Looking Beyond the Numbers: Addressing the Full Burden of PBC

This symposium took place at the European Association for the Study of the Liver (EASL) Congress, held between 27th–30th May, 2026, in Barcelona, Spain

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Speakers:	Marco Carbone,[2,3] Puneeta Tandon[4]
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Meeting Summary

Primary biliary cholangitis (PBC) is a chronic, inflammatory, autoimmune cholestatic liver disease, affecting mainly women over 40 years old, that, if left untreated, can progress to intrahepatic ductopenia and end-stage biliary cirrhosis. Recommended first-line pharmacotherapy for all patients with PBC is ursodeoxycholic acid (UDCA). However, treatment failure is common, with at least 40% of patients having an inadequate response. Increasingly, second-line treatments, including

peroxisome proliferator-activated receptor (PPAR) agonists, are used to reduce biochemical serum markers and manage symptoms. This symposium focused on the unmet needs in management of PBC, with experts David Jones, Newcastle University, UK; Marco Carbone, University of Milano-Bicocca, Italy; and Puneeta Tandon, University of Alberta, Canada, discussing the need for regular monitoring of treatment responses with earlier intervention when biochemical markers remain raised or symptoms persist. They also discussed the need for comprehensive risk stratification and ensuring optimisation of symptom management to improve quality of life (QoL) for patients. The expert panel highlighted recent clinical trials that demonstrate the efficacy of PPAR agonists in normalising alkaline phosphatase (ALP) and total bilirubin (TB) levels. Additional data were presented that suggest PPAR agonists can reduce the debilitating PBC symptoms fatigue and pruritus. Overall, the discussions highlighted the importance of considering ALP normalisation (ALP ≤1.0x ULN; TB <0.6x ULN) as a treatment goal. To help improve patient outcomes, the panel recommends a holistic approach to PBC management to avoid disease progression and improve survival, highlighting that, alongside disease control, symptom management is a priority for patient wellbeing.

Looking Beneath the Surface: Unmet Needs in PBC

David Jones

Jones opened the symposium by explaining that PBC is much like other chronic liver diseases, but with an important twist. "In PBC, injury to the bile ducts is associated with inflammation that becomes chronic, and the traditional view is that this drives fibrosis and can progress to cirrhosis," Jones explained. "However, in PBC there is a second pathway of injury where chronic inflammation is accompanied by the loss of bile ducts" (Figure 1).[1-5]

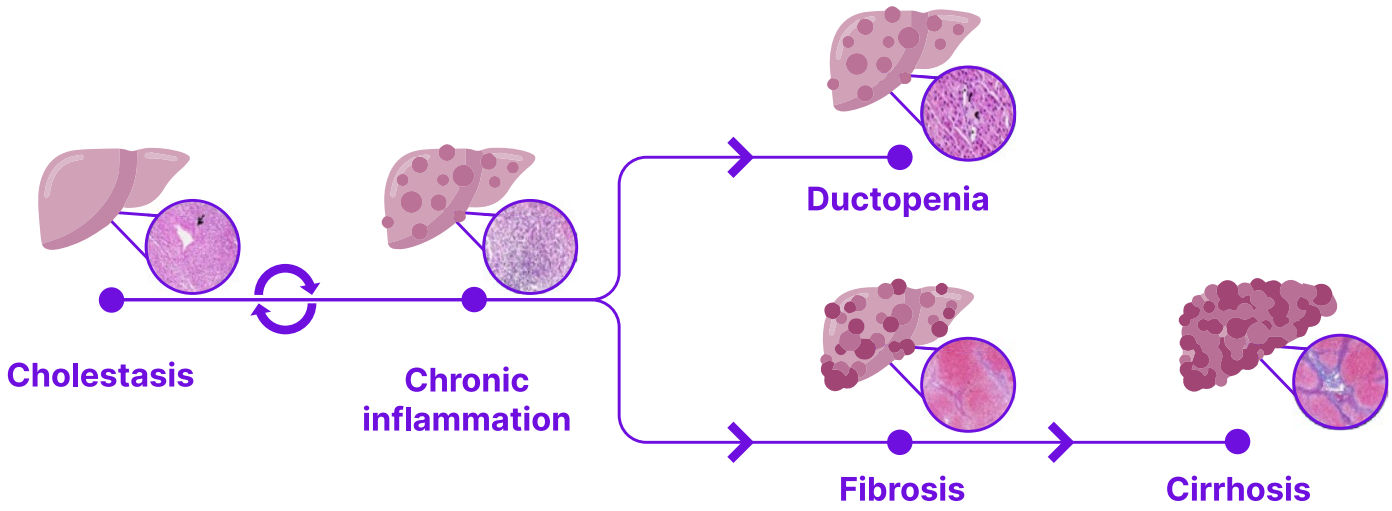
There are clear unmet needs in PBC management, and "if left untreated, this disease causes real harm," Jones emphasised. Although the rate of disease progression is variable, approximately 40% of patients with PBC develop cirrhosis within 10 years of diagnosis.[5,6]

