LETTERS TO THE EDITOR

Cardiac toxicity secondary to long term treatment with chloroquine

Chloroquine is frequently used to treat systemic autoimmune diseases, such as systemic lupus erythematosus (SLE). Its long term treatment, associated toxicity is well known, with retinopathy being the most common complication. Other chronic complications include skin disorders (hyperpigmentation), blood dyscrasias, corneal deposits, encephalopathy, neuropathy, myelopathy, and impairment of auditory function. Cardiac complications, such as conduction disorders, myocardial hypertrophy, and restrictive cardiomyopathy, have also been reported in long term treatment. Nevertheless, this problem is underappreciated. We describe a patient with SLE who developed a complete heart block and a restrictive cardiomyopathy owing to chronic treatment with chloroquine.

CASE REPORT

A 64 year old woman was diagnosed with SLE and associated Sjogren’s syndrome in 1988. She was treated with chloroquine for seven years (total dose 1000 g). In 1996 she presented a syncope, and a complete heart block was disclosed in the electrocardiogram (ECC), leading to placement of a permanent pacemaker. In April 1997 the patient was admitted into our hospital owing to a biventricular cardiac failure. There were no risk factors for coronary disease. A physical examination showed that the skin was hyperpigmented and she had auditory impairment and proximal limb weakness. Chloroquine retinopathy was found by ophthalmological examination. Biochemistry was normal except for increased hepatic transaminases. Normal results were obtained for ferritin and viral hepatic serological tests. Coronary angiography and pulmonary gammagraphy were normal. A transesohageal ECG was compatible with restrictive cardiomyopathy, with a left ventricular ejection fraction of 36%, dilatation of the left auricle, mild mitral insufficiency, and severe tricuspid insufficiency. Haptic and subcutaneous fat biopsies showed no abnormalities. A myopathic pattern was found on electromyography, and a muscular biopsy showed isolated muscular fibres and close group atrophy, focal myonecrosis, with little muscular regeneration and the presence of vacuoles, characteristic of chloroquine myopathy. The cardiac symptoms improved significantly with diuretic treatment. Chloroquine was discontinued. Subsequently, the patient has only presented mild, well tolerated biventricular cardiac failure.

Long term chloroquine treatment can produce cardiac complications, such as myocardial cardiopathy, both restrictive and hypertrophic, and auricular-ventricular blocks or other conduction disorders due to lysosomal storage alteration. These can be produced by the structural alteration of the interventricular septum, rather than by biochemical alterations in pacemaker cells. This toxicity seems to be restricted to patients receiving high doses or long term treatment, and it has been reported for treatment ranging from seven months to 25 years. At present, 12 cases of cardiac toxicity secondary to long term chloroquine treatment in systemic autoimmune diseases have been described (table 1). The doses of chloroquine in these patients ranged between 600 and 2281 g, and of hydroxychloroquine between 292 and 4380 g.

In a pathological examination hypertrophy of myocardiocytes with heavily vacuolated cytoplasm and disorganisation of the myofibrillar architecture has been found. Electron microscopy shows dense residual bodies with folded membranous aggregates and curvilinear bodies. These preferences were preferentially found in the cardiac septum, and this might explain the involvement of the conduction system. This pathological pattern has not been seen in cardiac SLE without chloroquine treatment.

In our patient the cause of biventricular cardiac failure was the hypertrophic cardiomyopathy. We excluded amyloidosis and haemosiderosis with a subcutaneous fat biopsy and ferritin determination. The SLE was not active, as the erythrocyte sedimentation rate, anti-DNA antibodies, and complement were normal. We considered that the cardiomyopathy was a chronic complication of chloroquine treatment, as the muscle biopsy showed. We did not perform an endomycardiac biopsy, because the muscular biopsy was positive. In addition, the patient also had other complications of long term treatment with chloroquine, such as retinopathy, myopathy, skin hyperpigmentation, and, probably, auditory impairment and hepatopathy.

We recommend that before starting long term treatment with chloroquine, cardiac evaluation with an ECG and an ophthalmological examination are carried out. Chloroquine is not indicated if the patient presents some cardiac conduction disorder, in order to prevent cardiomyopathy or complete heart block. A six month ECG should be performed and, possibly, when the total dose of chloroquine is 1000 g or more, every year.

