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Spectrum of Liver Diseases Diagnosed on Liver Biopsies in a Tertiary Care Centre: A Retrospective Descriptive Study

Dr Sharanya N S (Postgraduate)[1]; Dr Varsha S(Associate Professor)[2]; Dr Shubha H V (Associate Professor)[3], Dr Suguna B V(Professor)[4] ; Dr Vijaya C(Professor & HOD)[5]

[1]*Department of Pathology, Sapthagiri Institute of Medical Sciences and Research Centre (SIMS & RC), Bengaluru, Karnataka, India.*

Corresponding author: *Dr. Sharanya N S, Department of Pathology, SIMS & RC, Bengaluru – 560090, Karnataka, India.*

ABSTRACT

Background: *The liver is exposed to diverse metabolic, toxic, infectious and neoplastic insults, predisposing it to a wide spectrum of primary and secondary diseases. Liver biopsy remains the gold standard for histopathological diagnosis, grading and staging of hepatic lesions, providing critical clinicopathological information unobtainable by non-invasive testing.*

Aim: *To study the histopathological spectrum of liver diseases diagnosed on liver biopsies and resection specimens at a tertiary care centre, and to evaluate their age, gender and specimen-type distribution.*

Materials and Methods: *A retrospective descriptive study of 42 histopathologically diagnosed cases of liver lesions received in the Department of Pathology, SIMS & RC, between November 2023 and October 2025 was carried out. Formalin-fixed specimens were processed routinely; 3–5 µm sections were stained with haematoxylin and eosin, with periodic acid–Schiff, reticulin and Masson trichrome applied as required. Lesions were classified as neoplastic or non-neoplastic and further sub-categorised.*

Results: *Of 42 cases, 23 (54.8%) were neoplastic and 19 (45.2%) non-neoplastic. The male-to-female ratio was 1.1:1; mean age was 51.2 ± 16.4 years (range 1 month–80 years), with peak incidence in the 51–60 year age group (21.4%). Hepatocellular carcinoma was the commonest primary malignancy (9 cases, 21.4%), with strong male predominance (M:F 3.5:1) and a 6th–7th decade peak; grade 2 was the commonest grade with two clear-cell variants. Metastatic deposits comprised 8 cases (19.0%), mostly adenocarcinoma. Cirrhosis (n = 6) led the non-neoplastic group; all four paediatric biopsies under six months yielded biliary atresia.*

Conclusion: *Histopathological examination of liver biopsy remains the cornerstone for diagnosing the diverse spectrum of hepatic lesions, providing decisive diagnostic information across neoplastic, inflammatory, infective and congenital categories.*

Keywords: *Liver biopsy; Histopathology; Hepatocellular carcinoma; Cirrhosis; Biliary atresia.*

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I. INTRODUCTION

The liver is the largest solid visceral organ and a central regulator of protein synthesis, detoxification, bile production and immune surveillance. Owing to its dual blood supply from the portal vein and hepatic artery, and its position as the first major filter for absorbed enteric substances, the liver is uniquely susceptible to metabolic, toxic, infectious and neoplastic insults.[1,2] This susceptibility manifests as a remarkably broad spectrum of primary and secondary diseases ranging from steatosis and viral hepatitis to cirrhosis, primary hepatic malignancies and metastatic involvement.[1] Accurate and timely characterisation of these lesions is critical for treatment planning, prognostication and long-term outcomes.

Liver biopsy has remained the gold-standard investigation for the histological assessment of hepatic disease for over a century. The first percutaneous liver biopsy for diagnostic purposes was reported by Schüpfer in 1907, and the technique was further refined by Menghini in 1958 with the introduction of one-second aspiration biopsy.[1,2] Despite the subsequent development of sophisticated non-invasive modalities including transient elastography, magnetic resonance elastography and serum-based fibrosis biomarkers, liver biopsy continues to provide unmatched information regarding the nature, distribution and severity of parenchymal injury and is regarded as the cornerstone of hepatology practice.[1]

The diagnostic value of liver biopsy extends well beyond the assessment of fibrosis. A single core biopsy enables the pathologist to map the degree and pattern of inflammation, the nature of the inflammatory infiltrate, the status of the bile ducts and vasculature, the presence and pattern of steatosis, and the deposition or infiltration of the parenchyma with materials such as iron, copper, amyloid and glycogen.[1,11] This otherwise unobtainable information regarding the structural integrity of liver parenchyma, the degree and type of injury, and the host response has a direct impact on diagnosis, prognosis and the choice of treatment.[1,11] Percutaneous liver biopsy is also a procedurally safe investigation when performed under image guidance with appropriate coagulation screening, with reported procedural mortality of less than 0.5 in 1000 cases and a major complication rate below 1%.[1,2]

