

Subarachnoid hematoma following spinal anesthesia

*Izaskun Emazabel-Yunta MD**, *Isabel Casado-Campo MD*, *Sorkunde Telletxea-Benguria MD PhD*, *Fernando Torre-Mollinedo MD*, *Luis Fernando Ortega Largo MD* and *Antón Arízaga Maguregui, MD*

Abstract

We conducted a survey on anaesthesia practise for ambulatory surgery in The Netherlands with the purpose of identifying patterns and comparing them to published recommendations. Overall response rate was 69%. 97% of Dutch hospitals have ambulatory wards and 25% have dedicated operating rooms. Preoperative anxiolytic use is relatively high, approximately 40%. Prophylactic anti-emetic use is low, 33% for laparoscopic cholecystectomy, but a further 33% of patients require rescue treatment. Combination analgesic use is infrequent, with

just one analgesic being used in more than 50% of patients. There is a strong preference for both locoregional, 85% for upper limb surgery, and neuroaxial techniques, 65% for lower limb surgery. However, use of continuous peripheral nerve block catheters for pain control following discharge is limited. We conclude that closer adherence to guidelines on PONV prophylaxis and greater use of multimodal approaches to pain management would be beneficial.

Keywords: Spinal anesthesia; subarachnoid hematoma; conservative treatment.

Authors' addresses: Galdakao Hospital, Anesthesia and Reanimation Service, Galdakao, Bizkaia, Spain.

Corresponding author: Dr. Izaskun Emazabel-Yunta. Galdakao Hospital, Anesthesia and Reanimation Service, Barrio Labeaga s/n, E-48960 Galdakao, Bizkaia, Spain E-mail: lfortea@hgda.osakidetza.net

Introduction

Spinal anesthesia is an anesthetic technique which is widely used in daily clinical practice, offering to the anesthetist an alternative to general anesthesia. The advantages of this technique with respect to general anesthesia include a reduced risk of respiratory depression and of pulmonary thromboembolism, a reduced incidence of deep vein thrombosis and a very low mortality rate [1, 2]. Nevertheless, the technique is not without its risks and like all invasive techniques, it can present complications such as lumbar pain, neurological alterations and even death.

Neuraxial hematoma is a rare neurological complication whose incidence ranges between 1:150,000 for epidural anesthesia and less than 1:22,000 for subarachnoid anesthesia [2, 3, 4, 5, 6]. These incidence rates are approximations, since many hematomas are minute and probably go clinically unnoticed. Also, the rates are based on published data, suggesting that the magnitude of the problem is likely to be underestimated [7, 8]. The severity of symptoms depends on the magnitude of the compression that the hematoma exerts on the spinal cord, and may even lead to death when blood diffuses intracranially [5]. Clinical outcome depends fundamentally on rapid diagnosis and the choice of an appropriate therapeutic strategy, thus avoiding permanent neurological sequelae [9].

Case Report

A sixty year-old man, with no significant medical history came to the Accident and Emergency Service of our hospital complaining of bilateral pain in the area of the calves and headache six days after an inguinal herniorrhaphy with intradural anesthesia. The patient was referred to the hospital Anesthesia and Reanimation Service for detailed examination and pain treatment.

The patient reported an absence of complications during the immediate post-operative period following his inguinal

herniorrhaphy. Twenty four hours following surgery, continuous pain began to develop in the region of the calves of both legs, which was not relieved by postural changes. The patient did not report any motor or sensory deficits, or sphincter dysfunction. Forty eight hours later, bilateral lumbar pain began in the region of the sciatic nerve. The patient experienced headache with tensional characteristics which did not get worse upon remaining standing upright.

The surgical procedure, which was not performed in our hospital, reported a single, atraumatic puncture with a 25 gauge pencil point spinal needle (polymedic clinical elliptic shaped spinal needle). Results from preoperative tests, including evaluation of coagulation and platelet levels, were within normal limits. The patient was not routinely taking any medication and antithrombotic prophylaxis had not been administered. It was noted that the patient had spinal anesthesia on two previous occasions; one for a herniorrhaphy and the other for a hemorrhoidectomy, both without noteworthy incidents.

Upon physical examination, the patient was found to be fully conscious, well-oriented in time and space, but experiencing pain. The examination included: Normal cranial nerve function; conserved motor force, no sensory alterations; slow but present bilateral and symmetric reflexes; flexor, plantar cutaneous reflex; absence of muscular atrophy. The patient complained of bilateral lumbar pain in the territory of the sciatic nerve, as well as continual, bilateral pain in the region of the calves, which was not relieved by postural changes. Headache intensity was not increased by remaining seated or during walking and did not change in nature upon lying down.

