exerted by air or fluid injection.⁴

Though, negative catheter aspiration may rule out subarachnoid or intravascular placement or subsequent migration, but it is of little value if the catheter rests in whole or part, within the dura-archnoid interface.⁵ Our patient developed a high sensory block in 40 minutes, and the level was disproportionate to the volume of drug injected. Patient was able to partially shrug her shoulders indicating the involvement of C5 –T1 roots, but never complained of respiratory distress with normal arterial blood gas findings suggested sparing of phrenic nerve (C3, 4, 5). Moderate cardiovascular instability was seen 40 minutes later, which responded to inj. mephentermine and fluid therapy, and the patient recovered completely in 2 hours.

Furthermore, multiple predisposing factors e.g. technical difficulty, dural injury from excessive manipulation, previous back surgery have been implicated in subdural block.² Also in our patient it took two attempt by a skilled anesthetist for epidural catheterization. Several studies discuss the diagnosis of subdural block.^{2,6} Lubenow et al described two major and three minor criteria; major criteria are negative aspiration and unexpected extensive sensory block, whereas minor criteria include onset of sensory or motor blockade by more than 10 minutes, a variable

motor blockade and sympatholysis out of proportion to the administered local anesthetic. A diagnosis of subdural block is made if two major and one minor criteria are present.⁶ A diagnostic four step algorithm was proposed by Hoftman and Ferrante. In first step, the performer assesses whether the block is thought to be epidural or subarachnoid based on tactile feel upon insertion and the presence or absence of CSF. In the second step, dermatomal level is assessed and graded as excessive, restricted or neither. The last step assesses minor criteria such as onset at > 20 minutes, cardiovascular stability, motor sparing, patchy or asymmetrical spread, respiratory failure and cranial nerve involvement.² Other diagnostic modalities include radiological confirmation by x-ray, CT or MRI. It has been argued that radiological confirmation is unnecessary with no therapeutic benefit; it might contribute further to complications.¹ So we decided to remove the catheter without further radiological evaluation as MRI/CT was not available at our institution.

Based upon these diagnostic criteria, the patient's clinical scenario invoked a high suspicion of subdural blockade and other possible differential diagnosis of massive epidural block, total spinal block and allergic reaction were ruled out. No clear guidelines have been defined for the management of subdural block. Close and continuous monitoring with supportive (cardiovascular and respiratory) therapy are the mainstay of the management. The epidural catheter needs to be removed and reinserted to another space, if required,³ or the patient may be considered for general anesthesia, where succinylcholine is used with caution as severe bradycardia may occur in the face of high sympathetic block.⁷

Various measures for preventing and detecting subdural catheter placement include; care during Touhy needle insertion and rotation, high index of suspicion in patients with previous back surgery or difficult block, using single orifice catheters, and graded top-up injections.¹ But stress is on familiarity with its presentation, early diagnosis and timely management.

CONCLUSION

Although accidental subdural catheter placement is a rare complication of central neuraxial blockade but one should closely observe the patient in case of delayed or atypical block pattern, and avoid subsequent injections of local anesthetic through the catheter. Awareness of the anesthesiologist for this complication is imperative for early detection and appropriate management.

Conflict of interest: None declared by the authors.

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