Antimalarial-Induced Maculopathy: Accuracy of Amsler Grid as a Diagnostic Tool and Risk Factors

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Objective: *To determine the sensitivity, specificity, and agreement of Amsler grid (AG) in detecting antimalarial induced maculopathy (AM) compared to combination of dilated ocular examination and Humphrey visual field (HVF) 10-2 and to estimate the risk factors of AM.*
Material and Method: *20 patients with AM and 20 patients with no AM were included between October 1, 2010 and June 30, 2011 in Siriraj Hospital, Thailand. Sensitivity, specificity and unweighted kappa were used to determine accuracy of AG. Logistic regression was used to explore risk factors associated with AM.*
Results: *The sensitivity and specificity of AG were 40% and 100%, respectively. The agreement of AG and HVF 10-2 was poor with kappa of 0.4. Creatinine clearance < 60 ml/min/1.73 m^2 and bilateral macular abnormality were associated with AM at the same odds ratio of 8.9 (95% confidence interval: 1.3 to 61.2).*
Conclusion: *AG may be used as an additional test between ocular evaluation visits providing the availability and low cost. Patients with renal impairment and bilateral macular abnormality are associated with AM.*

Keywords: *Amsler grid, Chloroquine maculopathy, Sensitivity, Specificity, Antimalarial drug, Risk factors*

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Chloroquine (CQ) and hydroxychloroquine (HCQ) have been used as anti-rheumatic agents for more than 50 years[1]. Although maculopathy is an undesirable side effect of antimalarial drug, a substantial number of patients with rheumatic diseases have currently taken them since they are relatively less toxic and better tolerated than systemic corticosteroid, methotrexate, azathioprine and cyclophosphamide. Antimalarial induced maculopathy (AM) could be classified as reversible and irreversible stages. However, making diagnosis for very early reversible AM is currently challenging, as there is no widely accepted gold standard testing and patients would have no symptom. The characteristic feature of AM is bilateral bull's eye maculopathy which resulted from antimalarial drug binding to melanin in the retinal pigment epithelium (RPE)[2]. By providing long half-life of the medication[1], AM lesion may progress even after ceasing the causative agent. It is crucial to detect very early AM and stop the medication promptly. The fundoscopic examination is not sensitive enough to detect early AM[3] and fairly associated with paracentral scotoma, except target lesion[4]. It has been reported that some patients have paracentral scotoma before the RPE change was seen[3,5]. On the other hand, a patient with a macular pigmentary change may have no paracentral scotoma or AM[4]. If the patient with early AM continues taking the medication, macular abnormalities may progress to atrophic change and gradually spread over the entire fundus. In advance stage, the patient would lose visual acuity and peripheral and night vision[2]. To minimize permanent damage, it is needed to detect AM at early stage by routinely screen for CQ and HCQ maculopathy as recommended by The American Academy of Ophthalmology (AAO)[2]. They suggested a baseline examination which included a complete ocular examination, visual field testing with an Amsler grid or Humphrey visual field (HVF) 10-2 testing and the

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optional tests-color vision, fundus photography, fluorescein angiography or multifocal electroretinogram if indicated. It was thought that patients in the low risk group (age < 60 years old, dosage < 3 mg/kg/day of CQ or < 6.5 mg/kg/day of HCQ, < 5 years of usage duration, no obesity, no renal or kidney disease and no concomitant retinal diseases) have very slim chance of experiencing AM. However, some patients might develop AM within first 5 years due to other uncovered factors, *i.e.* genetics[6]. It is vital, therefore, to advise every patient to come back as soon as possible when noticing any change in their visions, including an Amsler grid testing abnormality.

The Amsler grid has been a popular testing technique to detect and follow the progression of macular lesions since Marc Amsler publicized it around 1950[7]. It is inexpensive and easy to use. The original grids is 10 x 10 cm grid containing 400 squares corresponding to an overall visual angle of 20° and 1° per individual square and white lines on black background (WOB)[8]. Validity of Amsler grid to detect AM is still inconclusive. A study showed that it was sensitive to detect AM[7] while, other studies demonstrated poor validity with Amsler grid[9,10]. The sensitivity of the grids has been reported to be around 60% when compared to fundus microperimetry[11]. Test performance may depend on the degree of severity of macular lesion, accuracy in carrying out the test and the type of Amsler grid[11,12]. At present, there are at least 7 types of Amsler grid. The 2 most popular tests used in Thailand were the original Amsler grid-WOB and the black lines on white background (BOW). It was unknown which one performed better in diagnosing AM. There was a study reported that WOB is better than BOW when the patients had visual acuity more than 0.5[13].