"The questions we need to ask are 'How do we prevent cirrhosis? How do we prevent ductopenia and how do we make sure people survive?'" Jones emphasised. Firstly, early detection of treatment response is important, and identifying patients who are eligible for second-line therapy earlier, rather than waiting for UDCA first-line treatment to fail, could reduce the risk of disease progression.[7] Secondly, comprehensive risk stratification is important, Jones went on. "We need to think about not only what treatment [is most suitable], but who needs what treatment and when." The likelihood of disease progression and poor clinical outcomes is influenced by certain risk factors, including older age, male gender, higher biochemical marker levels, and poor response to first-line therapy.[6-10] Thirdly, proactive symptom assessment is important. "We need to be asking our patients about symptoms at every clinic visit," Jones emphasised. "We need to do something with that information to work out how to escalate treatment and determine the best treatment approach."

Looking beneath the surface of these unmet needs, Jones said, will help us to address them. For example, some patients (up to 40%) do not respond effectively to first-line treatments,[11] increasing their risk of cirrhosis, liver transplantation, or death.[6] In risk stratification, Jones added, biochemical marker levels are used to measure treatment responses and risk of disease progression, but thresholds above the upper limit of normal (ULN) are considered acceptable. "Anything other than normal biochemistry is associated to some degree with residual risk,"[7,12] Jones emphasised, and continued that normalising surrogate markers, such as TB and ALP (ALP ≤1.0x ULN; TB ≤0.6x ULN), should be a key therapeutic goal.[13] In addition, according to Jones, inadequate evaluation of first-line treatment response and assessment

Figure 1: Pathways of inflammation in PBC.

PBC is characterised by the progressive inflammatory destruction of intrahepatic bile ducts[1-5]



PBC: primary biliary cholangitis.

of symptoms, and lack of timely escalation to second-line therapies, represent key treatment gaps in PBC.[7,12]

"When we talk about symptoms, we are really talking about itch (pruritus) and fatigue," Jones said. "We've had rapid development in PBC management options, and this is beneficial for patients, but it adds complexity." Jones continued by explaining that the model for first-line therapy followed by second-line therapy is well established.[1,14] "We have multiple second-line options, including obeticholic acid (OCA), elafibranor (a dual PPAR-α and PPAR-δ agonist), and seladelpar (a PPAR-δ agonist)."[15-17]

"It's important that we understand who requires treatment and how we should change treatment if we don't see improvements in biochemistry, symptoms, or both," Jones said, and introduced a hypothetical case study to illustrate the point: a female patient diagnosed with PBC, aged 52 years, who is given first-line treatment of UDCA (15 mg/kg/day) with a 12-month follow-up assessment[1] and then proactively managed after that. The patient presented with elevated ALP (325 U/L), which decreased to 247 U/L at 12 months. Tests showed a Liver Stiffness Measure (LSM) of 9.1 kPa that had increased 12 months post-treatment.

Jones explained that ALP and TB are key measures to consider when managing the risk of disease progression.[13] In this case, Jones elaborated, the patient showed improvements in biochemistry, but key measures remained outside first-line response criteria, LSM had worsened, and TB was rising. "This is typical of patients who respond to first-line therapy but have ongoing issues that require further treatment," Jones explained, and continued, the question is, "what do we do about them?" This highlights the need to monitor and assess disease progression to inform treatment option decision-making.

Optimising Second-Line Treatment Pathways

Marco Carbone

Carbone presented a deep dive into how PBC biochemistry results can be used to inform treatment options. "We know that ALP and TB are important markers in PBC, and they each give us different information," Carbone explained. "ALP is a marker of cholestatic bile duct injury and gives an indication of the speed of disease progression, whereas TB is a marker of duct loss and liver failure, and can inform us more about the disease stage."

