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**Research Article**

# Compare urine albumin to creatinine ration in patients with central and peripheral vertigo

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## ABSTRACT

**Background:** Vertigo is a symptom of ischemic stroke. In vertigos without neurological symptoms, central vertigo cannot be definitively differentiated from peripheral vertigo. We can use the albumin to creatinine ratio (ACR) of urine in patients with central and peripheral vertigo to differentiate between central and peripheral vertigos which were the aim of this study.
**Methods:** In this descriptive study, 60 patients (30 patients with central and 30 patients with peripheral vertigos) entered study and followed for one year. Necessary documents including age, sex, and medical records were obtained by face to face interview and patient's morning urine samples were sent to the laboratory for analysis of albumin to creatinine ratio. Collected data analyzed by statistical methods in SPSS-19.
**Results:** 65% of patients were female and 35% male. The mean age of patients with central vertigo was 57.2±10.9 and peripheral vertigo was 53±12.5 years. The mean of albumin to creatinine ratio was significantly higher in patients with central vertigo compared to patients with peripheral vertigo (126/53 versus 38/7 mg/g; P=0.001). This difference was significant between men (P = 0.049) and women (P=0.03) of both groups. Also, it was significant in patients with >60 years old compare to others (P=0.002).
**Conclusions:** Results showed that the mean level of albumin to creatinine ratio in patients with central vertigo was significantly higher than patients with peripheral vertigo, it seems that we can use urine albumin to creatinine ratio, as a low-cost test, to differentiate central vertigo from peripheral.

**Keywords:** Vertigo, albumin, Creatinine, Stroke

## INTRODUCTION

Stroke occurs by involvement of the anterior and posterior arterial system and anterior blood system involvement can leads to hemiparesis, hemisensory and aphasia.

Involvement of the posterior system leads to symptoms such as anesthesia, fall, dizziness and ataxia. Ischemia of this area due to conflict of vital elements (breathing center and heart) as well as edema can lead to instant death.[1]

Vertigo can be a symptom of the stroke. Although infarct size caused by ischemia may be small, but the attention is necessary for future ischemia which its symptoms may be identified only by MRI. In patient with dizziness without neurological symptoms, we cannot fully differentiated peripheral vertigo from central by history and clinical examination. So the first step in treatment of such disease was early detection and differentiation of peripheral vertigo form central.[2]

Urinary albumin excretion rate is an important risk factor for kidney failure, stroke and cardiovascular diseases,

perhaps because of increasing the urinary albumin excretion, reflects endothelial cell dysfunction. During the investigations it was found that having diabetes can be a risk factor for stroke in patients with dizziness. Due to this problem, micro albuminuria can be used as a marker in patients with central vertigo.[3]

So, using urine ACR and a low-cost test, we can have new methods for identify the peripheral vertigo from central. The aim of this study was compare urine albumin to creatinine ratio in patients with peripheral and central vertigo.

## METHODS

This is a descriptive cross-sectional study that has been done on 60 patients which have dizziness for one year (30 patients with peripheral and 30 patients with central vertigo). All patients with diagnosis vertigo with and without risk factors such as diabetic, BP, previous stroke and heart ischemia and age 30-75 were entered to study. The exclusion criteria were pregnant women, people on dialysis, and patients with diabetic nephropathy, fever and infection. All patients complete the consent form before entered to study.

Patients according to clinical symptoms such as a motor and sensory deficits, ataxia, nystagmus, tinnitus and hearing signs somewhat isolated by the central and peripheral vertigo and type of vitigo was confirmed by MRI. After randomly selected patients, necessary information such as age, sex, medical history and some risk factors were collected by interview and then the morning urine sample of patients obtained for measure the albumin and creatinine of urine. Collected data analysed by descriptive and analytical statistical methods in SPSS-19. $p<0.05$ was considered as significant.

## RESULTS

Of all patients, 39 (65%) were female and rest of them were male. From patients with central vertigo, 16 (53.3%) and from patients with peripheral vertigo 23 (76.7%) were female. The prevalence of vertigo (central and peripheral) in female was more than male (Figure 1).

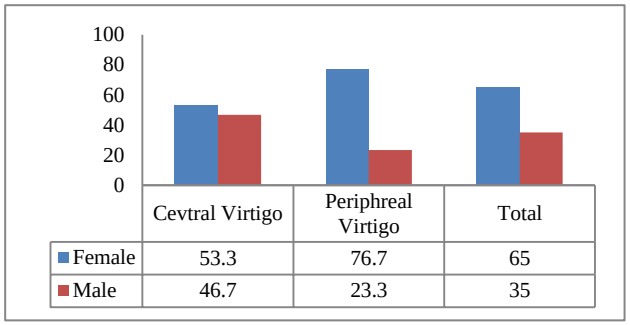


**Figure 1: The patient's distribution by sex and vertigo type.**

The mean age of all patients 55.1±12, central vertigo 57.2±10.9 and peripheral vertigo was 53±12.5. Most of patients with 56.7% and 5.3% in two central and peripheral vertigo groups were in age group 40-60; respectively (Table 1).