In Thailand there are a large number of patients with rheumatic diseases taking antimalarial agents; CQ especially provided its efficacy, has relatively less toxicity and low cost. Being concerned with AM, it is essential to have a simple tool for patients to detect their abnormal visual symptoms as early as possible before scheduled eye visits.

The present study carried out to test the sensitivity and specificity of the Amsler grid-WOB and BOW against the diagnosis made by ophthalmologists using ocular examination and HVF 10-2 as a gold standard. The study also evaluated the agreement of Amsler grid and HVF 10-2 to detect visual field abnormality, as well as, explore the risk factors associated with AM.

Material and Method

The present study was a retrospective cohort study. The eligible population was consecutive patients visiting the rheumatologic clinic at Siriraj Hospital, Thailand between October 1, 2010 and June 30, 2011. The inclusion criteria were patients more than 18 years old of age who had ever taken antimalarial drugs. They had to have the last dilated eye examination and HVF 10-2 within 12 months of study entry. If a patient was diagnosed of CQ/HCQ maculopathy, it was needed to have consecutively abnormal HVF 10-2 consistent with AM at least 2 times and still be abnormal at the last time. Patients were excluded if they had glaucoma, uveitis or moderate to severe non-proliferative diabetic retinopathy. Informed consent was obtained from all participants. The study was approved by Siriraj Institutional Review Board.

Clinical demographic data including age, sex, renal and liver function testing, clinical diagnosis, body mass index (BMI), type of antimalarial drug, cumulative CQ dose (gm), total duration of taken CQ (month), CQ dosage adjusted -ideal body weight (IBW) per kg per day, ocular examination and HVF 10-2 data were recorded. Creatinine clearance (CCl) was estimated by the Cockcroft-Gault method[14]. IBW was calculated by 45.5 + 2.3 ((height in cm -150)/2.5) for female; 50 + 2.3 ((height in cm -150)/2.5) for male. All data were collected from medical records, the patients' rheumatology records, and direct inquired from patients.

Ocular examination and gold standard of diagnosing antimalarial induced maculopathy

The antimalarial maculopathy was diagnosed by an ophthalmologist based on dilated eye examination and HVF 10-2 red or white target. The finding of visual acuity with pin-hold, color vision using Ishihara color plate, cornea, retina and macular were recorded. Interpretable HVF was defined as the false positive and the false negative less than 33% and fixation loss less than 20. The abnormal HVF 10-2 was defined as decreased sensitivity at least of 3 decibels for at least 3 consecutive points or decreased sensitivity at least 10 decibels for at least 2 consecutive points. A case with abnormal HVF 10-2 that was included in the study when there were at least 2 consecutive HVF 10-2 abnormalities; one of them had to be the last time.

Amsler grid testing procedure

The present study tested each eye with 2 types of Amsler grids, WOB and BOW. They were 10 x 10 cm grids containing 400 squares. Patients were

randomly selected to be tested by WOB and BOW according to patient's study number in order to prevent learning curve bias. The patients with odd numbers were tested with WOB and followed by BOW on the right eye, while their left eye were started with BOW and followed by WOB. The patients with even numbers were also tested the same eye sequence but started with the other Amsler grid, BOW.

The Amsler grid testing was done by standard instruction in a well illuminated room at the rheumatology clinic. To correct at best visual acuity, patients were allowed to wear eye glasses or contact lenses in order to read well at 30 centimeters (cm) distance. A trained doctor conducted the Amsler grid testing. The grid was held 30 cm away from the patient eyes at the same eye level each time. Each eye was tested separately; the other eye was covered by a paper. Patients were asked to do and answer 4 questions: 1) Do you see the central dot? 2) Do you see all four corners and all four sides of the chart? 3) Are there any areas of the chart that are missing? 4) Are there any areas of the chart that are distorted in any way, or unequal in size? Any abnormalities which were missing, the central dot, any corners, or any area and distorted lines, were counted as abnormal Amsler testing.

