

Meningitis post-spinal anaesthesia: A report of two cases

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Meningitis post-administration of a central neuraxial blockade is although a rare complication but a potentially fatal one. Breach in aseptic precautions leading to introduction of bacteria is considered the most probable cause and haematogenous spread due to microscopic vessel injury in symptomatic or asymptomatic bacteremia is also one of the etiologies. Mostly, a single anesthesiologist may be seen with such cluster

of cases. Sometimes defective drugs or faulty equipment used for the procedure may also lead to this complication. We report two cases where spinal anaesthesia was performed by different anesthesiologist's in different operation theatres of the same hospital, which landed up with the complication of meningitis post procedure despite maximum sterile barrier maintenance during both the cases.

Key Words: Meningitis, Bacterial injections, Spinal, Postoperative complications, Cerebrospinal fluid, Antibiotic prophylaxis, *Streptococcus*.

INTRODUCTION

Iatrogenic meningitis post-spinal anesthesia is considered rare but is essentially a grave complication. The incidence of infectious complication post-central neuraxial blockade ranges from 0% to 0.04% [1,2]. This complication can occur not only during spinal anesthesia but also after diagnostic lumbar puncture, epidural analgesia/anaesthesia, myelography and other neurosurgical procedures involving spinal canal [3-6].

Various etiologies for post-spinal meningitis are breach in aseptic precautions, haematogenous spread when bacteremia is present and lumbar puncture is carried out and primary contamination of the drug as well as the equipment [7-9].

CASE REPORT 1

A 48-years-old lady was posted for ureteroscopy (Left) for a 7 mm stone in the left proximal ureter. She was on treatment for Schizophrenia for past 8 years (Tab Clozapine 25 mg HS) and accepted in American Society of Anesthesiologist physical grade (ASA) II. In operation theatre (OT) after attaching regular monitoring (Heart rate, non-invasive blood pressure, electrocardiography, pulse oximetry) she received a sub arachnoid (SA) block with 12.5 mg bupivacaine in lateral position in lumbar interspace 3-4 with help of 26 G Quinckes' needle. Standard strict aseptic precautions which included wearing cap, face mask, sterile gown, sterile hand gloves, cleansing agent to prepare the skin (2% povidone iodine and alcohol) and sterile drape were followed strictly.

Intraoperative period was uneventful though pus was encountered around the calculus during extraction. Around five hours postoperatively, patient developed altered sensorium and had one episode of vomiting. On examination she was afebrile, GCS was E4V3M5, heart rate (HR) was 96/min, non-invasive blood pressure (NIBP) was 144/96 mmHg and pulse oximetry reading (SpO₂) of 100% on room air. No neck rigidity was noted, and no signs of meningism were present. Central Nervous Systemic (CNS) and rest systemic examination examination was normal. Computed tomography (CT) scan for head revealed no abnormalities and fundoscopy also did not show any sign of papilledema. A diagnostic spinal puncture under all aseptic precautions was executed which revealed cloudy cerebrospinal fluid (CSF). CSF study revealed white blood cell (WBC) count of 2,200/cu mm, with predominant polymorphonuclear leukocytes, protein value of 290 mg% and glucose value of 90 mg%. Gram stain of the CSF demonstrated no organisms and culture of the CSF was negative. A

simultaneous total leucocyte count (TLC) revealed 19,100/mm³ with 94% polymorphonuclear leukocytes and serum blood glucose of 95 mg%.

Physician referral was sought, patient was diagnosed as a case of aseptic meningitis and started on antibiotics (ceftriaxone 1 g intravenously (IV) 12 hourly+Vancomycin 1 g IV 12 hourly). Patient improved drastically within 24 h and became asymptomatic at 72 h however the antibiotics were given for seven days. Since the drug and spinal needle used for patient were single use so we sent sterile drug from the same batch as was used previously for the patient, sterile spinal needle from the same batch as was used in the patient, cleansing agent for microbiological investigation (culture) and no evidence of micro-organism growth was seen. A neurological exam conducted at one week was essentially normal and thereafter patient was discharged.

CASE REPORT 2

A 35-years-old male patient, case of Anterior Cruciate Ligament tear Left leg was posted for Arthroscopic repair. Patient was accepted in ASA I. In OT regular monitoring: HR, NIBP, ECG, SpO₂ was attached and he received a SA block with 12.5 mg bupivacaine in lateral position in lumbar interspace 3-4 with help of 26 G Quinckes' needle. Standard strict aseptic precautions which included wearing cap, face mask, sterile gown, sterile hand gloves, cleansing agent to prepare the skin (2% povidone iodine and alcohol) and sterile drape were followed stringently. The duration of surgery was 75 mints. Around six hours postoperatively patient developed repeated vomiting, agitation and altered sensorium. On examination, patient was not responding to oral commands, was visibly agitated, HR-114 bpm, NIBP-139/84 mmHg, SpO₂-100% on room air and GCS was E4V2M6. Midazolam 1.5 mg IV bolus was administered and Dexmedetomidine as IV infusion one mcg/kg/h as loading dose and 0.05 mcg/kg/h as maintenance was initiated. Patient was very agitated despite dexmedetomidine infusion hence decision was to intubate and mechanically ventilate the patient so as to facilitate CT head and CSF examination by diagnostic lumbar puncture. CT head showed normal study. Fundoscopy was also normal. Blood investigations revealed TLC-22900, blood sugar 130 mg% and CSF study showed Sugar-131 mg %, Protein-310 mg%, Globulin increased, LDH-182 mg/dL, Cell-260/mm³, Neutrophil-70%, Lymphocyte-30%.