The higher the ALP, the higher the risk of liver transplantation and risk of death, Carbone explained. Normalising blood biochemistry in PBC can reduce the risk of liver-related events, including risk of hospitalisation for hepatic decompensation, liver transplantation, or death.[13,18] The primary endpoint in recent trials for second-line PBC treatments was achievement of an ALP <1.67x ULN and TB <1.0x ULN, with a secondary endpoint assessing patients that achieve <1.0x ULN ALP.[13] In PBC, the risk of complications increases with the time patients spend above the ULN for these biochemical markers of ongoing liver damage, both before and after first-line therapy.[13,18] "It's also important to remember that patients can lose their response to therapies during treatment, so we need to keep monitoring,"[2] Carbone added.

Carbone then highlighted data showing a nearly sixfold increase in the risk of adverse long-term outcomes in patients with elevations of TB ≥0.6× ULN and ALP ≥1.0x ULN relative to those who never exceeded the normal thresholds.[11] Clinical risk is influenced by both the magnitude and duration of biochemical abnormalities, reinforcing the need for early and systematic risk assessment. Any deviation out of normal ranges for ALP and TB levels is an indicator of ongoing cholestatic bile duct injury and impaired hepatic function.[11] In addition, disease activity is higher in patients with PBC who only achieve biochemical response (ALP <1.67× ULN) but not ALP normalisation (<1.0× ULN), as suggested by the increase in mechanistic and inflammatory markers.[7]

Carbone reiterated that it is important to individualise treatment goals, recognising that patients may have different disease severity and require varying intensity of follow-up. He continued by drawing on the hypothetical case study of the 52-year-old female with PBC to illustrate how a patient can experience improved ALP measures on first-line therapy, but still not achieve normal levels. "This represents increased risk of disease progression and makes the patient a good candidate for second-line therapy," Carbone confirmed.

There are several second-line treatment options for PBC, and Carbone went on to outline trials that demonstrate the efficacy of PPAR agonists. "PPAR agonists are used in PBC for their anti-cholestatic, inflammatory-regulating, and anti-fibrotic effects, and are approved for use in patients who do not respond to or are intolerant to UDCA,"[19] Carbone outlined.

The ELATIVE trial demonstrated that elafibranor has a significant effect on cholestasis across patients with varying disease severity.[20] The primary endpoint was met by Week 52 in 51% of patients treated with elafibranor, compared to 4% receiving placebo ($p<0.001$).[20] The proportion of patients who reached ALP normalisation was over 15% ($p<0.002$) at Week 52, and when stratified by baseline ALP levels, this increased to 52% of cases.[21] ALP reductions were measurable as early as Week 4 and were sustained to Week 156 in an open-label extension study.[22]

Elafibranor has been shown to reduce markers of fibrogenesis and stabilise fibrosis (LSM).[22] It is generally well tolerated, with no difference in the proportion of patients experiencing adverse events leading to treatment discontinuation.[20] Carbone also said that, importantly, there were no clinically meaningful changes in the glomerular filtration rate over the trial, and bone density remained stable.[23]

Data from the RESPONSE trial showed that seladelpar treatment led to sustained

reductions in ALP levels and normalisation of ALP was reached in 25% of the treatment group, compared to 0% of the placebo group by Week 52.[24] LSM was also stabilised with seladelpar treatment.[25] There were no adverse events, such as changes in renal function, that were any more common than with placebo.[26]

Carbone went on to describe preliminary data from investigator-led real-world practice cohorts. A global Phase 4 study (ELFINITY, funded by Ipsen, Paris, France) supports the safety and efficacy of elafibranor. An interim analysis of 51 patients with baseline data showed that 27/51 (53%) had ALP ≥1.67× ULN, and of these, 55% achieved a biochemical response and ALP improvement by Month 3.[23] In the ELEVATE-PBC study from Italian registry data, an analysis of 281 patients with baseline data who started elafibranor, 78 patients achieved ALP normalisation (80%) 3 months after initiation.[27] "These are very preliminary data, and we need to wait until we have the 6-month follow-up data for 300 patients before reporting fully, but these are very promising results," Carbone clarified.

