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Case Report IJTM

Amlodipine Induced Peripheral EDEMA and Gingivitis: A Case Report

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Abstract

Calcium channel a group of drugs used to treat heart disorders are called blockers. These drugs dilate blood vessels and improve blood flow to the heart, these works by preventing calcium flow through ion-specific (L-type) calcium channels in the cell membrane. Amlodipine, a calcium channel blocker in the dihydropyridine class, can cause peripheral edema and drug-induced gingivitis in some patients. In this case, the patient experienced swelling in the ankles and feet, along with redness, swelling, and bleeding of the gums, which began approximately 2 weeks after starting amlodipine. These adverse effects are attributed to the vasodilatory action of the drug, which leads to fluid retention and increased capillary permeability, contributing to swelling. Gingival inflammation likely results from drug accumulation in the gums. Upon discontinuation of amlodipine, both the peripheral edema and gingivitis subsided. The aim of this case study is to enhance patient management for better clinical outcomes.

Keywords: Adverse effects, amlodipine, calcium channel blockers, drug substitution, edema, gingival enlargement, gingival overgrowth, hypertension

INTRODUCTION

PERIPHERAL EDEMA is swelling of upper and lower limbs, the cause may be due to standing for longer period [1]. Swelling occurs when the fluid in cells is not properly balanced [2].

GINGIVAL ENLARGEMENT

Gingivitis is a condition of excessively enlarged gums or gums that are too long. The phrase "gingival hypertrophy" is not applicable because enlargement is caused by an increase in the amount of extracellular tissue rather than the number of cells [3]. Angina and high blood pressure are treated with amlodipine, which is a calcium channel blocker in the dihydropyridine group. The mechanism of action involves blocking the influx of calcium ions from the heart and smooth muscle cells causes vasodilation in the coronary arteries and peripheral blood vessels, heart rate decreases. The contraction of the heart muscle decreases, reduces myocardial oxygen absorption and causes ventricular conduction to slow down [4]. Amlodipine having an excellent pharmacokinetic. Bioavailability is 60–65% followed by oral administration, peak plasma concentration 6–8 hours after administration, metabolism. In the liver with no significant pre systemic or first-pass metabolism and pharmacodynamic (terminal elimination half-life 40–50 hour). The major disadvantage of amlodipine is its adverse effect of peripheral edema facial blushing, headache, dizziness, gingival overgrowth [5], amlodipine-induced gingivitis overgrowth has been seen in

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1.7–3.3% percent of patients undergoing the treatment [6].

The first sign of overgrowth can be observed as early as 3 months after drug institution usually starting from anterior labial surface in interdental papillae which may gradually convert into massive diffuse enlargement involving marginal and attached gingiva [7]. Peripheral edema was seen in this case study 65-year-old female patient who was a known case of hypertension and was taking amlodipine 5mg from 10 years [8].

CASE REPORT

A 65-year-old female, who was diagnosed with hypertension, her clinical symptoms were leg pain, body pain, dizziness, and complaints of gaining weight, the patient had been using a calcium channel blocker of class dihydropyridines where drug of choice was amlodipine 5mg for 10 years daily and the patient was unaware of gum enlargement and its loosening, peripheral edema was observed.

CLINICAL FEATURES

When examined intraorally, marginal enlargement of gums, difficulty in eating, pedal edema and enlarged veins, black discoloration of limbs, weight gain, pruritus, and experienced in rare case scenarios anxiety rarely on physical examination blood pressure was found to be 160/90 mmHg. On assessing the case, risk factor for her gingival overgrowth except to be chronic use of amlodipine. Patients should use betel leaves sparingly and advise the dentist for better oral treatment for gingival and counseled for oral hygienic practices for gingival overgrowth.

ETIOLOGICAL CAUSES

Peripheral edema primarily arises from the drug's vasodilatory effects, which increase capillary permeability and allow fluid to leak into the interstitial space, resulting in swelling, particularly in the lower extremities. Additionally, the body may retain fluid as a compensatory mechanism in response to the drop in blood pressure caused by the medication. The risk of peripheral edema may be dose-dependent. This means that higher doses are associated with greater risks. Individual variation is important. This is because some patients may be more at risk for this side effect than others. Due to genetics existing medical problems or using drugs at the same time. On the other hand, gingivitis can occur due to gingival hyperplasia, which is a potential side effect of amlodipine, leading to inflammation of the gums. Poor oral hygiene practices may also contribute to the development of gingivitis, especially in patients who experience side effects and neglect their dental care. Furthermore, the inflammatory response triggered by increased blood flow to the gums due to vasodilation can exacerbate gingival issues. Individual susceptibility, including genetic predispositions or pre-existing dental conditions, can further influence the occurrence of gingivitis in patients taking amlodipine.

