Journal of Immunology and Allergy

ISSN: 2582-6549 Zeroual C, 2024-J Immuno Allerg **Review Article**

More Than a Classificatory and Diagnostic Marking, a Prognostic Importance of Antibodies in Autoimmune Liver Diseases

Chaïmaâ Zeroual^{*}

Abstract

Most often chronic, autoimmune liver and biliary diseases are rare. Although the etiology is still unclear, several factors including infection, environment, and genetics seem to be involved in the development of those damage. Autoimmune hepatitis AIH is liver inflammation characterized by the presence of antibodies, polyclonal hypergammaglobulinemia, and periportal infiltration are not due to another viral, medicated, or toxic cause. CHU Ibn Rochd, Department of Internal Medicine, Casablanca, Morocco

***Corresponding Author:** Zeroual C, CHU Ibn Rochd, department of Internal Medicine, Casablanca, Morocco.

Received Date: 02-29-2024

Accepted Date: 03-05-2024

Published Date: 03-27-2024

Copyright© 2024 by Zernoul C. All rights reserved. This is an open access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Primary biliary cholangitis PBC previously called primary biliary cirrhosis is a chronic disease in which the bile ducts are infiltrated by lymphocytes, obstructed then slowly destroyed.

Primary sclerosing cholangitis PSB is a chronic cholestatic liver disease characterized by progressive inflammation and fibrosis of the intra-hepatic and extra-hepatic bile ducts. Antibodies are of great help in those diseases. They are more than classificatory and diagnostic markers. Their prognostic contribution predicts severity, allows for monitoring of the therapeutic evolution, and watches for recurrence and complications.

Keywords: Autoimmune diseases; Hepatitis; Antibodies; Cholangitis; Lymphocytes; Bile ducts; Chronic; Infection; Cirrhosis.

Introduction

The liver, being an organ with the functions of synthesis, storage, and purification, can be subject to changes in its architecture by an autoimmune process. The latter will target the cellular components mainly the hepatocyte and the cholangiocyte. Autoimmune hepatitis AIH is an inflammatory disease of hepatocytes of unknown cause that is generally progressive

Zeroual C | Volume 4; Issue 2 (2024) | Mapsci- JIA-4(2)-046 | Review Article

Citation: Zeroual C. More Than a Classificatory and Diagnostic Marking, a Prognostic Importance of Antibodies in Autoimmune Liver Diseases. J Immuno Allerg. 2024;4(2):63-72.

DOI: https://doi.org/10.37191/Mapsci-2582-6549-4(2)-046

with fluctuating activity [1]. Most often chronic, it can progress to fibrosis and then cirrhosis. The acute installation, although exceptional, exposes to fulminant hepatitis which is a diagnostic and therapeutic emergency [2].

Autoimmune cholangiopathies include primary biliary cholangitis PBC, primary sclerosing cholangitis PSC, and IgG4 cholangitis. The risk of secondary biliary cirrhosis is present in both PBC and PSC in addition to the predisposition to angiocholitis and cholangiocarcinoma in PSC [3]. In addition to the undeniable role of antibodies in the classification of AIH and the diagnosis of autoimmune hepato-cholangiopathies, their prognostic value allows the assessment of severity and follow-up after treatment [4].

Autoimmune hepatitis

Diagnosis

Occurring at any age in both sexes with a predominance of females, the diagnosis of AIH is established thanks to the very sensitive and specific criteria of the International Autoimmune Hepatitis Group IAIHG [5]. Initially proposed in 1992, the diagnostic criteria were revised in 1999. However, given their difficulty of use in practice and their complexity, the IAIHG proposed in 2008 simplified ones comprising autoantibodies, IgG gamma globulins, histology, and negative viral serology [6]. When the score is equal to 6, the AIH is probable and if it is greater than or equal to 7, the diagnosis becomes certain (Table 1) [7].