Sample size and Statistical analysis

The present study set the prevalence of AM of the study at 50%. According to Schuchard's study[9], the sensitivity and specificity of Amsler grid were estimated at 60%. The acceptable lowest level of sensitivity and specificity in the present study were 40%. The statistical significance was set at < 0.05. The estimated sample size was 34 patients (17 patients with maculopathy and 17 with no maculopathy). Unweighted kappa index was used to assessed agreement between 2 types of Amsler testing and HVF. Kappa coefficient > 0.8, 0.60-0.80, 0.41-0.60, 0.21-0.40 and < 0.2 are considered as very good, good, moderate, fair and poor agreement, respectively.

Comparison of categorical variables was determined by Pearson X^2 test or Fisher's exact test, where appropriated. The student t-test or Mann-Whitney U test was used to compare continuous variables. Patients who took HCQ, switched between HCQ to CQ, or did not know the exact date and dosage of CQ were excluded from calculating association of cumulative dose, mean dose/day and duration of taking CQ and AM. Univariate logistic regression was calculated to determine the association of AM and the reported common risk factor (age, BMI, mean dose adjusted-IBW/kg/day, cumulative dose, duration of exposure, CCl, bilateral macular abnormality). The variables, which were significant difference between 2 groups with $p < 0.2$ in univariate analysis or expert opinion, would further be analyzed in the models by backward stepwise logistic regression. However, only 3 variables were selected in each model due to limited sample size. Statistical analyses were done by SPSS 13.0 for Windows.

Results

Seventy-two patients were approached and agreed to participate in the study. Thirty-two cases were excluded because of last complete ocular evaluation was more than 1 year ago or because of having only 1 HVF which was abnormal (16 cases), the change of HVF finding from abnormal to normal (14 cases), and having other eye diseases while doing HVF 10-2 (1 case with uveitis and 1 case with diabetic retinopathy). There were 40 patients, 20 AM patients, and 20 non-antimalarial maculopathy (NAM) patients, included in the present study. Most were female, with only one male in NAM group. Three patients had taken HCQ, 1 in AM group and 2 in NAM group. Rheumatic diseases in AM group were 6 systemic lupus erythematosus (SLE) patients, 11 rheumatoid arthritis (RA) patients and 3 patients with other rheumatologic diseases, while 8, 7 and 5 patients in NAM group were SLE, RA and other rheumatic diseases, respectively. Table 1 showed the comparison of demographic and baseline characteristics between the 2 groups. The AM patients were significantly older and had lower CCl than NAM patients. Eight AM patients had CCl less than 60 ml/min/1.73 m^2 (CCl < 60), while only 2 NAM patients did. There was no significant difference in BMI, cumulative dose of CQ (gm), duration of CQ intake (month) and mean adjusted IBW per kg per day between AM and NAM groups. The patients with AM were more likely to have poorer visual acuity and macular abnormality than those with NAM did.

The agreement between the HVF and Amsler grid testing was fair (kappa 0.4). Both types of Amsler testing performed equally to recognize AM (kappa 0.84) (Table 2). The sensitivity of Amsler grid testing was 40%, while the specificity of both Amsler testing was 100%.

Age, CCl and macular abnormality of both eyes are significantly associated with antimalarial maculopathy by computing univariate analysis (Table 3). Bilateral macular abnormality (BMA) that was RPE hypo- or hyper-pigmentary change and dull macular

Table 1. Clinical characteristic between patients with antimalarial induced maculopathy and non antimalarial maculopathy group