Hepatocellular carcinoma (HCC) is one of the commonest and most lethal malignancies worldwide. According to the Global Cancer Statistics 2020 estimates, liver cancer was the sixth most commonly diagnosed cancer globally, with approximately 906,000 new cases, and the third leading cause of cancer-related mortality, accounting for 830,000 deaths.[3] HCC constitutes more than 90% of all primary liver malignancies and demonstrates strong male predominance with a male-to-female ratio of 1.3 to 3.6 and a clear peak incidence in the sixth and seventh decades of life.[4] Major risk factors include chronic hepatitis B and hepatitis C virus infection, alcohol-induced cirrhosis, non-alcoholic fatty liver disease, exposure to aflatoxin B1 and inherited metabolic disorders such as hereditary haemochromatosis and alpha-1-antitrypsin deficiency.[4,5]

Chronic hepatitis B and C infection together account for the majority of HCC cases globally, although the relative contribution varies geographically. Hayashi and Di Bisceglie reported that approximately 50–55% of HCC cases worldwide can be attributed to HBV infection, with a further 25% attributable to HCV.[5] India bears a significant disease burden, with an estimated 40 million chronic HBV carriers and a steadily rising HCC incidence. Effective surveillance with serum alpha-fetoprotein and abdominal ultrasonography in cirrhotic patients, alongside curative-intent resection or transplantation for early-stage tumours, has been shown to improve clinical outcomes in selected patient groups.[6]

The liver represents one of the most common sites of metastatic involvement, second only to the lymph nodes. The dual blood supply from the portal vein and hepatic artery makes it a fertile soil for the deposition of haematogenously and lymphatically disseminated tumour cells. The ratio of metastatic to primary liver tumours varies widely by geographic region — from approximately 40:1 in Europe and South America to 2.6:1 in Japan.[12] The most common primary sites for hepatic metastases are the upper gastrointestinal tract, colon, lung, breast, oesophagus and genitourinary tract.[12] Approximately two-thirds of patients with hepatic metastases present with clinical manifestations including ascites, jaundice, anorexia or weight loss, while percutaneous liver biopsy is diagnostically positive in approximately 75% of cases with widespread metastatic involvement.[1]

The non-neoplastic spectrum of hepatic lesions encompasses an equally diverse range of pathological entities. Cirrhosis, defined as diffuse nodular regeneration of the hepatic parenchyma separated by fibrous septa, is the common end-stage of chronic liver injury and is associated with an increased risk of HCC.[1] Steatosis and steatohepatitis, increasingly attributed to non-alcoholic fatty liver disease and alcoholic liver disease, represent metabolic insults that may progress to cirrhosis. Autoimmune hepatitis is an important entity in middle-aged women, characterised by interface hepatitis with a plasma cell infiltrate. Paediatric cholestatic disorders, particularly biliary atresia and neonatal hepatitis, demand early biopsy-based diagnosis as definitive surgical correction in the first sixty days of life is the cornerstone of management.[8] Glycogen storage disease, although uncommon, is another important paediatric entity that may be suggested on biopsy by the characteristic mosaic pattern of swollen, periodic acid-Schiff positive hepatocytes.[9,10]

Indian hospital-based studies have explored the spectrum of hepatic lesions across diverse regional settings, providing valuable epidemiological insight. A study conducted by Murgod and colleagues (2019) analysed 66 liver biopsies from a Maharashtra tertiary centre and reported HCC as the leading diagnosis (36.3%), followed by glycogen storage disease (19.7%) and cirrhosis (4.5%).[11] Kulkarni and colleagues (2018) studied 80 liver biopsies from Miraj in western Maharashtra and reported neoplasms in 73.75% of cases, including 35 metastatic tumours and 22 HCCs, with cirrhosis in a further 8.75%.[12] A study conducted by Gupta and Farhana (2021) from western Uttar Pradesh evaluated 68 hepatic lesions and reported viral hepatitis (22.1%), hepatic secondaries (16.2%) and fatty liver (20.6%) as the leading entities.[13] Chawla and Sunila documented HCC (21.5%) and cirrhosis (23.1%) as the leading findings in their multi-centric series.[14] These findings collectively underscore considerable regional variation in the disease spectrum, attributable to differences in viral hepatitis prevalence, surgical referral patterns and socioeconomic factors.

