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Spectrum Of Imaging Features Of Malignant Neoplastic Hepatobiliary Pathologies In A Tertiary Hospital Of Eastern India

Dr. Nupur Basu[1], Dr. Prithvijit Chakraborty[2]
Assistant Professor, Medical College & Hospital, Kolkata
Resident, Medical College & Hospital, Kolkata
Corresponding Author; Dr. Prithvijit Chakraborty

Abstract:-
Objectives- *Malignant neoplasms of hepatobiliary system usually have poor prognosis. In this study we have studied the spectrum of neoplastic hepatobiliary pathologies presented in our institute and retrospectively evaluated important risk factors and imaging features that may help in early diagnosis and treatment of those conditions and improve the quality of life.*
Methods:- *We investigated 36 consecutive patients presenting with hepatobiliary pathologies proven to be of malignant neoplastic etiology between July 2018 and September 2018 after they met the inclusion criteria. Imaging features of each patients were studied ,analysed and classified based on the spectrum of neoplastic hepatobiliary pathologies.*
Results:- *Majority of the cases were gallbladder carcinoma. Peak age was 53 years. Sex prevalence was slightly male dominant. Significant prevalence of smoking, alcoholism and chronic liver disease were noted in the patients.*
Conclusion:- *Hepatobiliary malignancies are quite common in eastern india . Early diagnosis and treatment can help to reduce mortality and imaging has an important role in it.*
KEYWORDS:- *Hepatocellular carcinoma; Gallbladder carcinoma; Cholangiocarcinoma; Periampullary carcinoma; Contrast Enhanced Computed Tomography; Magnetic Resonance Cholangiopancreatography*.

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I. Introduction

Malignant neoplasms of hepatobiliary system usually have poor prognosis. Often the cases present in advanced status. The only way to reduce the mortality and morbidity associated with these malignancies is to identify and prevent important risk factors and early diagnosis and treatment. Radiology and imaging plays an important role in early diagnosis, Thus reducing the lead time and improving the treatment outcome. . In this study we have studied the spectrum of neoplastic hepatobiliary pathologies presented in our institute and retrospectively evaluated important risk factors and role of imaging features that may help in early diagnosis and treatment of those conditions and improve the quality of life.

II. Materials And Methods

A retrospective study was done at our institute between July 2018 and September 2018. 36 consecutive patients of Hepatobiliary pathologies proven to be of malignant neoplastic etiology referred to our department for review of their imaging features were included in the study after they met the inclusion criteria.

Institutional Ethics Committee*:* Approval from institutional ethics committee obtained.
Inclusion criteria:

1. Patients of primary neoplastic hepatobiliary pathologies detected clinically,Radiologically or Histopathologically
2. Patients having hepatic metastasis from hepatobiliary primaries were included in the study
3. Patients who gave consent to take part in the study

Exclusion criteria:

1. Patients having hepatic metastasis from non-hepatobiliary primaries
2. Periampullary carcinoma of non-biliary origin
3. Patients who refused to take part in the study

Procedure:

Before the data of the patients were collected and analysed, following informations were ontained-

- Age, Sex
- History of present illness, past history, drug history and family history of neoplastic disorders
- Clinical features and examination findings were noted
- Records of baseline laboratory investigations like Complete Blood Count, serum lipid profile, blood sugar, serum creatinine, ECG, Chest X-ray and some special investigations like serum alpha feto protein, serum liver enzyme levels etc were also noted.
- Radiologic imaging features were reviewed and recorded.
- Histopathologic features were also noted.

Findings were recorded in predesigned and pretested case record sheet for subsequent analysis.

III. Results

We investigated 36 consecutive patients presenting with hepatobiliary pathologies proven to be of neoplastic etiology between July 2018 and September 2018 after they met the inclusion criteria. Majority (38.9%) of the patients had carcinoma of gallbladder, where as 22.2% cases were of cholangiocarcinoma, 16.7% cases were of hepatocellular carcinoma. Hepatic metastasis from hepatobiliary primaries were noted in 13.9% cases, most of which were from gallbladder carcinoma primaries and remaining 8.3% cases were periampullary carcinoma which were histopathologically proven to be of biliary origin. Male:Female ratio was slightly greater than 1:1. Average age of the patients were 49.4 +/- 7.8 years. Majority of the cancers occurred in the 41-60 years age group, the peak age being 53 years. The age distribution formed a negatively skewed curve. Among hepatobiliary carcinoma cases, 66.7% were classical hepatocellular carcinoma (cHCC) and 16.7% were fibrolamellar variant of HCC (fHCC), whereas rest 16.7% were hemangiocarcinoma. Among gallbladder carcinoma, Majority (57.1%) was adenocarcinoma, whereas 28.6% were adenosquamous carcinoma and rest were Squamouus cell carcinoma(SCC) and lymphoma were 7.1%, each. Among cholangiocarcinoma cases, 50% were intraductal growing type and periductal infiltrating type and mass forming type were of 25%,each. 33% of hepatocellular carcinoma cases were positive for hepatitis B and 16.7% were HIV positive. 38.9% of neoplastic hepatobiliary pathologies had history of alcoholism, 44.5% had history of smoking. 27.8% of the patients who developed neoplastic hepatobiliary pathologies had history of chronic liver disease.