Further preliminary data from a Spanish cohort from the CoIHAI registry,[28] where 20% of patients had liver cirrhosis and the median ALP was 1.5x ULN, showed a 36% reduction in median ALP for those treated with elafibranor and a 33% reduction for those treated with seladelpar.[28] Further real-world evidence comes from the IDEAL study, using the USA HealthVerity Network (HealthVerity, Philadelphia, Pennsylvania, USA) claims database, in which more than 45% of patients treated with elafibranor achieved ALP normalisation within 6 months, with and without prior second-line treatment.[29] Overall, elafibranor and seladelpar are shown to be effective and well-tolerated second-line treatment options for patients with PBC who have an inadequate response or intolerance to UDCA in clinical trials and real-world settings.

"Normalisation of ALP should be the treatment goal," Carbone reiterated, adding that we should be more ambitious for young patients to avoid fibrosis, and also for patients with cirrhosis. "We have strong trial data, and we look forward to seeing more real-world evidence,"[20,22,26] Carbone added. The loss of biochemical response to UDCA can occur at any time, so early and routine monitoring of response to UDCA treatment is crucial for timely intervention.[11,30]

Looking Beyond the Biochemistry: A Full-Spectrum View of the Symptomatic Burden for Patients with PBC

David Jones and Puneeta Tandon

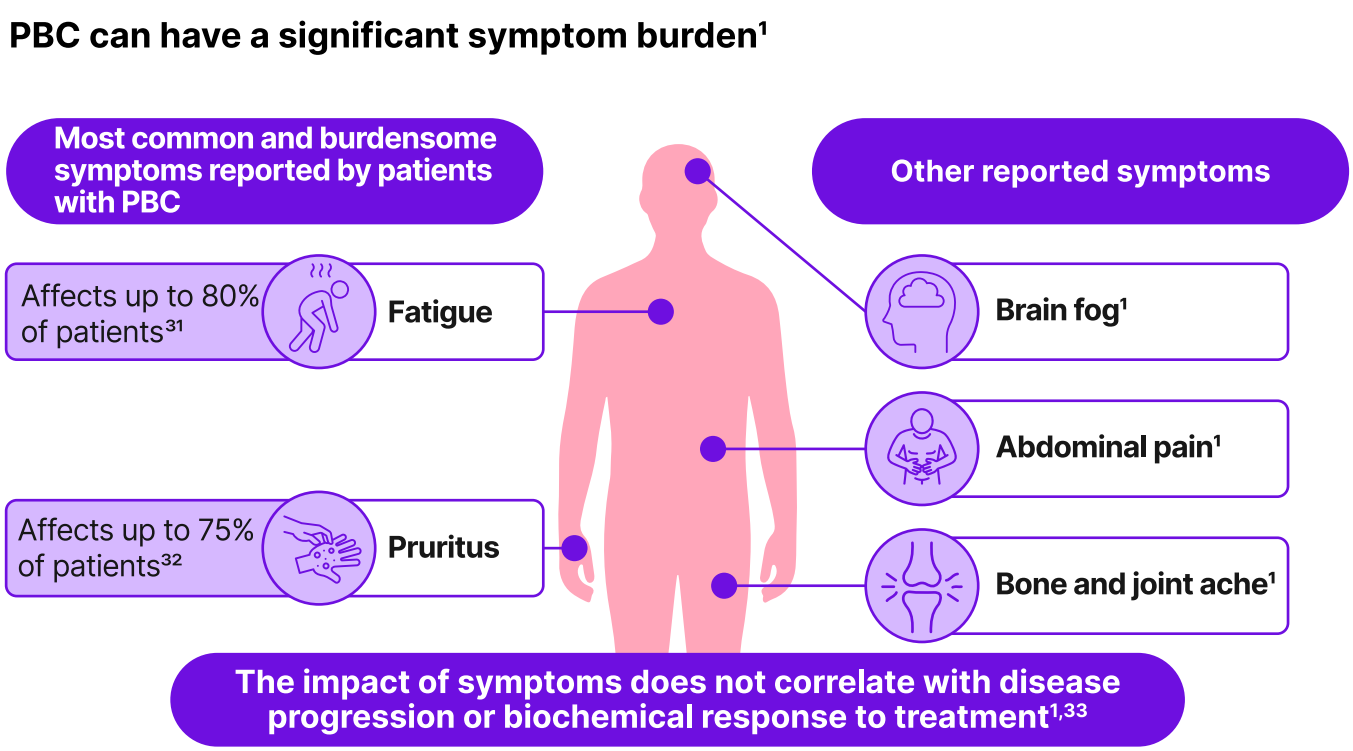
"We have effective therapies, and we are on the cusp of normalisation as a target for therapy," Jones reiterated. However, he added, "We do need to understand better the mechanisms of action around fibrosis, cirrhosis, and ductopenia. And importantly, we need to look more closely at what these treatments do for symptoms in patients."