Autoantibodies		
ANA or SMA	+1:40	+1
ANA or SMA	+1:80	+2
Antibodies to liver kidney microsome type 1	+1:40	+2
Antibodies to soluble liver antigen	Positive	+2
Absent autoantibodies	None	О
Immunoglobulin level		
Immunoglobulin G	+UNL	+1
	+1.1ULN	+2
	Normal	0
Histological Findings	Compatible	+1
Morphological features of AIH	Typical	+2
	Incompatible	0
Viral Disease		
Absence of viral hepatitis	No viral markers	+2
_	Viral markers present	0
	Score pre-treatment = 6 Dg	
Score pre-treatment = 7Dg certain	probable	

Table 1: Simplified Diagnostic Score of AIH according to the IAIHG.

Classification

In the beginning, 2 types were proposed AIH1 and AIH2. However, the discovery of anti-SLA soluble liver antigens (found similar to the anti-LP anti-liver pancreas, hence the name anti-SLA/LP) has made it possible to define a third AIH₃ type. Some authors equate AIH₁ to

Zeroual C | Volume 4; Issue 2 (2024) | Mapsci- JIA-4(2)-046 | Review Article

Citation: Zeroual C. More Than a Classificatory and Diagnostic Marking, a Prognostic Importance of Antibodies in Autoimmune Liver Diseases. J Immuno Allerg. 2024;4(2):63-72.

DOI: https://doi.org/10.37191/Mapsci-2582-6549-4(2)-046

AIH₃ given the clinical, histological, and therapeutic similarity, but the latter has a darker prognosis [8].

In AIH1, which is the most frequent (90%), the antibodies found are the antinuclear antibodies ANA and the smooth muscle antibodies SMA. This AIH1 can occur at any age but with a preference for adults. AIH2, found in 5 to 10%, is characterized by the presence of anti-liver kidney microsome LKM1 and anti-liver cytosol LC1. This type affects almost exclusively the child. AIH3 is rare. It is distinguished by the presence of anti-SLA/LP [9].

Autoantibodies

Antibodies are proteins synthesized in response to antigenic aggression by B lymphocytes activated in plasma cells. Autoantibodies, directed against the self's cells, are frequently found in autoimmune diseases but not exclusively. Detected by IFI indirect immunofluorescence, the substrates used are mainly Human Epithelial Cell Line Type 2 (HEp-2). These are cells of the human laryngeal carcinoma [10].

Other organs can be used such as the kidney, liver, and stomach. After detection, other techniques are used to identify the molecular target of antibodies such as immunoprecipitation, enzyme-linked immunosorbent assays, radioimmunology, and immunoblotting [11].

Anti-nuclear antibodies

Discovered in 1943 by the hematologist Malcolm Hargraves, they are non-organ-

specific autoantibodies directed against the constituents of the cell nucleus (DNA, lamin. histone) and chromatin, the cytoplasmic elements of the nucleus. Due to their high sensitivity, their interest is major in the detection and diagnosis of HAI1. Antichromatins are associated with severe forms of HAI1 and correlate with significant activity and relapse after corticosteroid therapy [12]. Given the poor specificity of ANA, it is necessary to ask for them only in front of a very evocative clinic. In front of a low clinical probability and positive ANA, a dosage of the anti-DFS70 (Dense Fine Speckled 70kD) can be carried out. The positivity is not in favor of an autoimmune disease [13].

Smooth muscle antibodies

Discovered by Johnson in 1965, they are directed against the antigens of the cytoskeleton (desmin, tubulin, vimentin, cytokeratin, actin). SMA is usually searched for by IFI on a rat substrate (liver-kidneystomach). The fluorescence has a reticulated honeycomb appearance at the hepatic level, fine needles in the renal tubules, and radial filaments at the muscularis mucosae and the gastric mucosa [14]. There are F-actin (filamentous) types as very suggestive of AIH1 at a level greater than or equal to 160 and non-F-actin SMA not specific to AIH [15]. The antiactin F typing can be done either by IFI on HEp-2 cells treated with colchicine (long straight actin cables) or by immunodot.

Anti-liver kidney microsome 1

Anti-LKM1 are anti-endoplasmic reticulum autoantibodies directed against liver and kidney cells. In IFI, they attach to the entire

Zeroual C | Volume 4; Issue 2 (2024) | Mapsci- JIA-4(2)-046 | Review Article

Citation: Zeroual C. More Than a Classificatory and Diagnostic Marking, a Prognostic Importance of Antibodies in Autoimmune Liver Diseases. J Immuno Allerg. 2024;4(2):63-72.