	Antimalarial induced maculopathy (n = 20)	Non antimalarial maculopathy (n = 20)	p-value
Age, mean(SD) year	56 (13.9)	44.8 (13.3)	*0.014
Female sex, n (%)	20 (100%)	19 (95%)	***1.00
BMI, mean(SD) kg/m^2	23.0 (4.0)	23.0 (4.7)	*0.998
CCl, median (IQR, min-max) ml/min/1.73m^2	66.4 (40.6, 33.7-101)	85.1 (48.2, 42.9-184)	**0.007
Disease duration, mean (SD) years	7.6 (4.3)	6.6 (5.7)	*0.551
Cum. CQ dose,median (IQR, min-max) gm	197.7 (156.2, 42.1-436.8)	91.4 (257.9, 28.6-344.9)	**0.108
CQ duration, mean (SD) months	62.5(40.8)	50.2 (35.5)	*0.402
Dose /kg-IBW/ day, mean (SD)	2.4(1.0)	1.83 (0.6)	*0.077
Amsler-eye duration median (IQR, min-max) months	6 (6.8, 0-12)	6 (8.5, 0-12)	**0.58
Visual Acuity:			
Right eye	0.6 (0.2)	0.8 (0.2)	*0.002
Left eye	0.7 (0.2)	0.9 (0.2)	*0.003
Abnormal color vision, n	3	0	NA
Cornea: verticillata, n	1	0	NA
Macular abnormality: n	11	3	***0.019
Dull reflex, n	2	1	NA
RPE change, n	6	2	NA
Target lesion, n	3	0	NA

SD = standard deviation; BMI = body mass index; CCl = creatinine clearance; IQR = inter-quartile range; min = minimum; max = maximum; IBW = ideal body weight; n = number; Amsler-eye duration = the duration between Amsler testing and ocular examination

*unpaired t test, **Mann Whitney U test, ***Fisher's exact test, NA = non analysis

Table 2. Agreements between Humphrey visual field 10-2 (HVF) and Amsler grid testing (white lines on black background (WOB), black lines on white background (BOW)) to detect visual field abnormality of 40 rheumatologic patients with and without maculopathy

	Kappa	Agreement (%)
HVF vs. Amsler grid-WOB	0.40	70
HVF vs. Amsler grid-BOW	0.40	70
Amsler WOB vs. BOW	0.84	95

reflex was further analyzed. The target lesion was excluded from this analysis due to the fact that it was a late manifestation and a characteristic of AM. The authors analyzed them into 3 models. Variables of model 1 included age (continuous data), BMA (nominal data), and CCl (continuous data). Variables of Model 2 were age (continuous data), BMA (nominal data) and CCl < 60 (nominal data). The variables of the last model were age > 60 years old (nominal data), BMA (nominal data) and CCl < 60 (nominal data). CCl or CCl < 60 and BMA are still significantly associated with AM after being adjusted for the other 2 factors in all models. In contrast, age did not associate with AM after being adjusted for CCl and BMA. The final 2 independent factors were CCl or CCl < 60 and BMA, as shown in Table 4.

Discussion

The present study showed that the sensitivity and specificity of Amsler grid-WOB or BOW to detect AM was equal at 40% and 100%, respectively, when combined ophthalmologic examination and HVF 10-2 testing were used as a gold standard. The agreement of either Amsler grid-WOB or BOW and HVF 10-2 field to detect visual field abnormality was fair, kappa coefficient 0.4. The sensitivity of Amsler in the present study was low which was consistent with Schuchard's study[9]. Additionally, Lowenstein showed that Amsler

Table 3. Risk factors of antimalarial induced maculopathy in rheumatologic patients (Univariate analysis)

Variable	n/total n	Odds ratio	95%CI	p-value
Age	40/40	1.06	1.01-1.12	0.021
Age > 60 years old	12/40	4.64	1.02-21.00	0.047
BMI (kg/m^2)	39/39	1.00	0.86-1.16	1.000
Mean dose /kg-IBW/day	29/29	2.77	0.79-9.67	0.111
Cum CQ dose (gm)	29/29	1.01	1.00-1.01	0.178
Antimalarial duration (month)	29/29	1.01	0.99-1.03	0.389
Duration of CQ > 5 mg/kg-IBW/day	12/29	1.29	0.94-1.78	0.113
CCl (ml/min/1.73 m^2)	36/36	0.96	0.93-0.99	0.016
CCl < 60 ml/min/1.73m^2	10/36	5.46	0.96-30.89	0.055
Macular Abnormality	14/40	6.93	1.53-31.4	0.012
Bilateral macular abnormality	10/37	8	1.40-45.76	0.019

