Original Article

Histomorphological Spectrum and Audit of Explant Livers: a 15 year Retrospective Study of 100 cases from a Government Liver Transplant Center

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Abstract

Background: Explant liver histopathology is considered the gold standard for confirming pre-transplant diagnosis and identifying incidental or previously unrecognized liver pathologies.[1] With a shifting global burden of end-stage liver disease (ESLD) from viral to alcohol- and metabolic-associated etiologies, region-specific histopathological data are essential.[2,3] However, long-term studies from Indian transplant centers remain scarce.[4] Our aim is to evaluate the histopathological spectrum of explant livers over a 15-year period and identify rare or incidental etiologies contributing to end stage liver disease. This retrospective descriptive study was conducted at the Department of Pathology, Government Medical College. Explant liver specimens (n=100), received between January 2009 and December 2024, were processed routinely, stained with hematoxylin and eosin, special stains like reticulin and analyzed. Clinical and demographic parameters were correlated with histopathological findings. In our study, the most common age group was 30 – 50 years of age. 83 cases were males and 17 cases were females. The leading etiology was ethanol related cirrhosis followed by decompensated liver disease with portal hypertension, cryptogenic cirrhosis, metabolic associated liver disease. This 15-year audit underscores a shifting etiological profile of liver disease and reflects a rising trend in alcohol and metabolic-associated liver disease.[2,3]

Keywords: Explant liver, cirrhosis, viral induced cirrhosis, Decompensated liver disease.

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Introduction

Liver transplantation is the definitive treatment for end-stage liver disease. Histopathological examination of explant liver provides an unparalleled opportunity to correlate clinical, radiological, and histopathological findings, enhancing the understanding of disease progression diverse etiological patterns and epidemiological trends of liver disease in a population. In recent decades, the burden of chronic liver disease has shifted from viral hepatitis to metabolic, autoimmune, and cryptogenic causes, particularly in developing nations.

Systematic histopathological audits of explant livers are vital for identifying these shifts, uncovering occult neoplastic or dysplastic lesions and provide the epidemiological insights, preventive strategies to reduce the liver disease burden in the community.[1-5]

Materials and Methods

This is a retrospective study, conducted in Department of Pathology in a tertiary care centre. Explant liver specimens received in our department were taken for the study.

In a period of 15 years, 100 explant liver specimens were received.

All the specimens were fixed with 10% Neutral buffered formalin. After adequate fixation, specimens were submitted for routine processing, followed by paraffin embedding and stained with hematoxylin and eosin, special stains such as reticulin. Immunohistochemical panel was used in required cases for further diagnosis.

The findings were noted and histopathological findings were correlated with clinical presentations and investigations. The results are tabulated and statistically analyzed.

Results

In a period of 15 years, 100 explant liver specimens were received. The most common age group was 30 – 50 years of age [Graph 1].