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Table 1 Cardiological complications in long term treatment with chloroquine and hydroxychloroquine in systemic autoimmune diseases. All the patients were female

<table>
<thead>
<tr>
<th>Authors</th>
<th>Age</th>
<th>Disease</th>
<th>Cardiac complications</th>
<th>Other complications</th>
<th>Total dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Verry et al</td>
<td>56</td>
<td>SLE</td>
<td>CHB</td>
<td>Neumyopathy</td>
<td>1168 g CQ</td>
</tr>
<tr>
<td>Verry et al</td>
<td>55</td>
<td>MCTD</td>
<td>Right and left posterior blockade</td>
<td>Renitopathy</td>
<td>600 g CQ</td>
</tr>
<tr>
<td>Ratcliff et al</td>
<td>59</td>
<td>SLE</td>
<td>CHF</td>
<td>CHF, CHB, RMC</td>
<td>293 g HCG, 730 g HCG</td>
</tr>
<tr>
<td>Cubero et al</td>
<td>59</td>
<td>DL</td>
<td>CHB</td>
<td>NA</td>
<td>1095 g CQ</td>
</tr>
<tr>
<td>Reuss-Borst et al</td>
<td>73</td>
<td>RA</td>
<td>CHB, RMC</td>
<td>Myopathy, dead</td>
<td>2281 g CQ</td>
</tr>
<tr>
<td>Reuss-Borst et al</td>
<td>40</td>
<td>SL</td>
<td>CHB</td>
<td>CHF, Neumyopathy, dead</td>
<td>941 g CQ</td>
</tr>
<tr>
<td>Baguet et al</td>
<td>58</td>
<td>SLE</td>
<td>Right blockade, first degree block, HMC</td>
<td>NA</td>
<td>941 g CQ</td>
</tr>
<tr>
<td>Veinot et al</td>
<td>60</td>
<td>RA, SS, Raynaud</td>
<td>CHB</td>
<td>Neumyopathy</td>
<td>4380 g HCG, 657 g CQ</td>
</tr>
<tr>
<td>McAllister et al</td>
<td>33</td>
<td>SLE</td>
<td>HMC</td>
<td>Neumyopathy</td>
<td>1003 g CQ</td>
</tr>
<tr>
<td>McAllister et al</td>
<td>70</td>
<td>SLE</td>
<td>HMC</td>
<td>Myopathy</td>
<td>912 g CQ</td>
</tr>
<tr>
<td>Guedira et al</td>
<td>43</td>
<td>RA</td>
<td>CHB</td>
<td>Hyperpigmentation</td>
<td>724 g CQ</td>
</tr>
</tbody>
</table>

SLE = systemic lupus erythematosus; MCTD = mixed connective tissue disease; DL = discoid lupus; RA = rheumatoid arthritis; SS = Sjögren’s syndrome; CHB = complete heart block; CHF = congestive heart failure; RMC = restrictive myocardopathy; HMC = hypertrophic myocardopathy; CQ = chloroquine; HCQ = hydroxychloroquine; NA = not available.

A pilot study of the salivary scintigraphy diagnostic performance in a Spanish population with Sjögren’s syndrome diagnosed by the European criteria

The European classification criteria (ECC) include salivary scintigraphy (SSC) for diagnosing Sjögren’s syndrome (SS). The performance of this test has been established without considering the ECC for either confirming or excluding SS. This pilot study aimed at evaluating the performance of the qualitative reading of SSC, performing a clinical measurement of SSC, and establishing the most discriminatory scintigraphic parameters for diagnosing SS in a Spanish population fulfilling the ECC.

This cross-sectional study included consecutive patients referred for SSC: 15 healthy volunteers (eight women, seven men; mean (SD) age 50.6 (17.5)), 16 patients with SS based on the ECC (15 women, one man; age 58.1 (10.4)), and 15 xerostomic patients who did not fulfill the ECC, as controls (seven women, eight men; age 53.3 (19.0); AIDS (n=3); chronic parotitis (n=2); sarcoidosis (n=2), or taking drugs that cause dryness (n=8)).

