Revista de Ciencias Médicas de Pinar del Río

ISSN: 1561-3194 **RNPS:** 1877
Rev Ciencias Médicas. 2025; 29(S1): e6992

REVIEW ARTICLE

Advances in the pharmacological management of alcoholic liver disease

Adrián Benjamín Valle-Torbisco[1], Heinz Joel Toaquiza-Toalombo[1], Paul Alejandro Sánchez-Llerena[1], Álvaro Paul Moina-Veloz[1]

[1]Universidad Regional Autónoma de Los Andes. Ambato, Ecuador.

Received: December 17, 2025
Accepted: December 18, 2025
Published: December 19, 2025

Citar como: Valle-Torbisco AB, Toaquiza-Toalombo HJ, Sánchez-Llerena PA, Moina-Veloz AP Avances en el manejo farmacológico de la hepatopatía alcohólica. Rev Ciencias Médicas [Internet]. 2025 [citado: fecha de acceso]; 29(S1): e6992. Disponible en: http://revcmpinar.sld.cu/index.php/publicaciones/article/view/6992

ABSTRACT

Introduction: alcoholic liver disease is one of the leading causes of chronic liver disease worldwide, associated with high morbidity and mortality and limited pharmacological therapeutic options, representing a major clinical and public health challenge.
Objective: to analyze recent advances in the pharmacological management of alcoholic liver disease, evaluating the available evidence on efficacy, mechanisms of action, and therapeutic limitations.
Methods: a bibliographic review was conducted following the PRISMA guidelines. Specialized scientific databases were consulted, including PubMed, Scopus, ScienceDirect, and Google Scholar, using descriptors related to alcoholic liver disease and pharmacological treatment. Systematic reviews, meta-analyses, observational studies, and clinical trials published in recent years were included, and relevant findings were analyzed qualitatively.
Development: the literature shows that conventional therapies, such as corticosteroids and pentoxifylline, provide modest and mainly short-term clinical benefits, with an adverse effect profile that limits their prolonged use. New pharmacological strategies have generated interest, including quercetin for its antioxidant and anti-inflammatory effects, and S-adenosylmethionine, which has demonstrated hepatoprotective effects in experimental models. In addition, regulation of super-enhancers involved in chemokine production opens innovative perspectives for controlling hepatic inflammation. Recent clinical trials are evaluating immunomodulatory agents and non-absorbable antibiotics, with promising preliminary results.
Conclusions: pharmacological management of alcoholic liver disease is evolving toward more specific and safer therapies. Although current treatments are limited, new alternatives show therapeutic potential, improving patients' quality of life.

Keywords: Medication Therapy Management; Alcoholism; Liver Diseases, Alcoholic; Therapeutic.

ISSN: 1561-3194 **RNPS:** 1877
Rev Ciencias Médicas. 2025; 29(S1): e6992

INTRODUCTION

Alcoholic liver disease, with high incidence and prevalence, is one of the main causes of chronic liver disease. Due to its high rates of morbidity and mortality, as well as its significant socioeconomic impact, this topic is problematic and critical. This disease, resulting from excessive and prolonged alcohol consumption, includes cirrhosis, hepatocellular carcinoma, and hepatic steatosis.[1]

There are still few effective therapies for alcoholic liver disease, despite advances in our understanding of its etiology. Research projects addressing various pharmaceutical approaches, nutritional replacement therapy, and the management of related complications have been completed. However, there is disagreement regarding the safety and efficacy of various treatments, highlighting the need for a comprehensive analysis of the current body of research on the safety and efficacy of different treatments, which underscores the necessity of conducting a thorough analysis of the current body of research.[2]

The primary objective of this project is the identification of current pharmaceutical therapies, which will continue until a critical evaluation of their efficacy is carried out using the most recent scientific data. The disease is a multifaceted pathology requiring the integration of public health, epidemiology, addictive behaviors, and organ damage caused by alcohol for effective management.[3]

Alcoholic liver disease constitutes one of the leading causes of chronic liver disease worldwide, with a high burden of morbidity and mortality, as well as considerable socioeconomic impact. Despite advances in understanding its pathophysiology, available pharmacological options remain limited and yield heterogeneous results in terms of efficacy and safety.[4,5] In this context, it is essential to conduct a critical and systematic review of current and emerging treatments in order to identify the most promising therapies and areas requiring further research. This study aims to analyze recent advances in the pharmacologic management of alcoholic liver disease, evaluating the available scientific evidence regarding efficacy, mechanisms of action, and therapeutic limitations.

