ASIDE

ASIDE Gastroenterology

ASIDE GASTROENTEROLOGY

Original Article

Clinical, Immunological and Outcome Features of Autoimmune Liver Diseases: A Single-Center Retrospective Case Series of 14 Patients

Afaf Aallam[1,*], Chaïmaâ Zeroual[1], Leila Barakat[1], Khadija Echchilali[1], Mina Moudatir[1], Hassan El Kabli[1]

1-Department of Internal Medicine, Ibn Rochd University Hospital, Faculty of Medicine and Pharmacy, Hassan II University of Casablanca, Casablanca, Morocco

ARTICLE INFO

Article history:
Received 13 Jan. 2026
Received in revised form 22 Oct. 2026
Accepted 8 Nov. 2026
Published 24 Nov. 2026

Keywords:
Autoimmune hepatitis
Primary biliary cholangitis
Overlap syndrome
Autoantibodies
Transient elastography
Morocco

ABSTRACT

Introduction: Autoimmune liver diseases (AILDs), including autoimmune hepatitis (AIH), primary biliary cholangitis (PBC), and AIH–PBC overlap syndrome, are rare immune-mediated conditions. Data from North Africa remain limited.
Methods: We conducted a retrospective case series of all patients diagnosed with an AILD between January 2020 and December 2024 in the Internal Medicine Department of a tertiary university hospital in Casablanca, Morocco. Diagnoses relied on the simplified AIH score, European criteria for PBC, and the Paris criteria for overlap syndrome. Data are reported at patient level.
Results: Fourteen patients were included (13 women; mean age 44.4 ± 10.9 years). Diagnoses were PBC (n = 8), AIH (n = 4), and overlap syndrome (n = 2). Eight patients (57%) had another autoimmune disease. Presenting features included jaundice (4/14, 29%), right upper quadrant pain (4/14, 29%), pruritus (3/14, 21%), and incidental abnormal liver tests (3/14, 21%). Antinuclear antibodies were positive in 12/14 (86%) and antimitochondrial antibodies in 8/14 (57%; 6/8 PBC). Transient elastography showed advanced fibrosis (F3–F4) in 4/6 patients assessed. At last follow-up (≥ 6 months unless the patient died or was lost to follow-up), 4 patients (29%) had a complete and 4 (29%) a partial biochemical response; 1 overlap patient was refractory to treatment, 1 patient with AIH died of decompensated cirrhosis, and 4 (29%) were lost to follow-up.
Conclusions: In this small series, PBC predominated, associated autoimmune diseases were frequent, advanced fibrosis was common at diagnosis, and two patients with PBC later developed AIH features. Larger prospective studies with structured follow-up are needed.

1. Introduction

Autoimmune liver diseases (AILDs) are chronic disorders characterized by an abnormal immune response directed against hepatocytes and/or biliary epithelial cells. They include autoimmune hepatitis (AIH), primary biliary cholangitis (PBC), primary sclerosing cholangitis (PSC), and overlap or variant forms [1, 2]. Because no single test is diagnostic, diagnosis relies on a combination of clinical, biochemical, serological, histological and imaging criteria [3, 4].

The incidence and prevalence of AIH and PBC have increased worldwide, but available estimates come mainly from Europe, North America and Asia [5, 6]. Data from North Africa remain scarce. Differences in clinical presentation, access to liver biopsy and specialized serology, and associated autoimmune conditions may influence disease recognition and outcomes in this region.

The objective of this case series was to describe the clinical, immunological, therapeutic, and outcome characteristics of patients diagnosed with AILDs in a single tertiary center in Casablanca, Morocco, with patient-level reporting of diagnostic features, treatment, and follow-up.

2. Materials and Methods

2.1. Study design and setting

This retrospective descriptive case series was conducted in the Internal Medicine Department of Ibn Rochd University Hospital, Casablanca, Morocco, a tertiary referral center, and included patients diagnosed between January 2020 and December 2024. Reporting follows the CARE guidelines as applicable to case series; the completed checklist is provided as Supplementary File S1.

2.2. Patient identification and selection

Patients were identified through the department's hospitalization and outpatient registers. Inclusion criteria were: (i) age ≥ 18 years; (ii) a final diagnosis of AIH, PBC, PSC or overlap syndrome meeting the criteria below; and (iii) a medical record containing the diagnostic work-up (clinical data, liver

* Corresponding author: Afaf Aallam, Department of Internal Medicine, Ibn Rochd University Hospital, Casablanca, Morocco. Email: afafaallam@gmail.com

Published and owned by PubPorta Publishing LLC. Academic oversight and scholarly guidance are provided by the American Society for Inclusion, Diversity, and Equity in Healthcare (ASIDE). ISSN (Print): 3066-4004, ISSN (Online): 3066-4012. ©2026 The Author(s). This is an open-access article distributed under the terms of the Creative Commons Attribution 4.0 International License (CC BY 4.0). Hosting by ASIDE Journals.

Citation: Aallam A, Zeroual C, Barakat L, Echchilali K, Moudatir M, El Kabli H. Clinical, Immunological and Outcome Features of Autoimmune Liver Diseases: A Single-Center Retrospective Case Series of 14 Patients. ASIDE GI. 2026;2(4):70-81, doi:10.71079/ASIDE.GI.112426502

tests, autoantibody panel and imaging) and treatment data. Patients with an alternative cause of liver disease were excluded. Twenty patients with a diagnosis of AILD during the study period were identified, including three not captured by the initial search and identified during a systematic re-screening of records performed during the preparation of this manuscript. Six were excluded because essential data were missing from their medical records, and 14 patients were included (Figure 1).

2.3. Diagnostic criteria

- AIH: simplified International Autoimmune Hepatitis Group criteria [7]: autoantibodies (antinuclear antibodies [ANA] or smooth muscle antibodies [SMA] ≥ 1:40, 1 point; ANA or SMA ≥ 1:80, anti-liver kidney microsome type 1 [anti-LKM1] ≥ 1:40 or anti-soluble liver antigen [anti-SLA] positive, 2 points), immunoglobulin G (IgG > upper limit of normal [ULN], 1 point; > 1.1 × ULN, 2 points), liver histology (compatible, 1 point; typical, 2 points) and absence of viral hepatitis (2 points). A score ≥ 6 was defined as probable AIH and ≥ 7 as definite AIH. Because serum IgG was not routinely measured and histology was not always available, the score could not be fully computed in all patients; diagnosis then relied on autoantibodies, histology when available, exclusion of other causes, and response to immunosuppression, in line with current guidance [3].
- PBC: European Association for the Study of the Liver (EASL) criteria [4]: chronic cholestasis (elevated alkaline phosphatase [ALP]) with antimitochondrial antibodies (AMA) > 1:40 or, in AMA-negative patients, PBC-specific ANA (anti-sp100 or anti-gp210) or compatible histology.
- AIH–PBC overlap syndrome: Paris criteria [8], i.e., at least two of three criteria for each disease. PBC: ALP ≥ 2 × ULN or gamma-glutamyl transferase (GGT) ≥ 5 × ULN; AMA positivity; florid bile duct lesions on histology. AIH: alanine aminotransferase (ALT) ≥ 5 × ULN; IgG ≥ 2 × ULN or SMA positivity; moderate or severe interface hepatitis on histology.

