

# ***Evaluation of Vertigo and dizziness and effectzcy of doppler ultrasonography in it's management***

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## **Abstract**

**Introduction:** Vertigo and dizziness is prevalent in all countries and many patients are referred to physician offices or emergency departments for this problem annually. These symptoms make a lot of distress for patients. Grossly vertigo is separated to peripheral and central and this division is clinically very important. Evaluation of vascular problem in vertigo is very important and Doppler ultrasonography is used widely.

### **Material and methods:**

This study is a retrograde study with use of files recorded in Mustafa Khomeini hospital Emergency or neurology department in a three years duration. Patients selected according to their chief complaint at the time of admission to the hospital.patients with complaint of dizziness , vertigo , ataxia and imbalance were selected. And data in relation of their symptoms,risk factors and demographic information registered separately for each patient

**Results:** There were 332 patients recorded in a three years period . there were 179(54%) female and 153(46%) male patients.chief complaint in 183(55%)were dizziness and 101 (30%)had vertigo and 48(15%) had complaint of ataxia and imbalance.stroke was seen in 53(16%) of patients.among patients without stroke most common diagnosis were labyrinthitis 53(19%),BPPV 89(32%)and metabolic and electrolyte imbalances 137(49%). Doppler ultrasonography showed abnormal finding in only two patients with stroke and was normal in patients with another diagnosis.

**Conclusion:** This study shows us that peripheral vertigo is more prevalent than central type's .there is many misdiagnoses in relation with differentiation of these two types of vertigo that is a warning for better education in medical courses in university. Doppler ultrasonography of Vertebrobasilar system is recommended only in central problem and it is not necessary for all patients and also it is not helpful in differentiation of central and peripheral problems.

**Key words:** Vertigo,Dizziness,Ataxia,Doppler ultrasonography.

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## Introduction

Vertigo is a prevalent disorder in all countries and a lot of patient each year are admitted To emergency departments or neurology services for evaluation of vertigo , in the united states each year near 7.5 million of patients with dizziness are visited as outpatients or in emergency departments.<sup>(1)</sup> one survey in Germany showed that near 30% of peoples have experienced dizziness although most patients had non specific symptoms but one quarter reported true vertigo.<sup>(2)</sup> many patients have complaint that is appropriate in relation with vertigo such as lightheadedness ,giddiness, and spinning but some complaints are inappropriate such as tingling, falling ,paresthesia and diplopia so it make a lot of confusion for the physicians especially in emergency department and at first it is important to exactly determine what patient means when he complains from vertigo.<sup>(3-5)</sup>

Vertigo in most cases is due to disturbance of inner ear and vestibular system. this system is in connection with brain stem , cranial nerves and cortex and provides necessary input and outputs for maintenance of equilibrium.<sup>(6-10)</sup> infarcts of the upper and lower brain stem and cerebellum can cause vertigo and disequilibrium due to disruption of these connection . these types of vertigo are called central vertigo that usually are less severe but more protracted than vertigo with inner ear origin.<sup>(11;12)</sup> Differentiation between these two types of vertigo is difficult and sometimes impossible in the

emergency department and definite diagnosis is cleared after few days with use of MRI and repeated examination.<sup>(13;14)</sup> Correct diagnosis is very important because most of peripheral type of vertigo with vestibular or inner ear origin are benign and can be managed as out patients.<sup>(8;15)</sup> but central based Vertigo especially those with ischemic or hemorrhagic origin can be very dangerous and life threatening and needs emergency hospitalization and treatment.<sup>(16-19)</sup> Differentiation between peripheral and central types of vertigo primarily is by history and clinical examination but new techniques such as MRI and investigations for vascular insufficiencies with Doppler ultrasonography and CT or MR angiography also play important roles.<sup>(6;13;20;21)</sup> Although these new and developed tools are important but sometime we use them more than they are required and indeed we waist a lot of time and money.<sup>(22-25)</sup> this study is designed to investigate the out come and diagnosis of patient who where admitted in hospital and the role of Doppler ultrasonography in the management of these patients.