BMI = body mass index; IBW = ideal body weight; Cum CQ dose = cumulative dose of chloroquine; CQ = chloroquine; CCl = Creatinine clearance; Macular Abnormality = retinal pigment epithelium change, dull reflex or target lesion; Bilateral macular abnormality = Bilateral macular abnormality of retinal pigment epithelium change or dull reflex; n = the number of that condition, total n = total number included in the analysis

Table 4. Risk factors associated with antimalarial maculopathy in rheumatologic patients (Multivariate analysis)

Variable	Odds ratio	95% CI	p-value
Model 1			
Bilateral macular abnormality	7.83	1.06-57.68	0.04
CCl (ml/min/1.73 m^2)	0.95	0.91-0.99	0.02
Model 2 and 3			
Bilateral macular abnormality	8.85	1.28-61.19	0.03
CCl < 60 ml/min/1.73 m^2	8.85	1.28-61.19	0.03

There were 33 patients included in each model. Bilateral macular abnormality = Bilateral macular abnormality of retinal pigment epithelium or dull reflex, excluding target lesions; CCl = Creatinine clearance; 95%CI = 95% confidential interval

grid was a low sensitive test, 34%, for detecting age related macular degeneration[15]. In contrast, Suansilpong presented that Amsler grid performed almost equally with HVF 10-2 white target, sensitivity 81.8% and specificity 100%[16]. Although Amsler grid testing is quite easy to do, it is a subjective test and still depends on user's ability to do it correctly. Fine showed that Amsler grid could improve recognition of visual field abnormality after patients performed it correctly[12]. In the present study, a doctor performed Amsler testing strictly as standard instruction in order to minimize measurement error. The other explanation was that Amsler testing might not be sensitive enough to recognize the minor degree of macular abnormality. In the present study, there were 3 cases of generalized visual field defects but the grid could detect abnormality in only 2 cases (data not shown). On the other hand, the Amsler grid had very high specificity as seen in the present study and as previously reported[5,15,16].

There was fair agreement of Amsler and HVF 10-2 in the present study as shown by kappa coefficient while kappa in Suansilpong's study was excellent (kappa 0.89)[16]. Cohen's kappa corrects for agreement by chance which it may be low if a prevalence of a disease is small. The prevalence of AM in the present study was set at 50% which was higher than the prevalence in Suansilpong's study, 7.9%, so it is impossible that the low kappa in the study was due to a small prevalence. Type of Amsler grid used might perform differently. Augustin reported that the original Amsler grid (WOB) was better in detection of macular degeneration than Amsler grid-BOW when visual acuity of 0.5 or better[13]. The performance threshold level to detect macular abnormality per eye of Amsler grids-

WOB or BOW in the present study was almost equal, 39.5% and 36.8%, respectively. It was also no difference when visual acuity was 0.5 or better (data not shown).

The risk factors of AM vary from study to study. Puavilai reported that no association between age, cumulative dosage and duration of treatment[17]. Leecharoen showed CCl associated with AM[18]. Srikua presented that age and duration of exposure were difference between patients with and without maculopathy groups significantly[19]. The association of lean body weight adjusted daily dose and AM was also reported[20,21]. Mackenzie's study showed that the daily dosage rate adjusted IBW more than 4 mg/kg/day of CQ associated with AM at mean followed-up 7 years but cumulative dose of CQ did not[21]. Elman found that age > 50 years old was a risk factor for AM[22]. The present study, age, CCl and BMA were significantly associated with AM by computing univariate analysis. In the multivariate analysis, CCl or CCl < 60, BMA and age or age > 60 were further analyzed by stepwise backward logistic regression. The authors selected these variables because they indicated significant difference between 2 groups by univariate analysis. On the contrary, cumulative dose of CQ, duration of exposure and mean dose per IBW per day did not associate with AM significantly in univariate analysis, and this is after controlling for age, CCl, or BMA as well. CCl or CCl < 60 and BMA had an association with AM while age or age > 60 years old did not associate with AM significantly after being adjusted for CCl and BMA. CCl < 60 ml/min/1.73 m^2 for $\geq$ 3 months was defined as chronic kidney disease[23] therefore CCl < 60 ml/min/1.73 m^2 might be more meaningful in clinical practice. In the present study, CCl < 60 and BMA had an association with AM and they had an equal odds ratio, 8.85. Liver function test was not included in the analysis because there were no patients with transaminitis in the present study population.