IV. Discussion

India falls in the high incidence region for hepatobiliary malignancies[1].

Majority of cases are carcinoma of gallbladder (incidence 21.5/100,000). It is three times more common in females. Incidence increases with age, with average age at diagnosis being 72 years. Interestingly, incidence rate in western world is quite low, 0.4–0.8 in men and 0.6–1.4 in women per 100,000[2]. There are several risk factors e.g demographic factors e.g advanced age,female gender,obesity,ethnicity etc, coexistant Gallbladder pathologies like cholelithiasis,porcelain gallbladder,gallbladder polyps,congenital biliary cysts, pancreaticobiliary maljunction anomalies etc, exposures to heavy metals,medications likemethyldopa, OCP, isoniazid,estrogen; smoking, salmonella and helicobacter infections etc. There are also some genetic associations like p53 mutation, cyclooxygenase-2 (COX2) overexpression, mitochondrial DNA mutations, and hypermethylation of promotors in tumour suppressor genes, inactivation of the fragile histidine triad (FHIT) and cyclin-dependent kinase inhibitor 2A (CDKN) tumour suppressor genes as well as loss of regions on chromosomes 9, 18, and 22[3]. Ultrasonography is most frequently the initial diagnostic study obtained when gallbladder disease is suspected. On ultrasonography, gallbladder carcinoma may have one of three appearances: (1) a mass replacing or invading the gallbladder, (2) an intraluminal gallbladder growth/polyp, or (3) an asymmetric gallbladder wall thickening. In advanced disease, sensitivity and specificity of ultrasound imaging is 85% and 80, respectively . High-resolution contrast-enhanced ultrasonography accurately identifies up to 70–90% of polypoid gallbladder lesions. The most common evaluative imaging in gallbladder cancer is the CT scan which may be useful in the diagnosis and staging of gallbladder cancer. This imaging modality may detect liver or porta hepatis invasion, lymphadenopathy, and involvement of the adjacent organs[4]. PET scanning may be useful in detecting residual disease after cholecystectomy, and uncovering distant disease not otherwise appreciable by other imaging modalities. Addition of diffusion-weighted imaging (DWI) to T2 weighted imaging may aid in the differentiation of malignant from benign gallbladder disease as it provides a greater sensitivity. Image guided fine needle aspiration and cytology or biopsy can help in obtaining tissue for hispathological examination. The only curative treatment for gallbladder carcinoma is complete surgical tumour resection and lymphadenectomy. The tumor is poorly responsive to radiotherapy and has guarded benifits in chemotherapy. However these are the only ways of treatment in surgically unresectable cases and can be used as adjunct to surgery for margin clearance[5].

Hepatocellular carcinoma (HCC) is one of the most common malignant tumors worldwide with an estimated 500 000 to 1 million new cases per year. In India, the mean incidence of HCC in four population-based registries is 2.77% for males and 1.38% for females. The prevalence of HCC in India varies from 0.2% to 1.6%. Hepatitis B virus (HBV) infection is the most common etiologic factor in high incidence areas, while hepatitis C (HCV) infection is more prevalent in the low incidence areas.[6]

There is male dominance with mean age of 52 years. Alcoholism, smoking and chronic liver disease also show association with this. The serum alpha feto protein is a 76-91% specific marker of HCC and it is more increased in patients having coexistant cirrhosis. However it has low sensitivity. Dynamic and multiphase contrast-enhanced computed tomography (CT) and magnetic resonance imaging (MRI) are the standard diagnostic tests for HCC. Faster MRI scanning, improved diffusion-weighted imaging (DWI) and hepatocyte-specific MR contrast agents are currently being explored. Emerging newer technologies such as MR elastography (MRE) and acoustic radiation force impulse imaging (ARFI) are promising for characterization of nodules in the liver. Positron emission tomography (PET) with specific tracers may prove useful for staging of HCCs. The fibrolamellar variant of hepatocellular carcinoma is a rare primary liver cancer occurring in adolescents and young adults without chronic liver disease or known risk factors. Radiologic imaging typically demonstrates a large, solitary mass with calcifications and a central scar[7]. Although liver transplantation and surgery are considered curative treatments for HCCs, more frequently and especially involving small HCCs, locoregional methods such as radiofrequency ablation (RFA) and ethanol ablation are now used. More advanced tumors may be treated with transarterial chemoembolization (TACE) and transarterial radioembolization (TARE)[8].