Notwithstanding this growing body of Indian hepatic-pathology data, contemporary epidemiological information from the southern Karnataka region remains limited. Variations in patient demographics, viral hepatitis prevalence, alcohol use and surgical practice may meaningfully influence the spectrum of hepatic lesions encountered at any given tertiary referral centre. Updated regional data are also required to anticipate the rising burden of non-alcoholic fatty liver disease, to guide HCC surveillance programmes, and to inform training in paediatric and adult hepatopathology. The present study was therefore undertaken to characterise the

histopathological spectrum of hepatic lesions diagnosed on liver biopsies and resection specimens at a tertiary care centre in Bengaluru, Karnataka, over a 24-month period; to stratify cases as neoplastic or non-neoplastic; to analyse their age, sex and specimen-type distribution; and to describe the spectrum of HCC observed in our cohort.

II. AIMS AND OBJECTIVES

Primary objective: To study the histopathological spectrum of liver diseases diagnosed on liver biopsies and resection specimens at a tertiary care centre.

Secondary objectives: (i) To determine the relative frequency of neoplastic and non-neoplastic hepatic lesions; (ii) to evaluate the age and gender distribution of diagnosed lesions; (iii) to analyse the pattern of lesions across different specimen types (core biopsy versus resection); (iv) to assess the severity of various hepatic diseases on histopathology; and (v) to detail the histopathological features of hepatocellular carcinoma in our cohort.

III. MATERIALS AND METHODS

Study design and setting

This was a retrospective descriptive study carried out in the Department of Pathology, Sapthagiri Institute of Medical Sciences and Research Centre (SIMS & RC), Bengaluru, Karnataka, India, between November 2023 and October 2025. The institution is a tertiary care teaching hospital serving a predominantly mixed urban–rural population from the North and West Bengaluru. Institutional Ethics Committee approval was obtained before the commencement of the study, and all patient identifiers were anonymised prior to analysis.

Study population and sample size

All histopathologically diagnosed cases of hepatic lesions received in the Department of Pathology during the 24-month study period were screened. Total enumerative sampling was used, and 42 cases met the eligibility criteria and were enrolled. Specimens included core needle liver biopsies, wedge biopsies and resection specimens (hepatectomy/lobectomy).

Inclusion criteria

Formalin-fixed liver specimens received in the Department of Pathology with a histopathological diagnosis of a hepatic lesion, in patients of all age groups and either sex, with complete clinical and pathology records were included.

Exclusion criteria

Cases were excluded if the specimens were autolysed, inadequately preserved or of poor quality; if the relevant clinical or pathology records were incomplete; or if the biopsy material was insufficient for histological evaluation (less than three portal tracts in core biopsies).

Specimen processing

All specimens were received in 10% neutral buffered formalin and fixed for a minimum of 12 hours. Following gross examination, representative sections were taken and processed routinely using an automated tissue processor. Tissues were embedded in paraffin wax, and sections of 3–5 µm thickness were cut on a rotary microtome and stained with haematoxylin and eosin. Special stains, including periodic acid–Schiff (PAS), PAS with diastase, reticulin, Masson trichrome, Perl's Prussian blue and Congo red, were performed wherever indicated.

Histopathological evaluation

All haematoxylin and eosin-stained sections were examined by two pathologists independently, and any discordance was resolved by joint review at a multi-headed microscope. Lesions were classified as neoplastic or non-neoplastic and further sub-categorised into primary malignant, metastatic, benign neoplastic, inflammatory or cirrhotic, congenital and infective/parasitic groups. Neoplasms were classified according to the WHO Classification of Digestive System Tumours.[7] Hepatocellular carcinoma was graded as well, moderately or poorly differentiated according to the modified Edmondson–Steiner system, and the presence of clear-cell, sarcomatoid and fibrolamellar variants was specifically noted.

Data analysis

Demographic, clinical and pathological data were entered into Microsoft Excel and analysed using descriptive statistics. Continuous variables were expressed as mean ± standard deviation and as median with range. Categorical variables were expressed as frequencies and percentages. Findings were subsequently compared with those reported in published Indian and international series.

IV. RESULTS

Demographic profile

A total of 42 cases of hepatic lesions were analysed over the 24-month study period. The age of the patients in the cohort ranged from 1 month to 80 years. Excluding five paediatric cases under 1 year of age, the mean age of the adult cohort was 51.2 ± 16.4 years, with a median of 50 years. The peak incidence occurred in the 51–60 year age group, accounting for 9 cases (21.4%), closely followed by the 41–50 year and 61–70 year age groups (8 and 7 cases respectively). The overall male-to-female ratio was 1.1:1, with 22 male (52.4%) and 20 female (47.6%) patients. The demographic characteristics of the study population are summarised in Table 1.