Other causes of liver disease were excluded in all patients: viral hepatitis (HBsAg, anti-HBc and anti-HCV antibodies), alcohol-related liver disease (history of alcohol intake), drug-induced liver injury (medication history), metabolic causes and biliary obstruction (ultrasound, and magnetic resonance cholangiopancreatography [MRCP] when available). The features supporting each diagnosis are reported per patient in Table 3.

2.4. Laboratory thresholds and clinical definitions

Upper limits of normal of our laboratory were: aspartate aminotransferase (AST) 40 IU/L, ALT 40 IU/L, ALP 120 IU/L, GGT 40 IU/L, and total bilirubin 12 mg/L (≈ 20 µmol/L). The following definitions were used:

- Cytolysis: AST and/or ALT > 1 × ULN.
- Cholestasis: ALP and/or GGT > 1 × ULN.
- Hyperbilirubinemia: total bilirubin > ULN.
- Hepatocellular insufficiency: prothrombin time (PT) < 70% and/or serum albumin < 35 g/L, in the absence of anticoagulant therapy.
- Hypergammaglobulinemia: increased gamma-globulin fraction on serum protein electrophoresis (SPE).
- Advanced fibrosis (F3–F4): fibrosis stage (METAVIR-equivalent) assessed by vibration-controlled transient elastography (FibroScan®), as reported by the operator [4, 9]; individual liver stiffness values (kPa) were not available in the medical records.

2.5. Serological testing

ANA were detected by indirect immunofluorescence (IIF) on HEp-2 cells, with a positivity threshold of 1:80. AMA, anti-sp100, anti-gp210, anti-LKM1, anti-liver cytosol type 1 (anti-LC1), anti-SLA/liver-pancreas (anti-SLA/LP) and anti-actin (SMA) antibodies were tested by immunodot, using the manufacturer's positivity cut-offs. All 14 patients were tested for each of these antibodies. Serum IgG was not routinely measured (available in one patient), so that the simplified AIH score could not be fully computed.

2.6. Data collection

Data were extracted from paper and electronic medical records using a standardized form by the first author (A.A.) and were verified against the source records by a second investigator; discrepancies were resolved by consensus. Variables included demographic data, personal and family history, clinical presentation, laboratory values at diagnosis (AST, ALT, ALP, GGT, total and conjugated bilirubin, albumin, PT, C-reactive protein, SPE), autoantibodies, imaging, transient elastography, histology, treatment (drugs, doses and duration), adverse events and outcomes.

2.7. Treatment response, follow-up and outcome definitions

- Complete biochemical response: normalization of aminotransferases, ALP, GGT and bilirubin (and of gamma-globulins for AIH) [3, 10].
- Partial biochemical response: decrease of more than 50% in aminotransferases, ALP and GGT from baseline without normalization.
- Relapse: re-increase of aminotransferases and/or cholestasis markers above the ULN after an initial biochemical improvement.
- Follow-up duration: time from diagnosis to the last available visit or death. Outcomes were assessed at the last available follow-up. Patients who did not attend any visit after the diagnostic work-up were classified as lost to follow-up.

2.8. Statistical analysis

Data were analyzed descriptively. Continuous variables are expressed as mean ± standard deviation or median (range),

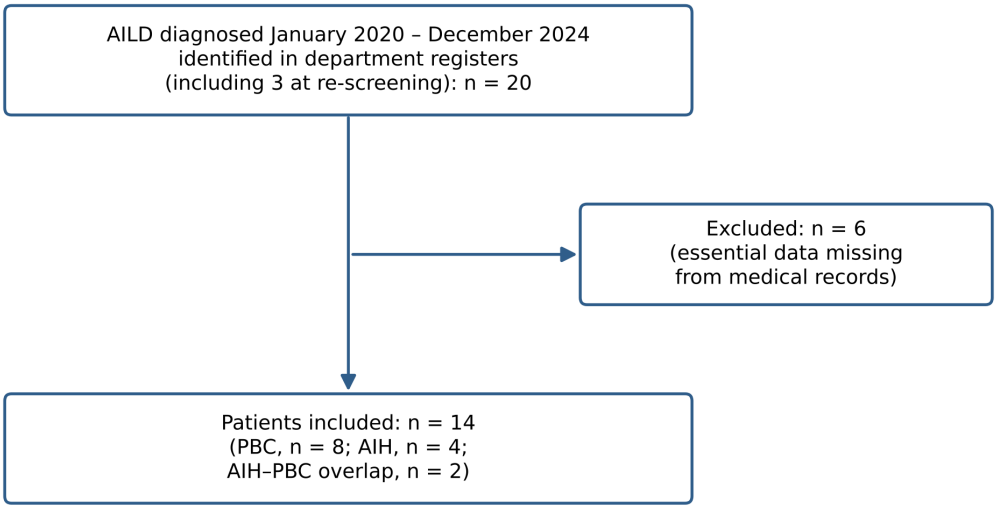

Figure 1: Flowchart of patient identification and selection. AIH, autoimmune hepatitis; AILD, autoimmune liver disease; PBC, primary biliary cholangitis.

and categorical variables as n/N (%), where N is the number of patients in whom the variable was assessed. Percentages were rounded to the nearest integer. Given the sample size, no inferential testing was performed.

2.9. Ethical considerations

In accordance with the policy of Ibn Rochd University Hospital, a university teaching institution, formal ethics committee approval was not required for this retrospective, non-interventional analysis of anonymized data collected during routine care (IRB approval: not applicable). For the same reason, and because no intervention or additional data collection was performed, individual informed consent was not required. Data were anonymized at extraction: each patient was assigned a study code (P1–P14), and no directly identifying information (name, record number, date of birth) was recorded in the analysis dataset, which was stored on a password-protected institutional computer accessible only to the investigators. The study was conducted in accordance with the Declaration of Helsinki.

3. Results

3.1. Patient selection and characteristics

Fourteen patients were included (Figure 1). Thirteen were women (93%); the mean age at diagnosis was 44.4 ± 10.9 years (median 43; range 19–63) (Figure 2A–B). Final diagnoses were PBC in 8 patients (57%), AIH in 4 (29%), and AIH–PBC overlap syndrome in 2 (14%); no case of PSC was identified (Figure 2C). Eight patients (57%) had at least one associated autoimmune disease: Sjögren's syndrome (n = 4), systemic sclerosis (n = 3, including one systemic sclerosis sine scleroderma), systemic lupus erythematosus (SLE; n = 2), and antiphospholipid syndrome, dermatomyositis, and Hashimoto's thyroiditis (n = 1 each); three patients had more than one (Figure 3). One patient (P9) was a smoker, without alcohol consumption. Patient-level characteristics are shown in Table 1.

