



ORIGINAL RESEARCH PAPER

General Surgery

ASSESSMENT OF EPIDEMIOLOGY, CLINICAL PRESENTATION AND MANAGEMENT OF SPACE OCCUPYING LESIONS OF LIVER: A TERTIARY CENTRE OBSERVATIONAL STUDY

KEY WORDS: Space-occupying Lesions; Liver Abscess; Hydatid Cyst; Ultrasonography.

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ABSTRACT

Introduction: Space-occupying lesions (SOLs) of the liver comprise a heterogeneous group of developmental, inflammatory, neoplastic, and miscellaneous hepatic lesions with diverse clinical presentations and management strategies. Understanding their epidemiology, clinical profile, and treatment outcomes is essential for optimizing patient care. **Material and Methods:** This prospective observational study was conducted in the Department of General Surgery, Government Medical College and Rajindra Hospital, Patiala, over a period of two years. A total of 100 patients with clinically suspected or imaging-detected liver SOLs were enrolled. Demographic characteristics, clinical presentation, radiological findings, and management details were recorded and analysed using SPSS version 20.0. **Results:** The mean age of patients was 51.2 ± 12.1 years, with a male predominance (61%). Most patients were symptomatic (85%), and abdominal pain was the most common presenting complaint (81%). Benign lesions accounted for 82% of cases, whereas malignant lesions constituted 18%. Ultrasound-guided aspiration was the most common treatment for pyogenic liver abscesses, resulting in improvement in 84.38% of patients. Amoebic liver abscesses treated with pigtail drainage showed clinical improvement in 88.89% of cases. **Conclusion:** Liver SOLs were predominantly observed in middle-aged and elderly males and were commonly associated with obesity, alcohol consumption, and diabetes mellitus. Infective and benign lesions constituted the majority of cases, with pyogenic liver abscess being the most common lesion. Early diagnosis using imaging modalities and timely institution of appropriate medical, percutaneous, or surgical management can significantly improve patient outcomes.

INTRODUCTION

Space-occupying lesions (SOLs) of the liver constitute a diverse group of focal hepatic abnormalities that may be developmental, inflammatory, neoplastic, or miscellaneous in origin. These lesions are frequently encountered in clinical practice and may present with a wide spectrum of manifestations ranging from asymptomatic incidental findings to symptoms such as abdominal pain, fever, jaundice, weight loss, and hepatomegaly. The differentiation of benign and malignant hepatic lesions is of paramount importance because it directly influences treatment decisions and patient outcomes. (1,2)

The epidemiology of hepatic SOLs varies across different geographic regions and populations. In developing countries such as India, liver abscesses and malignant hepatic lesions account for a significant proportion of cases. The liver is also one of the most common sites of metastatic disease because of its rich vascular supply. Hepatic metastases are more common than primary liver malignancies, while hepatocellular carcinoma remains the most frequent primary malignant tumor of the liver. Liver abscesses continue to be an important cause of morbidity and mortality in tropical countries and often require timely diagnosis and intervention. (1,3)

Advances in diagnostic imaging have substantially improved the detection and characterization of hepatic lesions. Ultrasonography (USG) is widely used as the first-line imaging modality because it is readily available, non-invasive, cost-effective, and free from ionizing radiation. It provides valuable information regarding the size, location, and characteristics of liver lesions and also serves as an

important tool for image-guided therapeutic procedures. However, certain benign lesions may mimic malignant lesions on imaging, making definitive diagnosis challenging in selected cases. (1,2)

Computed tomography (CT) and magnetic resonance imaging (MRI) provide additional information regarding lesion morphology, enhancement patterns, vascular involvement, and disease extent, thereby improving diagnostic accuracy. Furthermore, ultrasonography-guided fine-needle aspiration cytology (FNAC) has emerged as a safe, minimally invasive, and cost-effective method for obtaining tissue diagnosis and differentiating benign from malignant lesions when required. (3,4)

Given the diverse spectrum of liver SOLs and their varying clinical implications, a comprehensive evaluation of their epidemiology, clinical presentation, and management is essential. Therefore, the present study was undertaken to assess the epidemiology of space-occupying lesions of the liver, evaluate their clinical presentation, and analyze the various management modalities employed in patients presenting with these lesions at a tertiary care centre.

Material and Methods

This study was conducted prospectively in the Department of General Surgery, Government Medical College & Rajindra Hospital, Patiala. Written informed consent was taken from all the patients.

Source of Data

Data for this observational study were sourced from patients presenting to Government Medical College & Rajindra

Hospital, Patiala as outpatients/ inpatients during the study period of 2 years.

Study Design

This was a prospective observational study conducted in the Department of General Surgery, Government Medical College & Rajindra Hospital, Patiala to assess the epidemiology, clinical presentation, and management of space-occupying lesions of the liver.

