Rheumatic disorders and primary biliary cirrhosis: an appraisal of 170 Italian patients

B Marasini, M Gagetta, V Rossi, P Ferrari

Abstract

Objective—To establish the frequency of connective tissue diseases (CTD) in a cohort of Italian patients with primary biliary cirrhosis (PBC) and to evaluate the availability of a marker for the early identification of the more common associated CTD.

Methods—One hundred and seventy consecutive patients with histologically diagnosed PBC were screened for the presence of a CTD and/or Raynaud’s phenomenon (RP). Patients were classified as having a CTD only if they fulfilled standardised criteria.

Results—Forty-seven patients had a CTD. The most common CTD was systemic sclerosis (SSc), found in 21 patients. RP was present in 54 patients, most of whom (n=39) had an associated CTD. The most prevalent autoantibodies included antinuclear antibodies (ANA) with anticentromere (ACA) and speckled patterns (34 and 33 patients, respectively) and extractable nuclear antigens (ENA, 27 patients). However, while the frequencies of ACA and ENA were significantly higher in patients with an associated CTD (p<0.0001 and p<0.005, respectively), no relationship was found for speckled ANA. ACA was the best predictor of a CTD in patients with PBC (odds ratio (OR) 24.5, 95% CI 5.5 to 108.8), followed by the presence of ENA (OR 23.9, 95% CI 5.6 to 101.0) and RP (OR 20.2, 95% CI 5.7 to 71.2).

Conclusions—Using strict standardised classification criteria we have found that SSc is the most common CTD associated with PBC and that ACA and ENA are strong markers for an associated CTD in patients with PBC.

Primary biliary cirrhosis (PBC) is a chronic progressive cholestatic liver disease characterised by destruction of intrahepatic bile ducts causing fibrosis and eventually cirrhosis of the liver. The cause of this disease is unknown, although the immunological abnormalities and the strong female preponderance point to an autoimmune aetiology.

Methods

One hundred and seventy consecutive Italian patients (156 women, 14 men) of mean age 59 (range 30–84) with histologically confirmed PBC who attended our centre between 1995 and 1998 entered the study after giving informed consent. The majority (90%) were from Northern Italy. Patients were classified as having systemic sclerosis (SSc), systemic lupus erythematosus (SLE), or rheumatoid arthritis (RA) if they fulfilled the American College of Rheumatology (ACR) accepted criteria. Patients with Sjögren’s syndrome (SS) fulfilled the criteria of Vitali et al. Mixed connective tissue disease (MCTD) was diagnosed by the presence of the symptoms described by Sharp et al. The diagnosis of polymyositis (PM) was based on Bohan and Peter’s criteria. Patients with features strongly suggestive of autoimmune rheumatic disease (Raynaud’s phenomenon (RP), skin thickening limited to the fingers, finger oedema, serum ant centromere antibody (ACA), with no internal organ abnormalities), but not fulfilling the criteria for any disorder, were classified as undifferentiated CTD (UCTD). Patients were diagnosed as
Table 2  Prevalence of systemic sclerosis (SSc), undifferentiated connective tissue disease (UCTD), Sjögren’s syndrome (SS), rheumatoid arthritis (RA), systemic lupus erythematosus (SLE), mixed connective tissue disease (MCTD) and polymyositis (PM) in 170 patients with primary biliary cirrhosis

<table>
<thead>
<tr>
<th>SSc</th>
<th>UCTD</th>
<th>SS</th>
<th>RA</th>
<th>SLE</th>
<th>MCTD</th>
<th>PM</th>
</tr>
</thead>
<tbody>
<tr>
<td>21</td>
<td>12</td>
<td>7</td>
<td>5</td>
<td>18</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>12.3</td>
<td>7.1</td>
<td>3</td>
<td>1.8</td>
<td>1.8</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

