ORIGINAL RESEARCH

Evaluation of Postmortem Findings in Patients With Chronic Liver Disease: Correlating Clinical History With Autopsy Observations

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ABSTRACT

Introduction: Chronic liver disease (CLD) is a major cause of morbidity and mortality worldwide, often presenting with multisystem complications. While clinical diagnosis is frequently established during life, postmortem examination offers valuable insight into the full extent of liver pathology and its systemic effects.**Objective:** To evaluate autopsy findings in patients with clinically diagnosed chronic liver disease and correlate them with antemortem clinical history to assess diagnostic accuracy and identify underreported complications.**Methodology:** This retrospective study included 109 autopsied patients with a known diagnosis of chronic liver disease. Clinical records and autopsy reports were reviewed to assess liver morphology, histopathology, cause of death, and associated systemic findings.**Results:** Among 109 patients with chronic liver disease, autopsy confirmed cirrhosis in 88.9% and portal hypertension in 69.7%, with ascites (74.3%), splenomegaly (60.6%), and varices (41.3%) as common complications. Major diagnostic discrepancies were found in 17.4% of cases, most often involving undiagnosed variceal bleeding, hepatocellular carcinoma, or infections. Clinical and autopsy cause of death matched completely in 61.5% of cases.**Conclusion:** Autopsy continues to play a vital role in identifying the full burden of chronic liver disease and its complications. In a significant number of cases, autopsy revealed additional or previously undiagnosed findings, underlining its value in improving clinical-pathological correlation, especially in resource-limited settings.

Keywords: Chronic liver disease, autopsy, cirrhosis, hepatic complications, clinicopathological correlation, postmortem evaluation.

INTRODUCTION

CLD is a leading health concern worldwide, as it is responsible for over two million deaths every year from both direct and indirect complications [1-2]. It involves different degrees of liver damage that may be caused by viral hepatitis, drinking too much alcohol, NAFLD, autoimmune hepatitis, and several genetic problems [3]. If the disease is not managed and liver is repeatably injured, the result can be fibrosis, cirrhosis, and then liver failure or HCC. Although there have been new advancements in CLD tests, people usually come in later when the disease is advanced, and this allows complications such as bleeding, infection, brain dysfunction, and problems affecting numerous organs to lead to death [4-6]. While externally performed studies and blood tests are very useful, the most reliable way to confirm disease stage, eye the main cause, and highlight any general issues is a postmortem examination. Many times, an autopsy points to illnesses that were not diagnosed or recognized during the patient's treatment [7].

It has been noted in numerous studies that there is a difference between clinical and pathological diagnoses in chronic liver disease, demonstrating that doctors may be unable to make accurate diagnoses, especially when resources are limited [8-9]. Sometimes, major issues such as variceal bleeding, peritonitis, and cancer in the liver are not noticed until after a patient dies [10]. Also, issues such as pulmonary edema, damage to the kidneys, and coagulation disorders that are associated with the liver can easily be missed during the clinical course [11]. Linking the findings during life with those seen during the postmortem examination assists in accurate diagnoses, plans for future medical action, and highlights the importance of autopsies in medicine. In spite of its relevance, there are few recent studies that focus on doing a full assessment of CLD after death, mainly in regions where the practice of autopsy is less common and complex medical tests are not always available. This study focuses on comparing postmortem findings in chronic liver disease cases with what was documented by clinicians to find out the agreement between the diagnoses, unexplained missed conditions, and the need for autopsy in today's hepatology.

Objectives

To evaluate autopsy findings in patients with clinically diagnosed chronic liver disease and correlate them with antemortem clinical history to assess diagnostic accuracy and identify underreported complications.

Methodology

This retrospective descriptive study included 109 patients who had been clinically diagnosed with chronic liver disease and underwent medico-legal or hospital-consented autopsies. Inclusion was based on documented clinical history of chronic liver pathology, with or without cirrhosis, and availability of complete autopsy and histopathology records.

