Medication error report: Intrathecal administration of labetalol during obstetric anesthesia

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Introduction

Labetalol, a combined alfa and beta-adrenergic receptor antagonist, is used as an antihypertensive drug. We report a case of an acute rise in blood pressure and lower limb pain due to the inadvertent intrathecal administration of labetalol, mistaking it for bupivacaine, during obstetric anesthesia. The situation was rescued by converting to general anesthesia. The cesarean delivery was uneventful, and mother as well as newborn child showed no ill-effect. This particular medication error was attributable to a failure on the part of the doctors administering the injection to read and cross-check medication labels and the practice of keeping multiple injections together. In the absence of an organized medication error reporting system and action on that basis, such events may recur in future.

Case Report

A 25-year-old woman, parity status P1 + 0, weighing 50 kg, presented in early labor with a history of loss of fetal movement and cesarean section in the earlier pregnancy. On admission, she was fully oriented with a pulse rate of 80/min and BP of 130/70 mmHg, and the fetal heart sounds were equivocal. She was put up for emergency lower segment cesarean section under spinal anesthesia and premedicated with ranitidine 50 mg by intramuscular (IM) route and metoclopramide 10 mg IM in the labor room before being brought into the operation theater (OT).

In the OT, her vitals were taken which showed pulse 76/min, BP 140/72 mmHg, and oxygen saturation 98% in room air. Intravenous (IV) cannulation was done with an 18G cannula and ringer lactate infusion started. Urinary catheterization was done. Spinal anesthesia was administered, in the sitting posture, at the L2-L3 interspace with a 25G Quincke’s spinal needle by the anesthesia junior resident. The intended drug was hyperbaric bupivacaine 0.5% W/V, and the volume administered was 2.6 mL. Immediately upon assuming the supine position, the patient started complaining of acute pain in both lower limbs along with intense burning sensation. She became restless with pulse rising to 150/min and BP to 190/110 mmHg. The situation was rescued by converting to general anesthesia by propofol 100 mg IV, intubating with the help of succinylcholine 50 mg IV and maintaining with nitrous oxide 60% and oxygen 40% inhalation. Muscle relaxation was continued with atracurium 25 mg IV in two divided doses (20 mg + 5 mg). The cesarean

ABSTRACT

Labetalol, a combined alfa and beta-adrenergic receptor antagonist, is used as an antihypertensive drug. We report a case of an acute rise in blood pressure and lower limb pain due to the inadvertent intrathecal administration of labetalol, mistaking it for bupivacaine, during obstetric anesthesia. The situation was rescued by converting to general anesthesia. The cesarean delivery was uneventful, and mother as well as newborn child showed no ill-effect. This particular medication error was attributable to a failure on the part of the doctors administering the injection to read and cross-check medication labels and the practice of keeping multiple injections together. In the absence of an organized medication error reporting system and action on that basis, such events may recur in future.

KEY WORDS: Bupivacaine, labetalol, medication error, spinal anesthesia

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section was completed without problems and a 2.4 kg live baby was delivered. The baby cried immediately after birth and Apgar at 5 min was nine. Following intubation, the mother’s pulse was 86/min and BP was 130/80 mmHg. Pulse and BP remained stable throughout the operation (40 min). Fentanyl 50 mcg IV was given after delivery of the baby. Relaxation was reversed by neostigmine 2.5 mg IV with glycopyrrolate 400 mcg IV, and nitrous oxide was withdrawn after recovery of spontaneous respiration. The patient was extubated uneventfully and did not complain of any further leg pain or burning sensation after recovery from anesthesia.

Vital signs remained normal postoperatively, and the patient was shifted to the postnatal ward. She was discharged in normal course and suffered no neurological sequelae. The case was not reported to the hospital administration as there is no system of medication error reporting in the institution.