3.2. Clinical presentation

Jaundice was present at diagnosis in 4 patients (29%), right upper quadrant pain in 4 (29%), generalized pruritus in 3 (21%), and abnormal liver tests were discovered incidentally in 3 (21%). One patient with PBC-related cirrhosis presented with ecchymoses (P6), one with splenomegaly and leukopenia (P11), and one patient with AIH had clinical signs of decompensated liver disease (ascites, lower-limb edema and gynecomastia; P9) (Figure 4A; Table 1). Extrahepatic manifestations included sicca syndrome and inflammatory arthralgias (n = 3) and cutaneous vasculitis with peripheral neuropathy (n = 1).

3.3. Laboratory findings

Laboratory values are shown per patient in Table 2. Cholestasis was present in all 14 patients (100%), with ALP ≥ 2 × ULN in 5/13 tested; cytolysis was present in 12/14 (86%), with ALT ≥ 5 × ULN in 7/14. Hyperbilirubinemia was found in 3/8 patients tested (38%), signs of hepatocellular insufficiency in 4/14 (29%), and hypergammaglobulinemia on SPE in 6/9 patients tested (67%) (Figure 4B).

3.4. Immunological profile

All 14 patients were tested for each autoantibody (Table 3; Figure 5). ANA were positive in 12/14 (86%), 7 of whom had an associated systemic autoimmune disease. AMA were detected in 8/14 patients (57%): 6/8 patients with PBC (75%) and both patients with overlap syndrome; they were equivocal in one patient with AIH (P9). The two AMA-negative PBC patients (P8, P10) were positive for anti-gp210. Anti-sp100 antibodies were found in 3 patients (21%), all with AMA-positive PBC. Among AIH-related antibodies, anti-LC1 was positive in 2 patients (14%), anti-SLA in 2 (14%), and anti-actin in 1 (7%); anti-LKM1 and anti-LP were negative in all

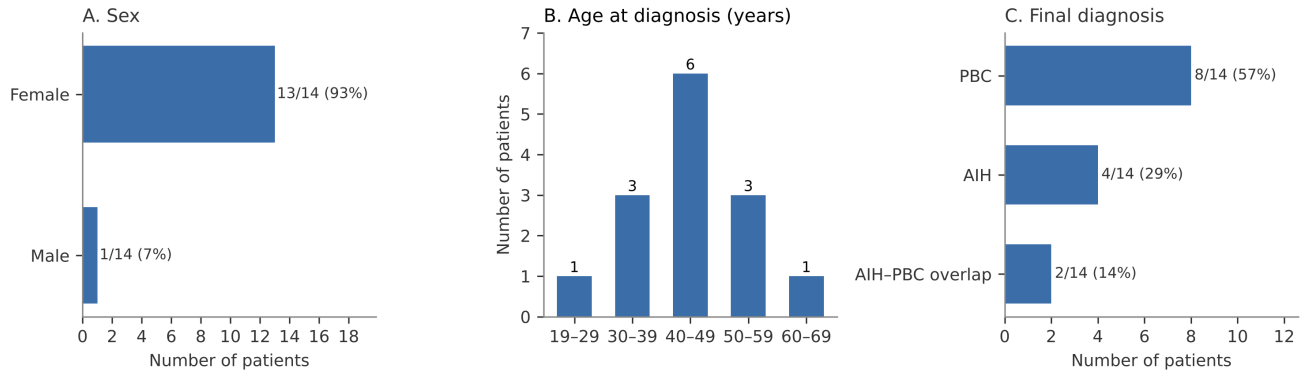

Figure 2: Demographic characteristics and final diagnoses (n = 14). (A) Sex. (B) Age at diagnosis. (C) Final diagnosis. AIH, autoimmune hepatitis; PBC, primary biliary cholangitis.

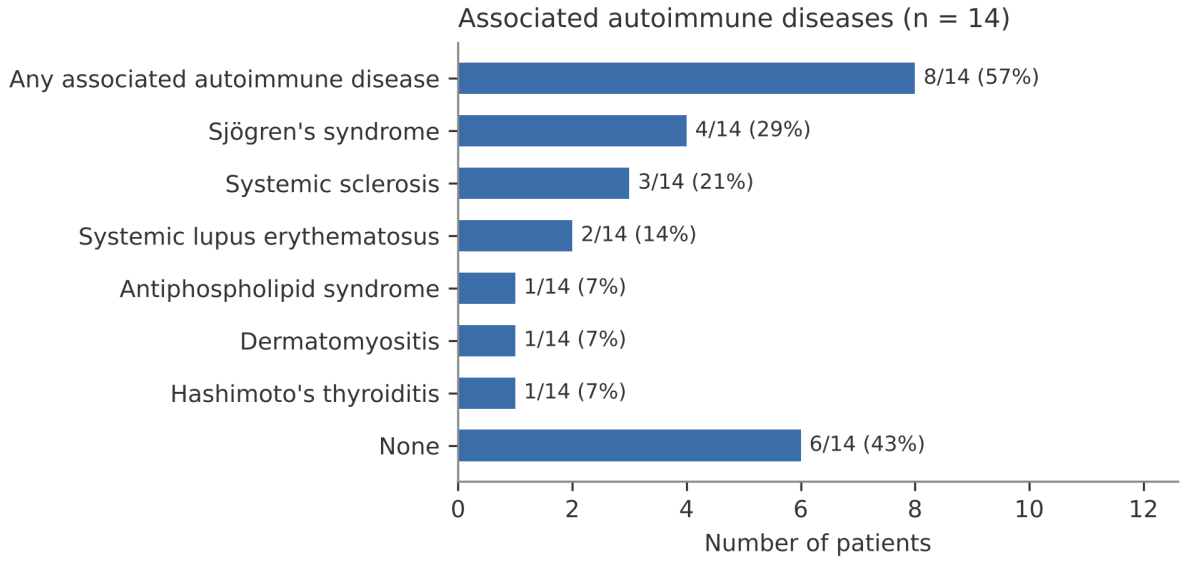

Figure 3: Autoimmune diseases associated with autoimmune liver diseases (n = 14). A patient may have more than one associated disease.