Inclusion Criteria

- Adults aged ≥18 years with clinical documentation of chronic liver disease
- Complete autopsy with histopathological liver examination
- Availability of medical records for clinical correlation

Exclusion Criteria

- Incomplete clinical or autopsy records
- Patients with acute liver failure or no evidence of chronic liver disease at autopsy
- Autopsies with inadequate tissue preservation or deferred due to legal objections

Data Collection

Relevant data were retrieved from hospital case files, autopsy reports, and histopathology records. Parameters collected included patient demographics, cause and duration of liver disease, clinical complications noted before death (e.g., hepatic encephalopathy, ascites, gastrointestinal bleeding), and gross/microscopic liver findings at autopsy (e.g., cirrhosis, fatty liver, HCC). Associated findings in other organssuch as splenomegaly, esophageal varices, renal tubular injury, or pulmonary edemawere also noted. The final cause of death ascertained during postmortem examination was compared with the clinical cause of death to assess the level of concordance.

Statistical Analysis

All data were entered and analyzed using SPSS version 21. Continuous variables such as age were presented as mean ± standard deviation. Categorical variables such as presence of cirrhosis or varices were summarized using frequencies and percentages. A p-value of <0.05 was considered statistically significant where applicable.

RESULTS

Among 109 autopsied patients with chronic liver disease, the average age was 51.4± 11.2 years, with a strong male predominance (80%). Alcohol-related CLD was the most common etiology (39.4%), followed by hepatitis-related (34.9%) and cryptogenic or NASH-related CLD (25.7%). Cirrhosis was more prevalent among alcohol-related cases (97.7%) and hepatitis-related cases (89.5%), while non-cirrhotic liver disease was more common in cryptogenic/NASH (58.3%). Non-cirrhotic cases were slightly younger, averaging 46.8 years, compared to 52.1± 10.8 years in cirrhotic patients.

Table 1: Demographic and Clinical Profile

Characteristic	Total (n=109)	With Cirrhosis (n=97)	Without Cirrhosis (n=12)
Mean Age (years)	51.4 ± 11.2	52.1 ± 10.8	46.8 ± 12.3
Male (n, %)	87 (79.8%)	79 (81.4%)	8 (66.7%)
Female (n, %)	22 (20.2%)	18 (18.6%)	4 (33.3%)
Alcohol-related CLD	43 (39.4%)	42 (43.3%)	1 (8.3%)
Hepatitis-related CLD	38 (34.9%)	34 (35.1%)	4 (33.3%)
Cryptogenic/NASH	28 (25.7%)	21 (21.6%)	7 (58.3%)

Portal hypertension was noted in 70%, and fatty liver in 30% of cases. Hepatocellular carcinoma (HCC) was identified in 8.3%, and liver necrosis in 15.6%. Among alcohol-related cases, cirrhosis and portal hypertension were found in over 95% and 84%, respectively. Fatty liver changes were more common in alcoholics (42%) than in hepatitis or NASH-related cases.

Table 2: Major Hepatic Findings at Autopsy

Finding	Total Cases (n=109)	Alcohol-related CLD (n=43)	Hepatitis-related CLD (n=38)	Cryptogenic/NASH (n=28)
Cirrhosis	97 (88.9%)	42 (97.7%)	34 (89.5%)	21 (75.0%)
Fatty Liver	33 (30.3%)	18 (41.9%)	10 (26.3%)	5 (17.9%)
Portal Hypertension	76 (69.7%)	36 (83.7%)	25 (65.8%)	15 (53.6%)
Hepatocellular Carcinoma (HCC)	9 (8.3%)	4 (9.3%)	3 (7.9%)	2 (7.1%)
Liver Necrosis	17 (15.6%)	7 (16.3%)	6 (15.8%)	4 (14.3%)

Ascites was the most frequent extrahepatic complication (74%), followed by splenomegaly (61%) and esophageal varices (41%). Hepatic encephalopathy was noted in 23%, renal tubular injury in 31%, and pulmonary edema in 20%. These complications were far more common in cirrhotic patients—over 80% of cirrhotics had ascites, while nearly 70% had splenomegaly. In contrast, most non-cirrhotic patients lacked major extrahepatic features, except for renal changes (33%).