DIAGNOSIS

Amlodipine Induced Peripheral Edema and Gingivitis, the patient has marginal enlarged gums (Figure 1). This patient's right leg is swollen and darkened compared with the more normal-appearing left leg (Figure 2).

Figure 1. Gingival hyperplasia.

Figure 2. Peripheral edema.

DISCUSSION

Amlodipine is a calcium channel blocker that belongs to the dihydropyridine family. And used to treat coronary artery disease and high blood pressure This is due to its excellent performance and durability. Therefore, calcium channel blockers are still recommended according to the JNC 8 guidelines as one of the first-line monotherapy options [9]. Because it can effectively treat 60% of hypertensive patients and improve vascular complications [10]. The most common side effect of amlodipine use is peripheral edema. This accounts for approximately 12% of all cases. Ankle edema can be seen in some individuals. And is caused by increasing the hydrostatic pressure in the capillaries of the part [11]. This results from reflex contraction of postcapillary blood vessels in these vascular beds [12]. And the dihydropyridines ccbs amlodipine an easy analysis of pooled data. On 581 treated patients found edema was seen in 11.6% of almost 9.3% of patients discontinued amlodipine therapy due to the adverse drug reactions in that most commonly is edema [13].

And the most common side effect seen in some patients are gingivitis, drug-induced gingivitis overgrowth (DIGO) this was first reported in Kimball in 1939 with the chronic usage of antiepileptic drug, contemporary more than 20 prescriptions medication causing (DIGO) [14].

Amlodipine, a calcium channel blocker commonly used to treat hypertension, can lead to two notable side effects: peripheral edema and gingival overgrowth. The frequency of amlodipine-induced gingival hypertrophy ranged from 1.7% to 3.3% [15].

Peripheral edema: The vasodilatory action of amlodipine in the peripheral arteries, especially in the lower extremities, is responsible for this. Increased capillary pressure causes inflammation as fluid leaks into surrounding tissue [16].

Gingival overgrowth (hyperplasia): The exact mechanism isn't entirely clear, but it is believed to involve both inflammatory and non-inflammatory processes. Amlodipine accumulates in gingival crevicular fluid, leading to an upregulation of pro-inflammatory cytokines, which results in gingival enlargement. Additionally, the drug can reduce collagenase activity, which prevents the breakdown of collagen, contributing to tissue overgrowth [17].

There are two proposed pathways: inflammatory and non-inflammatory pathways. The hypothesized non-inflammatory mechanism involves decreased absorption of folic acid. Inhibition of aldosterone synthesis in the adrenal glands. and subsequent elevated levels of adrenocorticotropic hormone and keratinocyte growth factor [18].

On the other hand, the direct effects of plaque or medicines containing gum ash can cause inflammation. This inflammation could lead to the up regulation of several cytokine factors, such as interleukin-6 (IL-6), IL-1β, platelet-derived growth factor subunit B (PDGF BB), fibroblast growth factor 2 (FGF 2), transforming growth factor-β1, and connective tissue growth factor (CTGF) [19, 20].

Not every person taking medication experiences gingival overgrowth because it has been proposed that oral hygiene habits, the existence of varying fibroblast subset proportions in everyone, and the existence of functional heterogenicity in gingival fibroblasts in response to different stimuli are to blame [21].

The treatment of medication-induced gingival hypergrowth in hypertensive individuals is intricate and demands a multidisciplinary strategy. When pharmaceutical modifications are combined, surgical procedures, as well as strict oral hygienic procedures, medical professionals can efficiently handle DIGO, therefore enhancing patients' standard of living and guaranteeing ideal dental health at a period. An interdisciplinary strategy is necessary to get the greatest results. results, emphasizing the necessity of patient education and coordinated treatment in the long-term treatment for this illness [22].

In this case study, we observed that patients were using betel leaf(pan) excessively, thus may be one of the etiological causes for increasing the heart rate and patients were taking the treatment for acute varicose vein, but due side effects of medications the patient stopped taking the medication. This untreated this may be another etiological cause of increasing blood pressure [23].

According to this research article no.10 about the comparison of amlodipine with cilnidipine on antihypertensive efficacy and incident of pedal edema in mild to moderate hypertensive individual : A prospective study status that, amlodipine and cilnidipine have an equal efficacy in decreasing blood pressure in hypertensive conditions, but this cilnidipine being N-type and T -type calcium channel blocker and associated with reduced incidence of pedal edema compare to L-type calcium channel blocker amlodipine, it may be better drug substitution for amlodipine [24, 25].

CONCLUSIONS

The case study purpose is to get the better therapeutical outcome and our case is the case reported in literature that inducing peripheral edema and gingivitis with the usage of amlodipine. In the case study, one of the etiological causes for increasing blood pressure are the administering of betel leaf. The patient was advice to reduce the usage of betel leaf and advise to dentist for better oral treatment for gingival and counseled for oral hygienic practices. We need further studies to identify the exact mechanism of adverse effect.

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