Patient was referred to neurophysician and was diagnosed as acute meningitis and started on vancomycin 1 g IV 8 h, and Ceftriaxone 2 g IV 8 h. CSF gram stain came as suggestive of Gram negative coccobacilli and then the diagnosis was revised to acute bacterial meningitis. Like in the

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previous case, the drug and spinal needle used for patient were single use and so not available for microbiological examination, we sent sterile drug and the sterile spinal needle from the same batch as was used previously for the patient, as well as cleansing agent for microbiological investigation (culture) and this time evidence of micro-organism growth was seen with the drug.

Patient improved with the antibiotics and was extubated the second day. Intravenous antibiotics were continued for seven days, patient was discharged with nil neurological sequelae.

DISCUSSION

Iatrogenic meningitis is an acute infection due to introduction of offending agent in the subarachnoid space. The possible causes are breach in sterility and aseptic techniques while spinal anesthesia is being administered, hematogenous spread in septicemic patients or in patients with asymptomatic bacteremia due to microscopic bleeding while spinal anesthesia is administered or due to contaminant being present in the drug utilized or the equipment used [7,8,10]. Contamination may take place from scrubbing and cleansing solutions, surgical glove powder or from the spinal needle or from the drug which is injected intrathecally during the procedure of spinal anesthesia. Sometimes systemic administration of drugs like NSAIDs, H₂ blockers, trimethoprim, and sulfadiazine may also lead to aseptic meningitis like symptoms [7-9].

Commensals of oral cavity and respiratory tract (Strains of *Streptococcus*) may be the causative organisms which are of low virulence but multiply rapidly in CSF leading to bacterial meningitis in seven to 24 h [11]. Droplet infection from the health workers, doctors or the patient may lead to contamination of the spinal needle on an incompletely sterilized patient's skin [11]. Frequently clustering of cases is seen by a single anesthesiologist. To localize the exact source of contamination, isolates from nasopharyngeal swabs of patients as well as health care workers need to be compared with patients CSF picture. Thus following personal protective measures like a tight fitting mask covering nose and mouth is essential while performing the spinal anesthesia. The scrubbing by the health care worker should be fastidious and preparation of patient's skin needs to be with stringent aseptic measures [12].

Meningitis is a differential diagnosis for altered sensorium, convulsions, headache, and neck rigidity [13]. Our both patients presented with altered sensorium within 5 h to 6 h post administration of spinal anesthesia. The batch of the spinal drug (Bupivacaine hyperbaric) utilized was same whereas two different anesthesiologists had given spinal anesthesia in two different OTs and there was a gap of two months between the two cases. The protocol for maintenance of asepsis is followed rigorously in our OTs.

The suspicion for meningitis led to CSF examination, CT head and funduscopy. First patient had no positive growth on culture or gram staining while the second patient had gram staining (Gram negative coccobacilli) results. The microscopic examination of the sterile drug sent after the second case happened revealed some gram staining growth and hence the source was localized. The batch of the drug which was sent for microbiological examination was removed from the OT stocks. We notified the drug company to withdraw all the drugs of the same batch from market and also notified the Food and drug administration regarding the complication with the batch of the drug (Hyperbaric bupivacaine).

The empirical antibiotics were started as suggested by the Neuro-physician and both patients displayed drastic improvements post administration of antibiotics. The CSF picture revealed raised proteins and presence of cells but did not show any decrease in glucose and could also be pointing towards aseptic meningitis due to chemical contamination of CSF. CSF glucose concentrations less than 40 mg% are abnormal and point towards bacterial, tubercular or fungal meningitis while in viral meningitis the CSF glucose does not decrease. Aseptic meningitis is

characterized by fever, nuchal rigidity and photophobia and is a neurological complication which presents within 24 h after spinal anesthesia. Microscopic examination of CSF is characterized by polymorphonuclear leukocytosis whereas CSF cultures are negative.

The second patient's CSF did show evidence of Gram negative coccobacilli on culture and hence we diagnosed both cases as meningitis post-spinal anesthesia. Turbid CSF but no growth on culture could also be due to preceding administration of antibiotics or due to viral etiology or aseptic meningitis.

Every patient presenting with post spinal anesthesia meningitis needs to be seen in totality considering the factors like technique, equipment, drug and patient factors. We suspected infection due to cleansing agent, drug or equipment contamination as there were no clustering of cases with single anesthesiologist or single OT and institution of maximum sterility precautions was ascertained in both the cases.

Microbiological culture of drug was positive for micro-organism growth in the second case and it led to removing that particular batch from the OT stocks and notifying the agencies involved. There were no further cases of meningitis reported, thereafter. To conclude iatrogenic meningitis is rare but a grave complication and high index of suspicion can lead to early diagnosis thereby preventing mortality by administration of appropriate treatment.

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