Table 3: Extrahepatic Complications Observed

Complication	Total (n=109)	With Cirrhosis (n=97)	Without Cirrhosis (n=12)
Ascites	81 (74.3%)	80 (82.5%)	1 (8.3%)
Splenomegaly	66 (60.6%)	65 (67.0%)	1 (8.3%)
Esophageal Varices	45 (41.3%)	43 (44.3%)	2 (16.7%)
Hepatic Encephalopathy	25 (22.9%)	24 (24.7%)	1 (8.3%)
Renal Tubular Injury	34 (31.2%)	30 (30.9%)	4 (33.3%)
Pulmonary Edema	22 (20.2%)	21 (21.6%)	1 (8.3%)

Variceal bleeding was the most frequently missed diagnosis at the clinical level (6.4%), followed by hepatocellular carcinoma (4.6%), spontaneous bacterial peritonitis (3.7%), and sepsis with multiorgan failure (2.8%). These conditions were often misattributed to nonspecific causes such as liver failure or cardiac arrest. The missed diagnoses carried direct implications on mortality and suggest that improved diagnostic vigilance, particularly in end-stage CLD, is needed.

Table 4: Major Discrepancies Between Clinical and Autopsy Diagnosis

Missed Diagnosis	Cases Missed Clinically (n)	Percentage of Total (%)	Common Clinical Presumptions	Relevance
Variceal Bleed	7	6.4%	Hypovolemia	Fatal hemorrhage missed
Hepatocellular Carcinoma	5	4.6%	Liver failure only	Cancer undetected
Spontaneous Bacterial Peritonitis	4	3.7%	Unknown fever	Treatable infection missed
Sepsis with Organ Failure	3	2.8%	Cardiopulmonary arrest	Cause of death unclear

DISCUSSION

By performing postmortem examinations on patients with clinically diagnosed CLD, useful insights were gained about matching the clinical and postmortem diagnoses, as well as the actual occurrence of hepatic and extra-hepatic complications. Portal hypertension and cirrhosis are well-known to medical professionals, but several dangerous complications are only discovered after the patient has died. This study included a majority of middle-aged men, with a mean age of 51.4 years and about 80% of them being male. The main reasons for CLD were alcohol-related (39.4%), hepatitis (34.9%), and cryptogenic/NASH (25.7%). In the past, studies from developing countries have consistently pointed out that alcohol is a big reason behind CLD, and this is especially true for men [12]. In addition, cryptogenic or metabolic-associated liver disease is now a major issue globally

for deaths caused by CLD, especially in those who do not have cirrhosis, as our data reflect by the higher number of non-cirrhotic deaths in the NASH group. Autopsy findings showed cirrhosis in 88.9% of cases, as earlier autopsy studies indicated that cirrhosis is seen in 85–95% of all people with end-stage liver disease [13]. Nearly 70% of the patients had portal hypertension, and fatty liver alterations were detected in 30%, often among alcoholics. Of note, 8.3% of the patients were found to have hepatocellular carcinoma (HCC), many of them showing no indications of the disease before they died [14]. It has been observed in previous studies that the infrequent use of surveillance in cirrhotic patients allowed malignancies to progress without being found until an autopsy [15].