Cholangiocarcinomas (CCA) are typically classified as intrahepatic cholangiocarcinoma (iCCA), perhilar/hilar cholangiocarcinoma (pCCA), distal cholangiocarcinoma (dCCA). Pathologically they may either be peripheral infiltrating type, intraductal growing type or mass forming type. Asians have the highest incidence in CCA. There are several risk factors such as Primary sclerosing cholangitis, Choledochal cysts, *Clonorchis sinensis* or *Opisthorchis viverrini* infections, bile duct stones, even diabetes mellitus. There is significant association of HBV with CCA and the relative risk is higher in asian countries[9]. Numerous genetic association studies have examined genetic variants associated with PSC, and a strong association has been found with HLA complex polymorphisms, with the most robust findings localizing to chromosome 6p21[10] .Ultrasound is an initial diagnostic screening tool in a patient of suspected biliary tract neoplasia. Multiphase Contrast enhanced CT can help in initial staging of disease. CT volumetry images can be used in preoperative management to estimate the liver volume and potential liver remnants, avoiding postoperative small-for-size-syndrome. Contrast-enhanced dual-energy CT (DECT) offers the opportunity of calculating virtual non-enhanced images, thus allowing the detection of bile duct stones without pre-contrast scanning. Functional imaging of volume perfusion CT (VPCT) can help to assess the exact vascularization of the tumour in CCA[11]. Compared with the normal parenchyma, CCA usually shows increased hepatic arterial perfusion, increased blood volume, and decreased portal perfusion. MRCP is the most accurate non-invasive non-contrast MRI imaging technique for assessing the biliary system . It allows accurate tumour assessment in both proximal and distal bile ducts. MRCP are heavily T2 weighted sequences that are usually acquired using a combination of thick-slab radial T2 sequences and thin 3D T2 sequences. The thick-slab sequences provide a good overview of the biliary system with a good suppression of the surrounding tissue, whereas the thin 3D T2 sequences provide high spatial resolution and allow for the detection of small abnormalities in the bile ducts such as small masses and/or stricture. 18-FDG PET is also helpful in assessment of residual disease and metastasis[12]. Complete surgical resection is the sole potentially curative treatment option for CCA. The combination of liver resection and bile duct resection yields a better oncological result than bile duct resection alone. Other options are endoscopic ablation, and less effective chemoraiation and palliative stenting in unresectable cases[13].

Most of the cases of hepatic metastasis from hepatobiliary origin have their primary in gallbladder and bileduct. Periampullary carcinoma can histopathologically be either of intestinal or pancreatic or biliary origin. Biliary periampullary carcinoma has worse prognosis than that of intestinal origin. Pancreaticoduodenectomy (PD) with or without (Whipple operation) pylorus preservation is the procedure of choice for these malignant tumors. Pylorus-preserving PD offers technical advantages (ease and speed) and may provide better quality of life and may prevent the occurrence of post-gastrectomy syndromes. Pstoperative adjuvant radiation therapy with and without concomitant chemotherapy are available but does not significantly improve longterm survival[14].

V. Conclusion

Hepatobiliary malignancies are quite common in eastern india and often have poor prognosis. Radiology and imaging has an important role in early diagnosis of these conditions and shortens the lead time to diagnosis and helps in improvement of survival and quality of life.

CONFLICT OF INTEREST: There are no conflicts of interest.
SOURCE OF SUPPORT: Nil
LIST OF ABBREVIATIONS:-
HCC- Hepatocellular carcinoma,
SCC- Squamouus cell carcinoma,
CCA- Cholangiocarcinoma,
HBV and HCV - Hepatitis B virus and Hepatitis C virus,
CECT- Contrast Enhanced Computed Tomography,
VPCT- Volume perfusion Computed Tomography
MRCP- Magnetic Resonance Cholangiopancreatography,
ARFI- Acoustic Radiation Force Impulse
TACE and TARE - Transarterial chemoembolization and Transarterial radioembolization ,

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FIGURE1 Types of Hepatobiliary malignancies presenting at our institute between July 2018 and September 2018-

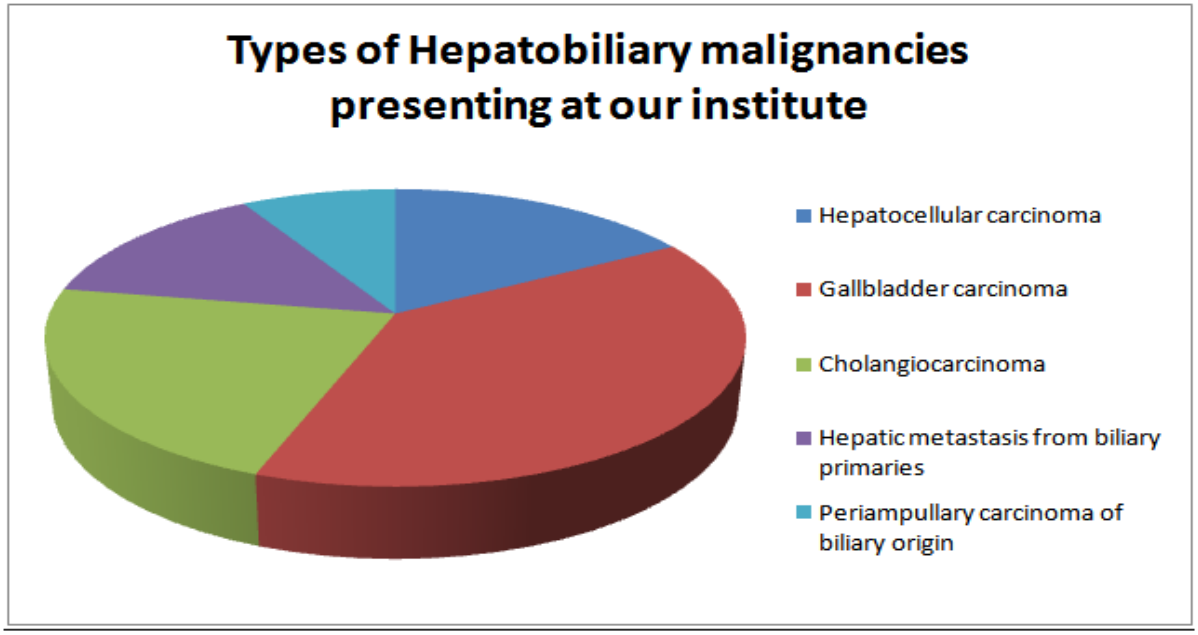


FIGURE 2 Age wise distribution of various Neoplastic hepatobiliary pathologies presenting in our hospital-