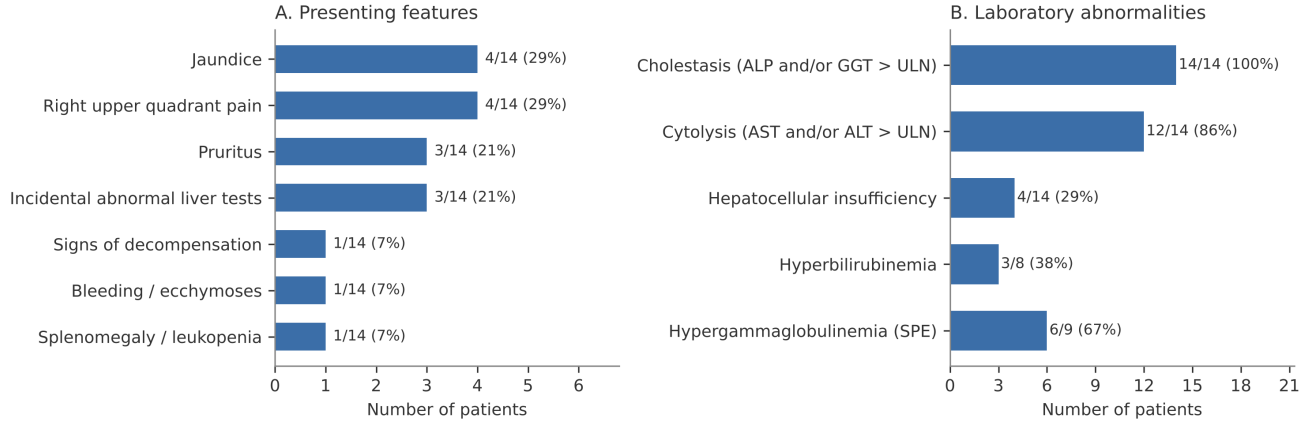

Figure 4: (A) Presenting features (a patient may have more than one). (B) Laboratory abnormalities at diagnosis; denominators are the numbers of patients tested. Definitions and upper limits of normal (ULN) are given in the Methods. ALP, alkaline phosphatase; ALT, alanine aminotransferase; AST, aspartate aminotransferase; GGT, gamma-glutamyl transferase; SPE, serum protein electrophoresis.

Table 1: Patient-level demographic and clinical characteristics at diagnosis

Patient	Age (y)/sex	Associated autoimmune disease(s) and history	Presenting features	Extrahepatic manifestations	Final diagnosis
P1	44/F	Sjögren's syndrome	RUQ pain	Sicca syndrome, inflammatory arthralgias	AIH (seronegative, cholestatic features)
P2	36/F	Systemic sclerosis (cutaneous, digestive, pulmonary)	Jaundice (clinical cholestasis)	—	PBC
P3	43/F	None	Jaundice, general deterioration	—	PBC
P4	55/F	Antiphospholipid syndrome; systemic sclerosis sine scleroderma	Incidental abnormal liver tests	Related to APS	PBC
P5	56/F	None (photosensitivity, atopy)	Pruritus, general deterioration, palmar erythema	Sicca syndrome, inflammatory arthralgias	PBC
P6	63/F	None	Ecchymoses, asthenia, RUQ pain	—	PBC (cirrhosis)
P7	42/F	Systemic sclerosis, dermatomyositis (myelodysplastic syndrome)	Incidental cytolysis	—	AIH
P8	56/F	SLE, Sjögren's syndrome, Hashimoto's thyroiditis	Pruritus	—	PBC (AMA-negative)
P9	46/M	None (smoker)	Jaundice, general deterioration, ascites, edema, gynecomastia	—	AIH
P10	39/F	SLE	Pruritus	—	PBC (AMA-negative)
P11	19/F	None	Splenomegaly, leukopenia	—	PBC
P12	43/F	Sjögren's syndrome	Jaundice	Sicca syndrome, inflammatory arthralgias	AIH–PBC overlap (sequential)
P13	40/F	Sjögren's syndrome	Incidental abnormal liver tests, asthenia, RUQ pain	Cutaneous vasculitis, peripheral neuropathy	AIH (type 1)
P14	39/F	None	RUQ pain, asthenia	—	AIH–PBC overlap (sequential)

AIH, autoimmune hepatitis; AMA, antimitochondrial antibodies; APS, antiphospholipid syndrome; F, female; M, male; PBC, primary biliary cholangitis; RUQ, right upper quadrant; SLE, systemic lupus erythematosus.

patients. One patient with AIH (P1) was negative for all tested autoantibodies (seronegative AIH).

3.5. Imaging, elastography and histology

Abdominal ultrasound, performed in 10 patients, was abnormal in 7: cirrhotic or dysmorphic liver (n = 3, with ascites in one), splenomegaly (n = 3) and isolated hepatomegaly (n = 1). Computed tomography in one patient (P2) showed hepatomegaly with multiple small hypodense tissue lesions. MRCP, performed in 4 patients, showed no features of PSC; incidental findings were a biliary cyst (P1), a hemangioma (P3), and a multinodular liver with steatosis (P12). Transient elastography, performed in 6 patients, showed advanced fibrosis (F3–F4) in 4 (67%): 3 with PBC (F3, F3, F4) and 1 with AIH (F3). Liver biopsy was performed in 4 patients and was diagnostic in 3 (Table 3); it was refused by one patient (P14) and was not performed in the others mainly because AMA-positive PBC does not require histological confirmation, or because of contraindication or limited access.

3.6. Treatment, follow-up and outcomes

Treatment and outcomes are reported per patient in Table 4. All patients who neither died nor were lost to follow-up were followed for at least 6 months after diagnosis (more than 4 years in P12); outcomes were assessed at the last available follow-up.

AIH (n = 4). P1 received prednisone 30 mg/day with ursodeoxycholic acid (UDCA, 13–15 mg/kg/day), followed by azathioprine (3 mg/kg/day), and achieved complete normalization of liver tests by day 18. Two patients (P7, P13) received corticosteroids (1 mg/kg/day, progressively tapered) combined with azathioprine (3 mg/kg/day) and achieved a complete biochemical response (normalization at day 15 in P7, day 21 in P13). The fourth patient (P9) received corticosteroids and azathioprine at the same doses; he progressed rapidly to decompensated cirrhosis with hepatocellular insufficiency and died one month after diagnosis (illustrative case 3).

Table 2: Laboratory values at diagnosis

Patient	AST (IU/L)	ALT (IU/L)	ALP (IU/L)	GGT (IU/L)	Total bilirubin (mg/L)	Albumin (g/L)	PT (%)	CRP (mg/L)	Serum protein electrophoresis
ULN / normal	40	40	120	40	12	≥ 35	≥ 70	< 6	
P1	445	315	375	378	4.7	35	100	Normal	Normal
P2	68	71	303	515	3.6	43	100	13	Polyclonal ↑ alpha-1 (inflammatory)
P3	203	194	1445	913	17	38	100	2	↑ gamma and beta-1
P4	48	43	168	103	13	NA	Low (on VKA)	12	ND
P5	35	27	129	53	6.8	42	100	2	NA
P6	40	34	210	137	NA	32	100	32	Restricted heterogeneity of gamma zone
P7	133	228	190	98	6.4	26	60	25	↑ gamma
P8	90	175	NA	789	NA	NA	100	16	NA
P9	644	949	108	199	159	24	26	NA	Beta–gamma bridging
P10	181	274	477	1025	NA	37	100	Normal	ND
P11	79	88	182	207	12	NA	78	3	Polyclonal ↑ gamma
P12*	327	239	361	160	NA	28	79	42	Polyclonal ↑ gamma
P13	336	450	78	43	NA	35	100	4	ND
P14*	74	230	78	371	NA	38	80	2	↑ gamma

ALP, alkaline phosphatase; ALT, alanine aminotransferase; AST, aspartate aminotransferase; CRP, C-reactive protein; GGT, gamma-glutamyl transferase; NA, not available; ND, not done; PT, prothrombin time; ULN, upper limit of normal; ↑, increased; VKA, vitamin K antagonist. Total bilirubin: 1 mg/L ≈ 1.71 µmol/L. *P12, P14: values at the time of the hepatic flare (sequential overlap).

