Atrioventricular block following administration of neostigmine: a case report

C. G. Lopes¹, S. L. F. Cavalcante², M. B. C. Fernandes², F. B. Lima²,
R. L. D. Perdigão², J. M. R. V. Josino³

1-Hospital São Carlos - Fortaleza (Brazil), 2-HGF-Hospital Geral de Fortaleza - Fortaleza (Brazil), 3-Hospital Universitário Walter Cantídio - Fortaleza (Brazil)

Background: The use of neuromuscular-blocking drugs is routine in anesthetic management, especially in videolaparoscopy where adequate muscle relaxation improves the surgical field and attenuates the effects of pneumoperitoneum. Before emergence, neostigmine is often administered to revert neuromuscular blocking. However, by stimulating the muscarinic receptors, neostigmine can, among other things, compromise atrioventricular (AV) nodal conduction and cause bradyarrhythmia.

Case report: A male patient (23 years; 80 kg; 1.76 m) was diagnosed with appendicitis and referred for videolaparoscopy, with no reported comorbidities, allergy or use of medication and no cardiovascular complaints or previous ECG. Standard monitoring was initiated (cardioscopy, SpO₂, arterial pressure and BIS) and 2.5 mg midazolam was administered i.v. The basal HR was 65 bpm. General anesthesia was induced with 40 µg sufentanil, 180 mg propofol and 4 mg cisatracurium. Orotracheal intubation was event-free and anesthetic depth (BIS 45-60) was maintained with sevoflurane and remifentanil TCI. Surgery lasted 45 minutes. No significant changes in capnography, arterial pressure or HR were observed. At the end of the procedure, sinus rhythm was normal and HR was 48 bpm. Atropine (0.75 mg) was administered. When HR had risen to 65 bpm, the patient received 1.5 mg neostigmine, leading to bradycardia (HR 35 bpm). Another dose of atropine (0.75 mg) was administered, with no result. On cardioscopy, AV block 2nd degree Mobitz I was detected, which progressed to total AV block, with no other hemodynamic changes. Adrenaline (10µg) was administered and sinus rhythm and conduction were normalized in approximately 5 minutes. After emergence and extubation, the patient was observed for 24 hours in the ICU. No further clinical or electrocardiographic events occurred.

Discussion: Neostigmine can cause muscarinic cholinergic syndrome even in young patients with no cardiovascular risk factors and even when preceded by anticholinergics. Vagal predominance induced by anticholinesterase agent can lead to AV block and hemodynamic instability. Anesthesiologists should be prepared to recognize and promptly manage such events.

References

1. WEBB, M.D. Type I second-degree AV block after neostigmine administration in a child with renal failure. *Anesth Prog.* 1995;42(1):21-2.
2. Shields, J.A. Heart block and prolonged Q-Tc interval following muscle relaxant reversal: a case report. *AANA J.* 2008 Feb;76(1):41-5.