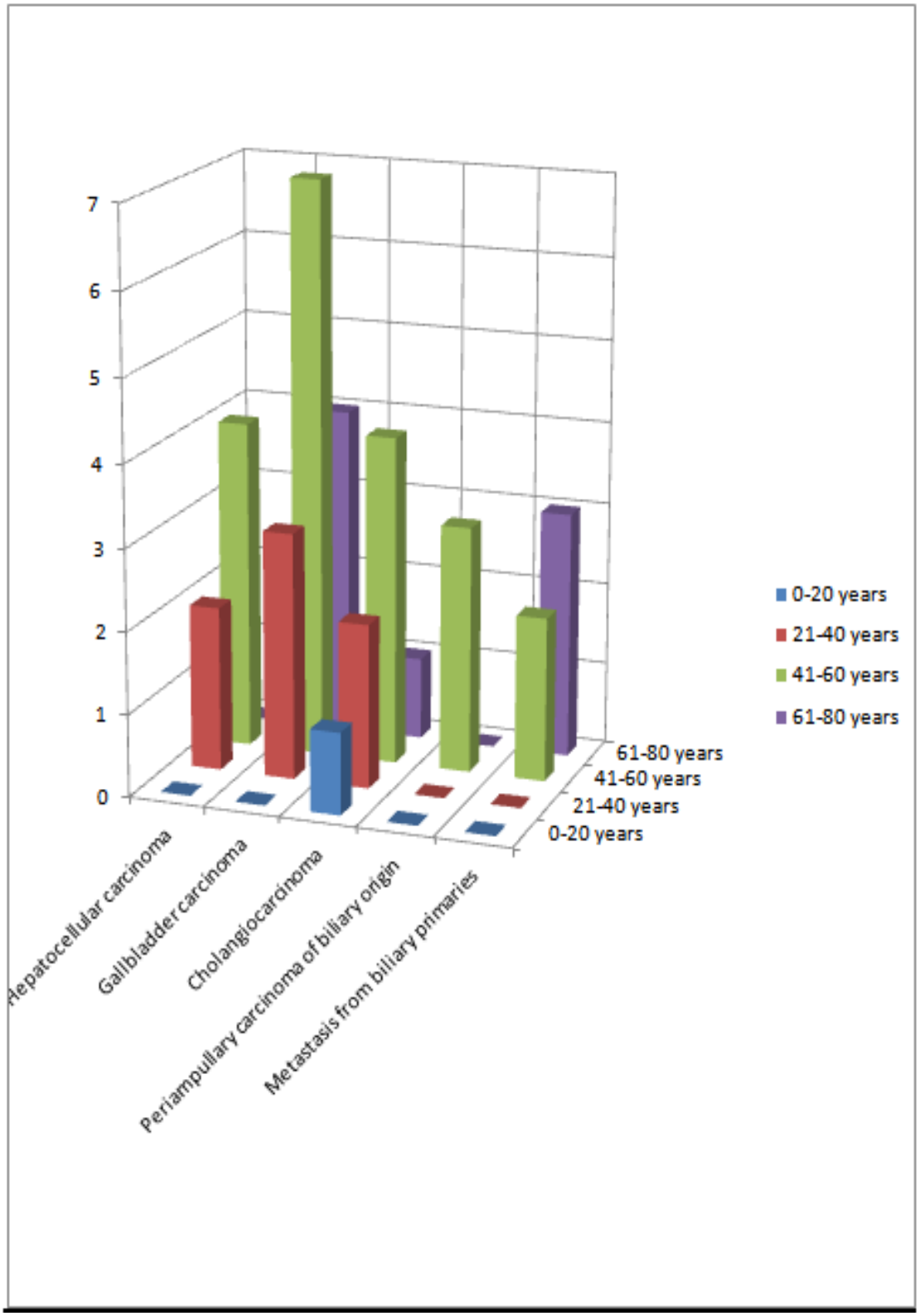


FIGURE 3 Sex wise distribution of various Neoplastic hepatobiliary pathologies presenting in our hospital-