In Thailand, the HVF testing is not available in every hospital where there is an ophthalmologist. Fundoscopic finding might alert for AM. The authors aimed to find out whether macular abnormality had any association with AM. In the present study, macular abnormalities, which were RPE change, dull reflex and target lesion, were associated with AM after adjusted for age, odds ratio 4.9; 95%CI: 1.01-23.69 (data not shown). Target lesion was excluding from the analysis because it was a characteristic of AM. Therefore, only patients with macular abnormality-RPE change or dull reflex both eyes were analyzed as a risk factor. It is well known that macular hyperpigmentation is associated with age. The result of the present study also supported the association of BMA and age, p = 0.04 (data not shown); however, BMA was still associated with AM after being adjusted for age and CCl. The macular abnormality may be a manifestation of AM or preexisting macular diseases; however, it may be a warning sign of AM, especially in the young. Dosage and duration of CQ did not associate with AM in the present study. This may be due to low mean adjusted IBW dose per day in the study; therefore, CQ dosage might not be overdose for each day. In Siriraj Hospital, chloroquine was used at quite a low dose after a disease was controlled, for example, 1-2 tablets per week.

The pathogenesis of AM is not well understood. After absorption, antimalarial drugs rapidly entry from plasma to cell. CQ and HCQ are excreted through kidney and metabolized in the liver[1]. Their half-life is at least 20-60 days[24]. Regarding to clinical pharmacokinetics and previous studies, the possible risk factors were duration of use > 5 years, cumulative CQ dose > 460 gm, CQ > 3 mg/kg of IBW for short stature, the elderly, kidney and liver dysfunction and retinal disease or maculopathy[3]. To minimize permanent damage, AAO recommendations on screening for CQ and HCQ has been revised and published in 2011[3]. It was suggested that baseline evaluation should be done. Screening for AM should be performed within 5 years depending on the risk factors. The recommended screening procedures are ocular examination and HVF 10-2 white target which is focused on the macular region and may be changed before fundus examination. Amsler grid is not recommended as a screening test but may be an adjunct test because it was not sensitive enough to recognize a minimal paracentral scotoma. The sensitivity of Amsler grid in the present study was consistent with the AAO recommendation 2011.

There were several limitations in the present study. First, many cases were excluded from the present study since they did not have the second HVF testing which confirmed the abnormality after the first HVF was abnormal. It is needed to repeat HVF testing if the first time was abnormal because it is a subjective test and depends on patients' understanding of how to do the test. Moreover, the some patients who had their last ocular evaluation more than 1 year were also excluded because the finding might be changed. In general, a patient with high risk of AM was suggested to do ocular examination every year. Most of these patients had missed an ophthalmologic visit due to the fact that they might have no eye symptoms. They may

be the less severe cases. Therefore, the present study might not represent the patients with early or mild severity of maculopathy. Second, due to small sample size, limited independent variables could be investigated by multivariate analysis and the models were at risk of imprecision. Third, visual field testing in the present study was HVF 10-2 red or white target. Ability to recognize AM might be different between red and white target[25] therefore the result might be different if comparing with only HVF 10-2 white testing as per the AAO recommendation. Finally, one patient was 58 years old and had cumulative CQ dosage of 54.6 gm, mean CQ adjusted IBW/day of 2.3 mg/kg/day, CQ duration of 13.3 months and CCl of 80.5 ml/min/1.73 m^2 should be defined as "low risk for AM" might be explained by other factors, *i.e.*, genetics or pre-existing macular abnormality. A larger and long-term prospective study, including genetic factors and baseline ophthalmologic evaluation, is needed.