**Table 1: The age distribution of patients by vertigo type.**

| Vertigo type<br>Age group | Central<br>N (%) | Peripheral<br>N (%) | Total<br>N (%) |
|---|---|---|---|
| <40 | 2(6.7) | 5(16.7) | 7(11.7) |
| 40-60 | 17(56.7) | 16(53.3) | 33(55) |
| >60 | 11(36.7) | 9(30) | 20(33.3) |
| Total | 30 | 30 | 60 |

The prevalence of diabetes in all patients was 11.7% which from them 57.1% were in central and 42.9% were in peripheral group and the difference wasn't significant between two groups. The prevalence of blood pressure in all patients was 56.7% which from them 58.8% were in central and 41.2% were in peripheral group and the difference wasn't significant between two groups. The prevalence of stroke in all patients was 23.3% which from them 78.6% were in central and 21.4% were in peripheral vertigo group and the difference was statistically significant between two groups (p=0.015).

The prevalence of heart attack in all patients was 16.7% which from them 80% were in central and 20% were in peripheral vertigo group and the difference was statistically significant between two groups (p=0.038).

The mean level of albumin to creatinine ratio (ACR) in patients with central vertigo with 126 to 53 significantly higher than patients with peripheral vertigo with 38 to 7 (p=0.0005).

This difference in male and female in central group significantly higher than peripheral group (p=0.003 versus p=0.049) (Table 2).

In all age groups, the mean of Albumin to Creatinine in patients with central vertigo higher than peripheral group and the difference in age group upper than 60 years was statistically significant (p=0.002).

**Table 2: The mean of albumin to creatinine in two groups by sex.**

| Vertigo type sex | Central | Peripheral | Total |
|---|---|---|---|
| Male | 71.8±52.1 | 33±39.8 | 0.0498 |
| Female | 169.3±139 | 40.4±55.7 | 0.0003 |

In diabetic cases, the mean of albumin to creatinine in patients with peripheral vertigo was higher than patients with central vertigo and in non-diabetic cases; the mean of albumin to creatinine in patients with central vertigo was higher than other patients. The compare results

between risk factors by type of vertigo have been presented in Table 4.

**Table 3: The mean of albumin to creatinine in patients of two groups by age.**

| Vertigo type<br>Age group | Central | Peripheral | p-value |
|---|---|---|---|
| <40 | 38±1.4 | 35.4±2.3 | 0.21 |
| 40-60 | 90±103.3 | 38.2±55.4 | 0.12 |
| >60 | 184.8±120.2 | 33.4±38.2 | 0.002 |

**Table 4: The mean of albumin to creatinine in two group patients by risk factors.**

| Vertigo type | | Central | Peripheral | p-value |
|---|---|---|---|---|
| Diabetes | + | 44.3±32.6 | 50.3±60.5 | 0.86 |
| | - | 139.2±118.9 | 37.4±52 | 0.002 |
| Blood pressure | + | 158.5±126.5 | 37.9±52.6 | 0.003 |
| | - | 62.6±49.5 | 39.2±53 | 0.26 |
| History of stroke | + | 187±141.9 | 74.3±94.5 | 0.22 |
| | - | 91.5±82.5 | 34.7±46.4 | 0.005 |
| History of heart-attack | + | 181.8±127.1 | 6.5±6.4 | 0.09 |
| | - | 106.5±107.2 | 41±53 | 0.007 |

## DISCUSSION

The age range of patients was 30-79 which most of them were in age group 40-60 (55% total, 56.7% in central and 53.3% in peripheral group). In Saberi and et al study most of patients were in age group 45-65 (47.4%).[4]

In Agrawal and et al study it was found that the prevalence of Vestibular disorder increased significantly by age.[5] Also, Yin and et al in a study showed that the prevalence of each vertigo increase with age.[6]

Of all patients, 65% were female and rest of them was male and the number of male patients was higher than female patients in two vertigo groups. Saberi and et al in a study showed that the prevalence of peripheral vertigo was similar between male and female but the central vitigo in male three times higher than female. Yin and et al, the sex ratio was 1.5 to 1 and in Agrawal and et al study found that the sex of patients wasn't effect on type of vertigo.[5,6]

The current study results showed that the prevalence of Diabetes, BP, heart attack and stroke in patients with central vertigo were significantly higher than other patients that this difference was significant with stroke and heart attack (p=0.015, p=0.038).

Mousarezaei and et al found significant relation between diabetes and stroke in patients with vertigo. In study done by Paul and et al, 91% of Vertebrobasilar stroke basilar referred only with vertigo and from them only 22% had been noted by doctors before stroke.[7,8]

This study results showed that the mean of albumin to creatinine in patients with central vertigo with 126 to 53 mg/gr significantly higher than other patients with 38 to 7 mg/g. (p=0.001) which this differences was significant between male (p=0.0489), female (p=0.003) and age group >60 (p=0.005) but in other age groups wasn't significant.

We have limitation in compare our results with other studies due to lake of any studies in world. So, we found studies about albumin to creatinine ratio in patients with other diseases such as stroke. Cho and et al, found that there was a significant relation between albumin to creatinine ratio and hyperintensity white matter.[3] Beamer and et al in other study researched the microalbuminory in patients with recent stroke and patients with risk factors such as diabetes, BP and heart diseases and resulted that microalbuminory in these patients with recent stroke three time prevalent than other patients.[9]

Moghtadery and et al in a study found that the albumin to creatinine ratio in case group was more than health people and not found any significant correlation between this ratio and stroke incidence.[10] Jeong and et al in a study found significant relation between albumin to creatinine ratio and sex of patients.[11]

## CONCLUSION

Results showed that the first step in treatment of patients referred to hospital with dizziness was detection and differentiation of the central vertigo from peripheral vertigo. Considering these circumstances, by using albumin to creatinine ratio and a low cost test we can provide a simple way to differentiate peripheral from Central vertigo. The generalizability of these findings requires larger and more comprehensive studies in other places in future.

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