Correlation between t-wave Inversion in Lead 3 Electrocardiography and Mitral Valve Prolapse in Patient with Atypical Chest Pain and/or Palpation

الارتباط بين انعكاس الموجةِ T في القسم 3 من تخطيطِ الكهربائي للقلب وهبوط الصمامِ التاجيِ في مرضِى ألمِ الصدرِ الشاذِّ و /أَو الخفقان

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الخلاصة

خلفية البحث :يعد هبوط الصمامِ التاجي مرضُ موجود في 3 % -2من عامةِ السكان ,إن هبوط الصمامِ التاجي قَدْ يُوْجَدُ بالتقيُ التاجي، التهاب شغافي جرثومي، عجز قلب ازدحامي، و حتى الموت المفاجئ ,ان هبوط الصمامِ التاجي قَدْ يُشارُ إليه كمتلازمة مرضية يعاني المريض من أعراض كالخفقانِ أو أيّ إيجاد طبيعي آخر ,وان تشخيص هبوط الصمامِ التاجي يُمْكِنُ أَنْ يُؤَكَّدَ مِن قِبَل إيكو القلب.

الهدف :هدَف الدراسةِ هو لاختبار الاستعمال المحتملِ للتخطيط الكهربائي للقلب كأداة مسح أساسيةِ لتَشخيص مرضى هبوطِ الصمامِ التاجي.

المنهجية: تتضمن هذه الدراسةِ المسحية ، 75مريضَ مَع الخفقانِ أو ألم صدرِ شاذٍّ ,كُلّ هؤلاء الأشخاص كَانوا قَدْ اختيروا مِنْ أولئك المرضى الذين يَزُورونَ استشارية الطبّ الباطني ووحدةَ إيكو القلب في مدينةِ الصدر الطبية خلال الفترة من يناير /كانون الثّاني 2013إلى يناير /كانون الثّاني .2016 لكُلّ مريضِ جَمعتْ البيانات حول العُمرِ,الجنس ، ضغط الدمّ ,النتائج المختبريةِ لمستوى الدهن في الدم, التخطيط الكهربائي للقلب و إيكو القلب ,تم تحليل البيانات والنتائج باستخدام الوسائل الإحصائية spss النسخة العشرون .

النتائج:خلال فترةِ الدراسةِ التي امتدت على مدار سنتين، 75مِنْ مرضى هبوط الصمامِ التاجي سجّلَ في هذا البحثِ المسحي.

اظهر التحليلُ الإحصائيُ بان حسّاسيةِ التخطيط الكهربائي للقلب كفحص تشخيصِي لهبوط الصمامِ التاجي في مريض ألمِ الصدرِ الشاذِّ 98.41 =، بينما كَانتْ الخصوصية 90.9 =، القيمة التنبؤية الإيجابية 98.41 =، وكانت القيمة التنبؤية السلبية 90.9 =لذلك فأن التخطيط الكهربائي للقلب عالي الخصوصية والحسّاسية ولهذا يُمْكِنُ أَنْ يَستعملَ لتَشخيص هبوط الصمامِ التاجي لحسّاسيته أَو يَستثنى تشخيصَ هبوط الصمامِ التاجي لخصوصيته.

الاستنتاج: نستنتج من الدراسة ما يلي :

1. وَجدنَا ان انعكاس الموجةِ Tفي القسم 3من التخطيط الكهربائي للقلب يعتبر تغييراً فريدًا في التخطيط الكهربائي للقلب لهبوطِ الصمامِ التاجي.
2. وَجدنَا ان انعكاس الموجةِ Tفي القسم 3من التخطيط الكهربائي للقلب أداة موثوقة جداً في تشخيصِ هبوطِ الصمامِ التاجي كونه اختبار حسّاس.
3. وَجدنَا هذه الأداةِ خاصة جداً لذا يُمْكِنُ أَنْ يستثنى تشخيصَ هبوطِ الصمامِ التاجي بسلامة إذا كان الاختبار سلبي.

التوصيات: نوصي باستخدام انعكاس الموجةِ **T**في القسم **3** من التخطيط الكهربائي للقلب كأداة مسح لغرض تشخيصَ هبوطِ الصمامِ التاجي كون هذا التخطيط الكهربائي للقلب ذو حساسية وخصوصية عالية.

Abstract:

Back ground: Mitral valve prolapse (MVP) is disease present in 2- 3% of the general population.

Mitral valve prolapse may be found with mitral regurgitation, bacterial endocarditis, congestive heart failure, and even sudden death. Mitral valve prolapse may be refer to as syndrome that present with symptoms palpitation or any other physical finding. The diagnosis of MVP can be confirmed by echocardiography

Objectives: We aimed from this study to test the possible use of electrocardiography as primary survey tool to diagnose patient with mitral valve prolapse.

Methodology: In this cross sectional study, we involve 75 patients with palpation and atypical chest pain. All these persons had been selected from those patients visit the internal medicine consult department and echocardiography unit in Al-Sadr medical city from January 2013 to January 2016. For all patient's data collected about age, sex, blood pressure, laboratory finding of lipid profile, electrocardiography and echocardiography.

