Amlodipine can increase atrial fibrillation in hypertensive patients

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Abstract

The aim of this study is to determine the increased prevalence of Atrial Fibrillation (AF) in hypertensive patients who use Amlodipine (a Dihydropyridine Calcium Channel Blocker), as compared to hypertensive patients who do not use Amlodipine. The study carried out in Alkarama Teaching Hospital, Wasit Province, Iraq, during the period from April 2010 to February 2014. One hundred eighty eight adult hypertensive patients with AF were included, 109 males with mean age 52 ± 3.4 SD and 79 females with mean age 49 ± 4.1 SD. Subdivided in two groups: group A (include 118 patients using Amlodipine) and group B (include 70 patients do not use Amlodipine). The study showed an increase in the prevalence of (AF), more in those patients using Amlodipine than those who do not use Amlodipine regardless of gender. But there increase in AF in older age and those using higher doses for longer period.

المستخلص

الغرض من هذه الدراسة هو بيان الزيادة في حدوث ذبذبة اذين القلب لدى المرضى المصابين بارتفاع ضغط الدم ممن يستعملون علاج الأملوديين أكثر من الذين لا يستعملون الدواء المذكور. أجريت الدراسة في مستشفى الكرامة التعليمي في مدينة الكوت محافظة واسط العراق في المدة مابين شهر نيسان 2010 وشهر شباط 2014. شملت الدراسة 188 مريضا عراقيا من المصابين بارتفاع ضغط الدم منهم 109 رجلا بمتوسط عمر 3.4± 25 و 79 أمرءة بمتوسط عمر 1.4± 49.

قسم المرضى الى مجموعتين : مجموعة(أ) تشمل 118 مريضا ممن يستخدمون علاج الأملودبين ومجموعة(ب) من لا يستعملون ذلك العقار أظهرت الدراسة زيادة في حدوث الأصابة بذبذة أذين القلب لدى المرضى الذين يستعملون عقار الأملودبين أكثر من المرضى الذين لايستعملون ذالك العقار بغض النظر عن والجنس لكن ظهرت زيادة في حدوث ذبذبة اذين القلب لدى كبار السن ومن يستخدم العقار بجرع عالية و لفترة طويلة .

Introduction

Atrial Fibrillation(AF) is the most common sustained arrhythmia which occurs in 1% to 2 % of general increases population and with advancing age, ranging from <2% in those below 40 years to 6% in those more than 70 years (1,2,3). Atrial contributes for fibrillation both morbidity and mortality and there is more than five folds risk of stroke (4,5 and 6). The main causes of (AF) are: Hypertension (HT), Ischemic Heart Disease (IHD), Heart Failure (HF), Cardiomyopathy (CM), Valvular Heart Diseases, Diabetes Mellitus and Hyperthyroidism (7, 8). Because hypertension is a common disease in the adulthood, it is considered the most common predisposing factor for (AF) (9, 10, 11). Atrial Fibrillation treatment consist of either rate or rhythm control. Among the rate control drugs are: Nondihydropyridines Calcium Channel Blockers like (Verapamil and Deltiazem), Beta Blockers and Digoxin, each one can be used alone or in combination, with the targeting of heart rate below 100 /minute. While the rhythm control drugs include Flecainide, Propafenone and Amiodarone (12, 13, 14).

Patients and methods

This is a descriptive retrospective study includes 188 adult Iraqi patients with Arterial Hypertension (HT) and Atrial Fibrillation (AF) .One hundred and nine males(age 20-78) with mean age 52±3.4

SD, and 79 females (20-79) with mean age 49 ± 4.1 SD. The study carried in the period from April 2010 to February 2014 during the patients visit to Al-Karama Teaching Hospital in Wasit Province Iraq, as outpatients and Coronary Care Unit admission. Patients with IHD, CM, structural heart diseases, thyroid disease and advanced pulmonary or renal disease were excluded from the study. The patients were subdivided into two groups according to their use of Amlodipine : Group A includes 118 patients (68 males and 50 females) using Amlodipine as antihypertensive with or without other antihypertensive agents, and Group B includes 70 patients (41 males and 29 females) not using Amlodipine treatment (Table 1) .The mean duration of (HT)was 8 years (3-26). During their visits and follow up full investigations were carried out to exclude any potential contribution for AF, a protocol of: patient history ,12leads ECG. Transthoracic Echocardiography Exercise and Test, chest x-ray, thyroid function tests, blood urea ,serum creatinine, serum calcium, serum potassium, serum sodium ,packed cell volume , white cell count , plasma sugar ,plasma lipid profile and liver function tests were done.