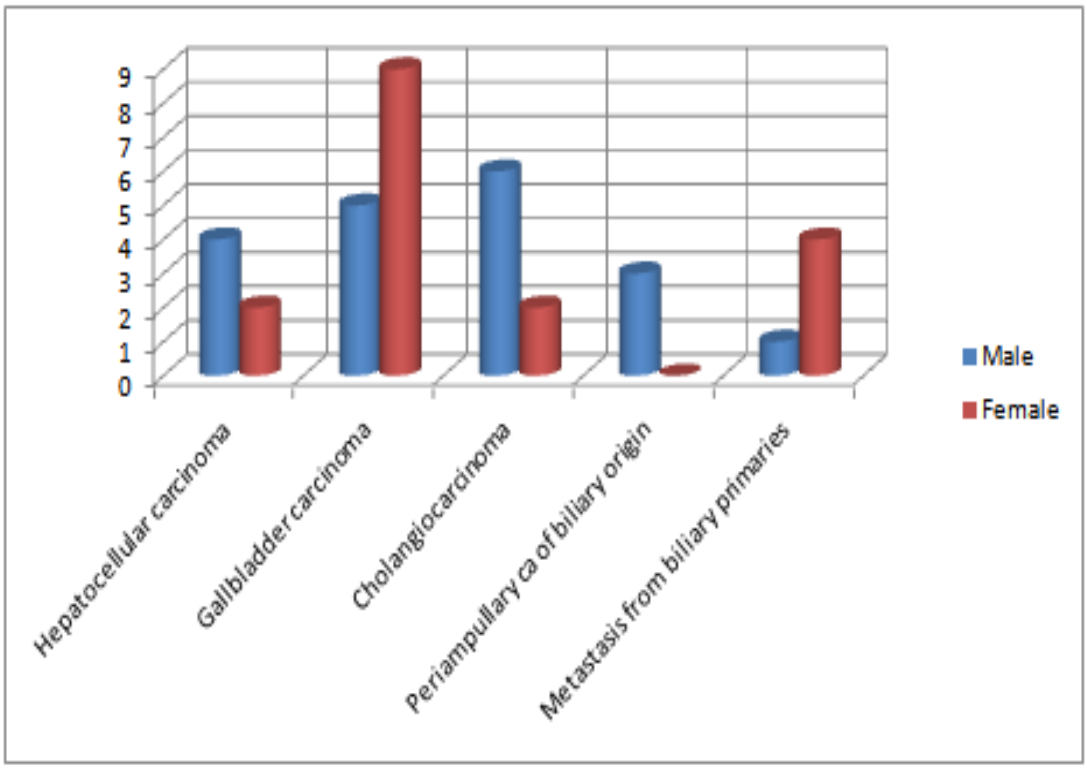


FIGURE 4 (a) Subtypes of Hepatocellular carcinoma presenting in our hospital-

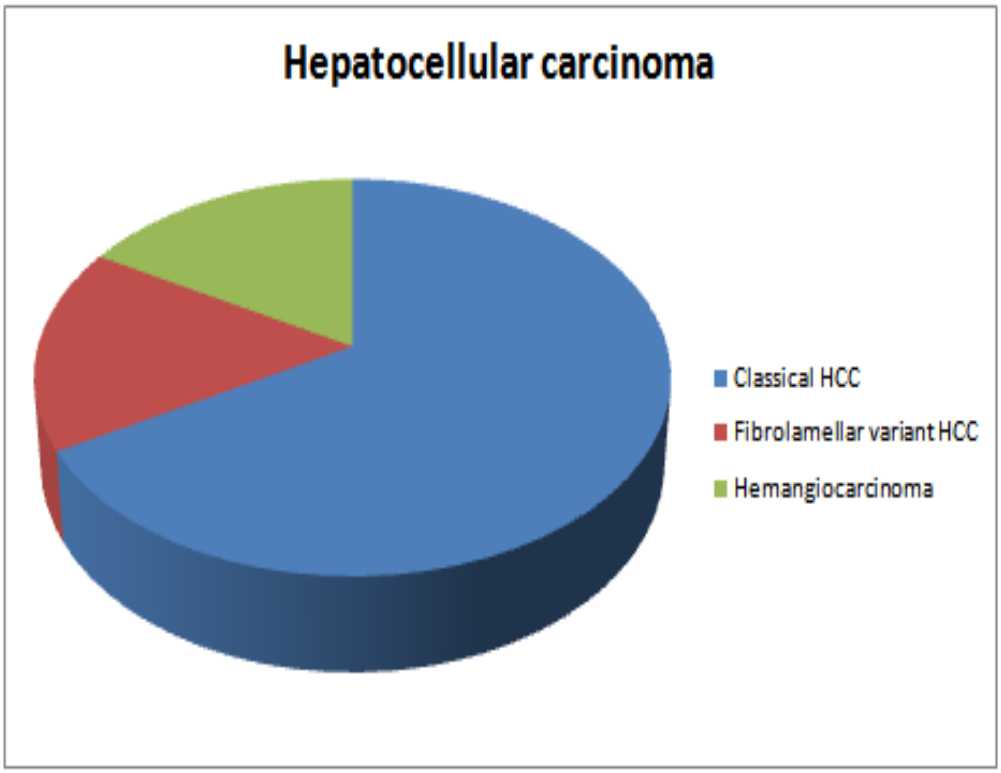


FIGURE 4 (b) Subtypes of gallbladder carcinoma presenting in our hospital-

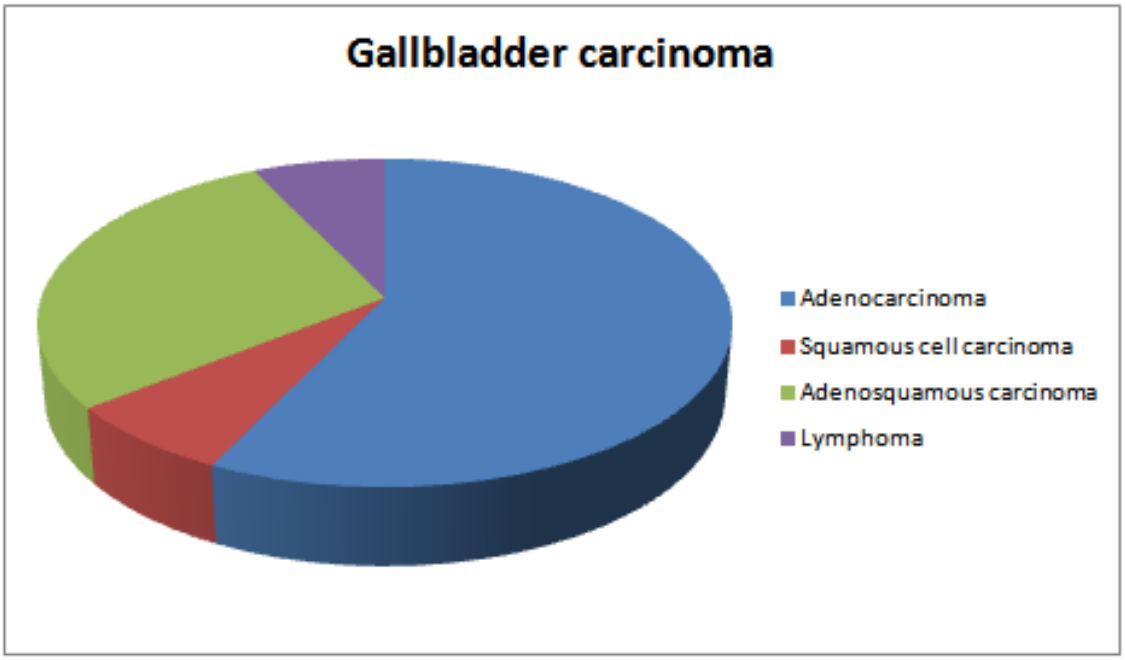


FIGURE 4 (c) Subtypes of Cholangiocarcinoma presenting in our hospital-