Patients underwent a sufficient number of tests included in the ECC set, if not all, to confirm or exclude SS. Scintigraphy was performed in patients and volunteers: image acquisition started two minutes after injection of technetium-99m pertechnetate, 60 second frames were continuously obtained for 16 minutes, and lemon juice given orally at 9.5 minutes. Data of the ECC set, except for scintigraphy, drug history, extraglandular manifestations of SS, associated connective tissue disease, and history of exclusion criteria, were collected by a questionnaire and from the medical records. SS was diagnosed according to the ECC.

Qualitative reading comprised visual evaluation of tracer accumulation and excretion by the parotid and submandibular glands in either the scan or the time-activity curves. Scintigraphy was positive for SS if both a sicca syndrome pattern and a curve M, F, or S were detected in at least two glands; it was negative if either positive in only one gland or normal (N curve and normal pattern on the scan) in all glands (fig 1). Qualitative reading showed an excellent normalcy fraction (100%) and high sensitivity (87.5%) in detecting SS, but specificity was lower (66.7%). Sensitivity and specificity were as previously reported. Some authors obtained better specificity by including healthy people as controls. Predictive values (positive predictive value 73.7%, negative predictive value 83.3%) differed from those of other studies; they are influenced by the prevalence of SS.

Clinical measurement was made on each gland curve measuring gland size (area), tracer accumulation, and stimulated excretion; these scintigraphic parameters were tabulated for all, parotid, submandibular, right and left glands. Clinical measurement in normal subjects generated a normal database that could be used to evaluate the inter- and intrapersonal variation of gland area and function in patients. ROC curves were plotted from parameters in patients, and optimal thresholds computed.

Optimal thresholds of area agreed well with the qualitative reading for diagnosing SS, and increased accuracy as a result of improved specificity with loss in sensitivity or normalcy fraction. They highly discriminated between patients with SS and controls, because areas significantly and exclusively decreased in patients with SS compared with normal subjects and controls. The amount of acinar mass lost by the gland, is reflected by the smaller size of the gland on SSC. As patients with SS, normal subjects, and controls had similar ages, the gland size reduction may be considered as a characteristic scintigraphic

![Figure 1: Dynamic scan and time-activity curves of a normal scintigraphic study. Both parotid and submandibular glands show regular size and morphology. Tracer uptake by the salivary glands is uniform and similar to thyroidal uptake, and fast prompt excretion of the tracer into the oral cavity follows excretory stimulus. The time-activity curves show a phase of increased counts that corresponds to active radioisotope uptake: the parotid curves present a marked increase (RP = right parotid; LP = left parotid), higher than that of the submandibular glands (RS = right submandibular; LS = left submandibular). Stimulation with lemon juice is instantly followed by profuse excretion by both the parotid and submandibular glands, as noted by a sharp fall in the curves of the glands and a spike in the oral time-activity curve (OC = oral cavity).](http://www.annrheumdis.com)
Remitting seronegative symmetrical synovitis with pitting oedema (RS3PE) as recurrence of aborted PMR

A comparison of clinical and laboratory findings in patients with RS3PE alone, PMR alone, and RS3PE associated with PMR has been recently published by Cantini et al.1

![Image](https://example.com/image.png)

**Figure 1** Dorsal hand swelling, mild synovitis, tenosynovitis of the extensor carpi ulnaris (arrow) and of the flexor tendons (arrowhead). Axial STIR image of the left wrist (TR/TE 1840/30; TI=685; NEX=1; matrix×180×180).

Optimal thresholds of gland function were insufficiently accurate for diagnosis of SS, as they failed to discriminate between SS and controls, probably owing to different degrees of dysfunction in the patients with SS and the small sample size. We noted that tracer accumulation by the parotid gland decreased in sicca syndrome, but failed to show similar changes in submandibular uptake. A decreased excretion fraction in all glands compared with normal is characteristic of sicca syndrome and not exclusive to SS as has been described.2

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Abnormality of SS. However, any conclusion must await a further extensive study.

