Original Article

Q and QTc Study

The Q and QTc Study (Quinine and QTc Interval Prolongation Study)

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ABSTRACT

Objective: The objective of this study is to determine the effect of Quinine on QTc interval.
Study Design: Observational / descriptive study.
Place and Duration of Study: This study was conducted at the Medicine Department of Saidu Teaching Hospital Saidusharif Swat from 1st October 2015 to 1st October 2016.
Materials and Methods: A total of 100 patients both male and female who needed Quinine for febrile illness were included Pretreatment ECG and post treatment ECG (on the last day of Quinine treatment) was recorded. Patients were divided in three groups on the basis of pretreatment ECG
Group I: (50%) pretreatment ECG QTc interval was 361 to 400msec (mean) 380 msec.
Group II: (30%) pretreatment QTC interval 401 to 450msec with mean 425.5msec.
Group III: (20%) pretreatment QTC interval 451 to 485msec with mean 468msec.
Patients were given Quinine according to the protocol and post treatment QTc interval was recorded.
Results: Values were analyzed on student T- Test with a P value of 0.006.
Conclusion: It is concluded that Quinine increases the QTc interval to a significant level.
Key Words: QTc- corrected QT interval, t-test Student t – test

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INTRODUCTION

Malaria is an important cause of morbidity and mortality. Affecting more than 1 billion people and causing 1 to 3 million deaths each year[1]. In our country malaria behaves like epidemic because of unstable transmission[2]. Majority of the complications are due to plasmodium falciparum[3]. Major problem in the management of malaria is chloroquineresistance[4]. Resistant malaria can be managed with alternative drugs.[5]

Malaria with complications need parenteral Quinine, which inhibits the polymerization of the toxic heme molecule[6]. Falciparum malaria can cause multi organ dysfunction due to cytokines production and impairment of microcirculation.[7] Complications can occur if there is high parasite load (> 5%).[8]

Although Quinine is effective for severe malaria but has a number of side effects, like prolongation of theQTc interval, which is a risk for arrhythmias. The QTc is calculated according to the Bazett's correction i-e QTc=QT/R-R msec[9].

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MATERIALS AND METHODS

This study was carried out in the Medicine Department of Saidu Teaching Hospital Saidu sharif Swat over a period of 1 year from 1st October 2015 to 1st October 2016.100 Patients were included in the study.70% were males and 30% were females. The age was ranging from 13 to 65 years.

Fever was the consistent clinical presentation (100%). Other symptoms were found in different combination like, headache (90%), nausea and vomiting (80%), abdominal pain (30%), Jaundice (20%), loose motions (20%) and confusion (10%).The symptoms, signs and other data were recorded on proforma. In 50% patients malarial parasites were isolated while in 50% patients malarial parasites could not be isolated. Patients were started on Quinine according to the protocol.

Pretreatment ECG was recorded for QTc interval. Patients were divided in three groups on the basis of pretreatment ECG Group I (50%) pretreatment ECG QTc interval was 361 to 400msec (mean) 380 msec.

Group II (30%) pretreatment QTC interval 401 to 450msec with mean 425.5msec. Group III (20%) pretreatment QTC interval 451 to 485msec with mean 468msec.

Post treatment (last day of Quinine treatment) QTc was recorded again and then the results were compiled and tested on student t-test.

RESULTS

The results are shown in table 1 and table 2.

Table No.1:Detail comparison of pre-treatment and post treatment of QTc interval in patients.

Group	No. of Patients	Pre-treatment QTc interval			Post treatment of QTc Interval		
		Min	Max	Mean	Min	Max	Mean
I	50	361	400	380.5	413	450	431.5
II	30	401	450	425.5	451	485	468
III	20	451	485	468	501	560	530.5
Total	100						

Table No.2: Mean comparison of pre-treatment and post treatment of QTc interval in patients.

Group	No. of patients	Pre-Treatment QTc mean	Post-Treatment QTc mean
I	50	380.5	431.5
II	30	425.5	468
III	20	468	530.5

T-Test (P. value)=	0.00609659

DISCUSSION

Malaria is common and sometimes presents with different manifestations[10-14]. Because of the development of resistance[15-17] alternative drugs are needed for the management. Falciparum malaria can be fatal especially in non-endemic areas[18]. For uncomplicated cases artemether and lumefantrine combination can be used[19] although it is expensive for developing countries[20]. Doxycycline can be combined with antimalarial drugs[21]. Quinine in its parenteral form is used for sever malaria, although mono therapy is responsible for resistance[22, 23] up to 5% resistance has been reported for Quinine in case of falciparum malaria, which has an annual incidence of 33%[24,25] the resistance has developed because of helicases as a result of adaptation to the stresses of existence[26] some studies have shown better results with artesunate regarding parasite clearance and safety.[27,28]

Quinine therapy needs closed monitoring especially if loading doses are considered for the management of patients[29-31]. The QT interval which was first described by wolff in 1950.[32] Can be either prolonged congenitally (330, or because of the underlying heart diseases[34] or because of the drugs

especially Quinine and Quinidine. Prolonged QTC interval has been considered increased risk factor for cardiovascular mortality[35].The, quinidine syncope, was described in 1964[36]. Both quinine and quinidineprolong the QTc interval.

However simple prolongation does not make the patient prone to torsade de pointes[37]. QTc is considered prolonged if it is > 440msec in malesand more than 450msec in females[38]. Although there is no rigid consensus on the prolongation limits but QTc of more than 500msec is a risk for arrhythmia[39]. In our study the range of pretreatment QTc was 380-388 and post treatment QTc was 431-530msec with mean QTc, variable for different groups. Although the prolongation in QTc internal is significant statistically with a P-value of 0.006 but only 20%

patienthad gone to QTc interval of > 500mscs in the post treatment phase. None of the patients developed arrhythmias. May be because of careful selection of patients, close monitoring and addressing the supporative care.

In view of this study we suggest that early diagnosis by optimal malarial test and microscopy[40,41] and proper management will decrease mortality and morbidity and avoid emergence of resistance strains especially, if WHO guidelines are adopted[42] which recommends 2 yearly monitoring for drug resistant strains.

Malaria will remain major health problem until effective vaccines are developed[43,44] and affective preventive measures are taken[45].

CONCLUSION

Quinine prolong the QTc interval but only 20% go to the interval of > 500msec. Even in this group arrhythmias were not documented.

Conflict of Interest: The study has no conflict of interest to declare by any author.

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