Out of 100 cases, 83 cases were males and 17 cases were females

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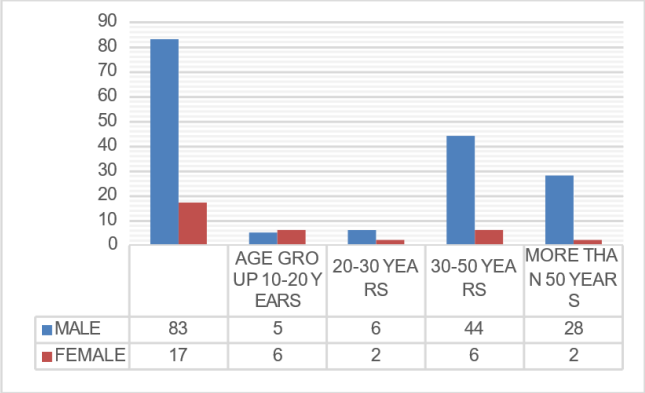
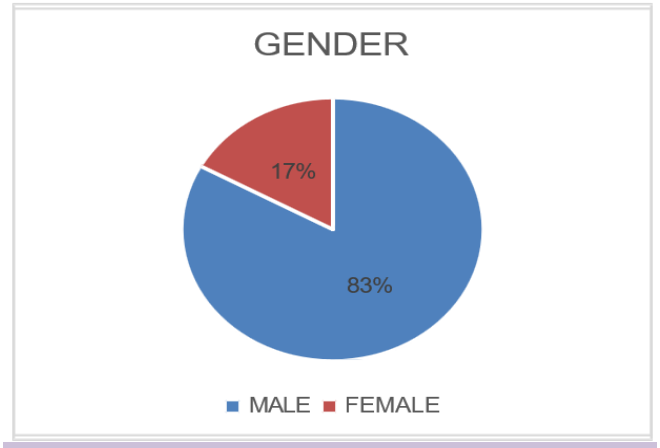
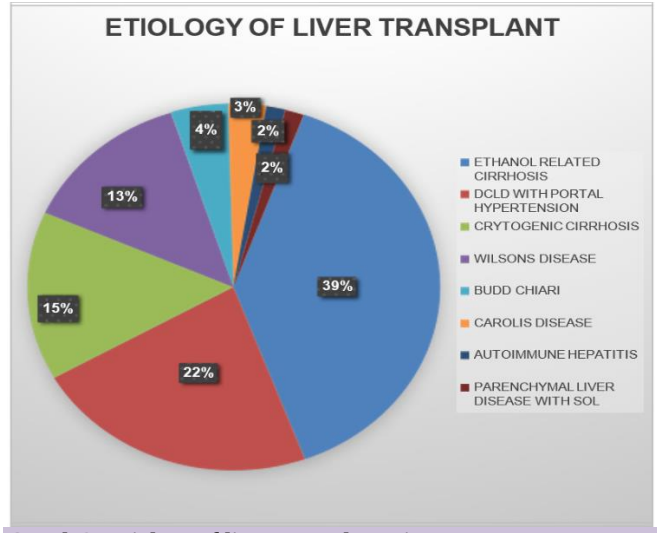
[Graph 2]. The leading etiology [Graph 3] was ethanol-related cirrhosis (n=26), followed by DCLD with portal hypertension (n=15), HBV (n=13), cryptogenic cirrhosis (n=10), HCV (n=9), Wilson's disease (n=9), Budd-Chiari syndrome (n=3), Caroli's disease (n=2), autoimmune hepatitis (n=1), and parenchymal liver disease with SOLs (n=1). Incidental hepatocellular carcinoma was identified in 6 cases.



Graph 1: Age and gender distribution



Graph 2: Sex distribution



Graph 3: Etiology of liver transplantation

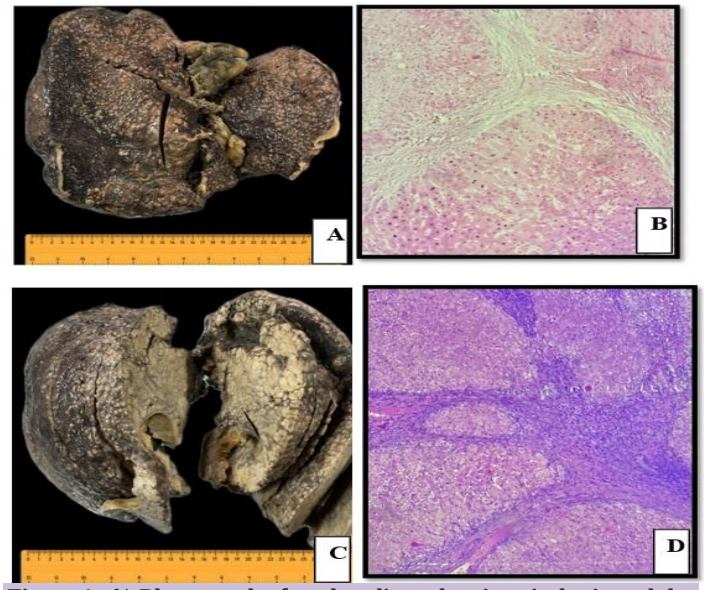


Figure 1: A) Photograph of explant liver showing cirrhotic nodules B) Photomicrograph showing cirrhotic nodules separated by fibrous septa C) Photograph of explant liver showing a cirrhotic nodule (a case of cirrhosis with regenerative nodule) D) regenerating hepatocytes separated by fibrous septa.