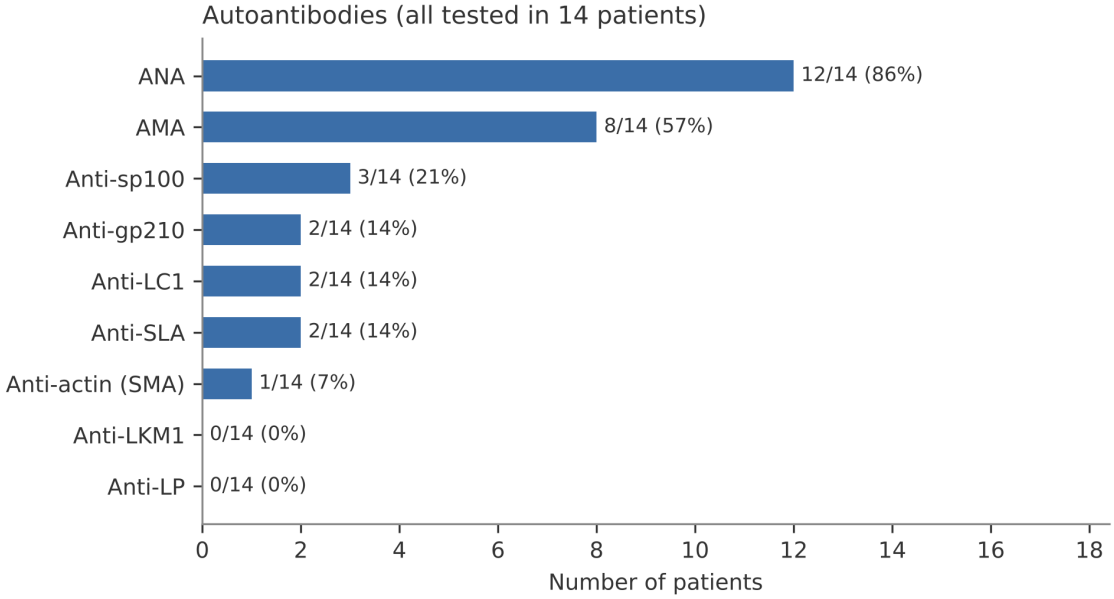

Figure 5: Autoantibody profile (n = 14). AMA, antimitochondrial antibodies; ANA, antinuclear antibodies; anti-LC1, anti-liver cytosol type 1; anti-LKM1, anti-liver kidney microsome type 1; anti-LP, anti-liver-pancreas; anti-SLA, anti-soluble liver antigen; SMA, smooth muscle antibodies.

Table 3: Autoantibodies, histology, elastography and criteria supporting each diagnosis

Patient	ANA	AMA	sp100	gp210	LC1	SLA	SMA (actin)	Other antibodies	Histology	TE	Diagnosis: supporting criteria
P1	−	−	−	−	−	−	−	—	Chronic hepatitis compatible with AIH, moderate portal and lobular activity	F3	Seronegative AIH: simplified score not computable (IgG not measured); compatible histology; Paris criteria not met (PBC: ALP ≥ 2 × ULN only); MRCP without PSC features; response to immunosuppression
P2	+	+	+	−	−	−	−	Anti-centromere	ND	ND	PBC (EASL): cholestasis + AMA
P3	+	+	+	−	−	−	−	—	ND	F3	PBC: cholestasis + AMA
P4	+	+	−	−	−	−	−	Anti-Th/To, anti-RNA polymerase III	ND	ND	PBC: cholestasis + AMA
P5	+	+	−	−	−	−	−	—	ND	ND	PBC: cholestasis + AMA
P6	+	+	−	−	−	−	−	—	ND	F4	PBC: cholestasis + AMA
P7	+	−	−	−	+	+	−	Anti-Ku, anti-SSA	ND	F1–F2	AIH: simplified score not computable (IgG not measured), no histology; anti-SLA and anti-LC1 positive; viral hepatitis excluded; response to immunosuppression
P8	+	−	−	+	−	−	−	NA	ND	ND	PBC: cholestasis + anti-gp210 (AMA-negative)
P9	+	Equiv.	−	−	+	−	+	NA	Chronic hepatitis, moderate activity, minimal cholestasis, portal fibrosis, no cirrhosis	ND	AIH: simplified score not computable (IgG not measured); ANA, anti-LC1 and SMA positive; compatible histology; viral hepatitis excluded
P10	+	−	−	+	−	−	−	Anti-dsDNA	ND	ND	PBC: cholestasis + anti-gp210 (AMA-negative)
P11	+	+	+	−	−	−	−	—	ND	F3	PBC: cholestasis + AMA
P12	+	+	−	−	−	−	−	Anti-SSA; rheumatoid factor +	Active chronic hepatitis, no cirrhosis	ND	Overlap (Paris): PBC — ALP ≥ 2 × ULN + AMA; AIH — ALT ≥ 5 × ULN + interface hepatitis
P13	+	−	−	−	−	+	−	Anti-SSA, anti-SSB	Non-representative	ND	AIH: simplified score not computable (IgG not measured), non-representative biopsy; anti-SLA positive; viral hepatitis excluded; response to immunosuppression
P14	−	+	−	−	−	−	−	—	Refused	F1–F2	Overlap (Paris): PBC — GGT ≥ 5 × ULN + AMA; AIH — ALT ≥ 5 × ULN + IgG ≥ 2 × ULN; response of cytolysis to immunosuppression

+, positive; −, negative; Equiv., equivocal. All patients were negative for anti-LKM1 and anti-LP. AIH, autoimmune hepatitis; ALP, alkaline phosphatase; ALT, alanine aminotransferase; AMA, antimitochondrial antibodies; ANA, antinuclear antibodies; anti-dsDNA, anti-double-stranded DNA; anti-LKM1, anti-liver kidney microsome type 1; anti-LP, anti-liver-pancreas; anti-SSA/SSB, anti-Sjögren's-syndrome-related antigen A/B; EASL, European Association for the Study of the Liver; GGT, gamma-glutamyl transferase; IgG, immunoglobulin G; LC1, liver cytosol type 1; MRCP, magnetic resonance cholangiopancreatography; NA, not available; ND, not done; PBC, primary biliary cholangitis; PSC, primary sclerosing cholangitis; SLA, soluble liver antigen; SMA, smooth muscle antibodies; TE, transient elastography (METAVIR-equivalent stage); ULN, upper limit of normal.