Conclusion

Amsler grid testing was not sensitive enough to recognize antimalarial induced maculopathy. It should be use as adjunct testing between ophthalmologic evaluating schedules because it had no cost and patients could test themselves anytime; however, patients should be advised how to perform it and be counseled to meet an ophthalmologist promptly if they have eye symptoms or abnormal Amsler testing. A patient with impaired renal function should be concerned about regular ophthalmologic examination. Bilateral dull macular reflex or RPE changes in a patient taking antimalarial drug might be a warning finding of AM.

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Potential conflicts of interest

None.

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ความแม่นยำของการใช้ตารางแอมซเลอร์ในการวินิจฉัยภาวะจุดรับภาพผิดปกติจากยาต้านมาลาเรียและปัจจัยเสี่ยงของการเกิดภาวะจุดรับภาพผิดปกติจากยาต้านมาลาเรีย

ปวีณา เชี่ยวชาญวิศวกิจ, วราลักษณ์ ศรีนนท์ประเสริฐ, สุรศักดิ์ นิลกานุวงศ์, วันรัชดา คัชมาตย์, อัจฉรา กุลวิสุทธิ์, เอมวลี อารมย์ดี, งามแข เรืองวรเวทย์

วัตถุประสงค์: *เพื่อประเมินความไว ความจำเพาะ และความสอดคล้องของตารางแอมซเลอร์ในการวินิจฉัยภาวะจุดรับภาพผิดปกติจากยาต้านมาลาเรียในผู้ป่วยรูมาติสซั่ม เมื่อเปรียบเทียบกับการตรวจตาโดยขยายม่านตาร่วมกับการตรวจลานสายตาด้วย Humphrey 10-2 และค้นหาปัจจัยเสี่ยงของภาวะจุดรับภาพผิดปกติจากยาต้านมาลาเรีย*

วัสดุและวิธีการ: *รวบรวมผู้ป่วยที่ได้รับการวินิจฉัยภาวะจุดรับภาพผิดปกติจากยาต้านมาลาเรีย 20 ราย และผู้ป่วยที่ไม่มีภาวะดังกล่าว 20 ราย ที่มาตรวจในโรงพยาบาลศิริราช ตั้งแต่ 1 ตุลาคม พ.ศ. 2553 ถึง 30 มิถุนายน พ.ศ. 2554 ประเมินความไว ความจำเพาะและใช้ดัชนี kappa เพื่อประเมินความสอดคล้องของตารางแอมซเลอร์เมื่อเปรียบเทียบ กับการตรวจตาโดยขยายม่านตา ร่วมกับการตรวจลานสายตาด้วย Humphrey 10-2 นอกจากนี้ใช้ logistic regression ประเมินปัจจัยเสี่ยงของภาวะจุดรับภาพผิดปกติจากยาต้านมาลาเรีย*

ผลการศึกษา: *ตารางแอมซเลอร์มีความไวร้อยละ 40 ความจำเพาะร้อยละ 100 ในการวินิจฉัยภาวะจุดรับภาพผิดปกติจากยาต้านมาลาเรีย และมีความสอดคล้องค่อนข้างต่ำโดยดัชนี kappa 0.4 พบว่าอัตราการขจัดครีตินิน (creatinine clearance) ที่น้อยกว่า 60 มิลลิลิตรต่อนาทีต่อพื้นที่ผิวกาย 1.73 ตารางเมตร และการตรวจพบความผิดปกติที่จุดรับภาพทั้งสองข้างสัมพันธ์กับภาวะจุดรับภาพผิดปกติจากยาต้านมาลาเรีย โดยมีอัตราส่วนเสี่ยงมีค่าเท่ากัน คือ 8.9 (ค่าช่วงความเชื่อมั่นร้อยละ 95 อยู่ระหว่าง 1.3-61.2)*

สรุป: *ตารางแอมซเลอร์อาจมีประโยชน์ในการใช้ตรวจจุดรับภาพ ระหว่างการตรวจตาตามนัดปกติ เนื่องจากมีราคาถูกและผู้ป่วยตรวจเองได้บ่อย ผู้ที่มีการทำงานของไตบกพร่อง และผู้ที่มีจุดรับภาพผิดปกติทั้งสองข้างสัมพันธ์กับการเกิดจุดรับภาพผิดปกติจากการรับประทานยาคลอโรควิน*