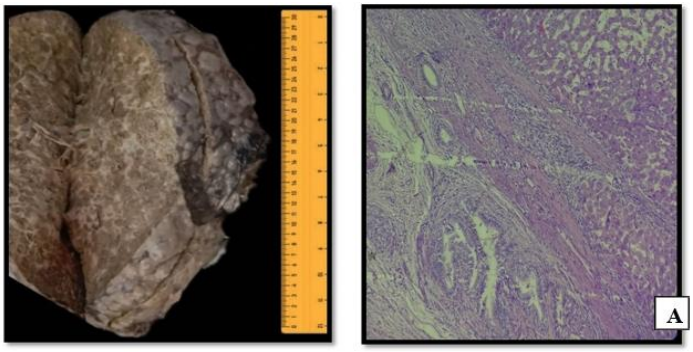


Figure 2: A) Photograph of explant liver showing cirrhotic nodules (a case of Wilsons disease) B) Photomicrograph showing nodules of ballooning hepatocytes separated by fibrous septa

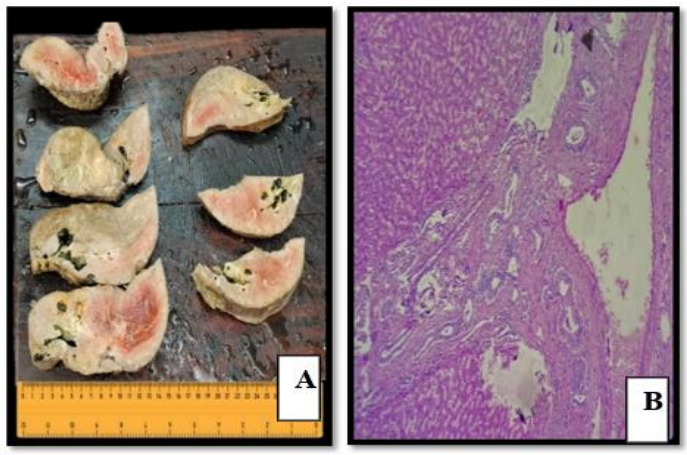


Figure 3: A) Photograph of explant liver showing dilated ducts (a case of Carolis disease)
B) Photomicrograph showing extensive bile ductular proliferation and dilatation.

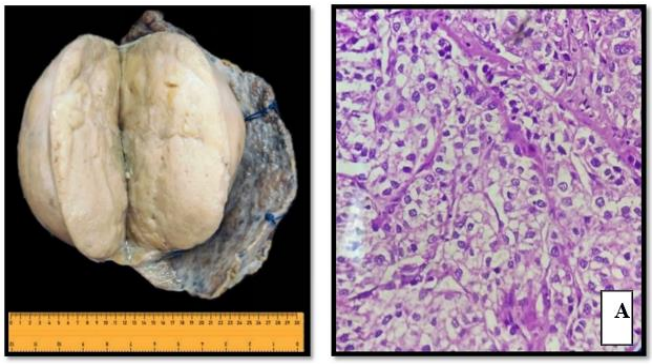


Figure 4: A)Photograph of explant liver showing a well circumscribed ,greywhite mass (a case of Type III glycogen storage disease with clear cell HCC) B) Photomicrograph showing a case of clear HCC with more than 80% neoplastic cells having clear cell morphology .