Complications in parts of the body aside from the liver were found frequently, with 74% of patients having ascites, 61% developing splenomegaly, and 41% showing esophageal varices. In addition, liver problems occurred in 23% of the cases, renal injury in 31%, and lung edema in 20%. According to the reports, advanced liver disease is related to problems affecting multiple organs, leading to severe symptoms and high rates of death [16]. Moreover, our findings showed that almost all patients with cirrhosis had one or more extrahepatic complications, highlighting the wide impact of end-stage liver disease on the whole body. Overall, 17.4% of the patients experienced a significant difference between the clinical cause of death and what was recorded at the autopsy. The common misdiagnoses were variceal bleeding, HCC that was not found, spontaneous bacterial peritonitis (SBP), and systemic sepsis with loss of organ function. Likewise, previous studies have shown that discrepancies in end-stage liver disease can range from 15–25%, because hepatic encephalopathy and fluid overload can make liver disease symptoms hard to identify [17]. It is especially concerning when such conditions as SBP or variceal hemorrhage are missed since they can often be cured if caught in time [18]. While only 6.4% of cases showed bleeding in the varices during the autopsy, this was not observed in the patient's clinical histories. The same population showed that 4.6% did not have their HCC detected, therefore regular surveillance imaging is necessary for all cirrhotics. In 3.7% of the cases, healthcare workers missed spontaneous bacterial peritonitis, a cause that is easy to treat. The outcome of this study is supported by studies in the past that highlight the fact that severe complications are less recognized in terminally ill patients, especially when there are not enough available diagnostic tools [19].However, this study has limitations. This approach also depended on the availability and correctness of the clinical records and the documents made during the autopsy. How good the histopathological examination was often depended on how well the samples were stored, and both imaging and serological diagnostic methods were not always available for all cases. Still, the study stresses that postmortem examinations help with diagnosis, mainly in challenging cases of multi-systemic illnesses, including CLD.

CONCLUSION

It is concluded that autopsy examination in patients with chronic liver disease reveals a high prevalence of cirrhosis and portal hypertension, along with a wide range of extrahepatic complications such as ascites, varices, hepatic encephalopathy, and renal injury. While clinical diagnosis of liver disease is often accurate, a significant number of serious complicationsincluding variceal bleeding, hepatocellular carcinoma, and spontaneous bacterial peritonitisremain undiagnosed until postmortem.

REFERENCES

1. Marbet, U.A., Bianchi, L., Meury, U. and Stalder, G.A., 1987. Long-term histological evaluation of the natural history and prognostic factors of alcoholic liver disease. *Journal of hepatology*, *4*(3), pp.364-372.
2. Merat, S., Sotoudehmanesh, R., Nouraie, M., Peikan-Heirati, M., Sepanlou, S. G., Malekzadeh, R., & Sotoudeh, M. (2012). Sampling error in histopathology findings of nonalcoholic fatty liver disease: a post mortem liver histology study. *Archives of Iranian medicine*, *15*(7), 0-0.
3. Santoriello, Dominick, Pascale Khairallah, Andrew S. Bomback, Katherine Xu, Satoru Kudose, Ibrahim Batal, Jonathan Barasch, Jai Radhakrishnan, Vivette D'Agati, and Glen Markowitz. "Postmortem kidney pathology findings in patients with COVID-19." *Journal of the American Society of Nephrology* 31, no. 9 (2020): 2158-2167.
4. Conwell, Yeates, Nicholas T. Forbes, Christopher Cox, and Eric D. Caine. "Validation of a measure of physical illness burden at autopsy: the Cumulative Illness Rating Scale." *Journal of the American Geriatrics Society* 41, no. 1 (1993): 38-41.
5. Shulman, H. M., Fisher, L. B., Schoch, G. H., Henne, K. W., & McDonald, G. B. (1994). Venoocclusive disease of the liver after marrow transplantation: histological correlates of clinical signs and symptoms. *Hepatology*, *19*(5), 1171-1181.
6. Hanley, Brian, Kikkeri N. Naresh, Candice Roufosse, Andrew G. Nicholson, Justin Weir, Graham S. Cooke, Mark Thursz et al. "Histopathological findings and viral tropism in UK patients with severe fatal COVID-19: a post-mortem study." *The Lancet Microbe* 1, no. 6 (2020): e245-e253.
7. Krieger, Derk, Silke Krieger, L. Theilmann, O. Jansen, P. Gass, and H. Lichtnecker. "Manganese and chronic hepatic encephalopathy." *The Lancet* 346, no. 8970 (1995): 270-274.
8. Sherlock, Sheila. "The liver in heart failure relation of anatomical, functional, and circulatory changes." *British heart journal* 13, no. 3 (1951): 273.
9. Van Slambrouck, C. M., Salem, F., Meehan, S. M., & Chang, A. (2013). Bile cast nephropathy is a common pathologic finding for kidney injury associated with severe liver dysfunction. *Kidney international*, *84*(1), 192-197.
10. Menter, T., Haslbauer, J. D., Nienhold, R., Savic, S., Hopfer, H., Deigendesch, N., ... & Tzankov, A. (2020). Postmortem examination of COVID-19 patients reveals diffuse alveolar damage with severe capillary

