Temporary trigeminal disorder as a result of pneumocephalus after subarachnoid block


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A patient was scheduled for inguinal herniorrhaphy under subarachnoid block. Lumbar puncture was difficult and several attempts were needed before it could be achieved. During the immediate postoperative period, the patient developed paraesthesia and anaesthesia on the right side of the face, mostly in the nose, cheek and upper lip areas. A CT scan showed a small pneumocephalus at the level of the brainstem. The symptoms persisted for approximately 70 min, after which they disappeared.

Br J Anaesth 2003; 91: 430–2

Keywords: anaesthetic techniques, regional, subarachnoid; complications, pneumocephalus

Accepted for publication: March 12, 2003

Pneumocephalus after a central nerve block is a rare complication. In most published cases it is related to epidural blocks in which the loss of resistance to air technique is used to identify the epidural space and in which the dura is accidentally perforated, so that air bubbles enter the subarachnoid space. Nevertheless, in exceptional cases, pneumocephalus can occur after a spinal puncture for subarachnoid block. We describe a case of pneumocephalus at the level of the second division of the trigeminal nerve, after a subarachnoid block in which the puncture was performed with great technical difficulty.

Case report

A 61-yr-old male was scheduled for inguinal herniorrhaphy as an outpatient. He had a history of hypertension (treated with enalapril), cholelithiasis, a single renal cyst and asymptomatic multiple hepatic cysts, and repeated episodes of lumbar pain of uncertain origin, and had undergone tonsillectomy without complications. Preoperative tests (ECG, blood count, coagulation, biochemical values and chest X-ray) were normal.

After routine monitoring (ECG, pulse oximeter, blood pressure) subarachnoid block was attempted. Several punctures were performed at the L4–L5, L3–L4 and L2–L3 intervertebral spaces with 25-gauge Whitacre needles. Finally, the spinal puncture was achieved with a 22-gauge Quincke needle, and hyperbaric bupivacaine 0.5% 12.5 mg plus fentanyl 15 µg were injected after checking that the syringe had been correctly purged. The sensory level of the block obtained was adequate for surgery (T7–T9). The patient remained stable throughout. At the end of surgery, local infiltration with bupivacaine 0.25% was performed in the wound.

Once the patient was transferred to the ambulatory surgical unit, he complained of a feeling of numbness on the right side of his face, mostly in the nose, cheek and upper lip areas, and sporadic paraesthesias in the right upper limb that disappeared after a few minutes. Neurologists were consulted and they confirmed anaesthesia in the area of the second division of the trigeminal nerve, but they did not find any other neurological signs. Later, a CT scan showed a small air bubble (<1 cm) in the subarachnoid space at the level of the brainstem and iatrogenic pneumocephalus was diagnosed. The facial neurological signs and symptoms lasted ~70 min. The patient stayed under observation for 24 h, after which another CT scan showed that the pneumocephalus had disappeared.

Discussion

Pneumocephalus is fortunately an exceptional complication of central nerve blocks. It usually presents with severe frontal headache, paraesthesias, restlessness or agitation, vegetative symptoms and haemodynamic changes. Occasionally, there may be general convulsions and loss
of consciousness. Some years ago, these symptoms appeared with relative frequency during pneumoencephalography, an imaging technique now obsolete. Apart from these general symptoms, the intensity of which is related to the volume of air inside the brain, pneumocephalus causes other specific symptoms depending on the position of the air bubbles inside the nervous system. In our patient, the location of the neurological facial signs and symptoms, together with the CT scan image, suggests that the second division of the trigeminal nerve (maxillary nerve) was affected.

Pneumocephalus after a central nerve block is usually a consequence of the identification of the epidural space using the loss of resistance to air technique, a procedure which certain authors seriously question. Indeed, there are many published papers which report complications other than pneumocephalus arising from the use of air. These include cervical emphysema, analgesic failures in parturients, cauda equina syndrome and venous air embolism. An increase in the incidence of accidental dural puncture has been described. For these reasons, it seems more advisable to identify the epidural space through the use of saline technique.9

Nevertheless, the occurrence of pneumocephalus after a subarachnoid puncture is rare. Flora and colleagues describe a case of pneumocephalus in the right frontal lobe. For their patient, numerous attempts (~30) were needed to perform a diagnostic spinal puncture. Avellanal and colleagues described a case of pneumocephalus after spinal anaesthesia with bupivacaine 0.5% in a patient with chronic obstructive pulmonary disease. In this case, during the puncture, just before the anesthetic was injected, the patient had a short series of coughs followed by deep inspiratory movements. In another published case, the deliberate injection of 2 ml of air to clear anything which might be occluding the spinal needle—a manoeuvre regularly used by the author of that paper—provoked pneumocephalus around the stalk of the pituitary gland, the most evident symptom being severe headache.

In our case there were no such incidents and the correct purging of the syringe was checked before injection. The only factors that may have caused pneumocephalus were the difficulty in performing the puncture (several attempts were needed) and the gauge of the needle that was finally used (22G).

The relationship between pneumocephalus and the inhalation of nitrous oxide during general anaesthesia may be relevant. This can increase the volume of the pneumocephalus. Animal experimentation has shown that nitrous oxide increases the size of epidural air bubbles produced after deliberate injection of 10 ml air into the lumbar epidural space. Saidman and Eger found an increase in cerebrospinal fluid (CSF) pressure in patients anaesthetized with nitrous oxide during pneumoencephalography. Another case report provides direct evidence for the role of nitrous oxide in the development of tension pneumocephalus during neurosurgical procedures, and suggests continuous monitoring of CSF or intracranial pressure during surgery for early detection and treatment of this hazardous complication. Moreover, it has been reported that gas under pressure in the intracranial subarachnoid space might cause venous gas emboli, because it is suspected that these emboli pass through the arachnoid granulations into venous blood. For all these reasons, it is advisable to avoid nitrous oxide when pneumocephalus is suspected, or when the extradural space has been identified by means of the loss of resistance to air technique.

Acknowledgement
The authors wish to thank M. Polledo for her help in translating the manuscript.

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