DOI: https://doi.org/10.37191/Mapsci-2582-6549-4(2)-046

hepatic lobule. On the substrate, cytoplasmic fluorescence (intense so-called lacquered) and proximal tubules are detected. However, the fluorescence of distal tubules and stomach is negative [4]. Their antigenic target is the isoform 2D6 of the cytochrome P450 superfamily, hence the other name of anti CYP2D6. Their value in diagnosis is not deniable: They are found in 85% of AIH2. They are also prognostic markers. Their rate increases with advanced stages and decreases after a good response to treatment [16].

Anti-liver cytosol 1

They are diagnostic markers of excellent specificity found in 30 to 70% of AIH2. In more than 90% associated with anti-LKM1, their antigenic target is aminotransferase cyclodeaminase. In IFI, anti-LC1 does not attach to the central-lobular areas of the liver. Thus, the anti-LKM1 can mask the presence of the anti-LC1 since it will cover the areas spared by the anti-LC₁ [4]. Their prognostic value varies depending on the stage of the disease and the treatment. In the acute phase, the anti-LC₁ is absent or present at a low titer, whereas in the case of chronicity, the titer is Immunosuppressants high. and liver transplantation make it possible to reduce the level of anti-LC1 to negate them [17].

Anti-soluble liver antigen /liver pancreas SLA /LP

In 1987, Mann, et al., discovered these antibodies and proposed type 3 of AIH. They are directed against a protein associated with a tRNA for the selenocysteine Trnp (Ser) Sec. Although their specificity is excellent, their sensitivity is mediocre (20 to 30%) dependent on detection techniques [18]. In addition to their diagnostic interest, sometimes their presence is of poor prognosis. When the anti-SLA are positive, there is the risk of AIH de novo after discontinuation of treatment or recurrence of AIH₃ after liver transplantation. However, whether the anti-SLA is positive or negative, the therapeutic response remains the same [19].

Anti-receptors of the anti-ASGPR asialoglycoprotein

Rarely used, they are non-specific markers of 50 to 90% of AIH1 or 2. Anti-ASGPR can be present in other liver pathologies (viral hepatitis B or C, PBC, and alcoholic hepatitis). Markers of severity of AIH, their presence is correlated with histological activity, the levels of transaminases and immunoglobulins G. Usually, the positivity of anti-ASGPR is predictive of good а response to corticosteroids and their level decreases under immunosuppressants or even during remission. However, if their level remains relapse high, at the end of immunosuppressive treatment would be very likely [20].

Anti-SSA/Ro52 or TRIM21

Being part of the family of proteins with tripartite motifs, it has been called TRIM21. The "Ro" comes from the name of the patient whose antibodies were extracted and discovered in 1969 by Clark, et al. The anti-SSA autoantibody targets the Ro proteins: Ro52 and Ro60. These are two different proteins encoded by genes on separate chromosomes. However, the Ro52 can be masked by the anti-60 if the 2 are searched

Zeroual C | Volume 4; Issue 2 (2024) | Mapsci- JIA-4(2)-046 | Review Article

Citation: Zeroual C. More Than a Classificatory and Diagnostic Marking, a Prognostic Importance of Antibodies in Autoimmune Liver Diseases. J Immuno Allerg. 2024;4(2):63-72.

DOI: https://doi.org/10.37191/Mapsci-2582-6549-4(2)-046

simultaneously. Anti-Ro52 is frequently associated with anti-SLA (77% of HAI3). The presence of anti-Ro52 is of poor prognosis, but the interest in researching them remains controversial [21].

Native anti-DNA

Presently, 20 to 30% of AIH1 without there being systemic lupus erythematosus SLE. They can have a poor prognosis [22].