Tandon highlighted that PBC has a significant symptom burden, with up to 80% of patients reporting fatigue, and pruritus affecting up to 75% of patients (Figure 2).[31-33] Other symptoms include brain fog, abdominal pain, and bone and joint aches.[1,31,32,34]

Importantly, Tandon emphasised, "the impact of the disease on patients with regards to symptoms does not correlate with disease progression, or the biochemical response. A patient with many symptoms can have normal liver enzymes. It's important to continue to screen for symptoms as up to 60% of patients can be asymptomatic at diagnosis, but half of these are likely to go on to develop symptoms."[1,33]

Tandon referred to the hypothetical case study of a 52-year-old female who has been fully compliant with UDCA. At the 12-month review, when asked about symptoms, the patient reported mild pruritus with a Numeric Rating Scale (NRS) of 2, and described significant fatigue, reduced productivity, withdrawal from social situations, and lack of motivation.

Figure 2: PBC symptom burden.



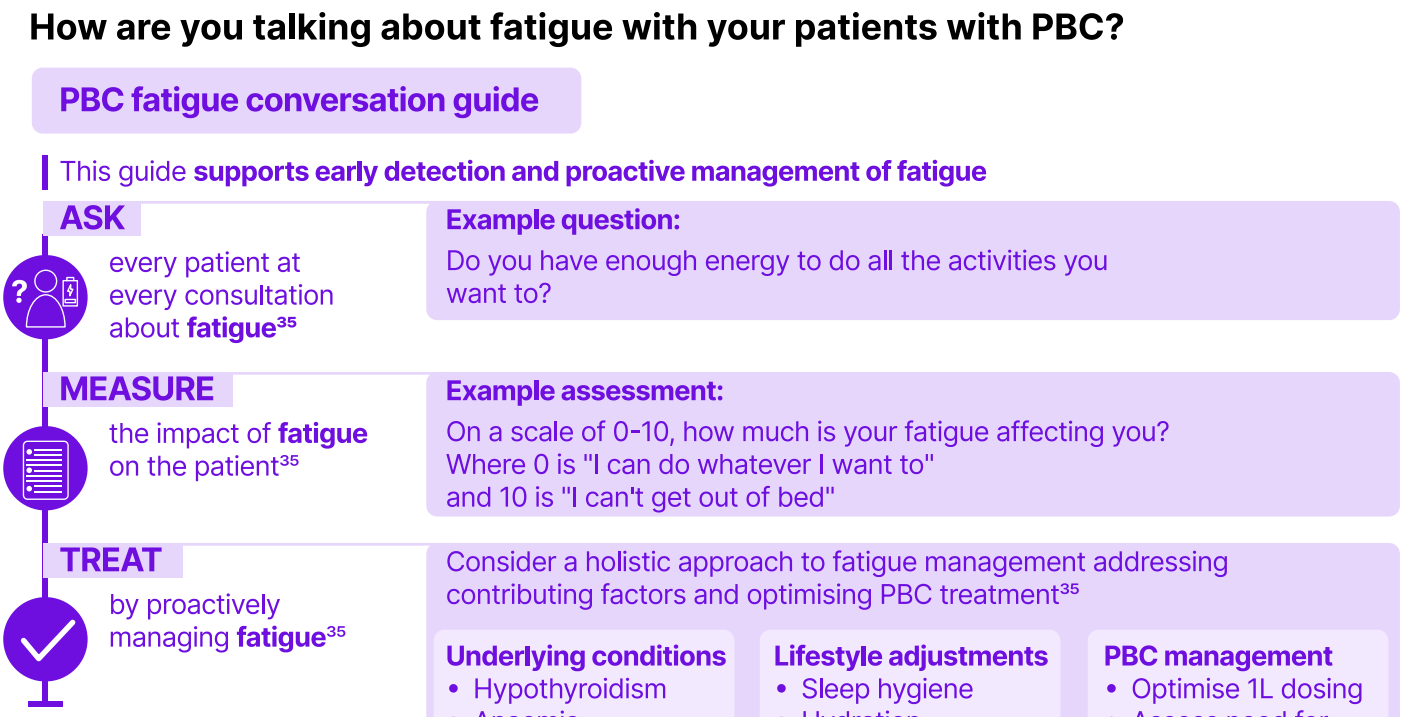
PBC: primary biliary cholangitis.