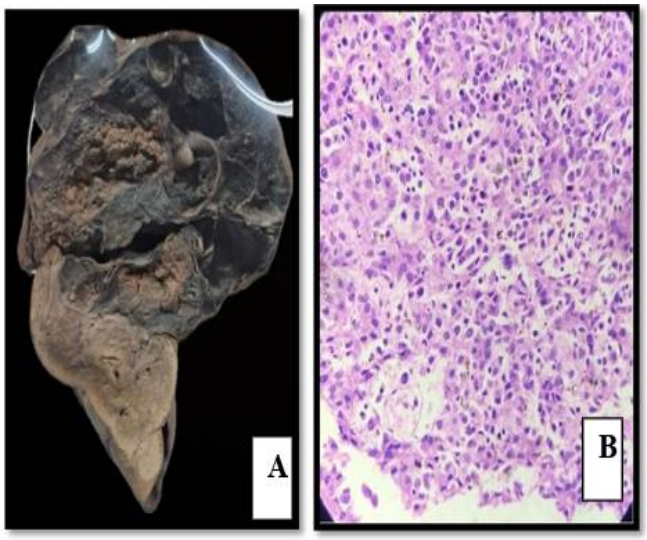


Figure 5: A) Photograph of explant liver showing a circumscribed, greybrown mass (a case of Hepatoblastoma) B) Photomicrograph showing a case of Hepatoblastoma epitheial small cell undifferentiated type with solid sheets of dyscohesive small cells.

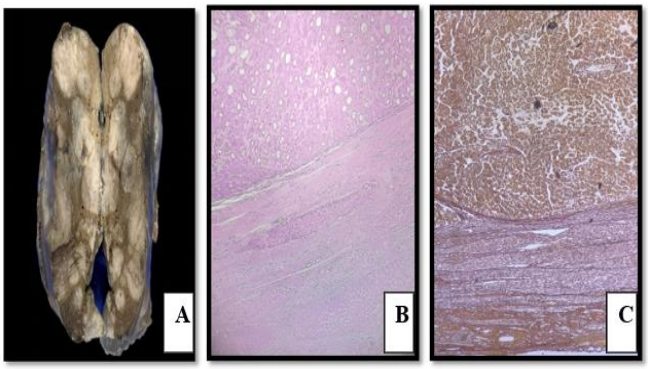
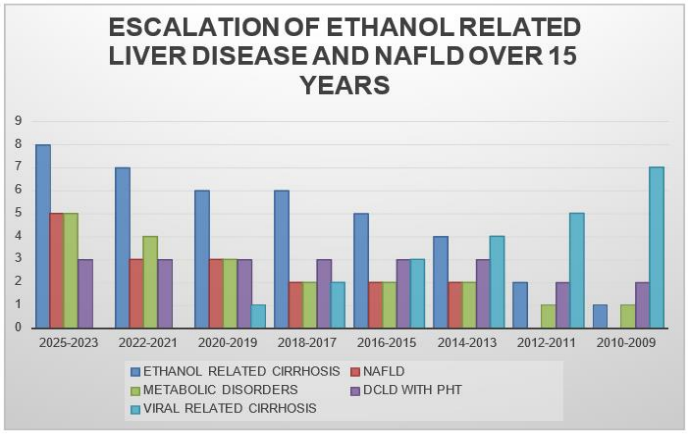


Figure 6: A) Explant liver with cirrhotic nodules (a case of HCC with cirrhosis)
B) Photomicrograph showing a case of HCC with pseudoglandular pattern in a background of cirrhosis. C)Photomicrograph showing loss of reticulin framework in upper portion (HCC) and dense fibrous septa (cirrhosis)



Graph 4: Rise of ethanol related cirrhosis and NAFLD over the past 15 years

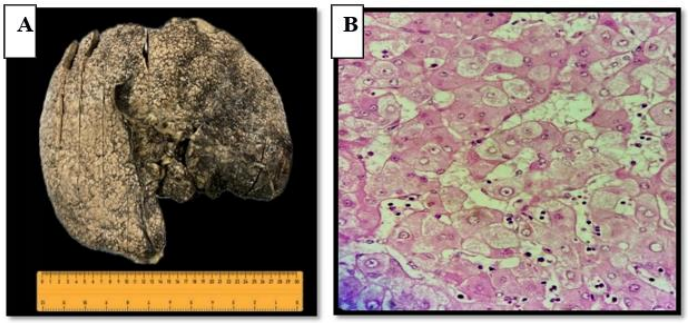


Figure 7: A) Photograph of explant liver of a case of non-alcoholic steatohepatitis B) Photomicrograph showing hepatocellular ballooning and macrovesicular steatosis.

