

# Medication Errors in Anaesthesia

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The ancient proverb 'to err is human, to forget divine' is no longer applicable in medical practice. Medical profession has advanced with use of artificial intelligence, electronic devices and precise monitoring systems which are proved to be fail safe. Medications errors continue to occur despite advanced vigilance systems. The National Coordinating Council for Medication Error Reporting and Prevention (NCC-MERP) has defined medication error as "Any preventable event that may cause or lead to inappropriate medication use or patient harm while the medication is in the control of the health care professional, patient, or consumer<sup>1</sup>. Globally, the incidence of death due to medication error is higher than road traffic accidents and cancer<sup>1,2</sup>. About 15 million people are affected by medication errors which contribute to adverse events in hospitalized patients<sup>2</sup>. The damage caused by medication error may range from 'unrecognizable' to serious health deterioration and mortality. Both ways it increases morbidity and healthcare costs.

Medication errors are common with antibiotics and antihypertensive drugs in outpatient prescription whereas under anaesthesia, opioids and vasopressors are drugs wrongly dosed or administered<sup>3</sup>. Anaesthetists administer thousands of injections in the course of career. Few errors which draw the attention of public as 'Anaesthesia overdose' is just the tip of an iceberg. Large numbers of drug errors go unrecognised or unlisted from the public's purview.

A medication error is 'a failure in the treatment process that leads to, or has the potential to lead to, harm to the patient'<sup>3,4</sup>. Medical error is an inadvertent act by a health care professional; medication error is the error in the process of medication which might occur any

time from prescription to administration, by health care professional or by the patient himself.

Medication errors in anaesthesia can go unreported as adverse reactions or as fatal event. Errors in operation theatre are commonly due to syringe swap, look -a -like drug packing, wrong drug administration, miscalculated dosage, wrong dilution and wrong identification of similar looking drug preparations<sup>3,4</sup>. In ICU setup, drug omissions, wrong timing or wrong route of administration are few noted causes for errors<sup>3</sup>. Drug delivery device failure occurs commonly in intensive care units. Often the labelling of syringe, drug and dilutions, preparations and settings on delivery device may lead to error in administration. In out- patient practice, omitting doses or over dosing occur due to non compliance by the patient to follow prescription<sup>4</sup>. With the advent of online pharmacy, medication errors are inevitable without proper regulations.

Most often, medical errors are labelled as adverse drug reaction. Adverse drug reaction is an unintended reaction to regular dose and adverse drug event is the untoward medical occurrence in a patient due to administration of a pharmacological agent which may or may not be the causal factor for the event. Medication errors constitute nearly half of the adverse drug events<sup>4,5</sup>.

Classification of medication error is necessary to identify the lapse and find preventable options. According to the mode of occurrence of error, categorised as prescription, transcription, dispensing, administration, or monitoring errors<sup>3-5</sup>. Commonly used classification is psychological classification as knowledge-based error, rule-based error, action-based, error and memory-based error<sup>3,4</sup>.

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Human errors contribute significantly to medication errors<sup>4,6</sup>. It can happen even in highly experienced and skilled professionals. Notable factors such as lack of knowledge, inexperience, inadequate training, distraction, lack of communication etc are listed for erroneous administration<sup>5</sup>. Contribution of human behaviour in medical mismanagement and hospital related deaths have been analysed by several studies<sup>5,6</sup>. In Japan, analysis of hospital death by Japan Medical Safety Research Organization (JMSRO) revealed that nearly 42% of deaths were linked to lack of non technical skills of treating doctors<sup>3,5,6</sup>. Of the non technical skill- absence of situation awareness, team work and decision making were notable causes<sup>3,6</sup>. Both technical and non technical skills are considered important in maintaining patient safety.

The question 'Is anaesthetist the only culprit in medication errors in perioperative setting lurks on. Studies around the world have proven that not only human error but workplace is equally culpable to occurrence of errors<sup>3,6,7</sup>. Currently, healthcare systems are forced to adapt to lesser budget and bear the burden of accommodating more surgeries in short time frame in order to maximise services. Anaesthetists are expected to do multitasking and maintain strict vigilance with new devices. One study found that 48% of anaesthetists do not read the manufacturer's manual before operating medical monitors and delivery device<sup>5,7</sup>. Though monitoring devices aid in vigilance, interpreting the multiple signals in a busy OR puts the burden on decision making, thus prone to errors<sup>4,8</sup>.