"When we ask patients which symptoms most affect their QoL, we see a range, including fatigue, anxiety, depression, and cognitive effects," Tandon explained. "When we look at fatigue, it is affecting patients across all domains of wellness, including physical, cognitive, and psychosocial aspects. Almost 60% of patients with PBC say fatigue negatively affects their social and family life.[35-37] "We need to understand that fatigue is different from tiredness. Fatigue is a distinct experience which does not improve with rest," Tandon emphasised, and "if we don't understand it, we undermine it during clinic visits."

Tandon went on to highlight studies that demonstrate functional MRI changes in the brains of people with PBC and fatigue.[38] "In the thalamus of people reporting fatigue, the neural networks are different," Tandon explained. This is objective and validates the symptoms that patients are experiencing. It can be central (poor concentration and memory) and peripheral (reduced muscle power and increased pain), and it is not uncommon for patients to experience both types.[38,39] It is also important to remember that fatigue and pruritus are independent.[35] Individual patient PBC-40 fatigue scores show no correlation with pruritus scores.[40] This is a reminder that, Tandon added, "we need to ask patients about both fatigue and pruritus and assess and manage them separately."

Despite its prevalence, fatigue is often overlooked in clinical care and under-reported by patients during consultations. Tandon presented Canadian data showing that of 167 patients who did not verbally report fatigue during consultation, 88% reported fatigue when using the PBC-40 questionnaire.[35] In the UK, insights from PBC patient surveys[12] reported that 43% of patients had not been assessed for fatigue

Figure 3: ERN rare liver disease algorithm tool.



1L: first-line; 2L: second-line; PBC: primary biliary cholangitis.

in the past 2 years (N=8,968), and the most common clinical responses to fatigue queries were (N=227): 45% no advice offered, and 35% were told there were no treatments available.[12]

Tandon was keen to stress that both pharmacological and non-pharmacological approaches are available to manage fatigue. In a trial of 31 patients involving a 12-week individualised home-based exercise programme (EXCITED),[41] the primary outcome of a reduction in fatigue score by >5 at 12 weeks was met in 26/31 patients ($p<0.001$). Additional improvements were also observed in daytime somnolence, cognitive function, and overall QoL.[41] Tandon went on to explain that there is also evidence that cognitive behavioural therapy, in combination with mindful moving, breathing and meditation, and other mind-body combinations, can help patients with PBC experiencing fatigue and psychosocial symptoms.[42]

Jones recapped, emphasising that conversations with patients about symptoms are always positive for patient wellbeing, and data on brain connectivity also help because this evidence helps to validate the patients' experience of symptoms like fatigue. "Exercise and wellness apps are also helpful because they allow people to 'own' the problem and 'own' solutions," Jones added, "but we want to do more than that." Jones went on to outline the European Reference Network (ERN) rare liver disease algorithm tool (ASK-MEASURE-TREAT),[36] which helps physicians to start conversations with patients to identify symptoms and develop an effective plan to treat them (Figure 3).

Jones then focused on how elafibranor and seladelpar can be used in symptom control.[16,17] Interim results from the ELFINITY Phase IV global study in patients with PBC showed rapid reductions in symptom burden in real-world practice.[23] But, Jones said, more work is needed. Seladelpar did not show clinically significant improvement in patients with moderate-to-severe fatigue, but provided improvements in PBC-40 fatigue scores in patients with severe pruritus (PBC-40 itch domain >7 score).[20,25] In summary, Jones said, "fatigue is the most debilitating symptom of PBC, and although complicated, it can be managed.[31,35,36] Routinely asking patients about symptoms ensures early intervention as symptoms arise."