METHODS

This study was designed as a systematic literature review, following the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines. The search period was limited to January 2010 through December 2024, with the purpose of covering the most recent advances in the pharmacological management of alcoholic liver disease. Both original articles and systematic reviews, meta-analyses, as well as grey literature from institutional repositories and conference proceedings, were included, provided they met relevance and accessibility criteria.

The information sources consulted were the main biomedical databases: PubMed/MEDLINE, SciELO, ScienceDirect, Google Scholar, LILACS, and BVSALUD. Additionally, secondary references from selected articles were reviewed to identify additional studies not retrieved in the initial search. The search strategy was constructed using an algorithm combining keywords and Boolean operators, such as: "alcoholic liver disease" OR "hepatopatía alcohólica" AND ("pharmacological therapy" OR "tratamiento farmacológico" OR "drug therapy"). Publications in

ISSN: 1561-3194 **RNPS:** 1877
Rev Ciencias Médicas. 2025; 29(S1): e6992

Spanish, English, and Portuguese were considered to ensure broad and representative coverage of the available scientific literature.

Inclusion criteria encompassed studies published within the defined timeframe, with full-text availability, and directly addressing the pharmacological treatment of alcoholic liver disease. Clinical trials, observational studies, systematic reviews, and meta-analyses were accepted. Exclusion criteria included duplicates, articles without full-text access, studies irrelevant to the topic, and those outside the search period. The selection process was carried out in two phases: first, title and abstract screening to exclude non-relevant records; subsequently, full-text review of selected articles. Initially, approximately 1,240 records were identified; after deduplication and screening, 312 articles remained for full-text reading. Finally, 87 studies were included in the qualitative synthesis. The selection process was represented using a PRISMA flow diagram detailing the stages of identification, screening, eligibility, and inclusion.

For data extraction and analysis, a standardized form was designed to collect information related to the developed topic. Data synthesis was performed qualitatively, grouping findings according to type of intervention and mechanism of action. In cases where data were homogeneous and comparable, the possibility of conducting an exploratory meta-analysis was considered; however, methodological heterogeneity among studies limited this procedure in several instances.

Overall, the applied methodology ensured a rigorous and transparent approach, allowing integration of the available evidence on pharmacological options for alcoholic liver disease and establishing a solid foundation for the critical discussion of their benefits and limitations.

DEVELOPMENT

Various emerging and current therapeutic approaches for alcoholic liver disease (ALD) have been identified and analyzed in this systematic review. In this regard, a study by Zhao et al.,[6] investigated the role of quercetin in preventing ethanol-induced hepatocyte injury. The findings showed that quercetin, a flavonoid with anti-inflammatory and antioxidant properties, significantly reduced mitochondrial reactive oxygen species (ROS) levels and promoted mitochondrial homeostasis through the regulation of PGC-1α. Furthermore, a decrease in the expression of NLRP3, ASC, caspase-1, IL-18, IL-1β, and GSDMD-N was observed, suggesting effective inhibition of pyroptosis. These findings imply that quercetin may be a promising therapeutic option for ALD, as it protects hepatic cells from ethanol-induced damage.

