

CASE REPORT

Nonne-Froin Sign– Dilemma for Subarachnoid Block

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Accidental finding of yellow colored CSF may pose a sudden dilemma to the mind of anesthesiologist whether to perform the block or not. Yellow coloration of CSF can be due to subarachnoid bleed or raised protein in the CSF. Anesthesiologists should have a working knowledge of this subject which will help in managing the cases peri-operatively with improved outcome.

Keywords: Xanthochromia; Nonne-Froin sign; Subarachnoid block

Accidental finding of yellow colored CSF may pose a sudden dilemma to the mind of anesthesiologist whether to perform the block or not. Yellow coloration of CSF can be due to subarachnoid bleed or raised protein in the CSF. To the best of our knowledge, there are very few reports of icteric CSF in medical literature, so we are writing this case to build upon the evidence for this finding.

Case Description

After taking permission from the patient for possible publication in literature, we are describing an unusual case of icteric cerebrospinal fluid (CSF). A 45-year-old male patient of chronic liver disease came to the emergency department with a soft tissue infection of the lower limb. He gave history of recurrent ascites, jaundice, dyspnea on mild exertion, muscle wasting, and fatigue. On examination patient was febrile, icteric and having respiratory rate of 18 per minute. Patient had almost normal blood counts; creatinine 1.5 mg dl-1; total bilirubin count 5.1 mg dl-1; INR 1.5 and slightly deranged liver function tests. Electrocardiography and Chest x-ray were within normal limits.

Patient was prepared for surgical debridement under subarachnoid block along with essential monitoring and secured intravenous access. Dural puncture was performed in single attempt but after removing the stylet, yellow colored CSF came out of the needle hub under normal pressure. Flow and consistency of the CSF was normal with no turbidity. There was no history of any head injury in our preanesthetic checkup, which was again confirmed by the patient. Opinion about abandoning the subarachnoid block was taken from another senior anesthesiologist and case was conducted with injection propofol and injection fentanyl. Perioperative recovery was uneventful. We decided to analyze the CSF material in a biochemistry as well as

microbiology laboratory for examination. Protein level of CSF sample was 546 mg dl-1 (normal value of CSF protein is 15-45 mg dl-1) and samples were negative for any growth or cells. Patient was later lost to follow up and we were unable to do a radiological examination or magnetic resonance imaging (MRI) of the spinal cord and vertebra (Figure 1).

Figure 1- Yellow colored CSF at the hub of spinal needle



Discussion

Yellow discoloration of the CSF is called xanthochromia. Milian and Chiray gave this term in supernatant fluid in subarachnoid hemorrhage (SAH) in 1902 [1]. Xanthochromia is seen in chronic SAH where red blood cells in the CSF get hemolysed-releasing oxyhaemoglobin, which is then converted, to bilirubin imparting the yellow discoloration to CSF [2].

Another cause of xanthochromia is high protein content in the CSF that makes the CSF turbid. Mildly elevated protein level in CSF can be seen in infectious (viral and bacterial), autoimmune diseases (Guillain-Barre Syndrome) and in SAH. Extremely high levels of protein in the CSF (>500 mg/dl) occur due to obstruction in CSF flow because of neoplasm or vertebral deformity. Protein (fibrinogen) gets exuded from the meningeal vessels due to altered permeability and collects below the obstruction. Yellow discoloration of the CSF due to elevated proteins is called

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Nonne-Froin sign as it was first described in meningitis by Georges Froin and by Max Nonne in spinal tumours [3-4]. A case has been reported - Froin's syndrome because of CSF Obstruction secondary to multiple meningioma. That patient had presented with papilledema, blurring of vision and meningioma of the brain. Patient had yellow colored CSF with increased protein level (1300 mg dl-1) and spinal neoplasms causing obstruction in the CSF flow [5].

Our case did not have very high levels of protein which may be the reason for its non-turbidity. As we were not able to do radiology of spine to rule out the causes of CSF obstruction, it may be due to a past spontaneous subarachnoid bleed. Deranged liver function and increased bilirubin level confounded the CSF finding, but bilirubin is not known to cross the blood brain barrier and appear in CSF without the inflammation of meninges.

Formerly before the advent of MRI, spinal stenosis was suspected by Queckenstedt's maneuver. The test is performed by placing the patient in lateral decubitus and permitting a lumbar puncture. Intracranial pressure is then raised by compressing abdomen or both external jugular veins. If spinal stenosis is present then this raised pressure is not transmitted to the puncture site. Nowadays, a MRI diagnose CSF flow obstruction (prolongation of T1 and T2

signal in CSF distal to level of block.

Conclusion

Subarachnoid block should be abandoned if yellow color CSF is encountered, as it may be associated with CSF obstruction, spinal tumor or vertebra deformity that may make the sensor and motor anaesthesia unpredictable.

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