Closing Remarks

Jones summarised the session, reiterating the importance of taking a holistic approach to PBC management to address both disease progression and symptom control. "We are always going to control the disease first, but we should aim to prevent advanced disease and achieve normalisation of biochemistry and symptom control. We must ensure that every patient gets the therapy they need," Jones concluded.

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References

1. 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.
2. Galoosian A et al. Clinical updates in primary biliary cholangitis: trends, epidemiology, and management. J Clin Transl Hepatol. 2020;8(1):49-60.
3. Khot R et al. Acquired ductopenia: an insight into imaging findings. Abdom Radiol (NY). 2025;50(1):152-68.
4. Cleveland Clinic. Cholestasis. Available at: https://my.clevelandclinic.org/health/diseases/24554-cholestasis. Last accessed: 24 June 2026.
5. Younossi ZM et al. Diagnosis and management of primary biliary cholangitis. Am J Gastroenterol. 2019;114(1):48-63.
6. Prince M et al. Survival and symptom progression in a geographically based cohort of patients with primary biliary cirrhosis: follow-up for up to 28 years. Gastroenterology. 2002;123(4):1044-51.
7. Jones DEJ et al. The relationship between disease activity and UDCA response criteria in primary biliary cholangitis: a cohort study. EBioMedicine. 2022;80:104068.
8. Peters MG et al.; PUMPS Group. Differences between Caucasian, African American, and Hispanic patients with primary biliary cirrhosis in the United States. Hepatology. 2007;46(3):769-75.
9. Cholankeril G et al. Increased waitlist mortality and lower rate for liver transplantation in Hispanic patients with primary biliary cholangitis. Clin Gastroenterol Hepatol. 2018;16(6):965-73.e2.
10. Gatselis NK et al. Factors associated with progression and outcomes of early stage primary biliary cholangitis. Clin Gastroenterol Hepatol. 2020:18(3);684-92.e6.
11. Kowdley KV et al. Longitudinal relationship between elevated liver biochemical tests and negative clinical outcomes in primary biliary cholangitis: a population-based study. Aliment Pharmacol Ther. 2025;61(11):1775-84.
12. Abbas N et al. Critical shortfalls in the management of PBC: results of a UK-wide, population-based evaluation of care delivery. JHEP Rep. 2023;6(1):100931.
13. Murillo Perez CF et al. GLOBAL PBC Study Group. Goals of treatment for improved survival in primary biliary cholangitis: treatment target should be bilirubin within the normal range and normalization of alkaline phosphatase. Am J Gastroenterol. 2020;115(7):1066-74.
14. Invernizzi P, Lleo A. EASL Clinical Practice Guidelines on management of primary biliary cholangitis and PBC. Presention. EASL Congress, 27-30 May, 2026.
15. Jamal F et al. Second-line therapies in primary biliary cholangitis: a comparative review of obeticholic acid, fibrates, seladelpar, and elafibranor. Biomedicines. 2025;13(10):2335.
16. European Medicines Agency (EMA). Iqirvo - Summary of Product Characteristics. Available at: https://www.ema.europa.eu/en/documents/product-information/iqirvo-epar-product-information_en.pdf. Last accessed: 23 June 2026.
17. European Medicines Agency (EMA). Lyvdelzi- Summary of Product Characteristics. Available at: https://www.ema.europa.eu/en/documents/product-information/lyvdelzi-epar-product-information_en.pdf. Last accessed: 23 June 2026.
18. Lammers WJ et al. Global PBC Study Group. Levels of alkaline phosphatase and bilirubin are surrogate end points of outcomes of patients with primary biliary cirrhosis: an international follow-up study. Gastroenterology. 2014;147(6):1338-49.e5.
19. IPSEN. Ipsen's Iqirvo® receives U.S. FDA accelerated approval as a first-in-class PPAR treatment for primary biliary cholangitis. 2024. Available at: https://www.ipsen.com/press-release/ipsens-iqirvo-receives-u-s-fda-accelerated-approval-as-a-first-in-class-ppar-treatment-for-primary-biliary-cholangitis/. Last accessed: 3 June 2026.
20. Kowdley KV et al. ELATIVE Study Investigators' Group. Efficacy and

safety of elafibranor in primary biliary cholangitis. N Engl J Med. 2024;390(9):795-805.