Results: During period of this study which extends over 2 years, 75 patients of MVP enrolled in this screening research. Statistical analysis shows that sensitivity of electrocardiography as screening tool for diagnosis of MVP in a patient with atypical chest pain = 98.41, were its specificity = 90.9, positive predictive value = 98.41, negative predictive value = 90.9 so that as shown electrocardiography are highly specific and sensitive and this can use to diagnose MVP as it sensitive or exclude diagnosis of MVP as it specific**.**

Conclusion:

1. we found that T-wave inversion in lead 3 of ECG is unique change in ECG for mitral valve prolapse
2. we found that T-wave inversion in lead 3 of ECG highly reliable tool in make diagnosis of mitral valve prolapse as it sensitive test
3. we found this tool highly specific so can safely exclude diagnosis of mitral valve prolapse if test negative

Recommendation: We recommend use T-wave inversion in lead 3 of ECG as screening tool for mitral valve prolapse, as this change in ECG sensitive and specific.

Keyword: electrocardiography, mitral valve prolapse, chest pain, palpation

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INTRODUCTION

Mitral valve prolapses (MVP) is disease present in 2- 3% of the general population[1,2].Mitral valve prolapse may be found with mitral regurgitation, bacterial endocarditis, congestive heart failure, and even sudden death [3].

Mitral valve prolapse may be refer to as syndrome that present with symptoms palpitation or any other physical finding [4,5].

Mitral valve prolapse may be found with serious complications as infective endocarditis or complications other that required treatment [6,7].

Some patients with mitral valve prolapse may be silent or may be present with palpitation, dizziness, chest pain, abnormal electrocardiogram findings or may be found with serious complications [6,7,8].

Some research found possible correlation among autonomic dysfunction [9] and arrhythmias [10] as atrial [11] and/or ventricular [12,13] or conduction disturbances in patients with Mitral valve prolapse [14]

The diagnosis of MVP can be confirmed by echocardiography [15,16].

Over-diagnosis of Mitral valve prolapse can be wrong done by planar; so, any echocardiographic should be aware about it.

Pivotal echocardiographic work in the late 1980s redefined normal mitral anatomy. Using three-dimensional (3D) echo imaging, Levine and Colleagues established that the mitral annulus was in fact saddle shaped. Therefore, in the anterior-posterior axis, the mitral annulus is concave upward, whereas medially-to-laterally, the annulus is concave downward. This mitral geometry creates the possibility that in a sono graphic four-chamber view the leaflets can appear to 'break' the annular plan (creating the appearance of prolapse), when in reality they are normal. Prolapse with thickening of the leaflets greater than 5 mm is termed 'classic' prolapse, whereas prolapsed with lesser degrees of leaflet thickening is regarded as 'non-classic' prolapse [17].

ECG is an important tool in cardiovascular evaluation. It is an essential tool for investigating cardiac abnormalities, in MVP patients there are many ECG findings such as premature atrial or ventricular beats, supraventricular or ventricular arrhythmias, atrial fibrillation, early repolarization, p-wave abnormalities and ST-depression in V1, V2. [8,17]

However, the most common ECG changes in MVP is T-wave inversion in inferior leads, so in this study we try to assess the possibility of use T-wave inversion in inferior leads as screening test for diagnosis of MVP.

OBJECTIVE

We aimed from this study to test the possible use of electrocardiography as primary survey tool to diagnose patient with mitral valve prolapse.

METHODOLOGY

In this cross sectional study, we involve 75 patients with palpation and atypical chest pain.

All these persons had been selected from those patients visit the internal medicine consult department and echocardiography unit in Al-Sadr medical city from January 2013 to January 2016.

For all patient's data collected about age, sex, blood pressure, laboratory finding of lipid profile, electrocardiography and echocardiography.

All patients with mitral valve prolapse have been made according to American society of echocardiography criteria.

For each patient with palpation and atypical chest pain we do electrocardiography and then echocardiography done to same patient as golden standard test to diagnose mitral valve prolapse.

Atypical chest pain defines as presence of two out of three symptoms which include: central chest pain, exacerbate by exercise, relief by rest or sublingual glycerin triniatrat.

Exclusion criteria:

- Ischemic heart disease
- Myocarditis
- Hypokalemia
- Pericarditis

Statistical Analysis:

We use IBM SPSS statistic software program version 20 to calculate sensitivity and specificity and other statistic parameter.

RESULTS

During period of this study which extend over 2 years, 75 patients of MVP enrolled in this screening research to test the use of electrocardiography as primary survey tool to diagnose patient with mitral valve prolapse.

These patients include 35(46%) men and 40(54%) women as shown in figure 1, there age range between (10 – 47) with mean age about 25.74 years (SD ±20), there age are distributed mainly in twenties years and to lesser extend in thirties years as shown in figure 2.