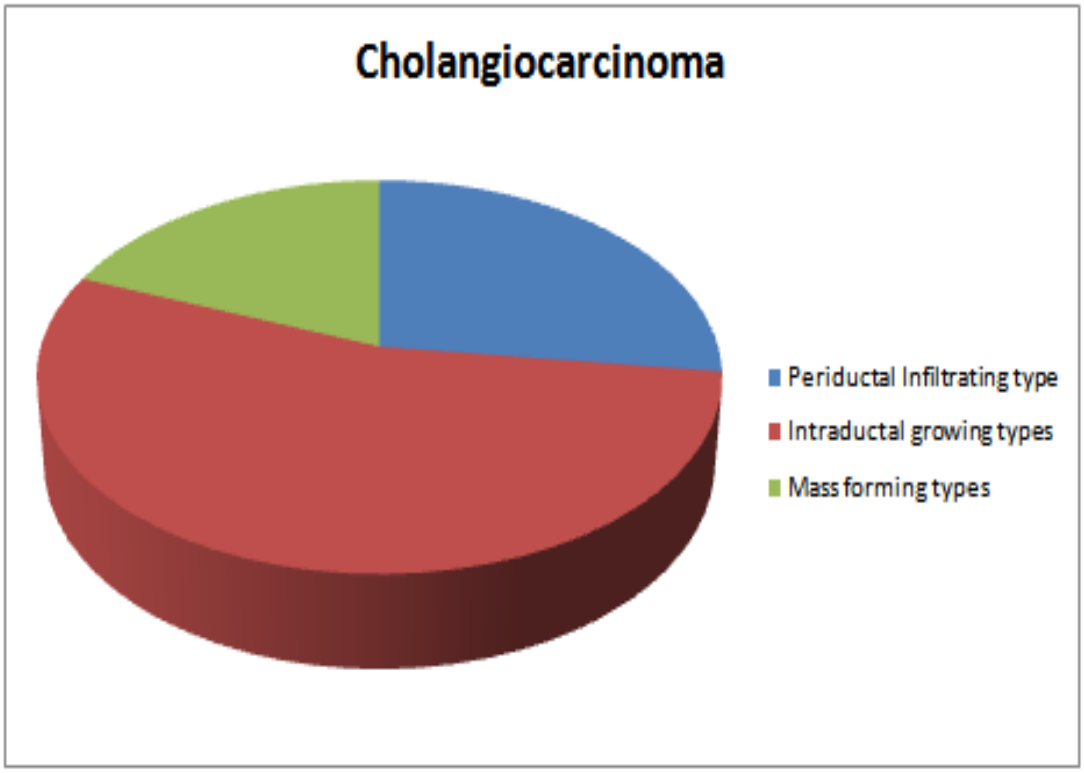


FIGURE 5 Contrast enhanced CT (Oral+i.v contrast) showing multiple heterogeneously enhancing irregular hypo to isodense lesions in liver. This was a case of multifocal Hepatocellular carcinoma in a Human Immunodeficiency Virus (HIV)positive young male patient