21. Levy C et al. Baseline alkaline phosphatase impacts response rates in primary biliary cholangitis: exploring response to elafibranor in ELATIVE. Liver Int. 2026;46(5):e70630.
22. Levy C et al. Long-term treatment with elafibranor leads to biochemical and symptomatic improvements for at least 3 years in patients with primary biliary cholangitis. Poster 5016. AASLD, 7-11 November, 2025.
23. Schattenberg JM et al. Elafibranor treatment results in rapid reductions in biochemical markers and symptom burden in real-world practice: interim results from the prospective, non-interventional ELFINITY phase IV global study in patients with primary biliary cholangitis. Poster SAT-033. EASL Congress, 27-30 May, 2026.
24. Gordon SC et al. Sustained efficacy and safety of seladelpar for up to 36 months in patients with primary biliary cholangitis from the placebo-controlled RESPONSE study to the open-label ASSURE study. Poster 4434. AASLD, 7-11 November, 2025.
25. Bowlus CL et al. 36 Months of treatment with seladelpar is associated with stable or improved liver stiffness in patients with primary biliary cholangitis. Poster 5031. AASLD, 7-11 November, 2025.
26. Hirschfield GM et al.; RESPONSE Study Group. A Phase 3 trial of seladelpar in primary biliary cholangitis. N Engl J Med. 2024;390(9):783-94.
27. Bonfichi A, et al. Real-world validation of elafibranor in UDCA non-responders previously treated with OCA or fibrates – results from the ELEVATE-PBC study. Poster LBP 004. EASL Congress, 27-30 May, 2026.
28. Diaz-Gonzalez A et al. Management of patients with primary biliary cholangitis in the post-obeticholic era: real-world effectiveness data on elafibranor and seladelpar from the ColHai registry. Abstract OS-010. EASL Congress, 27-30 May, 2026.
29. Levy C et al. Real world outcomes in patients with biliary cholangitis who initiated elafibranor treatment with baseline alkaline phosphatase levels between 1x to 1.67x the upper limit of normal. Poster LBP-023. EASL Congress, 27-30 May, 2026.
30. Roberts SB et al. Loss of biochemical response at any time worsens outcomes in UDCA-treated patients with primary biliary cholangitis. JHEP Rep. 2024;6(10):101168.
31. Faisal A. Understanding fatigue and pruritus in primary biliary cholangitis. Clin Liver Dis (Hoboken). 2024;23(1):e0216.
32. Gungabissoon U et al. Disease burden of primary biliary cholangitis and associated pruritus based on a cross-sectional US claims analysis. BMJ Open Gastroenterol. 2022;9(1):e000857.
33. Hirschfield GM et al. The British Society of Gastroenterology/UK-PBC primary biliary cholangitis treatment and management guidelines. Gut. 2018;67(9):1568-94.
34. Newton JL et al. Cognitive impairment in primary biliary cirrhosis: symptom impact and potential etiology. Hepatology. 2008;48(2):541-9.
35. Koc OM et al. Fatigue in people with primary biliary cholangitis: a position paper from the European Reference Network for Rare Liver Diseases. Lancet Gastroenterol Hepatol 2026;11(1):71-86.
36. Mells GF et al. UK-PBC Consortium. Impact of primary biliary cirrhosis on perceived quality of life: the UK-PBC national study. Hepatology. 2013;58(1):273-83.
37. Witt-Sullivan H et al. The demography of primary biliary cirrhosis in Ontario, Canada. Hepatology. 1990;12(1):98-105.
38. Swain MG et al. Fatigue in chronic liver disease: new insights and therapeutic approaches. Liver Int. 2019;39(1):6-19.
39. Mosher VAL et al. Primary biliary cholangitis alters functional connections of the brain's deep gray matter. Clin Translat Gastroenterol. 2017;8(7):e107.
40. Newton JL et al. Fatigue in primary biliary cirrhosis is associated with excessive daytime somnolence. Hepatology. 2006;44(1):91-8.
41. Freer A et al. A home-based exercise programme attenuates fatigue in primary biliary cholangitis: results from the EXCITED clinical trial. JHEP Rep. 2024;6(12):101210.
42. Watt M et al. An online mind-body program improves mental health and quality of life in primary biliary cholangitis: a randomized controlled trial. Hepatol Commun. 2023;7(11):e0316.