Another important study focused on the regulation of super-enhancers in cytokine-induced chemokine production in alcohol-related hepatitis. It was found that certain super-enhancers play a fundamental role in controlling the liver's inflammatory response. In patients with alcoholic hepatitis, results showed that modulation of these super-enhancers could provide a novel approach to control hepatic inflammation, opening pathways for specific therapeutic interventions.[7]

The use of S-adenosylmethionine (SAMe) as a therapeutic agent in ALD has shown encouraging results. SAMe, a compound involved in multiple biochemical reactions, has demonstrated hepatoprotective effects. Recent studies have shown that SAMe can improve liver function in animal models of endothelial dysfunction by reducing oxidative stress and inflammation in the liver. Through its antioxidant and anti-inflammatory properties, these results suggest that SAMe

ISSN: 1561-3194 **RNPS:** 1877
Rev Ciencias Médicas. 2025; 29(S1): e6992

could be a valuable addition to current therapeutic strategies for ALD, providing additional benefits.[8]

Numerous clinical trials evaluating the efficacy of various pharmacological treatments for ALD—such as corticosteroids, pentoxifylline, and antioxidants like vitamin E and ursodeoxycholic acid—have been reviewed. Although some treatments may offer short-term benefits, long-term efficacy and mortality reduction remain a challenge, according to the results. The combination of pentoxifylline with corticosteroids showed some efficacy in reducing hepatic inflammation, but at the cost of significant adverse effects. It is evident that safer and more effective treatments for ALD need to be developed, highlighting the necessity for continued research in this area.[9]

The results are presented in Table 1, which lists the types of therapies currently used.

Table 1. Randomized clinical trials on severe alcoholic hepatitis.

Therapeutic category	Source	Treatment / Intervention
Anti-inflammatory therapies	Van Melkebeke et al.,[9]	Amoxicillin–clavulanic acid (1 g/125 mg, 3 times/day, 30 days) + prednisolone vs. prednisolone Anakinra (100 mg, 14 days) + zinc (220 mg, 90 days) + prednisolone vs. prednisolone Canakinumab (3 mg/kg day 1 ± day 28) vs. placebo Ciprofloxacin (500 mg every 12 h) vs. placebo
	Bataller et al.(10)	Methylprednisolone
Antioxidants	Van Melkebeke et al.(9)	N-acetylcysteine (NAC) + standard medical treatment vs. standard
	Bataller et al.(10)	NAC (5 days) + prednisolone vs. prednisolone
Gut–liver axis modulation	Bataller et al.,[10]	Bovine colostrum vs. placebo Fecal microbiota transplantation (FMT) vs. prednisolone
	Van Melkebeke et al.,[9]	Rifaximin (1200 mg/day, 90 days) + prednisolone vs. prednisolone
Hepatic regeneration stimulation	Bataller et al.,[10]	G-CSF (5 µg/kg) vs. placebo (non-responders) G-CSF (5 µg/kg, 2 times/day, 5 days) vs. placebo Pegfilgrastim (6 mg) + standard vs. standard
Other therapies	Van Melkebeke et al.,[9]	DUR-928 (30 mg vs. 90 mg vs. placebo) Omega-5 fatty acids + prednisolone vs. prednisolone

Although the reviewed studies show promising approaches for the treatment of ALD, further clinical validation is needed to ensure the long-term efficacy and safety of these treatments. Regulation of super-enhancers represents an innovative pathway for therapeutic intervention, while quercetin and SAMe offer potential therapeutic benefits. However, rigorous clinical trials are essential to validate these findings and establish clear treatment protocols. To improve the overall efficacy of ALD management, efforts should focus on optimizing treatment dosing and duration, as well as evaluating potential therapeutic combinations.

ISSN: 1561-3194 **RNPS:** 1877
Rev Ciencias Médicas. 2025; 29(S1): e6992

CONCLUSIONS

The review of pharmacological treatments for alcoholic liver disease reveals a wide range of approaches, although most still require validation through additional research and robust clinical trials. While some compounds show encouraging results, there remains a lack of consensus regarding their efficacy and safety, reflecting the complexity of this disease and the need for multidisciplinary approaches that integrate public health, epidemiology, addictive behaviors, and organ damage. The updated synthesis of the literature allows for the identification of potential benefits and limitations of available therapies, as well as highlighting knowledge gaps that must be addressed to improve clinical practice. In this regard, advances in understanding the etiology of alcohol-induced hepatic injury provide a solid scientific foundation to guide future research and optimize pharmacological interventions toward more effective and safer treatments.