## Material & Methods

This study is a retrograde study with use of cases and files recorded in Mustafa Khomeini hospital emergency or neurology department in the last three years from 2007 to 2009 . all patients who were admitted with recorded chief complaint of dizziness or vertigo were selected and the history

studied carefully for the symptoms of patients in relation with true vertigo, dizziness, ataxia and imbalance and also all cases reviewed for reports and results of Doppler ultrasonography, age, sex, primary and definite diagnosis. In all patients laboratory test such as blood sugar, urea, creatinine, sodium and cholesterol were recorded from the patients files. Also history of cigarette smoking and evidence of atrial fibrillation in history or files was investigated and registered. If there was any confusion about chief complaint or history or the chief complaint had any component besides dizziness or vertigo, all the patients above eighty five years old, patients who were unable to walk from any other reason before admission or patients with old CVA and also the patients who had left hospital intentionally were not permitted for this study. All the data was recorded and analyzed with SPSS software.

## Results

There were 332 patients visited in hospital according to files and admission list for primary care. There were 179(54%) females and 153(46%) male patients. Chief complaint in 183 (55%) patients were dizziness and 101 (30%) of patients had vertigo and 48 (15%) of patients had imbalance in their brief history. 146(44%) patients had more than one complaint as their first manifestation. strokes were seen in 53(16%) of patients. The emergency ward physician had missed 11(20%) patients with stroke and patients were

returned again after visit with a neurologist or after progression of symptoms for second evaluation. From all patients with definite stroke only 28(52%) patients were admitted with stroke diagnosis and other were admitted for further evaluation that stroke was declared after complementary tests. Mean age of patients with stroke were 67 (56-77) years old and mean age of patients with peripheral vertigo were 56(34-67) years old. Statistical analysis showed significant difference between two groups. ( $P < 0.005$ ) stroke patients were in older range of age. Risk factor of patients were, cigarette smoking 50(15%) patients, hypertension 113(34%) patients, diabetes mellitus 90(27%) patients, hypercholesterolemia 83 (25%) patients, atrial fibrillation 7 (2%) patients and old age 113 (34%) patients. All risk factors were more prevalent in patients with ischemic strokes with significant difference in statistical analysis. ( $P < 0.005$ )

Among patients without strokes most diagnosis were labyrinthitis 53(19%), benign paroxysmal positional vertigo (BPPV) 89(32%), metabolic and hematological disorders, anemia 25(9%), hypoglycemia 20(7%), hyperglycemia 28(10%), hypernatremia 6(2%), hyponatremia 8(3%), orthostatic hypotension 8(3%), and hypertension crisis 42(15%). Doppler ultrasonography of vertebral arteries were done in 286(86%) of patients who were admitted in hospital for more than

48 hours. All tests were performed with known and expert radiologists with academic knowledge and at least two years experiences in ultrasonography. Stenosis of vertebral arteries were recorded in only 2(3.7%) patients with stroke and in other cases report was normal in vertebral territory and also there was no information about basilar artery. in these two cases that vertebral artery stenosis were recorded

angiography was recommended for better evaluation. Doppler sonography of carotids were performed in near all patients simultaneously with ultrasonography of vertebral arteries with normal reports in 85 percent of patients. nonsignificant stenosis in 14 percent and significant stenosis in only one percent of patients. Figures 1 and 2 shows differential diagnosis in patients with dizziness or vertigo.

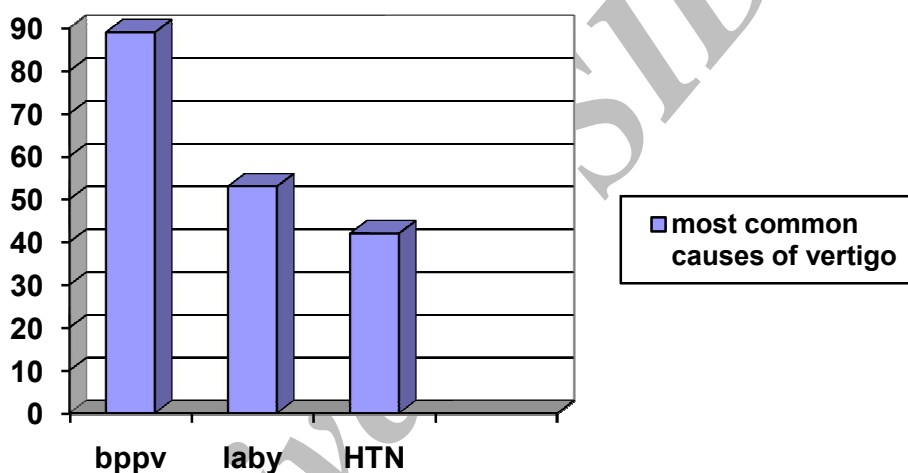


Figure 1: distribution of most common causes of vertigo.