Since the patient did not fulfill the criteria for postdural puncture headache (PDPH) and since pain appeared to be directly related to the spinal anesthesia, we decided to carry out emergency magnetic resonance imaging (MRI) in order to rule out the presence of neuraxial hematoma. The results revealed the presence of a subarachnoid hemorrhage localized at the level of L2-L3 with an anterior and left lateral disposition, surrounding the emerging left L3 and L4 segments. The L3 root in particular was found to be discreetly

enlarged, and associated reactive-irritative meningeal embossing was noticed.

The hospital Neurological Service was then consulted and it was decided to admit the patient to hospital under the supervision of the said Service for follow-up and treatment. Medical treatment was initiated with anti-inflammatory and analgesic drugs. Blood analysis revealed normal coagulation and platelet number. Four days later, MRI was performed revealing ischemic lesions localized to the frontoparietal subcortical zone, which were considered to be normal in number for the age of the patient. At the lumbar level, we saw cervical arthrosis, lumbar discarthrosis and intradural hematoma localized anterior to the left lateralized horse tail, presenting mild improvement with respect to that observed during the initial study. The patient evolved satisfactorily during his stay, with symptoms disappearing gradually. Seven days later, the patient was discharged.

MRI was performed one month later and revealed signs of multiple degenerative discopathy with hypointensity of the diffuse signal associated with all of the visualized lumbar discs, as well as mild loss of thickness of the L1-L2 and L5-S1 discs. Axial images revealed two mild circumferential protrusions in the L4-L5 and L5-S1 spaces, without evidence of latero-foraminal occupation or of spinal root contact. The epidural space was found to be normal, without any signs of hematic accumulations or hematomas.

Discussion

Spinal hematoma is a rare complication associated with subarachnoid anesthesia. Three types of spinal hematomas have been defined on the basis of their location: epidural hematoma (EH), subdural hematoma (SH) and subarachnoid hematoma (SAH), the most common being EH with an incidence of 1:150,000 following epidural anesthesia and 1:22,000 following subarachnoid anesthesia [4, 3]. Depending on the chronology of the clinical course of events, these hematomas can be classified as being acute, subacute or chronic.

Spinal hematomas appear more frequently in patients undergoing platelet antiaggregation treatments, treatments with low molecular weight heparin (LMWH) and also in the context of diseases involving coagulopathy [9, 10, 11]. Drug induced thrombocytopenia is another of the factors associated with spinal hematomas [12]. The development of a spinal hematoma following a so-called "clean" puncture is rare, appearing more frequently in difficult [6, 7] and repeated [13] punctures. Such was the case described by Peiro [5] in which the spinal hematoma was induced by repeated and traumatic lumbar puncture, after which the patient died. Cases have also been reported to be associated with lordosis, scoliosis, degenerative changes in the spinal column, osteoporosis, interventions by paramedical personnel and Quincke-type spinal needles [6, 14].

Cases of spinal hematomas have been reported with pencil point needles [16], as is the present case. Walsh et al. [5] reported the case of a patient who following an atraumatic diagnostic puncture developed a spinal hematoma. They attributed this to the laceration of the spinal root veins during the puncture and the LMWH treatment which commenced before the recommended 12 hours. However, in almost 30% of reported spinal hematomas, the causal factor has not been identified [6], as is the present case: subarachnoid hematoma following clean, atraumatic, intradural puncture with a pencil point needle, in the absence of antithrombotic prophylaxis and of diseases which alter coagulation or medication which might increase the risk of producing a spinal hematoma.

The symptomatology associated with spinal hematoma is not very precise and may vary from persistent back pain to frank paraplegia

[12]. It is caused by compression of the spinal cord or of the nerve roots, which may lead to spinal ischemia. In very few cases, death of the patient is the result of diffuse intracranial bleeding [17]. The appearance of symptoms may vary from as early as 2 min following puncture to as late as 10 days post-puncture [14, 18]. There is one case where headache has even been reported 5 min after puncture, the diagnosis of SAH being made with the help of computer tomography [19]. Typical symptoms include spinal root pain, lumbalgia, paraparesis, sphincter dysfunction [5] and headache that do not fulfill PDPH criteria. In some cases, the symptoms are not so clear cut, rendering the diagnosis quite difficult. When headache follows an intradural puncture, differential diagnosis should include: PDPH, migraine, headache produced by drugs [19], benign intracranial hypertension, meningitis, pneumoencephalos, thrombosis of intracranial veins [20, 15], and subdural as well as subarachnoid cerebral hemorrhages. The possibility of a spinal hematoma should also be borne in mind, despite the very low incidence of this type of complication. Early diagnosis is absolutely essential, since delayed diagnosis worsens the prognosis and the possibility of recovery [6]. When spinal hematoma is suspected (on the basis of clinical criteria and lumbar puncture antecedents), MRI should be performed immediately. In many cases, CAT scans do not give conclusive results. In contradistinction, MRI permits a diagnosis of hematoma, its extension and the degree to which it affects the spine; it also permits the detection of associated vascular lesions [21, 6]. It is important to accompany a spinal MRI with a cerebral MRI, in order to rule out the presence of an intracranial hemorrhage that could jeopardize patient outcome.

