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Naloxone Reversal of Nystagmus Associated with Intrathecal Morphine Administration

To the Editor:—Complications associated with epidural or intrathecal opioid administration include nausea, vomiting, pruritus, and respiratory depression.[1] Neurologic complications are rare,[2] although vertical nystagmus after epidural opioids was reported by Fish and Rosen.[2] We have used naloxone successfully to treat a patient in whom nystagmus was detected after intrathecal morphine administration.

A 43-yr-old, 70-kg woman was scheduled for cesarean section under spinal anesthesia. Except for previous cesarean section for severe toxemia, her medical history was unremarkable. Spinal puncture was performed with a 25-G spinal needle at the L3–L4 intervertebral space. Tetracaine HCl 10 mg and preservative-free morphine HCl 100 μg in 2.5 ml 10% glucose were injected intrathecally. The sensory block extended to T4 on both sides. Although the operation was uneventful, 3.5 h after the intrathecal injection, the patient complained of rotary vertigo. Neurologic examination showed only horizontal nystagmus. Naloxone 0.1 mg was administered intravenously without any improvement; however, after a second dose of 0.1 mg, her nystagmus disappeared. Subsequent neurologic examination revealed no abnormality.

Although many drugs can induce nystagmus, morphine was most likely the cause in our case. Although in general drug-induced nystagmus is observed with higher doses, there have been some reports[2,3] of small doses of epidural opioids causing vestibular dysfunction. The nystagmus of our patient, therefore, could have been induced by the 100 μg of morphine administered intrathecally. Furthermore, the symptom was completely reversed by naloxone.

In summary, intrathecal morphine induced nystagmus that was effectively antagonized by intravenous naloxone.

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Pulse Oximeters and Onychomycosis

To the Editor:—Factors affecting the accuracy of pulse oximeters include those that prevent consistent transmission of light (*e.g.*, nail polish) through the tissue to the photodetector of the system.[1,2] We present here the first description of the effect of onychomycosis on pulse oximeter readings.

A healthy young man was noticed during thyroid surgery to have a hemoglobin oxygen saturation (Sp_{O_2}) of 75–77% while breathing 35% oxygen. A good pulse signal indicated that the probe (Hewlett-Packard model 78352 A) was correctly positioned on the second finger of the left hand. Clinically the patient appeared well oxygenated, and no cause for hypoxia was evident. The probe was inspected and found to be correctly placed. However, when the probe was removed we found a yellowish superficial layer of onychomycosis coating the nail surface. Arterial blood gases showed a normal hemoglobin oxygen saturation (Sa_{O_2}) of 98%. When the probe was positioned on another finger not affected by the fungus, the Sp_{O_2} was normal (97%).

To study this further, we measured Sp_{O_2} in five volunteers with onychomycosis. With the probe on the affected finger, Sp_{O_2} was 71–84%. When the probe was placed on fingers without onychomycosis, Sp_{O_2} increased to 95–98% (FI_{O_2} 0.21). Table 1 shows Sp_{O_2} values in the five volunteers on both the diseased and nondiseased fingers.

TABLE 1. Sp_{O_2} Measured in Five Volunteers with Onychomycosis

Volunteer Number	Sp_{O_2} (%)	
	Diseased Finger	Nondiseased Finger
1	78	97
2	84	98
3	71	95
4	82	97
5	81	96

We assume that because the pulse oximeter functions by examining the difference in absorbance of two wavelengths, any factor that increases the difference in absorbance between 660 and 940 nm will cause the oximeter to falsely indicate desaturation.[3] The yellowish gray color of the onychomycosis suggests increased absorbance at 660 nm compared to 940 nm and thus may alter the accuracy of pulse oximetry readings and indicate desaturation. In addition, in onychomycosis the entire nail becomes brittle and separated from its bed;[3] this condition also may "trick" the sensor.

Thus, nail onychomycosis may be another cause for a falsely low Sp_{O_2} reading on a pulse oximeter.

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An American Dentist Pioneered Anesthesia in Spain

To the Editor:—In perusing the daily press of Madrid for early 1847, we have found several references to Mr. Oliver Machechan, an American dentist in practice there who, according to extensive items in newspapers dated January 28–31, 1847,[1–6] had used ether anesthesia in performing dental extractions. The existence of these reports suggests that Machechan was the second to use sulphuric ether for anesthetic purposes in Spain (the first having been Professor Argumosa-Obregón of the Medical Faculty at Madrid, on January 13 of that year)[7]; and if claims concerning the efficiency of the anesthetic are true, Machechan's trials were the first to meet with complete success. For the good of his reputation, this positive outcome was fortunate, if an anonymous dentist promising painless extractions prior to January 20 was in fact Machechan.

Machechan is again mentioned in the Madrid press in 1848 as having performed some of the first Spanish trials of chloroform as an anesthetic (Gaceta de Madrid, February 10, 1848). Our attempts to delve further into the biography of this apparently highly considered dentist have so far been unsuccessful.

In his trials with ether, Machechan administered the anesthetic with a Harapath-Landsdown inhaler, as did the other Spanish pioneers Argumosa-Obregón and Mendoza (the latter in Barcelona on February 16, 1847) and many other Spanish surgeons who tried out ether before the year's end.[7] News of this inhaler, which consisted of an animal bladder with a mouthpiece, reached Madrid in the same letter in which a Dr. Forbes of London described the use of ether to a Sr. Barron, who immediately communicated with Professor Argumosa-Obregón.[8] The inhaler was even erroneously attributed to Machechan in a medical journal published in Cadiz, the *Revista de Ciencias Médicas* (February 10, 1847).

In conclusion, our recent research enables us to correct our own[7] and others' previous notions as to the early chronology of ether anesthesia in Spain, in that it now seems almost certain that the second exponent of this technique here was Machechan.

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Long-lasting Neuromuscular Blockade from Pipecuronium

To the Editor:—Pipecuronium is a long-acting nondepolarizing neuromuscular blocking agent without hemodynamic effects. These properties have led to its increasing use during anesthesia for coronary artery bypass graft (CABG) surgery. Studies have shown no untoward effects from doses of pipecuronium as large as $4 \times ED_{95}$[1,2] and similar mean durations of drug action in normal and renal-failure patients.[3]

We recently cared for a patient undergoing CABG surgery who, over a 5-h period, inadvertently received a pipecuronium dose of 520