Table 4: Treatment, follow-up and outcomes

Patient	Diagnosis	Treatment (dose)	Biochemical response (timing)	Relapse/complications	Adverse events	Follow-up (months)	Outcome at last follow-up
P1	AIH	Prednisone 30 mg/day + UDCA 13–15 mg/kg/day, then azathioprine 3 mg/kg/day	Complete (day 18)	None documented	None	≥ 6	Complete response
P2	PBC	UDCA 13–15 mg/kg/day	Not assessed	—	None	NA	Lost to follow-up
P3	PBC	UDCA 13–15 mg/kg/day	Partial, > 50% decrease	None documented	None	≥ 6	Partial response
P4	PBC	None	—	—	—	Lost after work-up	Lost to follow-up
P5	PBC	None	—	—	—	Lost after work-up	Lost to follow-up
P6	PBC (cirrhosis)	UDCA 13–15 mg/kg/day	Partial, > 50% decrease	None documented	None	≥ 6	Partial response
P7	AIH	Corticosteroids 1 mg/kg/day, progressively tapered + azathioprine 3 mg/kg/day	Complete (day 15)	None documented	None	≥ 6	Complete response
P8	PBC	UDCA 13–15 mg/kg/day + corticosteroids (associated SLE)	Partial, > 50% decrease	None documented	None	≥ 6	Partial response
P9	AIH	Corticosteroids 1 mg/kg/day, progressively tapered + azathioprine 3 mg/kg/day	No response	Rapid progression to decompensated cirrhosis, hepatocellular insufficiency	None	1	Death
P10	PBC	UDCA 13–15 mg/kg/day + corticosteroids (associated SLE)	Complete	None documented	None	≥ 6	Complete response
P11	PBC	UDCA 13–15 mg/kg/day	Not assessed	—	None	NA	Lost to follow-up
P12	Overlap	UDCA 13–15 mg/kg/day; corticosteroids 1 mg/kg/day added at the hepatic flare; azathioprine not started (concurrent pleural effusion)	Initial improvement of cholestasis on UDCA	Cytolysis after about 4 years; no response to corticosteroids	None	≥ 48	Refractory to treatment
P13	AIH	Corticosteroids 1 mg/kg/day, progressively tapered + azathioprine 3 mg/kg/day	Complete (day 21)	None documented	None	≥ 6	Complete response
P14	Overlap	UDCA 13–15 mg/kg/day, then corticosteroids 1 mg/kg/day, progressively tapered + azathioprine 3 mg/kg/day	Partial: normalization of aminotransferases, persistent cholestasis	Cytolysis after initial response of cholestasis to UDCA	None	≥ 6	Partial response

Response definitions are given in the Methods. AIH, autoimmune hepatitis; NA, not available; PBC, primary biliary cholangitis; SLE, systemic lupus erythematosus; UDCA, ursodeoxycholic acid.

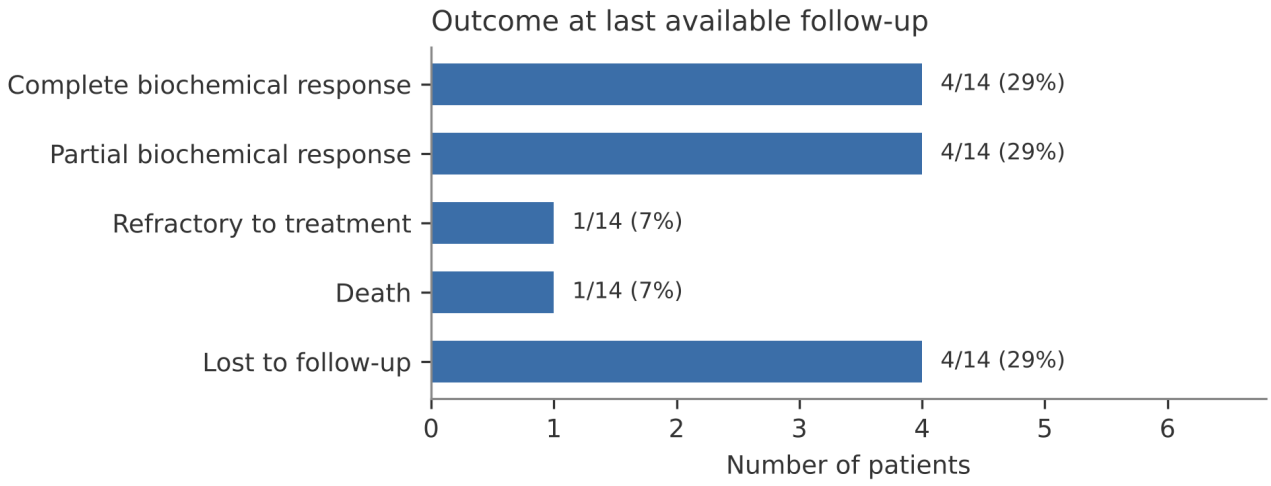

Figure 6: Outcome at the last available follow-up (n = 14). Definitions are given in the Methods.

Overlap syndrome (n = 2). Both patients (P12, P14) initially presented with isolated cholestasis that improved on UDCA, and later developed marked cytolysis. P12 received high-dose corticosteroids (1 mg/kg/day) in addition to UDCA without any improvement; azathioprine could not be added because of a concurrent exudative pleural effusion of undetermined cause, and she remains refractory, with persistent cytolysis and cholestasis. In P14, adding corticosteroids and azathioprine normalized aminotransferases, but cholestasis persisted (partial response).

PBC (n = 8). Six patients received UDCA (13–15 mg/kg/day, as recommended), combined with corticosteroids for associated SLE in two (P8, P10). Among them, one patient (P10) achieved a complete response, three (P3, P6, P8) a partial response, and two (P2, P11) were lost to follow-up. The two untreated patients (P4, P5) were lost to follow-up after the diagnostic work-up.

Overall, at last follow-up, 4 patients (29%) had a complete biochemical response, 4 (29%) a partial response, 1 (7%) was refractory to treatment, 1 (7%) had died, and 4 (29%) were lost to follow-up (Figure 6).

Safety. No treatment-related adverse events (such as corticosteroid-induced diabetes or infection, azathioprine-related cytopenia, pancreatitis or hepatotoxicity, or UDCA intolerance), dose reductions, or treatment discontinuations were documented in the medical records.

3.7. Illustrative cases

Case 1 — Sequential AIH–PBC overlap refractory to treatment (P12). A 43-year-old woman with Sjögren's syndrome presented with jaundice and isolated cholestasis; ANA and AMA were positive, and she was diagnosed with PBC. Cholestasis improved on UDCA. About four years later, she developed marked cytolysis without AIH-specific autoantibodies: AST and ALT were 327 and 239 IU/L (about 8 and 6 × ULN), ALP 361 IU/L, GGT 160 IU/L, and albumin 28 g/L, with polyclonal hypergammaglobulinemia. Liver biopsy showed active chronic hepatitis without cirrhosis, and MRCP showed a multinodular liver with steatosis. The Paris criteria were fulfilled (ALP ≥ 2 × ULN and AMA; ALT ≥ 5 × ULN and interface hepatitis). High-dose corticosteroids were added without any improvement; azathioprine could not be introduced because of a concurrent exudative lymphocytic pleural effusion (negative cultures and negative *Mycobacterium tuberculosis* PCR; two pleural biopsies showing non-specific inflammation), and cytolysis and cholestasis persist to date.