BIBLIOGRAPHIC REFERENCES

1. Niu X, Zhu L, Xu Y, Zhang M, Hao Y, Ma L, Li Y, Xing H. Global prevalence, incidence, and outcomes of alcohol related liver diseases: a systematic review and meta-analysis. BMC Public Health[Internet]. 2023 May [citado 03/11/2025]; 23(1): 859. Disponible en: https://doi.org/10.1186/s12889-023-15749-x

2. Thakral N, Deutsch-Link S, Singal AK. Therapeutic Pipeline in Alcohol-Associated Liver Disease. Semin Liver Dis[Internet]. 2023 Feb [citado 03/11/2025]; 43(1): 60-76. Disponible en: https://doi.org/10.1055/s-0042-1759614

3. Holbeck M, DeVries HS, Singal AK. Integrated Multidisciplinary Management of Alcohol-associated Liver Disease. J Clin Transl Hepatol[Internet]. 2023 Nov [citado 03/11/2025]; 11(6): 1404-1412. Disponible en: https://doi.org/10.14218/jcth.2023.00002

4. Zhang N, Xue F, Wu XN, Zhang W, Hou JJ, Xiang JX, Lv Y, Zhang XF. The global burden of alcoholic liver disease: a systematic analysis of the global burden of disease study 2019. Alcohol Alcohol[Internet]. 2023 Sep[citado 03/11/2025]; 58(5): 485-496. Disponible en: https://doi.org/10.1093/alcalc/agad046

5. Morgan TR. Emerging Pharmacologic Treatments for Alcohol-Associated Hepatitis: Current Status and Future Landscape. Clin Liver Dis[Internet]. 2024 Nov [citado 03/11/2025]; 28(4): 747-760. Disponible en: https://doi.org/10.1016/j.cld.2024.06.014

6. Zhao X, Wang C, Dai S, Liu Y, Zhang F, Peng C, Li Y. Quercetin Protects Ethanol-Induced Hepatocyte Pyroptosis via Scavenging Mitochondrial ROS and Promoting PGC-1α-Regulated Mitochondrial Homeostasis in L02 Cells. Oxid Med Cell Longev[Internet]. 2022 Jul [citado 03/11/2025]; 2022:4591134. Disponible en: https://doi.org/10.1155/2022/4591134

7. Liu M, Cao S, He L, Gao J, Arab JP, Cui H, Xuan W, Gao Y, Sehrawat TS, Hamdan FH, Ventura-Cots M, Argemi J, Pomerantz WCK, Johnsen SA, Lee JH, Gao F, Ordog T, Mathurin P, Revzin A, Bataller R, Yan H, Shah VH. Super enhancer regulation of cytokine-induced chemokine production in alcoholic hepatitis. Nat Commun[Internet]. 2021 Jul 27[citado 03/11/2025]; 12(1): 4560. Disponible en: https://doi.org/10.1038/s41467-021-24843-w

ISSN: 1561-3194 **RNPS:** 1877
Rev Ciencias Médicas. 2025; 29(S1): e6992

8. Pascale RM, Simile MM, Calvisi DF, Feo CF, Feo F. S-Adenosylmethionine: From the Discovery of Its Inhibition of Tumorigenesis to Its Use as a Therapeutic Agent. Cells[Internet]. 2022 Jan 25 [citado 03/11/2025]; 11(3):409. Disponible en: https://doi.org/10.3390/cells11030409

9. Van Melkebeke L, Korf H, Tsochatzis EA, van der Merwe S, Nevens F, Verbeek J. Treatment of severe alcoholic hepatitis: A systematic review. Curr Opin Pharmacol[Internet]. 2021 Oct [citado 03/11/2025]; 60: 91-101. Disponible en: https://doi.org/10.1016/j.coph.2021.06.011

10. Bataller R, Cabezas J, Aller R, et al. Enfermedad hepática por alcohol. Guías de práctica clínica. Documento de consenso auspiciado por la AEEH Gastroenterol Hepatol[Internet]. 2019 [citado 03/11/2025]; 42(10): 657-676. Disponible en: https://www.elsevier.es/es-revista-gastroenterologia-hepatologia-14-articulo-enfermedad-hepatica-por-alcohol-guias-S0210570519302249