Severe hypotension following spinal anesthesia in patients on amlodipine

Sir,

Amlodipine is widely used to treat hypertension. While there is no clear consensus on whether the drug needs to be withheld on the day of surgery, it is generally believed that most of the calcium channel blockers can be continued in the perioperative period.\(^1\) We report a series of three patients on amlodipine therapy, who developed severe, although transient, hypotension immediately after administration of spinal anesthesia for orthopedic surgery. Severe hypotension developed in these patients despite withholding the morning dose of Amlodipine. Admittedly, spinal anesthesia using a hyperbaric solution can result in hypotension. However, we found that the magnitude of decline in arterial pressures in our patients was rather difficult to explain as “routine” spinal-induced hypotension. Although the sensory levels following administration of the subarachnoid block in all the three patients were higher than needed for the surgical procedures, the degree of hypotension was out of proportion to the level of block.

A 70-year old, male hypertensive patient, on oral amlodipine 10 mg once a day for control of hypertension, without any other co-morbidity was scheduled for interlocking nailing of shaft of femur fracture. Morning dose of amlodipine was withheld and the first blood pressure (BP) recording on the operating table was 118/70 mm Hg. Following intravenous (IV) preloading, bupivacaine heavy 12.5 mg was administered intrathecally through the L3-4 interspace with the patient in a sitting position. Five minutes later, BP fell to 60/40 mm Hg, necessitating resuscitation with rapid volume infusion, mephentermine 6 mg intravenously and oxygen via face mask. Although the patient was fully conscious and oriented and sensory level to pinprick was T8, hypotension persisted and required initiation of phenylephrine intravenous infusion at 0.5 mcg/kg/min. BP recovered gradually over next 10 minutes to the patient’s pre-intervention levels. Infusion was tapered off postoperatively.

The second patient, an 80 year old woman was scheduled for dynamic hip screw fixation for fracture neck of femur, and was taking amlodipine 10 mg and hydrochlorothiazide 12.5 mg both once a day orally for control of hypertension. Amlodipine was withheld on the morning of surgery; however, the diuretic was continued. On the operating table, heart rate was 130/min and BP 144/66 mm Hg. Patient was extremely anxious and midazolam 1 mg intravenous was used to facilitate the positioning for administration of the subarachnoid block. After intravenous preloading, spinal anesthetic was administered with 12.5 mg of bupivacaine heavy through the L3/4 interspace in sitting position. Despite adequate sedation, the heart rate stayed at around 127/ min. No explanation could be offered for the sinus tachycardia as the patient was neither anemic nor apparently hypovolemic, and hence it was presumed to be reflex tachycardia resulting from the dihydropyridine calcium channel blocker. Ten minutes following the spinal anesthetic, BP declined to 60/40 mm Hg with the sensory level to pinprick at T8. Resuscitation was initiated with oxygen, fluids and vaspressors following which the BP gradually increased to 94/60 mm Hg, and stayed at similar levels throughout surgery. Remainder of the operative course was uneventful, except for persistence of the sinus tachycardia at around 125-127 beats/min. Alecu et al., have reported that increased aortic stiffness as encountered in hypertensive patients or in the geriatric age group, could be associated with more pronounced hypotension during induction of general anesthesia.\(^2\) Conceivably, spinal anesthesia could have a similar effect, which could be worsened by perioperative use of a long-acting calcium channel blocker like amlodipine. As the elimination half-life (t\(_{1/2}\)) of amlodipine is 35 to 45 hours, it might cause an “add-on” effect, despite discontinuing the dose on the morning of the surgery.

The third patient, a 37-year-old man, was scheduled for revision of amputation stump following below knee amputation, done four days earlier under general anesthesia for crush injury to his right leg. He was a diabetic and hypertensive, apparently with both conditions well controlled on insulin, atenolol 50 mg once daily and amlodipine 10 mg twice a day orally. Amlodipine was withheld on the morning of surgery and the beta blocker was continued. The initial blood pressure was recorded as 140/90 mmHg on the operating table. After intravenous preloading, spinal anesthetic was administered with bupivacaine heavy 12.5 mg through the L3/4 interspace with the patient in lateral position, and sensory level to pinprick up to T8 established. After 10 minutes, BP dropped to 72/40 mm Hg. Following fluid resuscitation and several vasopressor boluses, BP came up over 15 minutes to 104/70 mm Hg and stayed at that level for the rest of the surgery.

We believe that long-acting calcium channel blockers like amlodipine could potentiate the decrease in the systemic vascular resistance following spinal anesthesia, and thus...
exacerbate the magnitude of resulting hypotension. Careful titration of such therapy in the perioperative period is mandated, especially in vulnerable clinical groups and patients on multiple anti-hypertensive medications. More clinical studies are required before definite guidelines on perioperative antihypertensive therapy can be drawn, especially in those patients who are taking long-acting dihydropyridines.

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