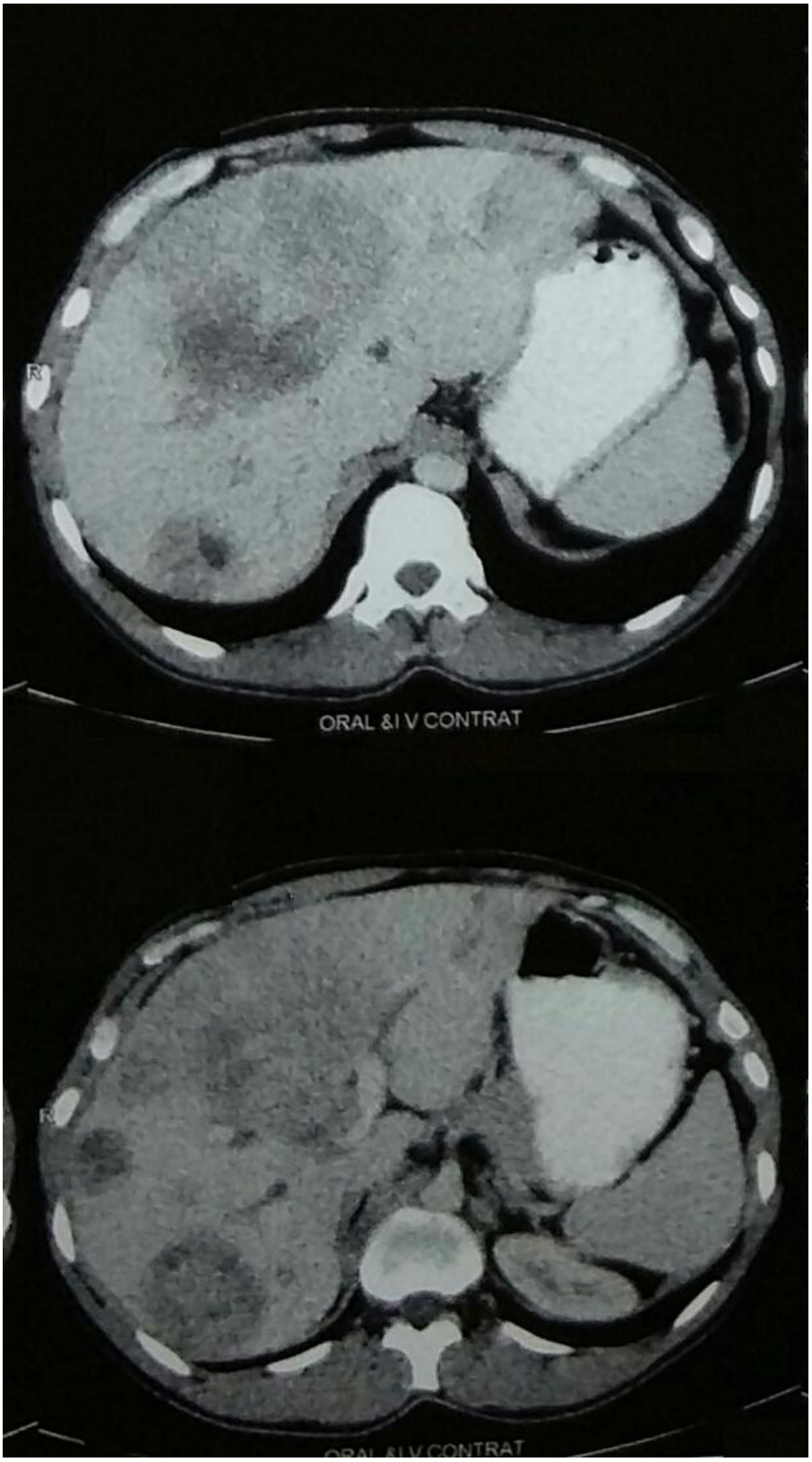


FIGURE 6 Contrast enhanced CT showing gallbladder mass near its neck (arrow) and a heterogeneously enhancing predominantly hypodense area in the liver parenchyma (arrow). This was a case of adenosquamous carcinoma of gallbladder metastasized to liver in an aged female patient