Results

This study shows that the prevalence of (AF) is more in Group A (using Amlodipine) than those in Group B (no Amlodipine) (Table 1, 2).Atrial Fibrillation is recorded more common in

those patients who shows left ventricular hypertrophy and more common in those using higher doses of Amlodipine (10 mg/day) than those using low dose (Table 3). Also (AF) is seen more common in those using Amlodipine for longer period (18-24 months) (Table 4). It is also more common with increasing age of patients

Table (1): Shows the gender, number and percentage of hypertensive patients with (AF) in the two groups (Group A using Amlodipine and Group B without Amlodipine)

| | Sex | Number | % | total |
|-------|--------|--------|-----|-------|
| Group | | | | |
| А | Female | 50 | 42% | 118 |
| | Male | 68 | 68% | |
| В | Female | 29 | 29% | |
| | Male | 41 | 41% | 70 |

| Table (2): Shows the gender, numbers (n), and age of hypertensive patients with A | ۱F, |
|---|-----|
| Group A (using Amlodipine) and Group B (non-amlodipine) | |

| | Gender | Age (years) | | | | total | |
|----------------|--------------------|-------------|-------|-------|-------|-------|----|
| Group | M=male F=female | 20-30 | 31-40 | 41-50 | 51-65 | >65 | |
| A (<i>n</i>) | М | 2 | 8 | 12 | 17 | 29 | 68 |
| | F | 1 | 5 | 10 | 14 | 20 | 50 |
| B(<i>n</i>) | М | 1 | 4 | 9 | 12 | 15 | 41 |
| | F | 1 | 2 | 7 | 9 | 10 | 29 |

 Table (3): Shows the number and percentage of hypertensive patients with AF and the dose of Amlodipine in mg/day

| Amlodinine dose(mg/day) | Number of patients and percentage (%) | | | |
|-------------------------|---------------------------------------|--------------|-------|--|
| | Females | Males | Total | |
| 5 mg | 36 (19.14 %) | 52 (27.65 %) | 88 | |
| 10 mg | 43 (22.87 %) | 57 (30.31%) | 100 | |

Table (4): Shows the number and percentage of hypertensive patient with AF according to duration of Amlodipine therapy in months.

| | Number of | |
|-------------|-----------|-------|
| Duration in | patients | % |
| months | | |
| 6 | 18 | 9.57 |
| 6-12 | 29 | 15.42 |
| 12-18 | 52 | 27.65 |
| 18-24 | 89 | 47.34 |

Discussion

Atrial fibrillation (AF) is the most common sustained arrhythmia and a major global public health problem due to its associated morbidity, including stroke and heart failure, diminished quality of life, and increased mortality (15). AF often presents initially in a paroxysmal form and may progress to a more sustained form over time (16). It may present as acute symptomatic or chronic or even asymptomatic that discovered during examination for other purposes (17, 18). In some studies its prevalence is 2% of population at age 40 and increasing steadily with age to reach about 10% at 80ths (19, 20). In one study, in hypertensive subjects with sinus rhythm, and no other major

predisposing conditions, risk of atrial fibrillation increases with age and left ventricular mass (21). It was found in one study, Antihypertensive treatment with valsartan/amlodipine combination was more effective than atenolol/amlodipine preventing combination in AF recurrences in hypertensive patients with associated type 2 diabetes mellitus and a history of recent AF. The antiarrhythmic effect of valsartan, possibly related to its positive impact on atrial structural and electrical remodeling (22). In other study, in patients with paroxysmal AF and hypertension, treatment of hypertension by candesartan did not have an advantage over amlodipine in the reduction in the frequency of paroxysmal AF (23, 24). Although Nonhydropyridine Calcium Channel Blockers such as Deltiazem and Verapamil are used to control the rate of (AF), Dihydropyridines Calcium Channel Blockers like Nefidipine and Amlodipine, on the other side, can increase the heart rate through reflex tachycardia. In our study we recorded (AF) is more common in those using Amlodipine drug as treatment for hypertension (Group A) as compared to those patients who did not use Amlodipine as part of antihypertension treatment (Group B), (Table 2). This study shows Atrial Fibrillation more frequent in older age group regardless of the gender (Table 2) , this may be explained by usual increase of (AF) with advancing age which is compatible with other studies by: Psaty BM and etal (19) .Our study also

shows (AF) is more in those using higher doses (Table 3). The duration of Amlodipine treatment is also important factor in causing an increase in the incidence of (AF), more in those using the drug to more than 24 months, (Table 4). In other words this study showed an increase in the prevalence of (AF)among hypertensive patients using Amlodipine drug in their treatment for hypertension and the frequency is more in those old age, using higher doses of Amlodipine and with long duration

Conclusion

Although Non- dihydropyridine Calcium Channel Blocker (Verapamil & Deltiazem) are used for rate control therapy of (AF), there is a new observation in this study, despite good control of blood pressure in the hypertensive patients, the Dihydropyridine Calcium Channel Blockers like Amlodipine can increase the occurrence of (AF) in patient with (HT) especially those with left ventricular hypertrophy bv echocardiography as compared with those hypertensive patients who do not use Amlodipine .So it is better to avoid Amlodipine drug therapy for hypertensive patient who shows left ventricular hypertrophy and advanced age.

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