Primary biliary cholangitis

Formerly called "primary biliary cirrhosis", the term "cirrhosis" has been replaced by "cholangitis" since the diagnosis is now made at earlier stages. It is the main cholestatic disease of adults whose diagnosis is made if at least 2 of the 3 criteria are met. Biological cholestasis (alkaline phosphatases PAL1,5 the upper limit of normal), anti-mitochondrial antibodies AMA $\geq 1/40$ or specific anti-nuclear antibodies (anti-gp210 or anti-sp100) or histologically, destructive non-suppurative cholangitis of the interlobular ducts [23].

Anti-mitochondrial 2 or anti-M2 antibodies

Being early markers, AMA anti-mitochondria can be detected by IFI on HEp-2 cells, on tissues (kidney, mouse stomach), or by immunoblot. The typing of these AMAs can be carried out by immunoblot, ELISA, and western blot. There are 10 types of AMAs. In PBC, anti-M2 or anti-pyruvate dehydrogenase, anti-M4 almost always associated with anti-M2, anti-M8, anti-M9, or anti-glycogen phosphorylase, and anti-M10 in the early forms can be found [11]. Presently, in 90% of cases, the anti-M2 has a cytoplasmic fluorescence of the filamentogranular type. They are very sensitive (90 to 95%) and quite specific. Since they can be detected before the onset of the clinical picture, the Anti-M2 titer is not correlated with the severity. After liver transplantation, the anti-Mi2 remains positive but at a reduced rate in IFI [24].

ANA

Anti-glycoproteins 210

Endowed with a specificity of 99%, they correspond to anti-nuclear antibodies with "rim-like" circled membrane fluorescence directed against nuclear pores. Found in 30% of PBC, they are predictive of progression to liver failure with a risk of liver transplantation [25].

Anti-sp100

The spioo antigen is a 100 kDa protein constituting a specific target during PBC. The anti-spioos are directed against nuclear bodies, unlike the anti-gp210s targeting the nuclear membrane. In IFI, the fluorescence is in large grains "dot blot". Their prognostic value is not as clear as that of anti-gp210 [26]. However, the combination of anti-gp210 and anti-spioo significantly increases the risk of portal hypertension and liver transplantation [27].

Anti-centromeres

Frequently found in limited systemic scleroderma, they can also be present in PBC. In the latter, their presence predisposes to

Zeroual C | Volume 4; Issue 2 (2024) | Mapsci- JIA-4(2)-046 | Review Article

Citation: Zeroual C. More Than a Classificatory and Diagnostic Marking, a Prognostic Importance of Antibodies in Autoimmune Liver Diseases. J Immuno Allerg. 2024;4(2):63-72.

DOI: https://doi.org/10.37191/Mapsci-2582-6549-4(2)-046

renal damage [28]. These anti-centromeres are also predictive of portal hypertension with an increase in its severity in parallel with the increase in their level [4].

Anti-p62

These are antibodies directed against the 62 kD nucleoporin protein. Their presence is frequent in stage 4 PBC, which corresponds to cirrhosis according to Scheuer's histological classification [29].

Anti-kelch-like 12 and anti-hexokinase 1

These two antibodies, recently discovered, are found in PBC. Research is still ongoing on their diagnostic and prognostic interests [30].

Primary sclerosing cholangitis

It is а sensing fibro-inflammatory involvement of the intra and/or extrahepatic bile ducts. Often associated with a chronic inflammatory bowel disease IBD, the diagnosis is based on chronic cholestasis, the histological typical or radiological abnormalities on the bili-MRI with an of arguments for secondary absence infectious, ischemic, lithiasis, and tumor cholangitis [31]. Unlike PBC, there are no specific or constant antibodies.

 x-anti-neutrophil cytoplasmic antibodies or x-ANCA: They are autoantibodies directed against the antigens present in the azurophilic granules of neutrophil polynuclear cells. The IFI makes it possible to define 3 types of antibodies: c-ANCA (cytoplasmic fluorescence), p-ANCA (perinuclear fluorescence), and xANCA or "atypical" p-ANCA (perinuclear fluorescence with a fine border) [32]. The x-ANCA does not have an identified antigenic target. They are observed in 40 to 70% of PSC and even during inflammatory bowel disease IBD (50 to 70% of ulcerative colitis and 2 to 20% of Crohn's disease). Their prognostic value is still poorly known [33].