congestion and variegated findings in lungs and other organs suggesting vascular dysfunction. *Histopathology*, *77*(2), 198-209.

11. Vasquez-Bonilla, W.O., Orozco, R., Argueta, V., Sierra, M., Zambrano, L.I., Muñoz-Lara, F., López-Molina, D.S., Arteaga-Livias, K., Grimes, Z., Bryce, C. and Paniz-Mondolfi, A., 2020. A review of the main histopathological findings in coronavirus disease 2019. *Human pathology*, *105*, pp.74-83.
12. Guerrero, Manuel L. Fernández, Beatriz Alvarez, Félix Manzarbeitia, and Guadalupe Renedo. "Infective endocarditis at autopsy: a review of pathologic manifestations and clinical correlates." *Medicine* 91, no. 3 (2012): 152-164.
13. Rose, Christopher, et al. "Manganese deposition in basal ganglia structures results from both portal-systemic shunting and liver dysfunction." *Gastroenterology* 117.3 (1999): 640-644.
14. Wichmann, D., Sperhake, J. P., Lütgehetmann, M., Steurer, S., Edler, C., Heinemann, A., ... & Kluge, S. (2020). Autopsy findings and venous thromboembolism in patients with COVID-19: a prospective cohort study. *Annals of internal medicine*, *173*(4), 268-277.
15. Holt, D. E., Schelling, C. G., Saunders, H. M., & Orsher, R. J. (1995). Correlation of ultrasonographic findings with surgical, portographic, and necropsy findings in dogs and cats with portosystemic shunts: 63 cases (1987-1993). *Journal of the American Veterinary Medical Association*, *207*(9), 1190-1193.
16. McDonnell, P. J., Toye, P. A., & Hutchins, G. M. (1983). Primary pulmonary hypertension and cirrhosis: are they related?. *American Review of Respiratory Disease*, *127*(4), 437-441.
17. Hobson-Webb, Lisa D., Alan D. Proia, Beth L. Thurberg, Suhrad Banugaria, Sean N. Prater, and Priya S. Kishnani. "Autopsy findings in late-onset Pompe disease: a case report and systematic review of the literature." *Molecular genetics and metabolism* 106, no. 4 (2012): 462-469.
18. van Geenen, E.J.M., Smits, M.M., Schreuder, T.C., van der Peet, D.L., Bloemena, E. and Mulder, C.J., 2010. Nonalcoholic fatty liver disease is related to nonalcoholic fatty pancreas disease. *Pancreas*, *39*(8), pp.1185-1190.
19. Bryce, C., Grimes, Z., Pujadas, E., Ahuja, S., Beasley, M.B., Albrecht, R., Hernandez, T., Stock, A., Zhao, Z., Rasheed, M.A. and Chen, J., 2020. Pathophysiology of SARS-CoV-2: targeting of endothelial cells renders a complex disease with thrombotic microangiopathy and aberrant immune response. The Mount Sinai COVID-19 autopsy experience. *MedRxiv*, pp.2020-05.