CASE REPORT

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A Case Report on Bupivacaine Induced Limb Weakness; Type I Augmented Adverse Drug Reaction (ADR)

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Abstract

Bupivacaine is an amide-type, long-acting local anesthetic. It acts by preventing generation or conduction of nerve impulses by reducing sodium permeability and increasing action potential threshold. Lower limb motor weakness is a well-known complication of epidural analgesia with local anesthetics. In this case report a 60yr old female developed Bupivacaine induced lower limb weakness post-surgery. This event was identified as Type 1 augmented ADR which was assessed and reported with the help of Naranjo ADR scale. The dose of Bupivacaine was reduced as per clinical pharmacist's suggestion and that helped in recovery from the weakness on the same day. Type 1 augmented ADR is related to the pharmacological action of the drug or due to the exaggerated pharmacologic response.

Keywords: Bupivacaine, Epidural analgesic, ADR, Limb weakness, Naranjo scale.

INTRODUCTION

Adverse Drug Reaction can be defined according to World Health Organization (WHO) as a response to a drug that is noxious and unintended and occurs at doses normally used in man for the prophylaxis, diagnosis, or therapy of disease or for modification of physiological function.[1] To know about the severity and type of ADR, Rawlin and Thompson (1981) has classified ADR into six types (Table 1). Type A or Augmented ADR is mainly dose of the drug related. This type of ADR is predictable and occurs commonly.[2]

Bupivacaine is an amide-type, long-acting local anesthetic. It acts by preventing generation or conduction of nerve impulses by decreasing sodium permeability and increasing action potential threshold.[3] Bupivacaine is given as an epidural injection into the back in order to produce insensitivity during labor, surgery, or certain other medical procedures.[4] Epidural Bupivacaine is an effective way for post operative pain reliever. Lower limb motor weakness could be a documented complication of epidural analgesia with local anesthetics. However, continuous use of epidural anesthetic has high risk of side effects and thus postoperative monitoring should be done to ensure its safety and effectiveness.[5] In this case report, the patient was administered with high therapeutic dose of epidural Bupivacaine that resulted in severe lower limb weakness. Patient was assessed and identified to have a drug reaction which was confirmed using Naranjo ADR probability scale. It was reported that on reduction of the dose of Bupivacaine the patient recovered on the same day.

Table 1: Classification of ADR.

Type of Reaction	Features	Examples	Management
A: Dose related (Augmented)	Commonly noticed and predictable. Related to the pharmacological action of drug.	Warfarin induced bleeding, digoxin toxicity	Reduce the dose or withhold the drug
B: Non–dose related (Bizarre)	Uncommon and unpredictable. Not related to the pharmacological action of drug.	Anaphylaxis to penicillin	Withhold the drug and avoid usage in future
C: Dose related and time related (Chronic)	Uncommon. Related to the cumulative dose of the drug.	Hypothalamic-pituitary-adrenal axis suppression by corticosteroids	Reduce the dose or withdraw the drug for a longer period of time
D: Time related (Delayed)	Uncommon. Occurs due to the dose of the drug.	Carcinogenesis, teratogenesis	Often intractable
E: Withdrawal (End of use)	Uncommon. Occurs soon after withdrawal of the drug.	Insomnia or anxiety with benzodiazepines	Reintroduce the drug and withdraw slowly
F: Unexpected failure of therapy (Failure)	Common. Dose related, often caused by drug interaction.	Resistance to antimicrobial agent	Increase dosage of the drug.

CASE REPORT

A 60-year-old female patient was admitted to the orthopedic department for the complaints of her right leg pain. She has history of osteoarthritis for the past 10 years. The physician advised her to undergo total knee replacement (TKR) surgery the very next day. Her vitals and other laboratory reports were obtained to be normal. She was taken for surgery and was administered with the surgical prophylaxis medications. The surgery was uneventful. She was taken to the post operative ward from where she was given analgesics, antiemetic as well as antacid drugs. She was continued to administer the local anesthetic medication Bupivacaine (0.2%). During her first session of physiotherapy she complained about severe left leg weakness and immobility.

Clinical pharmacist was referred for the same to identify the cause of left leg weakness. It was then identified and reported that the drug Bupivacaine 0.2%

induced this leg weakness due to the high dosing. Immediately the suggestion for reducing the dose to 0.1% was ordered. It was noticed that the left leg weakness was reduced and completely resolved on the same day. This event was identified as Type 1 augmented ADR by the clinical pharmacist using ADR probability scale.

DISCUSSION

As per the observation and assessment it was identified to be dose induced type 1 augmented ADR. Looking up on various other research articles local anesthetic induced weakness is rarely reported in humans. Joseph M. Neal *et al.* studies explain three postoperative cases where each patient progressively developed muscle weakness over the days because of the administration of these amide types of local anesthetics.[6] This augmented type ADR can be recovered by reducing or adjusting the dose of the drug which is reported in this case.[2] Based on these case reports and articles it can be studied that epidural Bupivacaine induces lower limb weakness and the ADR can be reverted back by adjusting the dose of the drug given. And based on these evidences post operative monitoring is considered important in order to ensure effectiveness and safety of the local anesthetic.

CONCLUSION

This case report confirms that epidural Bupivacaine can induce lower limb motor weakness which is an augmented type of ADR and can be recovered by reducing the dose. Clinical pharmacist should monitor closely the efficacy and safety of the drug.

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CONFLICT OF INTEREST

The author declares that there is no conflict of interest.

ABBREVIATIONS

ADR: Adverse drug reaction; **TKR:** Total knee replacement.

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