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Review Article

Is Sublingual Nifedipine Justified as Premedication: Where is the Evidence?

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Abstract: Hypertension (HTN) is a worldwide epidemic. It is a chronic disease with a high mortality and morbidity, and has a very high cost to society. Overall 20 % of the population in the world has HTN. Arterial hypertension is a risk factor for cardiovascular complication after anesthesia and surgery. Bite and chew, sublingual, and oral immediate – release Nifedipine have became traditional know. Better newer drugs are available like Clonidine, Esmolol, and Dexmetomidine. Use of immediate release Nifedipine has been reduced by 98%.However a moratorium on the use of immediate release Nifedipine for hypertensive urgencies has existed.
Keywords: Nifedipine, Hypertension, Sublingual

INTRODUCTION

Hypertension (HTN) is a worldwide epidemic. It is a chronic disease with a high mortality and morbidity, and has a very high cost to society. Overall 20 % of the population in the world has HTN. It could be Primary HTN/Essential HTN, Secondary HTN, Isolated systolic Hypertension(ISH), HTN during pregnancy or White coat HTN .Elevated blood pressure is the most frequent preoperative health problem in non cardiac surgery patient with an overall prevalence of 20%- 25% [1].

Arterial hypertension is a risk factor for cardiovascular complication after anesthesia and surgery. Ideally all hypertensive patients should be treated before elective surgery, but in practice only patients with Stage 3 JNC VI (Table1. systolic blood pressure > 180mmHg, diastolic blood pressure > 110mmHg) are regarded as needing preoperative treatment [2]. These patients are at risk of dangerous Hypertensive crisis (Table 2.) likely to cause intracranial hemorrhage, acute left ventricular failure, ventricular arrhythmias, and renal failure. For Stage 1 JNC VI (Table 1) preoperative treatment regarded is optional, where as for Stage 2 JNC VI (Table 1.) preoperative treatment is recommended if patients suffer from target organ involvement.

Table 1: Joint National Committee (JNC) Blood Pressure Classification [3, 4]

SBP/DBP *(mmHg)	JNC VI Category	JNC VII Category
<120/80	Optimal →	Normal
120-129/80-84	Normal	Prehypertension
130-139/85-89	Borderline	
≥140/90	Hypertension →	Hypertension
140-159/90-99	Stage 1 →	Stage 1
160-179/100-109	Stage 2	Stage 2
≥180/110	Stage 3	

*Systolic Blood Pressure/Diastolic Blood Pressure

Table2. Hypertensive Crisis

1. **Hypertensive Emergency:** Severe elevation in blood pressure (>180/110mmHg) complicated by evidence of impending or progressive target organ dysfunction.
2. Hypertensive urgency: Severe elevation in blood pressure without progressive target organ dysfunction.

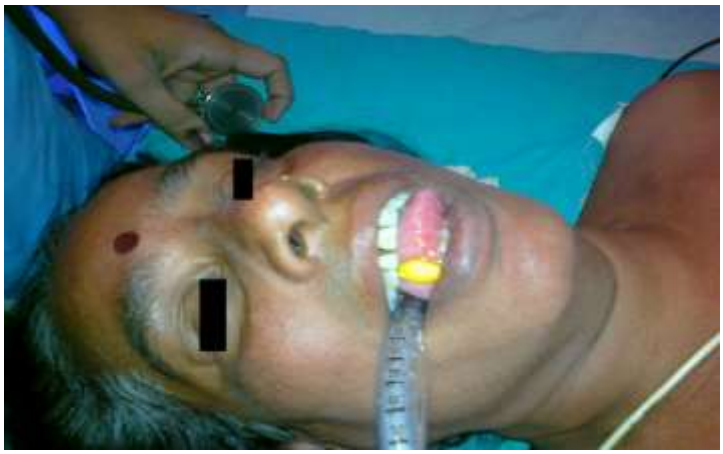

Fig. 1: A yellowish thing was noticed on the lateral aspect of tongue of patient mouth

Immediate preoperative HTN is a matter of worry for surgeons, paramedical staff nurse, patient itself and anesthesiologist. Preoperative HTN in an elective case is neither a hypertensive emergency nor urgency (Table 2). Even if it is a White coat HTN, it requires multiple blood pressures reading to distinguish it from sustained hypertension.

MATERIALS AND METHOD

A 45 year –old female, weighing 50kg, with a diagnosis of spinal Tuberculosis (Potts disease/Potts caries/David's disease) at the level L_3-L_4 was scheduled for elective decompression and fusion. A thorough preanaesthetic assessment was done a day before surgery. Patient was apparently anxious. She was on anti- tubercular therapy (ATT) from last 6 months. Her laboratory investigation, chest X-ray, Electrocardiogram (ECG), Echocardiography, clinical status were within normal limit. Patient was not a known hypertensive. Patient was accepted as ASA grade II.

General anesthesia (GA) was planned. After taking informed consent she was shifted to operating room (OR). Vital parameters at the time of induction were blood pressure 140/80mmHg, Heart rate 98/min, SpO_2 99%. GA was induced with thiopentone sodium 300mg and succinylcholine 100mg intravenously. Trachea was intubated with cuffed Polyvinylchloride (PVC) endotracheal tube of size 7.0mm. Soon after intubation while withdrawing laryngoscope, even before securing the tube, a yellowish thing was noticed on the lateral aspect of tongue (Fig. 1). Our first impression was it is a peanut but later when enquired, a paramedical staff nurse revealed, it was a 10mg sublingual Nifedipine capsule given sublingually(SL) at the time of shifting the patient to OR as patient blood pressure was 170/90mmHg without notifying the concerned surgeon. As seen in Figure 1, it could be a cause of airway obstruction if slipped during laryngoscopy and intubation, as we were unaware of it. Patient was positioned prone. Intraoperatively patient dropped her blood pressure to 70/50mmHg, which was managed by IV fluids, colloids, and phenylephrine. At the end of surgery, reversal of neuromuscular block was achieved with Injection Neostigmine 2.5mg and injection Glycopyrrolate 0.4mg. After extubation she was shifted to recovery and closely monitored for 4-5hours till the effect of drug wears off.