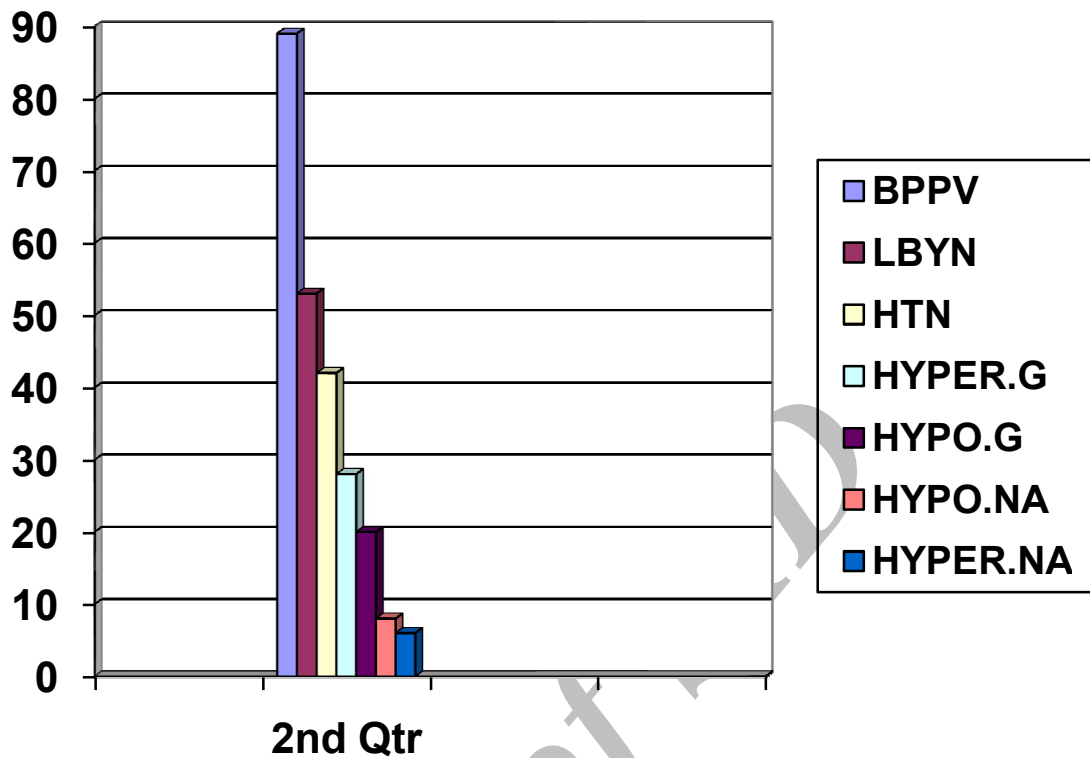


Figure 2: distribution of causes of peripheral vertigo

### Discussion

As this study shows vertigo and dizziness are common symptoms in our country and many patients are admitted to emergency department because of these symptoms. Dizziness was the most common symptom and imbalance was less common. This probably is the result of the prevalence of dizziness in both central and peripheral type of vertigo while imbalance as a solitary symptom is more prevalent in central problem. Stroke was seen in a low percent of patients but it was missed in a high percent that this warns us about better education in our courses.

Besides known peripheral problems such as labyrinthitis and BPPV many patients had metabolic problems and electrolyte disturbances such as hypo

and hyperglycemia,... that it warns us about diffuse causes of vertigo and dizziness as a symptoms and our view must expand in relation to etiologies.<sup>(4;26)</sup> This results are similar with Wiltink and Tamber study which peripheral types are more prevalent.<sup>(1;2)</sup> Risk factors of patients in this study are similar to stroke patients and probably this is due to same range of age in both groups. Doppler ultrasonography is done in many patients and almost all patients who were admitted for a long time. Results of Doppler ultrasonography were normal in most patients especially in vertebral territory and had not any effect on prognosis of patients with symptoms of dizziness and vertigo. These results can be partly due to technical errors by the

radiologist and another reason is limitations of ultrasonography especially in posterior circulation that is surrounded with bony structures.