Table 1. Demographic characteristics of the study population (n = 42).

Parameter	Value
Total number of cases	42
Mean age, years (± SD)*	51.2 ± 16.4
Median age, years	50
Age range	1 month – 80 years
Male:Female ratio	1.1 : 1
Male, n (%)	22 (52.4)
Female, n (%)	20 (47.6)
Peak age group, years	51 – 60 (21.4%)
Paediatric cases (<1 year), n	5

**Calculated from the adult cohort excluding 5 paediatric cases under 1 year of age.*

Distribution by lesion type

Of the 42 hepatic lesions studied, 23 cases (54.8%) were neoplastic and 19 cases (45.2%) were non-neoplastic. The neoplastic group comprised primary malignant lesions (10 cases, 23.8%), metastatic deposits (8 cases, 19.0%) and benign neoplastic lesions (5 cases, 11.9%). The non-neoplastic group included inflammatory or cirrhotic lesions (10 cases, 23.8%), congenital biliary atresia (4 cases, 9.5%), parasitic/infective lesions (4 cases, 9.5%) and reactive/non-specific changes (1 case, 2.4%). The distribution of lesions by major category is presented in Table 2.

Table 2. Distribution of hepatic lesions by major diagnostic category (n = 42).

Diagnostic category	n	%
Primary malignant	10	23.8
Inflammatory / Cirrhotic	10	23.8
Metastatic	8	19.0
Benign neoplastic	5	11.9
Congenital (biliary atresia)	4	9.5
Infective / Parasitic (hydatid)	4	9.5
Reactive / Non-specific	1	2.4
Total	**42**	**100.0**

Distribution by specimen type

Of the 42 specimens received, 27 cases (64.3%) were core needle liver biopsies, 12 cases (28.6%) were hepatectomy or resection specimens, and the remaining 3 cases (7.1%) were wedge biopsies. Core needle biopsies were the principal specimen type used in the diagnosis of metastatic deposits, cirrhosis and steatohepatitis. Hepatectomy and resection specimens were obtained for curative-intent surgery in primary malignant tumours (HCC and cholangiocarcinoma), large benign neoplasms (cavernous haemangioma and mesenchymal hamartoma) and hydatid cyst resection. The specimen-type distribution is summarised in Table 3.

Table 3. Distribution of specimens by type (n = 42).

Specimen type	n	%
Core needle liver biopsy	27	64.3
Hepatectomy / Resection	12	28.6
Wedge biopsy	3	7.1
Total	**42**	**100.0**

Spectrum of neoplastic lesions

Among the 23 neoplastic lesions, hepatocellular carcinoma was the commonest single diagnosis, accounting for 9 cases (39.1% of neoplastic lesions). Metastatic deposits accounted for 8 cases (34.8%), most of which were morphologically consistent with adenocarcinoma. Cavernous haemangioma comprised 4 cases (17.4%), all of which were in female patients with a mean age of 42 years. A single case each of cholangiocarcinoma (in a 38-year-old male) and mesenchymal hamartoma (in a 1.7-year-old male child) was also encountered. The complete neoplastic spectrum is detailed in Table 4.

Table 4. Spectrum of neoplastic hepatic lesions (n = 23).

Diagnosis	n	% of neoplastic	Mean age	M : F
Hepatocellular carcinoma	9	39.1	65 yrs	7 : 2
Metastatic deposits	8	34.8	51 yrs	3 : 5
Cavernous haemangioma	4	17.4	42 yrs	0 : 4
Cholangiocarcinoma	1	4.4	38 yrs	1 : 0
Mesenchymal hamartoma	1	4.4	1.7 yrs	1 : 0
Total neoplastic	**23**	**100.0**	**–**	**11 : 12**

Spectrum of non-neoplastic lesions

Among the 19 non-neoplastic lesions, cirrhosis was the most frequent diagnosis with 6 cases (31.6% of non-neoplastic lesions). Of these, the majority demonstrated a micronodular pattern, with autoimmune aetiology suggested in two cases. Echinococcal (hydatid) cyst was diagnosed in 4 cases (21.1%), all involving the right lobe of the liver and managed by surgical resection. Biliary atresia accounted for 4 cases (21.1%), all in infants under six months of age, including both intra-hepatic and extra-hepatic variants. Steatohepatitis was diagnosed in 3 cases (15.8%), with macrovesicular and microvesicular patterns, and one case demonstrated co-existent cirrhosis. Single cases of autoimmune hepatitis with interface activity and of reactive inflammatory change without neoplasm were also encountered. The complete non-neoplastic spectrum is detailed in Table 5.