DISCUSSION

It is a First generation calcium channel blocker clinically introduced in 1960s.

Immediate – release Nifedipine is an oral liquid filled capsule form of a dihydropyridine calcium channel blocker (L- Type), which dilates the vascular bed and reduces peripheral vascular resistance, thus reducing the arterial blood pressure. This immediate release Nifedipine is rarely used today, as it results in fluctuations in blood pressure effects leading to severe complication. The most recent guidelines for the treatment of hypertension (JNC VI) state that "inability to control the rate and degree of fall in blood pressure makes the use of Nifedipine unacceptable". These concerns have stimulated many institutions to remove immediate –release Nifedipine from their formularies [3]. The goal of therapy for acute hypertension urgencies is to reduce arterial blood pressure by no more than 25% within minutes to 2 hours, then to bring it below 160/100mm Hg within 2 to 6 hours. Thus excessive abrupt decrease in blood pressure should be avoided because that might precipitate cerebral, renal and coronary ischemia [4]. Patients over 65years old seem to be most affected even with low doses producing myocardial infarction [5]. The peak effect

when given SL is generally observed at 20-30minutes, with duration of action of four to five hours [6].

There is a myth concept that SL area is richly vascular and after squeezing capsule it would be absorbed very quickly than when it is swallowed. There is no evidence to support this. In fact, there was a study where Van Harten J etal concluded that oral mucosa was a deficient barrier for the absorption of Nifedipine. Its therapeutic effect was reported to be result of ingestion rather than SL absorption [7].

The real administered SL dose from 10mg Nifedipine after squeezing it under the tongue may be close to 7-8 mg. so it is not a complete dose. A common side effect of this drug is reflex tachycardia. The higher the heart rate, the higher the possibility of myocardial ischemia, SL Nifedipine does not absorb well and does produce non -specific ST segment deviations in ECG, without achieving optimal drop in blood pressure [8]. Syncope and conduction disturbances have also been reported following sublingual Nifidepine [9].

Cardio renal advisory committee of Food and Drug Administration (FDA) concluded that the use of sublingual Nifedipine should abandoned because it is neither safe nor efficacious [10]. It may cause severe hypotension, acute myocardial infarction, stroke or death due to uncontrolled drop in blood pressure, peripheral vasodilatation producing steal phenomenon, reflex effects including catecholamine release. However a moratorium on the use of immediate release Nifedipine for hypertensive urgencies has existed.

CONCLUSION

Bite and chew, sublingual, And oral immediate – release Nifedipine have became traditional know. Better newer drugs are available like Clonidine, Esmolol, and Dexmetomidine. Use of immediate release Nifedipine has been reduced by 98% [11]. Unfortunately, despite the availability of numerous effective anti hypertensive agent, many patients may have uncontrolled high blood pressure preoperatively such elective non –cardiac cases should be postponed and properly evaluated, proximate causes of elevated blood pressure such as pain, distended urinary bladder should be addressed rather than trying all their efforts to reduce blood pressure before sending the patient to OR. The entire health care giver, paramedical staff nurses must well be acquainted with knowledge of SL Nifedepine.

REFERENCES

1. Manolis AJ, Erdine S, Borghi C, Tsioufis K; Perioperative screening and management of hypertensive patients. Update on Hypertensive Management, 2010; 11: 47.
2. Foex P, Sear JW; The surgical hypertensive patient. BJA: Continuing Education in Anesthesia Critical care & Pain, 2004; 4:139-143.
3. Hatton RC; Alternatives to nifedipine for hypertensive urgencies. Drugs & Therapy Bulletin, Shands at the University of Florida, Drug Information Service, 2001; 15(10). Available from professionals.ufhealth.org/.../111201-drugs-therapy-bulletin.pdf
4. Brewster LM; Sutters M; Hypertensive Urgencies & Emergencies - Hypertension Drug Therapy. Systemic Hypertension. Armenian Health Network, 2006.
5. Ishibashi Y; Sublingual Nifedipine in elderly Patients even a low dose induces myocardial ischemia. Clinical and Experimental Pharmacology and Physiology, 1999; 26: 404-410.
6. Beer N, Gallegos J, Cohen A, Klein N, Sonnenblick E, Frishman W; Efficacy of sublingual Nifedipine in acute treatment of systemic hypertension. Chest, 1981; 79(5): 571-574.
7. Van Harten J, Burggraf K, Danhof M,Van Brummelen P, Breimer DD; Negligible sublingual absorption of Nifedipine. The Lancet 1987; 2(8572):1363-1365.
8. Madariaga HM, Campos PE; Electrcardiographic and arterial blood pressure changes in hypertensive crisis after sublingual Nifedipine. The Internet Journal of Emergency Medicine 2009; 5(2). Available from http://ispub.com/IJEM/5/2/5436
9. Zangerle KF, Wolford R; Syncope conduction disturbances following sublingual Nifedipine for hypertension. Annals of Emergency Medicine, 1985; 14(10): 1005-1066.
10. Levy JH: Treatment of perioperative hypertension. Anesthesiol Clin North Am., 1999, 17:569-570.
11. Matuschka PR; Safer alternative to sublingual Nifedipine for the treatment of hypertensive urgencies. J Pharm Technol., 1995; 15(6): 199-203.