In the operation theatre, distractions occur at every stage of anaesthesia induction and recovery. It is the noise in OT, communication between doctors, nurses and technical assistants add to the commotion. In addition to the work burden, lack of sleep, fatigue and constant beeps from devices cause mental fatigue amounting to errors in practice<sup>9</sup>. Study by JMSRO, found that medication errors were higher in less experienced anaesthetists however South African study found that the incidence of medication error was similar in experienced and less experienced anaesthetists<sup>8,9</sup>. Protocol based practice such as suggested by Jenison et al ensures that medication errors in anaesthesia will be reduced<sup>8</sup>. To mention a

few – labelling of drug; syringes, non usage of unlabelled syringes and ampoules, following a particular pattern of arrangement of syringes, minimizing verbal handover between cases or shift change etc might be helpful<sup>8,9</sup>.

Knowledge based errors can be minimised by regular training and updating knowledge; rule based errors may be reduced by implementing protocols and checklists; skill based errors can be addressed by rigorous and repeated training. Focus on non technical skill assessment and training has gained momentum from the year 2000 onwards. Workplace culture changes – such as implementing Protocols, following standard guidelines, reporting errors and providing support system will ensure patient safety<sup>8,10</sup>. Out-patient prescription should be as per WHO prescription guidelines; surgical check list such as WHO checklists for pre induction, post induction and recovery should be practised<sup>3,4</sup>. Institutional support for prompt addressing of medical errors and medication errors will encourage the voluntary reporting of medication errors. There are separate scoring and assessment tools available for surgeons (NOTSS), scrub nurses (SPLINTS) and Anaesthetists (ANTS)<sup>11,12</sup>. Implementing training and assessment of both technical and Non technical Skills at organization level might improve patient safety. Anaesthesia Non Technical Skill (ANTS) training will improve communication, situation awareness, team work, decision making and communication<sup>11</sup>.

Organizations providing health care should abide by the regulation of the State and adhere to standards in purchase medical devices. Strict enforcement of regulations on pharmaceutical manufactures to follow uniform standards in the country with respect to drug labelling and packing will ensure safety as per guidelines laid down by Anaesthesia Patient Safety Foundation<sup>8,11</sup>.

Medication errors are under reported worldwide. Patient safety surveillance will gather information on such errors. As per Centre for Disease Control (CDC) and prevention data, death due to medication errors stands third<sup>12,13</sup>. In India, there is no such regulation to report deaths or events arising from medication errors or adverse drug events. The study by Harvard, reported 5.2 million medication errors occurring annually in India<sup>13</sup>. Only a few studies conducted in India, have quoted the incidence of medical errors as 15-25%<sup>11-13</sup>. A

survey of medication errors involving anaesthesiologists is published in the current issue which tries to address the awareness regarding reporting of errors and various factors inducing such errors<sup>14</sup>.

In western countries, agencies such as National Coordinating Council for Medical Error Reporting and Prevention (NCC-MERP) and Agency for healthcare Research and Quality (AHRQ), monitor the patient safety and keep check on medical and medication errors<sup>10,13</sup>. In India, currently the safety measures, reporting systems and vigilance are fragmented and limited to only few areas such as immunization, obstetric and neonatal care and needle stick injuries. Drug controller General of India places the authority of surveillance to various sections such as safe surgical practice, blood transfusion, medical devices, and medical error reporting etc under different national councils. Society for Pharmacy vigilance is in the evolving and spreading awareness about medication errors, device failure and safe practice<sup>15</sup>.

In India, ministry of health and Family welfare has launched National Patient safety Framework programme to ensure quality health care, education and medication error reporting<sup>15,16</sup>. Encouraging incident reporting, voluntary reporting of errors by doctors and periodical skill based training will go a long way in patient safety.

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