Statistical analysis shows that sensitivity of electrocardiography as screening tool for diagnosis of MVP in a patient with atypical chest pain = 98.41, were its specificity = 90.9, positive predictive value = 98.41, negative predictive value = 90.9 so that as shown electrocardiography are highly specific and sensitive and this can use to diagnose MVP as it sensitive or exclude diagnosis of MVP as it specific as shown in table 1

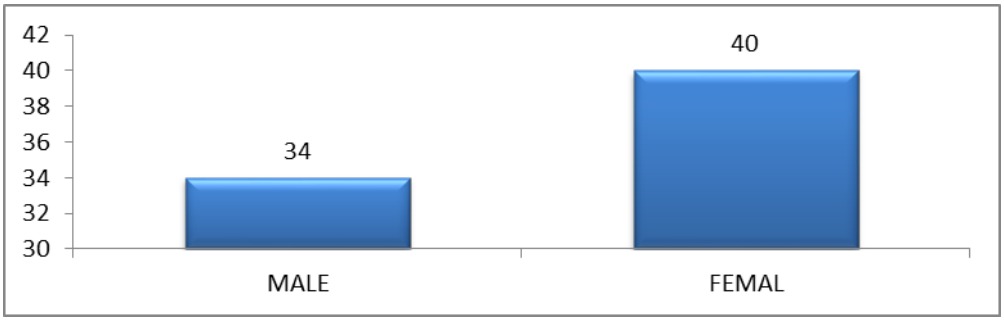

Figure:1 sex distribution

This figure showing the male to female ratio to the enrolled patients in this study and as we see sex distribution seems to be equal between male and female.

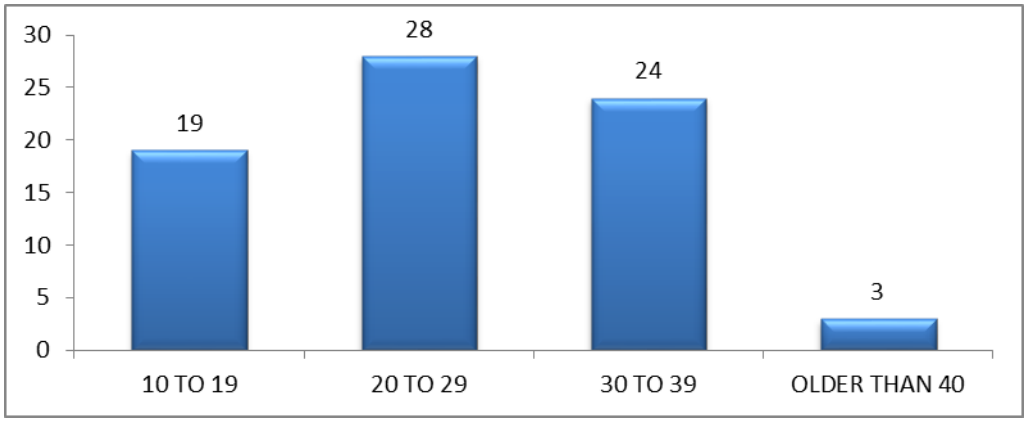

Figure :2 Age distribution

This figure showing age groups of enrolled patients in this study and as we see most patients aged twenties years and to lesser extend in thirties year.

Table (1): The relation between ECG and ECHO finding in MVP

	Echo result		total
ECG result	positive	negative	
positive	62	1	63
negative	1	10	11
total	63	11	74

This table showing positive and negative result of ECG and echo of enrolled patient who complain from atypical chest pain and/or palpation

DISCUSSION:

Many study point to ECG change of mitral valve prolapse, some mention that there is no specific change in QT interval change in inferior leads [18], other show ventricular repolarization[19], some study focused on ST-wave change that may lead to false positive result due to the presence of mitral valve prolapse [20], none of all previous study mention specific change for mitral valve prolapse on electrocardiography but our concentrate on this point which is very important as electrocardiography cheap noninvasive test that can point to diagnosis of mitral valve prolapse .

The importance in diagnosis mitral valve prolapse that it may present with arrhythmia[21,26], and even sudden death [22,23,24,25], so it's very important to early diagnosis and recognize mitral valve prolapse even in asymptomatic person and our research solve this matter as we found that T-wave inversion in lead 3 is highly sensitive in make diagnosis even in asymptomatic group not only this in our research we can exclude the diagnosis of mitral valve prolapse as our tool highly specific so if there is no T-wave inversion in lead 3 we can exclude mitral valve prolapse .

CONCLUSION

We found that T-wave inversion in lead 3 of ECG is unique change in ECG for mitral valve prolapse

We found that T-wave inversion in lead 3 of ECG highly reliable tool in make diagnosis of mitral valve prolapse as it sensitive test

We found this tool highly specific so can safely exclude diagnosis of mitral valve prolapse if test negative.

RECOMMENDATION

We recommend use T-wave inversion in lead 3 of ECG as screening tool for mitral valve prolapse.

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