RS3PE alone, and RS3PE associated with PMR has been recently published by Cantini et al.1
satisfying the 1987 American College of Rheumatology criteria for RA. Serum IgG and IgM aCL were characterised by enzyme linked immunosorbent assay (ELISA) using microtriatration plates (Immunosorb, Nunc, Roskilde, Denmark) coated with cardiolipin purified from bovine heart (Sigma, St Louis, MO). Wells were saturated with 1% bovine serum albumin (BSA; Diamed, Cressier/Morat, Switzerland) in phosphate buffered saline solution (PBS). Serum samples diluted 1/100 in PBS-BSA were incubated for one hour at 37°C. The blocking and sample diluent buffer did not contain β2GP1 and differed from those using fetal calf serum, which are considered to add exogenous β2GP1. aCL levels were expressed in IgM and IgG units (U), calculated by including serum samples calibrated with Harris's standards on every plate. A search was made for IgG and IgM β2GP1 antibodies by an ELISA using human β2GP1 antigen coated on irradiated plates, according to Arruebea et al. β2GP1 and β2GP1 antibodies were considered to be positive when greater or equal to 20 U. Rheumatoid factors (RF) (detected by nephelometry) and antinuclear antibodies (ANA) (detected by indirect immunofluorescence (IIF)) were determined for each patient. Additionally, antikeratin antibodes (detected by IIF on sections of rat esophagus) and the presence of HLA-DR4 or HLA-DR1 were determined for 25 patients. The patients were assessed to determine the presence or absence of extra-articular manifestations of RA and sicca syndrome. A history of arterial or venous thrombosis, recurrent fetal loss, and current treatment—for example, steroid treatment, treatment with disease modifying antirheumatic drugs, and treatment for other diseases, were reviewed. Statistical analysis was performed with the χ² test or Fisher's test, as appropriate.

Nine patients (18%) had low titre IgG iso-type aCL, but no β2GP1 antibodies. There was no correlation with thrombosis or recurrent fetal loss. There was an increase in sicca syndrome and extra-articular manifestations of RA in the aCL+ group, but this was not statistically significant (table 1). No significant association was found between aCL and other autoantibodies (RF, ANA, antikeratin antibodies). No extracarticular significant association was found between any drug inducing aCL and the presence of aCL. In contrast with our patients, another study found IgG aCL in only 2% of healthy subjects.

The frequency of aCL, all of them β2GP1 independent in this study, was close to or lower than in other studies (39–49%). We found no association with clinical manifestations such as thrombotic events, or extra-articular manifestations, or other autoantibodies (ANA). The relation between IgM β2GP1 antibodies and RA remains to be determined; it might be due to non-specific binding with RF.

<table>
<thead>
<tr>
<th>Table 1</th>
<th>Correlation of anticardiolipin antibodies (aCL) with serological and clinical findings in 50 patients with rheumatoid arthritis. Results are given as number (%) of patients</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>aCL+ patients (n=9)</td>
</tr>
<tr>
<td>Age (years)</td>
<td>63.2 ±/− 4</td>
</tr>
<tr>
<td>ANA* positive (titre &gt;160)</td>
<td>7 (77)</td>
</tr>
<tr>
<td>Sclerosis syndrome</td>
<td>4 (44)</td>
</tr>
<tr>
<td>Extra-articular manifestations</td>
<td>4 (44)</td>
</tr>
<tr>
<td>Thrombosis history and/or abortion</td>
<td>1 (11)</td>
</tr>
<tr>
<td>Steroid treatment</td>
<td>7 (77)</td>
</tr>
<tr>
<td>DMARD* treatment</td>
<td>8 (88)</td>
</tr>
</tbody>
</table>

*ANA = antinuclear antibody; DMARD = disease modifying antirheumatic drug.

The use of placebo studies for the development of new medicines in patients with rheumatoid arthritis (RA) remains controversial. Placebo studies are useful when testing the effectiveness of new drugs. However, in two studies that compared two active disease modifying drugs with placebo the radiological deterioration was about four times higher in those patients with placebo. In view of this, in 1999 Emery and Smolen suggested that long term placebo studies should be a thing of the past in patients with active RA. Nowadays, there is enough evidence that single or combined treatments can modify RA. Thus, for example, in a recent prospective and observational study patients with severe RA who responded to methotrexate had a reduced mortality.

Dr García-Porrua is a member of the Galician ethical committee for clinical investigation (northwestern Spain).

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