Study Period

The study was conducted over a period of 2 years during the post-graduation course as part of the thesis work.

Study Population

The study was conducted on a minimum of 100 patients with either symptomatic or asymptomatic, clinically suspected or imaging-detected, and diagnosed cases of space-occupying lesions of the liver presenting to the Department of General Surgery, Government Medical College, Patiala, who had given valid informed consent to participate in the study.

Inclusion Criteria

- Patients of all ages
- Patients of both genders
- Patients with space-occupying lesions of the liver

Exclusion Criteria

- Previously operated cases of SOL
- Patients not willing to give written informed consent

Data Collection Tool

A complete history of each patient was taken, including chief complaints, associated disorders, medical history, clinical examination, and relevant investigations.

Data Collection Procedure

After taking history, detailed clinical and radiological examinations were conducted and recorded according to the proforma. Demographic data and clinical characteristics were recorded including age, sex, marital status, education level, occupation, BMI, smoking, alcohol use, and diabetes. Ultrasonography was carried out by a radiologist to determine hepatic lesions.

Treatment details (conservative or surgical) were recorded.

Data Analysis Plan

The observations obtained from individual samples were pooled and analyzed. Statistical analysis was performed using Statistical Program for Social Sciences (SPSS) software version 20.0 (Chicago, Illinois, USA). All analyses were conducted on an intention-to-treat basis.

Ethical Consideration

Ethical clearance was obtained from the institutional ethics committee. Written informed consent was taken from all patients.

Observations

A total of 100 patients diagnosed with space-occupying lesions (SOLs) of the liver were included in the study. The mean age of the study population was 51.2 ± 12.1 years. Most patients belonged to the 51–60 years age group (33%), followed by >60 years (24%) and 41–50 years (21%). Males constituted 61% of the study population. The majority of patients were married (69%). Secondary and higher secondary education levels were observed in 29% and 23% of patients, respectively. Service employees (23%), farmers (19%), and labourers (18%) represented the predominant occupational groups. Overweight and obese individuals accounted for 40% and 27% of cases, respectively. Alcohol intake was reported in 53% of patients, while 27% had diabetes mellitus and 33% had both alcohol intake and

diabetes. Non-vegetarian dietary habits were present in 54% of patients.

Table 1. Baseline demographic and clinical characteristics of study participants (N=100)

Lesion type	n (%)
Pyogenic liver abscess	32 (32)
Metastatic lesions	15 (15)
Hydatid cyst	14 (14)
Simple hepatic cyst	11 (11)
Amoebic liver abscess	9 (9)
Hemangioma	9 (9)
Calcified hydatid cyst	7 (7)
Primary HCC	2 (2)
Cholangiocarcinoma	1 (1)
Benign lesions	82 (82)
Malignant lesions	18 (18)

Most patients presented with symptoms (85%), whereas 15% were diagnosed incidentally. Pain abdomen was the most frequent presenting symptom, followed by fever, abdominal swelling/mass, loss of appetite, weight loss and jaundice. On clinical examination, hepatomegaly and ascites were the predominant signs, followed by abdominal tenderness, icterus and pallor.

Table 2. Clinical presentation of patients with liver SOLs (N=100)

Variable	n (%)
Symptomatic presentation	85 (85)
Pain abdomen	81 (81)
Fever	51 (51)
Swelling/mass	42 (42)
Loss of appetite	39 (39)
Weight loss	33 (33)
Jaundice	21 (21)
Hepatomegaly	55 (55)
Ascites	53 (53)
Tenderness	43 (43)
Icterus	31 (31)
Pallor	18 (18)

Contrast-enhanced computed tomography identified pyogenic liver abscess as the most common lesion (32%), followed by metastatic lesions (15%), hydatid cysts (14%), simple hepatic cysts (11%), amoebic liver abscess (9%), hemangioma (9%), calcified hydatid cyst (7%), primary hepatocellular carcinoma (2%) and cholangiocarcinoma (1%). Overall, benign lesions constituted 82% of cases, whereas malignant lesions accounted for 18%.

Among pyogenic liver abscess patients (n=32), hypoechoic lesions with right lobe predominance were the most frequent ultrasonographic findings. Ultrasound-guided aspiration was the commonest treatment modality, and improvement was observed in 84.38% of patients. Metastatic lesions (n=15) commonly demonstrated hypoechoic echotexture, well-defined margins and bilobar involvement. All patients received palliative chemotherapy, with 66.67% remaining clinically stable during follow-up.

All hydatid cysts (n=14) showed hypoechoic cystic lesions with well-defined margins and were managed by open cyst evacuation with omentopexy. Simple hepatic cysts (n=11) and hemangiomas (n=9) were managed conservatively, demonstrating favourable follow-up outcomes. Amoebic liver abscesses (n=9) predominantly involved the right lobe and were mainly treated with ultrasound-guided pigtail drainage, resulting in clinical improvement in 88.89% of patients. Calcified hydatid cysts (n=7) were managed conservatively and remained clinically stable on follow-up.