Anti-glycoprotein 2 IgA or anti-gp2 2. IgA: This IgA-type antibody directed against pancreatic glycoprotein 2 is found in PSC with a distinct and more serious phenotype. It is an immunological marker whose presence during the PSC makes it possible to detect patients at high risk of developing cholangiocarcinoma. Its value predictive is confirmed. However, it remains to be integrated into clinical practice [34].

Overlap syndrome

It corresponds to the simultaneous or consecutive association of AIH with an autoimmune cholangiopathy, either PBC or PSC. The bone between AIH and PBC is more frequent (10% of PBC), while that between AIH and PBC is rare (less than 5% of PBC) [35]. Antibodies alone do not allow the diagnosis of a bone to be made. It is the combination of various clinical, biological, immunological, and histological elements that makes it possible to make the diagnosis. If a PBC is confirmed and in addition, F-actintype SMA, an overlap AIH-PBC syndrome is uncertain.

Zeroual C | Volume 4; Issue 2 (2024) | Mapsci- JIA-4(2)-046 | Review Article

Citation: Zeroual C. More Than a Classificatory and Diagnostic Marking, a Prognostic Importance of Antibodies in Autoimmune Liver Diseases. J Immuno Allerg. 2024;4(2):63-72.

DOI: https://doi.org/10.37191/Mapsci-2582-6549-4(2)-046

Antibodies	Liver's autoimmune disease associated	Diagnostic Value for First Time	Prognostic Value
	AIHı	+++	Anti-chromatin in the AIH1
	PBC		Anti-gp210 in the PBC:
ANA			Progression to failure and transplantation of the liver
			Anti-centromere in the PBC: Predisposition to renal impairment and pulmonary hypertension
Anti-M2	РВС	+++	No
ASMA-type F-actin	AIH1	+++	No
Anti-LKM1	AIH2	+++	In the AIH2, a title very high can be seen in cirrhosis. Their rate decreased after immunosuppressive therapy and liver transplantation
Anti-LC1	AIH2	No (in the second intention if the anti LKM1 are negative)	Similar to anti-LKM1
Anti-SLA/LP	AIH3 (Considered by the authors HAI1)	+++	Their presence is predictive of AIH de novo or recurrence after liver transplantation
Anti-ASGPR	AIH	No (in second intention)	Correlation between their presence and the activity of histological

Zeroual C | Volume 4; Issue 2 (2024) | Mapsci- JIA-4(2)-046 | Review Article **Citation:** Zeroual C. More Than a Classificatory and Diagnostic Marking, a Prognostic Importance of Antibodies in Autoimmune Liver Diseases. J Immuno Allerg. 2024;4(2):63-72. **DOI:** https://doi.org/10.37191/Mapsci-2582-6549-4(2)-046

			Relapse after immunosuppressive treatment if rates remain high
Anti-SSA/R052	AIH ₃	No	Similar to anti-SLA
Anti-DNA native	AIH	No	Their presence is a sign of poor prognosis
	Overlap syndrome with AIH	+++	Poorly-known
	РВС		
Anti-p62	РВС	No	Presence at the stage of cirrhosis
Anti-Kelch-like 12(anti-KLH12), anti- hexokinase1(antiHK1)	РВС	No	Misunderstood
x-ANCA	AIH	No	Poorly-known
	PSC		
Anti-GP2 IgA	PSC	No	High risk of cholangiocarcinoma

Table 2: The autoantibodies found in liver autoimmune diseases (diagnostic and prognostic values).

Similarly, a bone is possible in a patient who has a confirmed HAI with negative AMAs. This seronegative AIH-PBC profile has a risk of more severe disease and more extensive fibrosis [36].