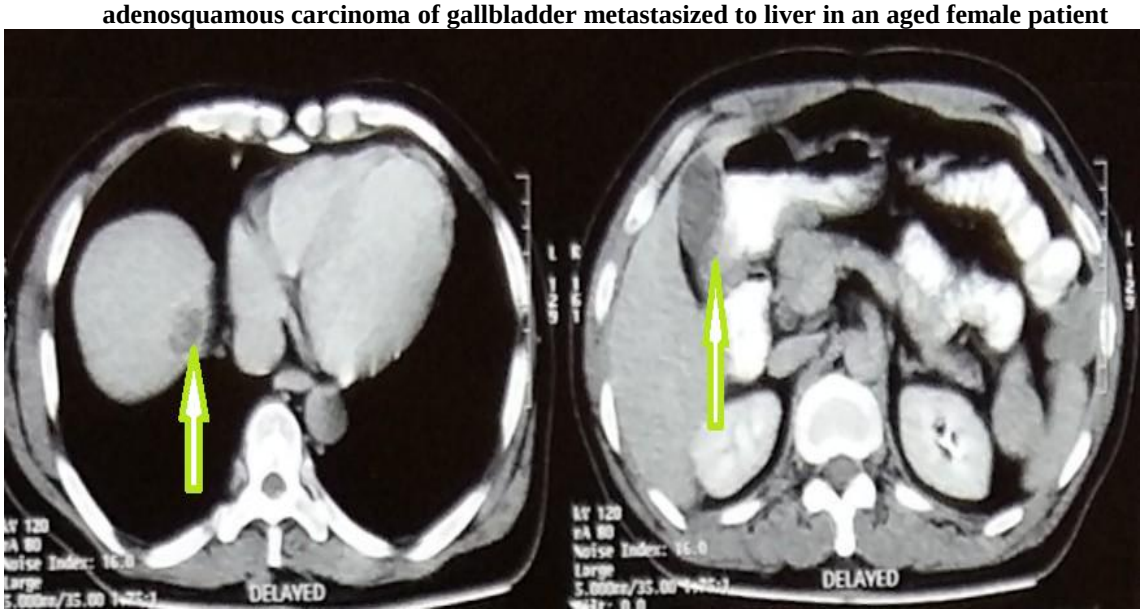
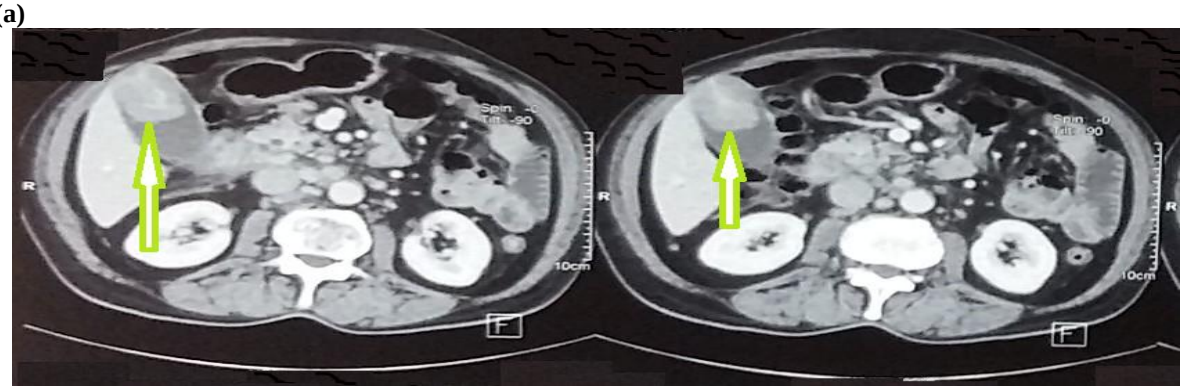


FIGURE 7 Contrast enhanced CT showing a heterogeneously enhancing globular mass (arrow) in the fundus of gallbladder adjacent to the anterior abdominal wall in axial section (a) and in coronal section (b). This was a case of adenocarcinoma of gallbladder in a middle aged male patient

(a)



(b)

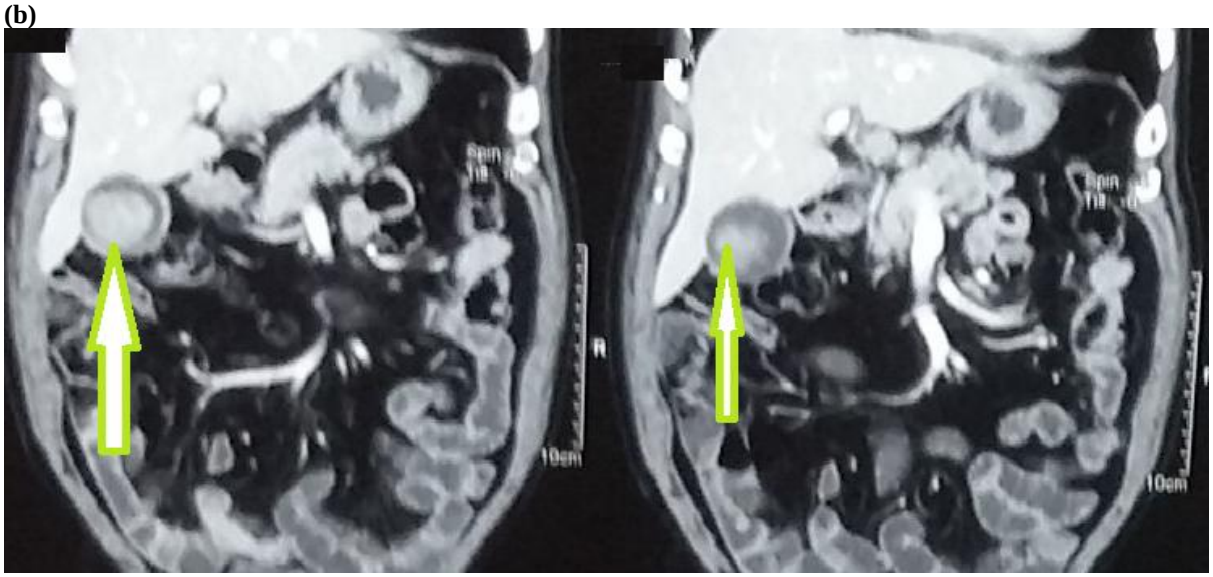


FIGURE 8 Magnetic Resonance Cholangio Pancreatography (MRCP) showing abrupt cut off of (arrow) Common bile duct and dilatation of Common bile duct, Right & Left Hepatic duct and Intra Hepatic Biliary radicles(IHBR). This was a case of Intraductal Growing type of Cholangiocarcinoma of the distal Common bile duct in a young female patient

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