Table 3  Results of the best fitting logistical model

<table>
<thead>
<tr>
<th>Variable</th>
<th>Odds ratio</th>
<th>p Value</th>
<th>Lower</th>
<th>Upper</th>
<th>95% confidence intervals</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGA</td>
<td>24.5</td>
<td>0.0001</td>
<td>5.5</td>
<td>108.8</td>
<td></td>
</tr>
<tr>
<td>ENA</td>
<td>23.9</td>
<td>0.0001</td>
<td>5.6</td>
<td>101.0</td>
<td></td>
</tr>
<tr>
<td>RP</td>
<td>20.2</td>
<td>0.0001</td>
<td>5.7</td>
<td>71.2</td>
<td></td>
</tr>
<tr>
<td>ACA-ENA</td>
<td>0.02</td>
<td></td>
<td>0.112</td>
<td>0.4</td>
<td></td>
</tr>
<tr>
<td>Criterion</td>
<td></td>
<td>Intercept and covariates</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>−2 logL score</td>
<td>187.4</td>
<td></td>
<td>83.4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Patients with UCTD had features of SSc; all had RP and ACA, three had skin thickening limited to the fingers, and three had telangiectases. No patient had visceral involvement typical of SSc, and none had three or more of the CREST syndrome features (three patients could have been classified as RS, three as RT, and six as R). RP appeared before (1–52 years, mean 19 years, n=26) or after (1–16 years, mean 5 years, n=23) the diagnosis of PBC. In five patients PBC and RP occurred almost simultaneously.

One hundred and sixty three patients with PBC had autoantibodies. However, excluding AMA which is typical of PBC and was found in 164 patients, autoantibodies were observed in 56% of patients with PBC, particularly if a CTD co-existed (87% PBC with CTD vs 44% PBC without CTD, p<0.0001). The most prevalent autoantibodies included ANA with anticentromere (n=34) and speckled (n=33) patterns and ENA (n=27). The frequencies of ACA and ENA were significantly higher in patients with PBC and CTD (ACA: 82% PBC with CTD vs 18% PBC without CTD, p<0.0001; ENA: 69% vs 30%, p<0.005), while the presence of the speckled pattern was independent of any autoimmune rheumatic conditions (37% v 63%, p=0.4018). Most of the ACA positive patients (n=27, 79%) had RP, but RP was unrelated to the presence of ACA (27/54 with RP had ACA and 27 did not). ACA were particularly frequent in UCTD and in SSc, with no significant differences between lc-SSc or dc-SSc (n=9 and n=4, respectively). The frequencies of ACA and ENA significantly differed between SSc and UCTD (ACA: SSc=13 patients positive v UCTD=all patients positive, p<0.02; ENA: SSc=7 patients positive v UCTD=all patients positive, p<0.05). ENA were particularly frequent in patients with SS (n=4 out of 6). SS-A, the most common ENA positive, p<0.05) was unrelated to rheumatic conditions (seven patients had PBC with no associated conditions, seven had a CTD, two had an isolated RP). SS-B was found in four patients, and in three it coexisted with SS-A (two patients had SS, one with no CTD). ATA was more frequent in CTD (three patients had dc-SSc, one had RA, one had PM, and one had PBC without rheumatic diseases). RNP was found in eight patients, five of whom had CTD; none of the patients had Sm or Jo-1. The ANA homogeneous pattern, found in 11 patients, was unrelated to CTD.

No relationship was observed between AMA negativity (n=6), the other autoantibodies, and the different rheumatic disorders. A multivariate analysis found that ACA was the best marker of an associated rheumatic disease, followed by the presence of ENA and RP (table 3).

Discussion
This study confirms that a relatively large proportion of patients with PBC have an autoimmune rheumatic disease. To avoid the effects of geographical factors which have a role in PBC as well as in autoimmune rheumatic diseases, we performed

having primary RP if they had typical episodic ischaemic attacks in response to cold or emotional stimuli for at least 2 years without clinical or serological evidence of CTD. Antinuclear antibodies (ANA) were assayed by indirect immunofluorescence with HEp-2 cells (Immunoconcepts, Sacramento, CA, USA). Antimitochondrial antibodies (AMA) were assayed by indirect immunofluorescence on rat liver, kidney, and stomach sections (The Binding Site, Birmingham, UK). AMA negativity was confirmed by immunoblotting analysis of the PBC specific serum autoantibody against the M2 component of the mitochondrial inner membrane, as previously described.14 The following ANA patterns were considered: homogeneous, speckled, centromere, nucleolar. Antibodies to extractable nuclear antigens (ENA), including RNP, SS-A, SS-B, Jo-1, anti-topoisomerase I (ATA), and Sm, were detected by an ELISA method (Diamedix Corp, Miami, FL, USA) and confirmed by immunoblotting analysis (Euroimmun GmbH, Gross Groenau, Germany).

Statistical analysis
ANOVA followed by the Scheffé test was used to test differences between groups. The χ² test was used for categorical data. Logistic regression models were used to predict a binary dependent variable from a set of independent variables. The results are expressed as odds ratios (ORs) with 95% confidence intervals (CI).

Data are mean (SD) unless otherwise specified. p Values of <0.05 were considered significant.