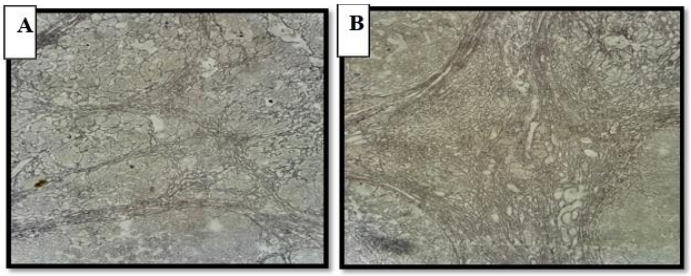


Figure 8: A) B) Photomicrograph showing reticulin stain done on a case of cirrhosis

Discussion

The present 15-year retrospective audit provides valuable insight into the evolving etiological and histomorphological patterns of end-stage liver disease encountered in a tertiary liver transplant center. The leading etiology in this study was ethanol-related cirrhosis (n=26) [Figure 1], followed by DCLD with portal hypertension (n=15), HBV (n=13), cryptogenic cirrhosis (n=10), HCV (n=9), Wilson's disease (n=9) [Figure 2], Budd-Chiari syndrome (n=3), Caroli's disease (n=2) [Figure 3], autoimmune hepatitis (n=1), and parenchymal liver disease with SOLs (n=1). Hepatocellular carcinoma was identified in 4 cases, one is case of clear cell HCC on a known case of type III glycogen storage disease [Figure 4], a case of hepatoblastoma [Figure 5] and 2 cases of hepatocellular carcinoma with cirrhosis [Figure 6]. Incidental hepatocellular carcinoma was observed in 2 cases.

Cirrhosis constituted the predominant indication for transplantation, consistent with global and national data. Chronic viral hepatitis, particularly hepatitis B and C, remained major contributors however, an increasing trend of metabolic and autoimmune liver diseases was observed, reflecting the global epidemiological transition.

[Graph 4] The graph illustrates the shifting etiological trend of chronic liver diseases over the past 15 years highting the rising burden of alcohol and metabolic associated liver diseases. The significant rise in ethanol related cirrhosis in recent years is due to increased alcohol consumption and decrease effectiveness of alcohol abuse preventive programs. Non-alcoholic steatohepatitis (NASH)–related cirrhosis (Figure 7) emerged as a significant etiology, paralleling the rising prevalence of obesity, diabetes, and metabolic syndrome in the population. The identification of hepatocellular carcinoma in nearly one-third of explants, frequently in cirrhotic backgrounds, highlights the critical role of surveillance in high-risk groups. Incidental findings including dysplastic nodules, bile duct injury, and vascular alterations, underscore the diagnostic value of meticulous histopathological evaluation.

Reticulin stains are used to see whether the framework is intact or lost and it also highlights the dense fibrous septa in cirrhosis. [Figure 8]

Overall, the findings emphasize that systematic histomorphological assessment of explant livers s indispensable for correlating clinical and radiological data, refining diagnostic accuracy, and recognizing emerging disease trends. Such audits not only aid in understanding regional etiological shifts but also provide essential feedback for preventive and therapeutic strategies in hepatic disease management.

Conclusion

This 15-year retrospective audit of explant liver reflects a rising trend in alcohol and metabolic-associated liver disease, NASH due to increasing rates of obesity, metabolic syndrome. Histopathological analysis enabled etiological reclassification in several cases, especially in younger patients.

This study supports targeted patient education and preventive strategies to reduce the liver disease burden in the community.

Evidence of hepatocellular carcinoma (HCC) coexisting with cirrhosis underlines the importance of vigilant pre-transplant surveillance, tailored post-transplant care such as closer surveillance strategies for recurrence.

Explant liver evaluation is indispensable for confirming clinical diagnosis, detecting rare conditions, and refining transplant strategies. Long-term data such as this provides a valuable benchmark for future studies and policy planning.

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Nil.

Conflicts of interest

There are no conflicts of interest.

References

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