Primary hepatocellular carcinoma (n=2) and

cholangiocarcinoma (n=1) exhibited heterogeneous echotexture with ill-defined margins and right lobe involvement. All malignant primary lesions were treated with neoadjuvant chemotherapy. Follow-up outcomes were poor, with mortality observed in one patient with hepatocellular carcinoma and in the single patient with cholangiocarcinoma.

Table 3. Distribution of liver space-occupying lesions and outcomes

Variable	n (%)
Male sex	61 (61)
Mean age (years)	51.2 ± 12.1
Married	69 (69)
Overweight	40 (40)
Obese	27 (27)
Alcohol intake	53 (53)
Diabetes mellitus	27 (27)
Alcohol + diabetes	33 (33)
Non-vegetarian diet	54 (54)

DISCUSSION

The present study evaluated the epidemiology, clinical presentation, and management of space-occupying lesions (SOLs) of the liver in 100 patients presenting to a tertiary care centre. The mean age of the study population was 51.2 ± 12.1 years, with the majority of patients belonging to the 51–60 years age group and a male predominance (61%). Similar findings were reported by Rajiv Sonarkar et al. (1), who observed a mean age of 47.19±14.53 years and male predominance (57.1%), and by Sanjeet Kumar et al. (3), who reported a mean age of 52.2 years with a male-to-female ratio of 2.4:1. Podduturi Rohan Reddy et al. (2) also reported a comparable mean age of 54.3 ± 9.8 years and a male-to-female ratio of 1.7:1. These observations suggest that hepatic SOLs predominantly affect middle-aged and elderly individuals, with a higher prevalence among males.

In the present study, pain abdomen was the most common presenting symptom (81%), followed by fever (51%), abdominal swelling (42%), loss of appetite (39%), weight loss (33%), and jaundice (21%). Hepatomegaly (55%) and ascites (53%) were the most frequent clinical signs. Similar findings were observed by Rajiv Sonarkar et al. (1), who reported abdominal pain in 76.2% of patients and hepatomegaly in 54.0% of cases. Sanjeet Kumar et al. (3) also found abdominal pain and abdominal distension to be the predominant presenting complaints. These findings highlight that abdominal pain remains the most consistent clinical feature across various hepatic SOLs.

The spectrum of lesions observed in the present study differed somewhat from previous reports. Pyogenic liver abscess was the most common lesion, accounting for 32% of cases, followed by metastatic lesions (15%) and hydatid cysts (14%). In contrast, Rajiv Sonarkar et al. (1) reported metastatic lesions (34.9%) as the most common SOL, closely followed by hepatic abscesses (33.3%). The higher proportion of pyogenic liver abscesses in the present study may reflect regional epidemiological variations and referral patterns. Overall, benign lesions constituted 82% of cases, whereas malignant lesions accounted for 18%, which differs from the findings of Podduturi Rohan Reddy et al. (2), where malignant lesions slightly outnumbered benign lesions (51.7% versus 48.3%).

Management strategies in the present study were largely determined by lesion type. Ultrasound-guided aspiration was the most common intervention for pyogenic liver abscesses and resulted in clinical improvement in 84.38% of patients. Similarly, Rajiv Sonarkar et al. (1) reported favorable outcomes with aspiration and pigtail catheter drainage for liver abscesses. Hydatid cysts in our study were managed successfully by open cyst evacuation with omentopexy, whereas Sonarkar et al. (1) employed both open and

laparoscopic approaches with satisfactory outcomes. Metastatic lesions were treated with palliative chemotherapy, and two-thirds of patients remained clinically stable during follow-up. However, primary malignant lesions, including hepatocellular carcinoma and cholangiocarcinoma, were associated with poor outcomes despite neoadjuvant chemotherapy, emphasizing the aggressive nature of these malignancies.

CONCLUSION

Space-occupying lesions of the liver were predominantly observed in middle-aged and elderly males and were commonly associated with metabolic and lifestyle-related risk factors such as obesity, alcohol consumption, and diabetes mellitus. Most patients presented with symptomatic disease, with abdominal pain being the most frequent clinical complaint. Infective and benign lesions constituted the majority of cases, with pyogenic liver abscess emerging as the most common lesion, followed by metastatic lesions and hydatid cysts. Radiological evaluation played a pivotal role in accurate diagnosis, characterization, and treatment planning. Most benign and infective lesions demonstrated favorable outcomes following appropriate medical, percutaneous, or surgical management, whereas malignant lesions were associated with poorer prognosis and higher mortality. Early diagnosis and timely intervention are essential for improving clinical outcomes in patients with liver space-occupying lesions.

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