Table 5. Spectrum of non-neoplastic hepatic lesions (n = 19).

Diagnosis	n	% of non-neoplastic	Age range	M : F
Cirrhosis	6	31.6	39–66 yrs	3 : 3
Echinococcal (hydatid) cyst	4	21.1	22–55 yrs	2 : 2
Biliary atresia	4	21.1	1–6 months	3 : 1
Steatohepatitis	3	15.8	29–60 yrs	2 : 1
Autoimmune hepatitis	1	5.3	64 yrs	0 : 1
Reactive / Non-specific	1	5.3	68 yrs	1 : 0
Total non-neoplastic	**19**	**100.0**	**–**	**11 : 8**

Hepatocellular carcinoma in detail

Hepatocellular carcinoma emerged as the leading primary malignancy in our cohort and was therefore evaluated in additional detail. Of the 9 HCC cases (21.4% of the total cohort), 7 occurred in male patients and 2 in female patients, yielding a male-to-female ratio of 3.5:1. The mean age of HCC patients was 65 years, with a clear peak in the sixth and seventh decades of life. The most common histological grade was grade 2 (moderately differentiated), seen in 5 cases. Two cases were of the clear-cell variant of HCC, both demonstrating cytoplasmic

clearing attributable to intracellular glycogen and lipid accumulation. The remaining 2 cases were conventional HCCs without a specified grade. Histologically, the tumours showed trabecular and pseudoacinar architecture, with eosinophilic cytoplasm and pleomorphic, hyperchromatic nuclei. Most HCC cases were received as hepatectomy specimens, facilitating accurate grading and assessment of resection margins. The histological subtype and grade distribution of HCC is shown in Table 6.

Table 6. Histological subtype and grade distribution of hepatocellular carcinoma (n = 9).

Subtype / Grade	n	% of HCC
Grade 2 — moderately differentiated	5	55.6
Clear-cell variant (Grade 2)	2	22.2
Conventional, grade unspecified	2	22.2
Total	**9**	**100.0**