**Discussion**

Labetalol injection had been given by mistake instead of spinal bupivacaine. The mix-up had occurred in picking up the vial from the anesthetic injection tray on which multiple ampoules and vials were kept. An intern had picked up the ampoule, broken the top and held it while the resident drew up the injection in the syringe without reading the label. The ampoules [Figure 1] were similar in size and amber colored although the labeling was distinct.

A medication error is any failure in the medicine selection, prescription, dispensing, handling, and use process that may harm the patient.[3] Like adverse drug reactions (ADRs), medication errors are an inevitable consequence of pharmacotherapy, although, unlike ADRs, they are often preventable through individual and institutional measures. Though recognized as an important cause of patient mortality and morbidity globally, particularly in operative, emergency, critical care, and other such high pill burden settings,[4,5] medication errors remain a neglected phenomenon in India, particularly in public hospital context.

There are many reasons why medication errors occur.[5-7] It may be related to professional practice, products, procedures, environment or systems; may involve prescribing and ordering; dispensing and distribution; preparation and administration; labeling, packaging, and nomenclature; communications and education; or use and monitoring of treatment. Commonly implicated are medication factors (e.g., similar sounding names, low therapeutic index, polypharmacy), patient factors (e.g., impaired cognition, vision problems and other physical disabilities, poor renal or hepatic function) or health system-related factors (e.g., use of inappropriate abbreviations and decimal points on prescriptions, failure to read drug labels, overburdening, and fatigue of healthcare providers). In our case, the reasons were keeping similar looking ampoules together; failure on the part of the intern to read the label and failure on the part of the resident to cross-check that the correct medication was being injected.

Fortunately, the subject recovered in this case without suffering any irreversible harm. Labetalol is a dual α-and β-adrenergic antagonist that is often used to treat systemic hypertension in acute care settings. IV overdose of labetalol has been reported to cause hypotension and bradycardia as would be expected from the receptor profile of its activity. Injections are not painful. Therefore, the acute rise of BP, tachycardia, and the intense pain and burning are difficult to explain. Theoretically, the unopposed beta-adrenergic blockade can lead to rise in BP by peripheral vasoconstriction mediated through α₁-adrenergic receptors on vascular smooth muscle. However, this is not expected of labetalol since it simultaneously blocks α1-receptors. Nevertheless, the network of neurotransmission in the central neuraxis is complex and it is possible that a large dose of labetalol may have unexpected receptor activity (for instance blockade of central α₁-receptors will increase noradrenaline release from adrenergic synapses) that transiently caused these events.

Finally, it is to be noted that a system of medication error reporting does not exist in this hospital, or for that matter, most hospitals in India, and this may lead to such events recurring in future. Introducing such a system can be worthwhile and would be an important step toward assessing and reducing the medication error burden.[8] Unfortunately, we anticipate that any attempt at the introduction of such a system would be met by resistance out of fear of being identified and subsequently penalized for negligence. Two approaches to human error have been described: (1) The person approach and (2) the systems approach and they are also applicable to the issue of medication errors. The person approach focuses on the culpability of individuals. The tendency is to name, blame, and shame. The systems approach accepts that humans are fallible, and therefore, errors may occur regardless of the competence of individuals working within the system. Rather than focusing on the individual, it focuses on the conditions under which individuals work and how those conditions can predispose to errors. It is now widely acknowledged that although professionals must take responsibility for their actions, blaming doctors, pharmacists, or nurses for errors does not encourage a culture of reporting or learning.[10] Serious errors are often caused by wider defects in the system that lie dormant (latent conditions) until they combine with human error to precipitate a serious incident. In order to reduce risk, a system needs to understand its defects so that it can minimize...
them by building appropriate defenses and safeguards.\textsuperscript{[11]} Defects can only be identified if there is a commitment to an open culture of reporting throughout the system.\textsuperscript{[10,11]} A healthy debate on this issue is essential at this juncture in India.

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Conflicts of Interest

There are no conflicts of interest.

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