Double-stranded or native anti-DNA

Associated with anti-M₂, the native anti-DNA seems to be a serological markers of the AIH-PBC overlap syndrome [22]. Research is still underway as to their diagnostic and prognostic interests. Diagnostic and prognostic value of antibodies in autoimmune liver diseases. In autoimmune liver and biliary diseases, the autoantibodies have an important utility in the diagnosis and prognosis that varies from one antibody to another (Table 2). ANA and ASMA of the F-actin type make it possible to diagnose AIH1. On the other hand, the anti-LKM1 and anti-LC1 define AIH2. The AIH3 is a class that is denied by authors and considered a particular form

Zeroual C | Volume 4; Issue 2 (2024) | Mapsci- JIA-4(2)-046 | Review Article

Citation: Zeroual C. More Than a Classificatory and Diagnostic Marking, a Prognostic Importance of Antibodies in Autoimmune Liver Diseases. J Immuno Allerg. 2024;4(2):63-72. **DOI:** https://doi.org/10.37191/Mapsci-2582-6549-4(2)-046

of the AIH-1. It includes anti-SLA/LP. ANA and ASMA of the F-actin type make it possible to diagnose AIH1.

On the other hand, the anti-LKM1 and anti-LC1 define AIH2. The AIH3 is a class that is denied by authors and considered a particular form of the AIH-1. It includes anti-SLA/LP. In the 3 classes of AIH, the presence of native anti-ASGPR and anti-DNA is correlated with histological activity and relapse after immunosuppressive treatment if the levels remain high. In AIH1, anti-chromatins have a poor prognosis, whereas, in AIH2, it is anti-LKM1 and anti-LC1 that predispose to cirrhosis if the levels remain high. Moreover, in AIH3, anti-SSA/Ro52 are markers of severity, in particular, given their frequent association with anti-SLA/LP. In PBC, anti-M₂ are early and specific markers. In case of negativity, the anti-gp210 and anti-sp100 help in the diagnosis.

The combination has a derogatory prognostic value (hepatic insufficiency, portal hypertension, and liver transplantation). Anti-centromeres and anti-p62 are also markers of poor prognosis. PSC, unlike AIH and PBC, does not have specific antibodies. However, the x-ANCA retains their diagnostic contribution and their prognostic value is still poorly known. Anti-gp2 IgA, on the other hand, is associated with a high risk of developing cholangiocarcinoma.

Conclusion

The diagnosis of autoimmune liver diseases is based on a bundle of clinical-biological, immunological, and sometimes histological arguments. Antibodies are a great help to the clinician to label the pathology and predict possible complications. This then allows to process correctly and prepare for subsequent challenges.

References

- 1. Krawitt EL. Autoimmune Hepatitis. Engl N J Med. 2006;354:54-66. <u>PubMed | CrossRef</u>
- 2. Manns MP, Czaja AJ, Gorham JD, Krawitt EL, Mieli-Vergani G, Vergani D, et al. Diagnosis and Management of Autoimmune Hepatitis. Hepatology. 2010;51(6):2193-213. <u>PubMed | CrossRef</u>
- 3. Johanet C, Dubel L, Chazouillères O. Autoantibodies in Hepatology. Pathologie-biologie. 1999;47(9):997-1005. <u>PubMed</u>
- 4. Sebode M, Weiler-Normann C, Liwinski T, Schramm C. Autoantibodies in Autoimmune Liver Disease-clinical and Diagnostic Relevance. Front Immunol. 2018;9:609. <u>PubMed</u> | <u>CrossRef</u>
- 5. Duclos-Vallée JC. Autoimmune Hepatitis: Pathophysiological, Clinical and Therapeutic Aspects. Act Med. Int Gastroenterol. 2000;14:48-51.
- 6. Qiu D, Wang Q, Wang H, Xie Q, Zang G, Jiang H, et al. Validation of the Simplified Criteria for Diagnosis of Autoimmune Hepatitis in Chinese Patients. J Hepatol. 2011;54(2):340-7. <u>PubMed | CrossRef</u>
- 7. Hennes EM, Zeniya M, Czaja AJ, Pares A, Dalekos G, Krawitt E, et al. Simplified Diagnostic Criteria for Autoimmune Hepatitis. Hepatology. 2008;48:169-76. <u>PubMed | CrossRef</u>
- 8. Kanzler S, Weidemann C, Gerken G, Löhr HF, Galle PR, Lohse AW, et al. Clinical Significance of Autoantibodies to Soluble Liver Antigen in Autoimmune Hepatitis. J Hepatol. 1999;31(4):635-40. <u>PubMed | CrossRef</u>
- 9. Duclos-Vallée JC, Ballot E, Huguet S, Johanet C. Autoimmune Hepatitis. Gastroenterol Clin Biol. 2005;29(12):1236-43.