Case 2 — Sequential overlap with partial response (P14). A 39-year-old woman without known autoimmune disease presented with right upper quadrant pain and asthenia. AMA were positive and ANA negative. She initially had isolated cholestasis, which improved on UDCA, then developed marked cytolysis (ALT 230 IU/L, about 6 × ULN; GGT 371 IU/L, about 9 × ULN; ALP 78 IU/L) with hypergammaglobulinemia and serum IgG > 2 × ULN. Ultrasound showed a dysmorphic liver and transient elastography F1–F2 fibrosis. She refused liver biopsy; the Paris criteria were nevertheless fulfilled on biochemical and serological grounds (GGT ≥ 5 × ULN and AMA; ALT ≥ 5 × ULN and IgG ≥ 2 × ULN). Corticosteroids and azathioprine normalized aminotransferases, but cholestasis persisted.

Case 3 — AIH with decompensated cirrhosis and death (P9). A 46-year-old man, a smoker without alcohol consumption, presented with jaundice, general deterioration, ascites, lower-limb edema and gynecomastia. AST and ALT were 644 and 949 IU/L, total bilirubin was 159 mg/L, albumin was 24 g/L, and PT was 26%; SPE showed beta–gamma bridging. ANA, anti-LC1 and anti-actin antibodies were positive and AMA equivocal. Ultrasound showed a dysmorphic liver with ascites and MRCP was normal. Liver biopsy showed chronic hepatitis with moderate activity, minimal cholestasis and portal fibrosis without cirrhosis, possibly reflecting sampling variability given the clinical and ultrasound signs of cirrhosis. Despite corticosteroids and azathioprine, he progressed rapidly to

decompensated cirrhosis with hepatocellular insufficiency and died one month after diagnosis.

Case 4 — Seronegative AIH with cholestatic features (P1). A 44-year-old woman with Sjögren's syndrome presented with right upper quadrant pain. AST and ALT were 445 and 315 IU/L (about 11 and 8 × ULN), ALP 375 IU/L (about 3 × ULN) and GGT 378 IU/L, with normal bilirubin. All autoantibodies, including ANA, SMA, AMA, anti-sp100 and anti-gp210, were negative, and SPE was normal. MRCP showed only a biliary cyst, ruling out large-duct sclerosing cholangitis. Liver biopsy showed chronic hepatitis compatible with AIH, with moderate portal and lobular activity, and transient elastography showed F3 fibrosis. Because only one PBC criterion was met, the Paris criteria were not fulfilled and the patient was classified as seronegative AIH with cholestatic features. She received prednisone 30 mg/day and UDCA, followed by azathioprine, with normalization of liver tests at day 18.

4. Discussion

This single-center case series describes the clinical, immunological, and outcome features of AILDs in a Moroccan tertiary care setting. PBC was the most frequent diagnosis, and there was a strong female predominance, consistent with previously reported data [2, 11].

The mean age at diagnosis (44 years) is comparable to that reported in a cohort from the Middle East Liver Diseases Center, where mean ages were 46 years for AIH and 51 years for PBC [12]. Likewise, the female predominance observed here is in line with the French nationwide cohort reported by Corpechot et al. [11] and with population-based data from Germany [13].

Associated autoimmune diseases were found in 57% of our patients. Extrahepatic autoimmunity is common in AILDs: PBC is mainly associated with Sjögren's syndrome and systemic sclerosis, whereas AIH is associated with a broader spectrum including autoimmune thyroiditis, celiac disease, SLE and rheumatoid arthritis [1, 2]. The high proportion in our series probably also reflects recruitment in an internal medicine department, where patients with systemic autoimmune diseases are followed and screened for liver involvement.

Jaundice, right upper quadrant pain, and pruritus were the most frequent presenting features, consistent with the literature [4, 14]. However, about one in five patients were diagnosed after incidental detection of abnormal liver tests, highlighting the value of systematic investigation of abnormal liver tests, particularly in patients with known autoimmune disease.

Cholestasis was present in all patients. In PBC, cholestasis associated with AMA positivity is sufficient for diagnosis without biopsy. In contrast, biopsy is indicated in AMA-negative patients without PBC-specific ANA or when AIH features are suspected [4]. AMA are reported in about 90–95% of patients with PBC [4]; the lower proportion in our series (75%) may reflect the small sample and the assays used, and both AMA-negative patients carried anti-gp210, illustrating the diagnostic value of PBC-specific ANA. Marked aminotransferase elevation (ALT $\geq 5 \times$ ULN) should prompt consideration of AIH features and of overlap syndrome [4, 8].

From a diagnostic perspective, our series reflects real-world practice with limited access to histology (4/14 patients, with one refusal) and advanced imaging. The simplified AIH score relies partly on histology and IgG levels, so diagnoses established without biopsy remain probable rather than definite [7, 15]. Recent guidelines and reviews emphasize integrating clinical, serological, and histological data, as well as the role of non-invasive tools such as transient elastography [3, 9, 14]. The high rate of advanced fibrosis among patients assessed (4/6) suggests delayed diagnosis, but elastography was performed in only 6 patients, and this finding must be interpreted cautiously.

AIH responds to corticosteroids combined with azathioprine, the latter usually introduced about two weeks after corticosteroids; mycophenolate mofetil is an alternative. Complete biochemical response is achieved in most patients, and maintenance therapy with gradual tapering reduces the risk of relapse [3, 10, 14]. Three of our four AIH patients achieved complete response with corticosteroids and azathioprine, including one seronegative patient (P1), a recognized presentation in which diagnosis relies on histology and exclusion of other causes [3, 14]. The death of P9 one month after diagnosis, in a patient who already had signs of decompensated cirrhosis at presentation, underlines the poor prognosis of AIH diagnosed at the stage of decompensated cirrhosis and the importance of earlier detection [3].

In PBC, UDCA at 13–15 mg/kg/day is first-line therapy, and an adequate biochemical response is associated with a favorable long-term prognosis; second-line options for inadequate responders include fibrates and peroxisome proliferator-activated receptor agonists [4, 16]. Anti-gp210 and anti-centromere antibodies have been associated with a worse prognosis, and anti-sp100 with a poorer response in some studies [4]. In our series, only one of the six UDCA-treated PBC patients achieved complete response, three had a partial response, and two were lost to follow-up, which illustrates both the need for systematic response assessment and the challenge of follow-up in our setting. Two PBC patients also received corticosteroids for associated SLE, which limits interpretation of their biochemical course.

Both overlap cases in our series were sequential: patients were first diagnosed with PBC. They developed AIH features after an initial cholestatic response to UDCA, about four years later in P12. Such consecutive presentations are described and justify periodic monitoring of aminotransferases in PBC, since a new hepatic flare should prompt reassessment, including liver biopsy, and the addition of immunosuppression [3, 4, 8]. Response in overlap syndrome is often incomplete, as illustrated by persistent cholestasis in P14 and refractory disease in P12.

These findings should be interpreted with caution given the small sample size and retrospective design. Nevertheless, this series provides patient-level data on the presentation and management of AILDs in our setting and highlights the need for earlier detection, standardized response assessment, and structured follow-up.