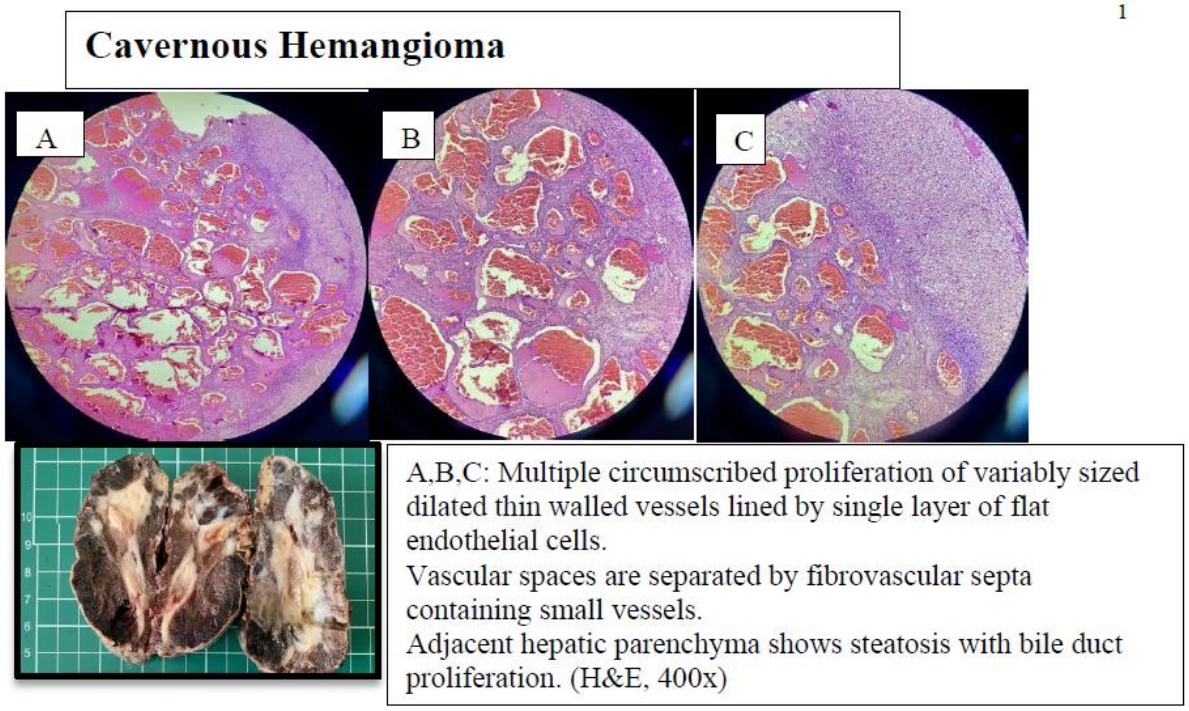
Comparison with previous Indian series

A comparison of the major diagnostic proportions in our cohort with those of previous Indian liver-biopsy series is presented in Table 7. Our HCC proportion (21.4%) closely approximated that reported by Chawla and Sunila (21.5%) and by Kulkarni and colleagues (27.5%), but was lower than the 36.3% reported by Murgod and colleagues. The metastatic proportion (19.0%) in our cohort was intermediate between that of Gupta and Farhana (16.2%) and that of Kulkarni and colleagues (43.8%). The cirrhosis proportion (14.3%) was comparable to that reported by Gupta and Farhana (14.7%) and Chawla and Sunila (23.1%).

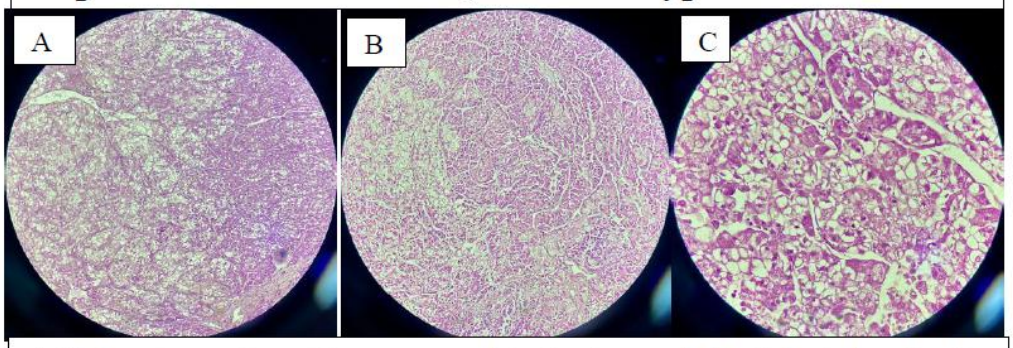
Table 7. Comparison of major diagnostic proportions across published Indian series.

Study (Year)	N	HCC (%)	Metastatic (%)	Cirrhosis (%)
Murgod et al. (2019)	66	36.3	–	4.5
Kulkarni et al. (2018)	80	27.5	43.8	8.8
Gupta & Farhana (2021)	68	7.4	16.2	14.7
Chawla & Sunila (2014)	65	21.5	4.6	23.1
Present study (2025)	**42**	**21.4**	**19.0**	**14.3**

1

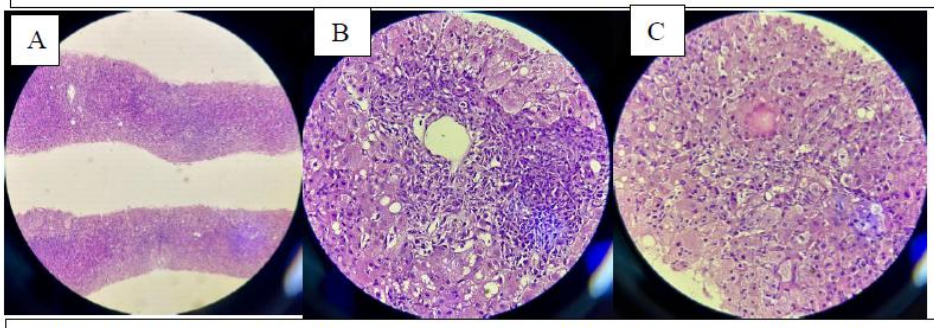


Hepatocellular Carcinoma, Clear cell type.



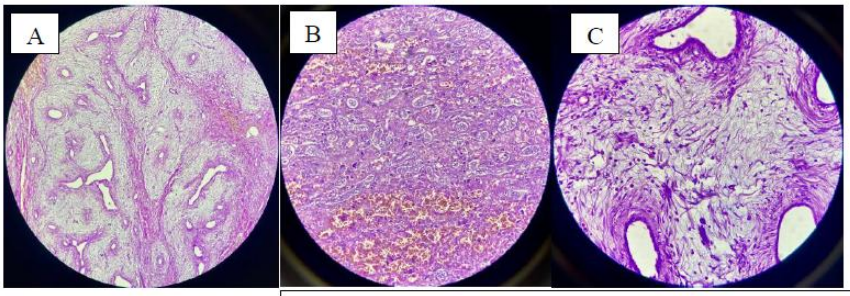
A, B: Invasive malignant tumor arranged in sheets, pseudoglandular, trabecular & macrotrabecular pattern. (H&E, 100x)
C: Individual tumor cells having high N:C ratio, pleomorphic round to vesicular nuclei, irregular nuclear borders, prominent eosinophilic nuclei & abundant clear cytoplasm. (H&E,400x)