In this patient, with the clinical suspicion, the antecedent dural puncture and the detailed neurological exploration, we decided to carry out MRI that revealed the presence of a subarachnoid hematoma. The treatment of choice for spinal hematoma is evacuating laminectomy. The rapidity of diagnosis and of application of the corresponding treatment are directly related to the degree of success of the subsequent neurological results. It is recommended not to delay the treatment for more than 8 h [22], although there are reports of cases in which cord decompression was carried out 12 and 72 h later, with complete recovery from symptomatology [6]. A number of cases have been reported in which persistent headache following spinal anesthesia that is resistant to traditional treatments may be indicative of the presence of a subarachnoid hematoma [23]. NMR confirmation is late.

There are cases in which surgical intervention is not necessary, since clinical symptoms can be cured with medical treatment [6]. In the present case, in the absence of significant clinical signs of spinal cord compression, we decided to initiate medical rather than surgical treatment, under strict neurological evaluation in the event of the appearance of clinical signs of hematoma progression. A significant clinical improvement was observed, accompanied by a progressive reduction of the hematoma, as assessed by MRI in subsequent examinations. In summary, subarachnoid hematoma is a rare complication associated with spinal anesthesia. Taking into account the appropriateness of the anesthetic technique and the absence of coagulopathy or factors which might alter coagulation, the probability of incidence of a subarachnoid hematoma, such as the present one, is minimal. Early diagnosis by means of MRI following clinical suspicion and the rapid application of the appropriate treatment are crucial for the satisfactory recovery of the patient.



Figure 1 Lumbar MRI:subarachnoid hemorrhage.

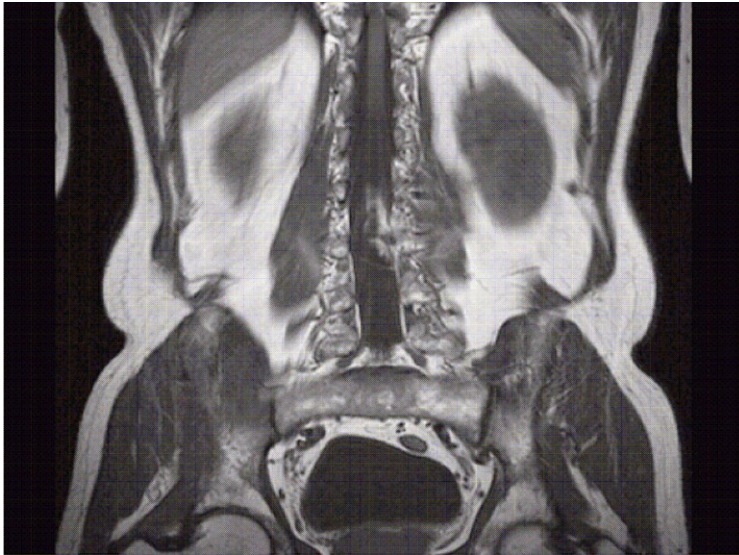


Figure 1 Lumbar MRI:subarachnoid hemorrhage localized at the level of L2-L3 with an anterior and left lateral disposition.

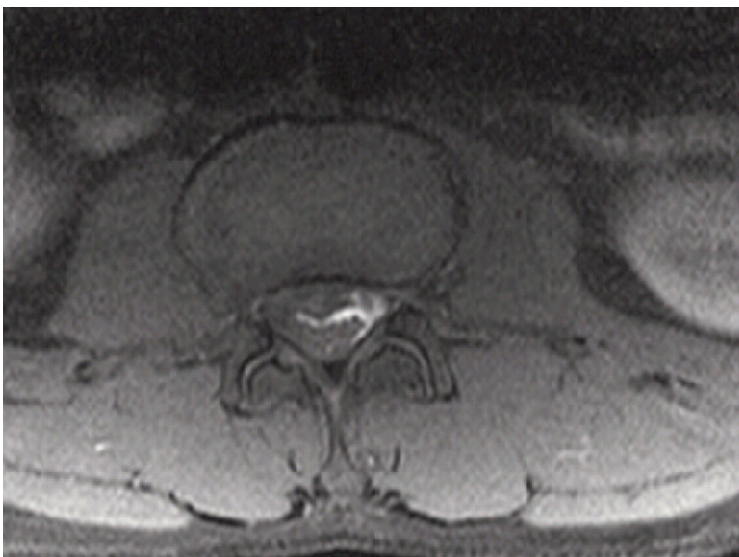


Figure 1 Lumbar MRI:subarachnoid hemorrhage surrounding the emerging left L3 and L4 segments. L3 root is discreetly enlarged..

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