- Vergani D, Alvarez F, Bianchi FB, Cançado EL, Mackay IR, Manns MP, et al. Liver Autoimmune Serology: A Consensus Statement from the Committee for Autoimmune Serology of the International Autoimmune Hepatitis Group. J Hepatol. 2004;41(4):677-83.
- 11. Fabien N, Monier JC. Principle, Advantages and Disadvantages of the Immunoblot Technique in the Context of Antibody Detection. 2005:15-20.
- 12. Brahim I, Hazime R, Admou B. Autoimmune Hepatitis: Immunological Diagnosis. Presse Medicale. 2017;46(11):1008-19.
- 13. Liberal R, Mieli-Vergani G, Vergani D. Clinical Significance of Autoantibodies in Autoimmune Hepatitis. J Autoimmun. 2013;46:17-24. <u>PubMed | CrossRef</u>
- 14. Johanet C, Huguet-Jacquot S, Eyraud V, Ballot E. Auto-anticorps and Hepatic Pathologies. Francophone J Lab. 2006(387):25-33.
- 15. Toh BH, Taylor R, Pollock W, Dearden S, Gill CC, Buchner C, et al. 'Actin-reactive' Discriminated from 'Nonactin-reactive' Smooth Muscle Autoantibody by Immunofluorescence Reactivity with Rat Epithelial Cell Line. Pathology. 2010;42(5):463-9. <u>PubMed</u> | <u>CrossRef</u>
- Homberg JC, Abuaf N, Bernard O, Islam S, Alvarez F, Khalil SH, et al. Chronic Active Hepatitis Associated with Antiliver/Kidney Microsome Antibody Type 1: A Second Type of "Autoimmune" Hepatitis. Hepatology. 1987;7(6):1333-9. <u>PubMed | CrossRef</u>
- 17. Martini E, Abuaf N, Cavalli F, Durand V, Johanet C, Homberg JC. Antibody to Liver Cytosol (anti-LC1) in Patients with Autoimmune Chronic Active Hepatitis Type 2. Hepatology. 1988;8(6):1662-6. <u>PubMed | CrossRef</u>
- 18. Wies I, Brunner S, Henninger J, Herkel J, Kanzler S, Lohse AW, et al. Identification of Target Antigen for SLA/LP Autoantibodies in Autoimmune Hepatitis. Lancet. 2000;355(9214):1510-5. <u>PubMed | CrossRef</u>
- 19. Chen ZX, Shao JG, Shen Y, Zhang J, Hua Y, Wang LJ, et al. Prognostic Implications of Antibodies to Soluble Liver Antigen in Autoimmune Hepatitis: A PRISMA-compliant Meta-analysis. Medicine. 2015;94(23). <u>PubMed</u> | <u>CrossRef</u>
- 20. Löhr H, Treichel U, Poralla T, Manns M, Büschenfelde KH, Fleischer B. The Human Hepatic Asialoglycoprotein Receptor is a Target Antigen for Liver-infiltrating T cells in Autoimmune Chronic Active Hepatitis and Primary Biliary Cirrhosis. Hepatology. 1990;12(6):1314-20. <u>PubMed | CrossRef</u>
- 21. Oke V, Wahren-Herlenius M. The Immunobiology of Ro52 (TRIM21) in Autoimmunity: A Critical Review. J Autoimmun. 2012;39(1-2):77-82. <u>PubMed | CrossRef</u>
- 22. Reynaud P, Nespola B, Chantran Y, Desgruelles C, Goetz J, Ballot E, et al. Anti-DNA Antibodies and Antinucleosome Antibodies. Francophone J Lab. 2016;484BIS:48-53.
- 23. Worman HJ, Courvalin JC. Antinuclear Antibodies Specific for Primary Biliary Cirrhosis. Autoimmunity Reviews. 2003;2(4):211-7. <u>PubMed</u> | <u>CrossRef</u>
- 24. Johanet C, Ballot E. Autoantibodies and Liver. The Hepato-Gastroenterologist's Letter 2002;4:200-2.
- 25. Itoh S, Ichida T, Yoshida T, Hayakawa A, Uchida M, Matsuda Y, et al. Autoantibodies Against a 210kDa Glycoprotein of the Nuclear Pore Complex as a Prognostic Marker in Patients with Primary Biliary Cirrhosis. J Gastroenterol Hepatol. 1998;13(3):257-65. <u>PubMed</u> | <u>CrossRef</u>
- 26. Muratori P, Muratori L, Cassani F, Terlizzi P, Lenzi M, Rodrigo L, et al. Anti-multiple Nuclear Dots (anti-MND) and Anti-SP100 Antibodies in Hepatic and Rheumatological Disorders. Clin Exp Immunol. 2002;127(1):172-5. PubMed | CrossRef
- 27. Chantran Y, Corpechot C, Haddouk D, Gaouar F, Ballot E, Johanet C, et al. Anti-gp210 Antibodies and Anti-sp100 Antibodies in Primary Biliary Cirrhosis: A Very Poor Prognosis Association. Francophone J Lab. 2014; 464BIS:21.
- 28. Mandai S, Kanda E, Arai Y, Hirasawa S, Hirai T, Aki S, et al. Anti-centromere Antibody is an Independent Risk Factor for Chronic Kidney Disease in Patients with Primary Biliary Cirrhosis. Clin Exp Nephrol. 2013;17:405-10. PubMed | CrossRef
- 29. Wesierska-Gadek J, Klima A, Komina O, Ranftler C, Invernizzi P, Penner E. Characterization of Autoantibodies against Components of the Nuclear Pore Complexes: High Frequency of Anti-p62 Nucleoporin Antibodies. Ann N Y Acad Sci. 2007;1109:519-30. <u>PubMed</u> | <u>CrossRef</u>