Results
Sixty two patients (36.5%) had a CTD and/or RP. Table 1 shows the prevalence of CTD and/or RP and the sex and age distribution among the groups. The most common CTD was SSc (table 2). Fifteen patients with SSc had the limited form of the disease (lc-SSc) and six had the diffuse form (dc-SSc). Fifty four patients (51 women) had RP, most of whom (39 patients, 72%) presented with an associated CTD (SSc (n=21); UCTD (n=12); SS (n=4); SLE and PM (n=1 each)). Most
our study on a cohort of Italian patients sufficiently large to draw conclusions about the co-existence of CTD in a defined population. Furthermore, we included only those patients with PBC who fulfilled well defined diagnostic or classification criteria for rheumatic diseases, which made it easier to compare data across studies.

The most frequent autoimmune rheumatic disease we found in patients with PBC was SSC. The co-existence of PBC and SSC is well known with a frequency ranging from 3% to 50%. Even if patients with a “scleroderma spectrum” disorder are excluded, and although epidemiological studies of the prevalence of SSC in an Italian population are lacking, the prevalence of SSC in PBC appears to be significantly greater than that found in the general population, this finding may suggest some common aetiological mechanism, and certain peculiar aspects of the immune system reported in patients with PBC associated SSCc to confirm this. Whether PBC and SSC have a chronic graft-versus-host disease pathogenesis, possibly related to the persistence of microchimeric fetal cells in the circulation, has to be clarified. It is tempting to speculate that the co-existence of PBC and SSC may reflect a new distinct clinical syndrome.

Since the frequencies of SS, SLE, MCTD, and PM were similar to those reported in the general population, the co-occurrence with PBC should be considered casual. The previously reported high prevalence of SS in patients with PBC has not been confirmed in this study, probably because different classification criteria were used. The frequency of RA, which is similar to that observed in the general population, appears particularly high if compared with that recently reported in an Italian epidemiological survey. The previously reported high frequency of RA in PBC is probably also reflects different classification criteria. In fact, patients with PBC often complain of articular symptoms which do not fulfil the ACR criteria for RA (“arthritis of PBC”). Further studies over time are necessary to understand the significance of the co-occurrence of UCTD and PBC and, in particular, to evaluate whether these patients are at risk of SSC. It would be interesting to ascertain whether ACA, found in all UCTD, might identify a subset of patients with PBC who are destined to develop SSC. It is worth noting that ACA have been associated with severe vascular disease in SSC, and that microvascular abnormalities have been found in PBC.

The high frequency of RP is probably non-casual, although the prevalence of RP is difficult to assess. The significance of RP in patients with PBC and the relationship between RP and ACA are difficult to understand since RP was unrelated to ACA but, although weaker, RP was also a good indicator of an associated CTD. Whether or not RP is the result of an endothelial dysfunction is an interesting question that has to be settled.

With the exception of ENA, the frequency of the other autoantibodies was not related to CTD. The significance of ATA is intriguing since half of the ATA positive patients with PBC did not have SSC.

In conclusion, using strict standardised classification and diagnostic criteria, we have found that a number of Italian patients with PBC have autoimmune rheumatic diseases, with SSC being the most common. Since autoimmune diseases constitute a leading cause of death among women, ACA and ENA, which are strongly indicative of a coexisting CTD, could be a useful prognostic test for patients with PBC. Further studies are needed to assess whether the combined occurrence of these diseases may provide new insight into their aetiopathogenesis.

Rheumatic disorders and primary biliary cirrhosis: an appraisal of 170 Italian patients

B Marasini, M Gagetta, V Rossi and P Ferrari

Ann Rheum Dis 2001 60: 1046-1049
doi: 10.1136/ard.60.11.1046

Updated information and services can be found at:
http://ard.bmj.com/content/60/11/1046

These include:

References
This article cites 27 articles, 3 of which you can access for free at:
http://ard.bmj.com/content/60/11/1046#BIBL

Email alerting service
Receive free email alerts when new articles cite this article. Sign up in the box at the top right corner of the online article.

Topic Collections
Articles on similar topics can be found in the following collections

- Connective tissue disease (4253)
- Immunology (including allergy) (5144)
- Musculoskeletal syndromes (4951)

Notes

To request permissions go to:
http://group.bmj.com/group/rights-licensing/permissions

To order reprints go to:
http://journals.bmj.com/cgi/reprintform

To subscribe to BMJ go to:
http://group.bmj.com/subscribe/