4.1. Study limitations

- Small sample size from a single center, limiting generalizability.
- Exclusion of 6 of the 20 identified patients because of incomplete medical records, which may have introduced selection bias.
- Retrospective design with missing data (IgG, bilirubin, and SPE in some patients; elastography in 8 and histology in 10 patients), which limits the computation of the simplified AIH score and of standardized response criteria; the diagnosis of overlap syndrome in P14 relied on biochemical and serological criteria because biopsy was refused.
- Recruitment in an internal medicine department, which may over-represent patients with systemic autoimmune diseases (referral bias).
- Loss to follow-up in 4 patients (29%) and variable timing of response assessment.

5. Conclusions

Autoimmune liver diseases are heterogeneous conditions requiring early diagnosis and multidisciplinary management. In this series, PBC predominated, associated autoimmune diseases were frequent, advanced fibrosis was common at diagnosis, and AIH features could emerge years after a diagnosis of PBC. Immunosuppressive therapy remains the cornerstone of AIH management, while UDCA is first-line therapy for PBC. Systematic response assessment and structured long-term follow-up are essential to prevent progression to cirrhosis.

Conflicts of Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this article.

Funding Source

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Acknowledgments

The authors have no acknowledgments to declare.

Informed Consent

Individual informed consent was not required under Ibn Rochd University Hospital policy for retrospective analyses of anonymized routine-care data (see Methods).

Institutional Review Board (IRB)

IRB approval: not applicable. Formal ethics committee approval was not required under Ibn Rochd University Hospital policy for retrospective, non-interventional analyses of anonymized routine-care data (see Methods).

Large Language Model

During the revision of this manuscript, the authors used Claude (Anthropic) to assist with language editing, consistency checks of counts and percentages, preparation of tables and figures from the study dataset, and reference formatting. The authors reviewed and verified all content and take full responsibility for the manuscript.

Authors Contribution

AA contributed to conceptualization, data collection, analysis, and writing of the original draft. CZ contributed to data collection and verification. LB, MM and HEK contributed to supervision and to reviewing and editing the manuscript. KE contributed to supervision and to reviewing and editing the manuscript. All authors reviewed and approved the final manuscript.

Data Availability

The anonymized dataset is available from the corresponding author upon reasonable request. All figures are original and were generated by the authors from the study data.

References

1. Terziroli Beretta-Piccoli B, De Gottardi A, Vergani D, Mieli-Vergani G. Le malattie autoimmuni di fegato nell'adulto [Autoimmune liver diseases in adults]. Schweiz Gastroenterol. 2021;2(2):56-66. [https://doi.org/10.1007/s43472-021-00040-4].
2. Trivedi PJ, Hirschfield GM. Recent advances in clinical practice: epidemiology of autoimmune liver diseases. Gut. 2021;70(10):1989-2003. [https://doi.org/10.1136/gutjnl-2020-322362].
3. European Association for the Study of the Liver. EASL Clinical Practice Guidelines on the management of autoimmune hepatitis. J Hepatol. 2025;83(2):453-501. [https://doi.org/10.1016/j.jhep.2025.03.017].
4. European Association for the Study of the Liver. EASL Clinical Practice Guidelines: the diagnosis and management of patients with primary biliary cholangitis. J Hepatol. 2017;67(1):145-72. [https://doi.org/10.1016/j.jhep.2017.03.022].
5. Hahn JW, Yang HR, Moon JS, Chang JY, Lee K, Kim GA, et al. Global incidence and prevalence of autoimmune hepatitis, 1970–2022: a systematic review and meta-analysis. EClinicalMedicine. 2023;65:102280. [https://doi.org/10.1016/j.eclinm.2023.102280].
6. Tan JJR, Chung AHL, Loo JH, Quek JWE, Sharma S, et al. Global epidemiology of primary biliary cholangitis: an updated systematic review and meta-analysis. Clin Gastroenterol Hepatol. 2026;24(3):621-32. [PMID: 40398833, https://doi.org/10.1016/j.cgh.2025.03.025].
7. Hennes EM, Zeniya M, Czaja AJ, Parés A, Dalekos GN, Krawitt EL, et al. Simplified criteria for the diagnosis of autoimmune hepatitis. Hepatology. 2008;48(1):169-76. [https://doi.org/10.1002/hep.22322].
8. Chazouillères O, Wendum D, Serfaty L, Montembault S, Rosmorduc O, Poupon R. Primary biliary cirrhosis-autoimmune hepatitis overlap syndrome: clinical features and response to therapy. Hepatology. 1998;28(2):296-301. [https://doi.org/10.1002/hep.510280203].

9. Lemoinne S, Heurgue A, Bouzbib C, Hanslik B, Gournay J, Nguyen-Khac E, et al. Non-invasive diagnosis and follow-up of autoimmune hepatitis. Clin Res Hepatol Gastroenterol. 2022;46(1):101772. [https://doi.org/10.1016/j.clinre.2021.101772].
10. Pape S, Snijders RJALM, Gevers TJG, Chazouillères O, Dalekos GN, Hirschfield GM, et al. Systematic review of response criteria and endpoints in autoimmune hepatitis by the International Autoimmune Hepatitis Group. J Hepatol. 2022;76(4):841-9. [https://doi.org/10.1016/j.jhep.2021.12.041].
11. Corpechot C, Hornus P, Cals M, Rinder P, Marcille T, Malek A, et al. Epidemiology, comorbidities, treatments and outcomes of autoimmune liver diseases: a French nationwide study. JHEP Rep. 2025;7(11):101546. [https://doi.org/10.1016/j.jhepr.2025.101546].
12. Nejad SEM, Heiat M, Javanbakht M, Alavian SM, et al. Evaluation of autoimmune liver disease natural history in patients referred to Middle East Liver Diseases (MELD) center. BMC Gastroenterol. 2024;24(1):17. [https://doi.org/10.1186/s12876-023-03105-7].
13. Sebode M, Kloppenburg A, Aigner A, Lohse AW, Schramm C, Linder R. Population-based study of autoimmune hepatitis and primary biliary cholangitis in Germany: rising prevalences based on ICD codes, yet deficits in medical treatment. Z Gastroenterol. 2020;58(5):431-8. [https://doi.org/10.1055/a-1135-9306].
14. Mercado LA, Gil-Lopez F, Chirila RM, Harnois DM. Autoimmune hepatitis: a diagnostic and therapeutic overview. Diagnostics (Basel). 2024;14(4):382. [https://doi.org/10.3390/diagnostics14040382].
15. Flikshteyn B, Amer K, Tafesh Z, Pyrsopoulos NT. Diagnosis of autoimmune hepatitis. Clin Liver Dis. 2024;28(1):37-50. [PMID: 37945161, https://doi.org/10.1016/j.cld.2023.06.004].
16. van Hooff MC, Werner E, van der Meer AJ. Treatment in primary biliary cholangitis: beyond ursodeoxycholic acid. Eur J Intern Med. 2024;124:14-21. [https://doi.org/10.1016/j.ejim.2024.01.030].