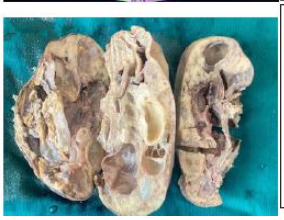
Autoimmune Hepatitis



A,B: Moderate to dense portal lymphoplasmacytic cell infiltration along with interphase hepatitis. Inflammatory cells are seen involving the junction between portal tract & liver parenchyma. Mild periportal fibrosis seen. (H&E,40x & 400x)
C: Hepatocyte rosettes, few apoptotic hepatocytes are seen along with plenty of swollen hepatocytes showing hydropic degeneration. (H&E 400x)

Hepatic Mesenchymal Hemartoma





A:Complete loss of normal lobular architecture. Variable proportions of solid & cystic components.(H&E, 100x)
B,C:Epithelial component- benign dilated & branching bile ducts lined by cuboidal epithelium admixed with clusters of hepatocytes.
Primitive mesenchyme- mixture of bland spindle shaped cells & collagen in a loose, myxoid & oedematous stroma. (H&E,400x)

V. DISCUSSION

The present study analysed 42 hepatic lesions diagnosed over a 24-month period at a tertiary care centre in southern Karnataka. The cohort demonstrated a near-equal distribution between neoplastic (54.8%) and non-neoplastic (45.2%) lesions, reflecting the mixed urban–rural referral base of the institution. This balanced distribution stands in contrast to the predominantly neoplastic distribution reported in some Indian series and highlights the importance of regional case-mix in interpreting liver-biopsy epidemiology.[11,12]

A study conducted by Murgod and colleagues (2019) analysed 66 liver biopsies from a Maharashtra tertiary centre and reported HCC as the leading diagnosis (36.3%), followed by glycogen storage disease (19.7%).[11] Their malignant proportion was substantially higher than the 21.4% of HCC observed in our cohort, likely reflecting differences in referral patterns and oncology specialisation. Notably, the male predominance (M:F = 2.14:1) reported by Murgod and colleagues mirrors the strong male preponderance for HCC observed in our study (M:F = 3.5:1).

Kulkarni and colleagues (2018), in a Maharashtra-based series of 80 liver biopsies, reported neoplasms in 73.75% of cases, with metastatic tumours dominating (35 cases) and HCC accounting for 22 cases (27.5%).[12] Their metastatic-to-HCC ratio of 1.6:1 contrasted with the 0.89:1 ratio in our cohort, reflecting our institution's higher proportion of resection-based primary tumour diagnoses. Among their HCC cases, the male-to-female ratio was 2.14:1, with three clear-cell variants documented. The 22% prevalence of clear-cell HCC in our cohort (2 of 9 HCC cases) corresponds closely to the 9–13% literature estimate for this variant.[12]

A study conducted by Gupta and Farhana (2021) from western Uttar Pradesh examined 68 hepatic lesions and reported a distinctly different spectrum, with viral hepatitis (22.1%), hepatic secondaries (16.2%) and fatty liver (20.6%) as the leading diagnoses, and HCC contributing only 7.4% of cases.[13] The contrast with our cohort, where HCC dominated the primary malignant group, underscores the substantial regional heterogeneity in the histopathological spectrum of liver lesions across India. Such heterogeneity is attributable to differences in chronic hepatitis B and C prevalence, alcohol consumption patterns and the availability of HCC surveillance and surgical services.[5,6]

Hepatocellular carcinoma was the leading primary malignancy in our cohort, with 9 cases (21.4% of the total cohort and 39.1% of neoplastic lesions). The mean age of 65 years and strong male predominance (M:F = 3.5:1) are concordant with the global HCC epidemiology described by El-Serag, who reported a male-to-female ratio of 1.3 to 3.6 and a sixth-to-seventh decade peak.[4] Grade 2 tumours dominated our HCC cohort (55.6%), which is consistent with the findings of Kulkarni and colleagues, who reported six moderately differentiated HCCs among their 22 cases.[12] The frequency of clear-cell HCC variants (2 of 9 cases; 22.2%) in our cohort is also consistent with reported literature estimates of 9–24%, attributable to intracytoplasmic accumulation of glycogen and lipid.