Zeroual C | Volume 4; Issue 2 (2024) | Mapsci- JIA-4(2)-046 | Review Article

Citation: Zeroual C. More Than a Classificatory and Diagnostic Marking, a Prognostic Importance of Antibodies in Autoimmune Liver Diseases. J Immuno Allerg. 2024;4(2):63-72.

DOI: https://doi.org/10.37191/Mapsci-2582-6549-4(2)-046

- 30. Norman GL, Yang CY, Ostendorff HP, Shums Z, Lim MJ, Wang J, et al. Anti-kelch-like 12 and Anti-hexokinase 1:Novel Autoantibodies in Primary Biliary Cirrhosis. Liver Int. 2015;35(2):642-51. <u>PubMed | CrossRef</u>
- 31. Lindor KD, Kowdley KV, Harrison EM. ACG Clinical Guideline: Primary Sclerosing Cholangitis. Am J Gastroenterol. 2015;110(5):646-59. PubMed | CrossRef
- 32. Seibold F, Slametschka D, Gregor M, Weber P. Neutrophil autoantibodies: A Genetic Marker in Primary Sclerosing Cholangitis and Ulcerative Colitis. Gastroenterology. 1994;107(2):532-6. <u>PubMed | CrossRef</u>
- 33. Rizvi S, Yang JD, Gores GJ. Anti-GP2 IgA: A Biomarker for Disease Severity and/or Cholangiocarcinoma in Primary Sclerosing Cholangitis. Gut. 2017;66(1):4-5. <u>PubMed | CrossRef</u>
- 34. Bunchorntavakul C, Reddy KR. Diagnosis and Management of Overlap Syndromes. Clin Liver Dis. 2015;19(1):81-97. <u>PubMed | CrossRef</u>
- 35. Berg PA, Klein R. Autoimmune Hepatitis and Overlap Syndrome: Diagnosis. Praxis. 2002;91(34):1339-46. PubMed | CrossRef
- Chazouillères O, Wendum D, Serfaty L, Montembault S, Rosmorduc O, Poupon R. Primary Biliary Cirrhosisautoimmune Hepatitis Overlap Syndrome: Clinical Features and Response to Therapy. Hepatology. 1998;28(2):296-301. <u>PubMed | CrossRef</u>