### **Conclusion**

Vertigo and dizziness are very prevalent in emergency department. Differentiation between peripheral and central problems is very important and easy but it is missed in many cases, so better education is important in this course in our universities. Doppler ultrasonography of vertebral arteries must be limited only in patients with evidence of central problems and in patients with peripheral symptoms it is not useful. We must consider that ultrasonography do not help in differentiation of central and peripheral problems.

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# بررسی مبتلایان به سرگیجه و میزان اثربخشی اولتراسونوگرافی داپلر در ارزیابی این بیماران

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## چکیده

**سابقه و هدف:** سرگیجه در تمام کشورها شایع بوده و بسیاری از بیماران به همین دلیل به درمانگاهها و بخش های اورژانس مراجعه می کنند. این علائم ناراحتی و اضطراب زیادی برای بیمار ایجاد می کند. سرگیجه به دو نوع محیطی و مرکزی تقسیم شده و افتراق این دو از لحاظ بالینی بسیار اهمیت دارد. ارزیابی مسائل عروقی در سرگیجه بسیار مهم است و اولتراسونوگرافی داپلر به میزان بالا در این بیماران مورد استفاده قرار می گیرد.

**روش بررسی:** این مطالعه به روش گذشته نگر و به مدت سه سال بر روی پرونده های بیماران در بخش اورژانس و مغز و اعصاب در بیمارستان مصطفی خمینی انجام شده است. مقیاس ورود بیماران به مطالعه شکایت اصلی آنها هنگام ورود به بیمارستان بوده است. بیماران با شکایت سرگیجه، گیجی یا منگی و عدم تعادل انتخاب شدند و اطلاعات در زمینه علائم، عوامل خطر ساز و خصوصیات آماری بیماران بصورت جداگانه ثبت گردید.

**یافته ها:** در نهایت ۳۳۲ بیمار در طول سه سال در مطالعه وارد شدند. (۵۴٪) ۱۷۹ نفر از بیماران مونث و ۱۵۳ (۴۶٪) نفر مذکر بودند. شکایت اصلی در ۱۸۳ (۵۵٪) نفر گیجی و منگی، در ۱۰۱ (۳۰٪) نفر سرگیجه بوده و (۱۵٪) ۴۸ نفر از عدم تعادل و افتادن شکایت داشتند. سکتة مغزی در (۱۶٪) ۵۳ نفر مشاهده شد. در بین بیماران بدون ایسکمی مغزی شایعترین تشخیص ها شامل لابیرنتیت (۱۹٪) ۵۳ نفر، سرگیجه وضعیتی خوش خیم (۳۲٪) ۸۹ نفر و اختلالات الکترولیتی و متابولیک (۴۹٪) ۱۳۷ نفر از بیماران را شامل شده است. اولتراسونوگرافی داپلر فقط در دو بیمار مبتلا به استروک شواهد غیر طبیعی بودن را نشان داده است و در بیماران با سایر تشخیص ها یافته غیر طبیعی مشاهده نشده است.

**بحث و نتیجه گیری:** این مطالعه به ما نشان می دهد که سرگیجه محیطی شایعتر از نوع مرکزی می باشد. در ارتباط با افتراق بین این دو نوع سرگیجه اشتباهات زیادی رخ می دهد که بعنوان یک هشدار جهت بهبود آموزش پزشکی در دانشگاه ها می باشد. اولتراسونوگرافی داپلر فقط در موارد مرکزی سرگیجه توصیه می شود و ضرورتی در انجام آن در تمام بیماران وجود ندارد و همچنین این روش کمکی به افتراق بین سرگیجه های محیطی و مرکزی نمی کند.

**واژگان کلیدی:** سرگیجه، گیجی و منگی، عدم تعادل، اولتراسونوگرافی داپلر