Metastatic deposits represented 19.0% of our total cohort and 34.8% of neoplastic lesions. Hepatic metastases are well recognised to outnumber primary tumours globally, with reported ratios ranging from 2.6:1 in Japan to 40:1 in Europe and South America.[12] Our ratio of metastatic to primary tumours (8:10 = 0.8:1) deviates from the international pattern but aligns with the smaller cohort size and a tendency for primary HCC to be resected at our centre. Most metastatic cases in our cohort were morphologically consistent with adenocarcinoma, with the primary site clinically suspected to be in the gastrointestinal tract or pancreas, although confirmation was not always available.

Cirrhosis was the leading non-neoplastic diagnosis in our cohort, accounting for 6 cases (14.3% of the total cohort and 31.6% of non-neoplastic lesions). This proportion is comparable to the 14.7% reported by Gupta and Farhana and the 23.1% reported by Chawla and Sunila.[13,14] The majority of our cirrhosis cases demonstrated a micronodular pattern with associated nodular regeneration, and autoimmune aetiology was suggested in two cases on the basis of interface hepatitis and plasma cell infiltrate. The cirrhotic background is of particular clinical importance owing to its established association with hepatocellular carcinoma.[1,4]

Among the paediatric subset, biliary atresia was diagnosed in all four infants under six months of age. Biliary atresia is the commonest cause of pathological jaundice in infancy, and the classical clinical triad of persistent neonatal jaundice, dark urine and pale stools, accompanied by hepatomegaly, was identified in our cases.[8] Ductular proliferation, expansion of the portal tracts and intracytoplasmic cholestasis were the principal histological findings. Early biopsy diagnosis is critical because surgical correction via the Kasai portoenterostomy procedure within the first 60 days of life significantly improves outcomes.[8] A study conducted by Dehghani and colleagues (2013) of 308 paediatric liver biopsies identified 14 cases of biliary atresia and 22 cases of neonatal hepatitis, illustrating the diagnostic predominance of biliary atresia in the paediatric cholestatic population.[10]

Echinococcal (hydatid) cyst was diagnosed in four of our cases, all involving the right lobe of the liver and managed by surgical resection. The liver is the commonest site of human hydatid disease, accounting for approximately 65–70% of all cystic echinococcosis cases globally. Histopathological confirmation of the laminated outer cuticle and the inner germinal layer with protoscolices remains diagnostic. Our findings highlight

that liver biopsy and resection specimens continue to play a meaningful role in the definitive diagnosis of parasitic hepatic disease, particularly in rural regions of India where exposure to the canine–ovine cycle remains prevalent.

Strengths and limitations

The strengths of this study include a balanced sampling of neoplastic and non-neoplastic lesions, classification according to the WHO digestive-system tumour scheme, comprehensive histological subtyping of HCC including clear-cell variant identification, and the addition of region-specific data from southern Karnataka to the contemporary Indian hepatopathology literature.

Several limitations should be acknowledged. First, the modest sample size of 42 cases limits sub-group statistical analyses and inferential testing. Second, the retrospective single-centre design carries an inherent risk of referral and selection bias. Third, immunohistochemistry was not performed in any case during the study period owing to logistical constraints, limiting the sub-classification of metastatic deposits and the identification of unusual primary tumour types. Fourth, the primary tumour site could not be confirmed in several metastatic cases despite extensive radiological evaluation. Finally, the descriptive scope of the study precluded the analysis of clinical follow-up data and long-term patient outcomes.

VI. CONCLUSION

Histopathological examination of liver biopsy and resection specimens remains the diagnostic cornerstone for the evaluation of the diverse spectrum of hepatic lesions encountered in clinical practice. In our cohort of 42 cases, neoplastic and non-neoplastic lesions were almost equally represented (54.8% versus 45.2%), reflecting the genuinely mixed case-mix of a tertiary referral centre. Hepatocellular carcinoma dominated the primary malignant group with 9 cases, demonstrating strong male predominance, a sixth-to-seventh decade peak and a 22% prevalence of the clear-cell variant. Cirrhosis was the leading non-neoplastic diagnosis, while all four paediatric biopsies under six months of age clinched the critical diagnosis of biliary atresia. The findings broadly reproduce those of contemporary Indian hepatopathology series while highlighting the institutional case-mix variations attributable to differences in viral hepatitis prevalence and surgical referral patterns. Regular updates of regional histopathology data, augmented in future by routine immunohistochemistry panels and molecular adjuncts, are warranted to ensure accurate and contemporary diagnosis and to inform clinical practice, training and resource allocation in tertiary care pathology services.

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