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Case Report

Mucinous cystic neoplasm of the liver: A rare case report

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ABSTRACT

Mucinous cystic neoplasm of the liver is a rare cystic neoplasm accounting for approx. 5% of cystic liver in the liver parenchyma. We describe the histomorphology and immunophenotyping features of MCN-L in a 52-year-old woman who came to the surgical department with complaints of pain abdomen for 1.5 months. The ultrasonography showed a septated cyst located centrally in the liver. The CT abdomen showed a large hypodense multiloculated cystic lesion in the liver with thin enhancing septae and multiple small cysts involving the entire left lobe with extension into the right lobe and having a large infra-hepatic exophytic component. A provisional diagnosis of a Hydatid cyst was made. Drainage of the cyst with laparoscopic deroofing was done. Histopathology examination showed a cyst lined by cuboidal to columnar epithelium with mucinous cytoplasm and basally oriented nuclei. Subepithelium shows ovarian-like stroma.
MCN-L has a lower frequency as compared to the counterpart of MCN in the pancreas, and further molecular studies are necessary to clarify the biology of MCN-L. The relevance of this rare entity's clinical and radiological suspicion, histological recognition and immunohistochemistry is emphasised.

1. Introduction

Cystic liver lesions represent diverse anomalies frequently observed in routine clinical settings. They exhibit variability in origin, clinical manifestations, and radiographic characteristics. Diagnostic assessment can encompass a spectrum, ranging from harmless cystic formations to malignancies with potentially grave outcomes.[1] Mucinous Cystic neoplasm of the liver (MCN-L) is a less commonly encountered entity comprising <5% of liver cysts.[2]

MCN-L was earlier known as hepatobiliary cystadenoma The terminology was revised in 2010 by the WHO, due to its similarity to the mucinous neoplasm of the pancreas.[3] The mucinous cystic neoplasm of the liver and biliary system is a cyst-forming epithelial neoplasm, which usually shows no communication with the bile ducts. It is composed of cuboidal to columnar, variably mucin-producing lining epithelium, associated with ovarian-type subepithelial stroma.[2,3] MCN-L are categorised as MCN-L with either low/intermediate–grade dysplasia or high-grade dysplasia.[2] Invasive carcinomas may occur in MCNs. It's rare presentation and insufficient recognition frequently lead to delayed diagnosis or is often misdiagnosed.[2,4]

We have a low-grade, non-invasive, mucinous neoplasm of the liver with a radiological diagnostic dilemma and the importance of histopathological and immunohistochemistry correlation for establishing the diagnosis.

2. Case Report

A 52-year-old female presented with pain in the upper abdomen for 1.5 months which is insidious in onset, mild intensity, dull aching and non-radiating in nature. There is no history of fever, vomiting, jaundice, hematemesis,

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melena, loss of appetite or weight, constipation or loose stools. There are no associated comorbidities.

There was a history of abdominal hysterectomy 12 years back, but histopathology was not available.

Ultrasound abdomen: showed an ill-defined multiloculated cystic lesion in the left lobe of the liver with internal septations and radiological diagnosis was given as features are suggestive of liver hydatid cyst.

CECT abdomen: showed liver enlarged in size, measuring 15cms craniocaudally. A single large hypodense, multiloculated cystic lesion was seen involving the entire left lobe. The cysts have multiple septae and multiple small cysts within. It measures 11.8 x 13.3 x 18.6 cm (AP X TR X CC). The cyst showed extension into the right lobe with a large infra-hepatic exophytic component. Volume is approximately 1500cc. It is mildly compressing and displacing the pancreas left laterally and right kidney inferiorly. It also compresses the portal vein's right and left branches. Mild IHBRD was seen. There was no communication with the biliary system—the diagnosis was given as likely a hepatic hydatid cyst with mild IHBRD due to its well-circumscribed nature and internal complexities.

Laboratory investigations: Routine laboratory studies such as complete hemogram, liver function, and renal function tests were within normal limits. Viral markers were negative. Tumor markers were within normal range.

Treatment: Laparoscopic deroofing of a part of the cyst with drainage was done as a standard procedure for surgical removal of the hydatid cyst. Since the lesion was large a complete resection was not done as it will increase the morbidity in the patient. The excised specimen was sent for histopathological examination.

Histopathological examination: Gross findings showed that an already cut-open cystic tissue was received in the form of multiple fragmented, flattened tissue pieces. One of the surfaces is grey-white and glistening, and the other surface is grey-brown. Wall thickness ranges from 0.2 to 0.5 cm. Papillary excrescence, solid areas and content of the cyst were not identified. There was no attached liver with any of the flattened tissue pieces. (Figure 1)

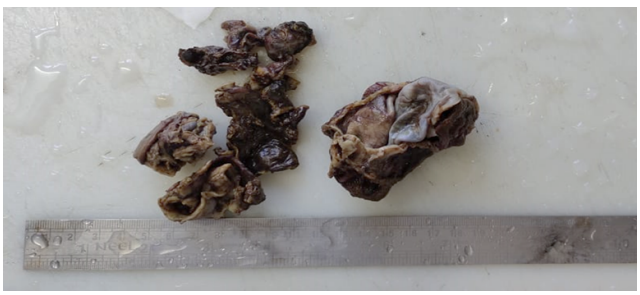

Figure 1: Gross image: Multiple flattened tissue pieces were received. Both the surfaces were smooth. Papillary excrescences, solid areas and content of the cyst and liver parenchyma were not identified

Microscopy: The microscopic examination revealed a cyst lined by cuboidal to columnar epithelium with mucinous cytoplasm and basally oriented nuclei. Sub-epithelium shows ovarian-like stroma. The focal area shows hemosiderin-laden macrophages and haemorrhage. No area with evidence of dysplasia was noted. Further immunohistochemistry using CK 7 highlighted the lining epithelium and ER highlighted the underlying ovarian-type stroma. The diagnosis was MCN-L according to the WHO classification of 2021.

The postoperative course was uneventful, and the patient was discharged from our institution on postoperative day 10. At present, 6 months after the surgery, the patient remains asymptomatic. Follow-up CECT shows a multiloculated cystic lesion involving segments IV, V, and VIII, measuring 9.8 X 7.2 X 9.5 cm (AP X TR X CC). Reduction in the bulk of the right anterior sector of the liver with herniation of peritoneal fat in the liver parenchyma. There are mild inflammatory changes in the subhepatic space. The lesion appears to be encasing the right and left hepatic arteries, with no evidence of infiltration or luminal narrowing. Persistence of mild IHBRD was noted.

3. Discussion

The 5th edition of the WHO Classification of Digestive System Tumours has categorised MCN-L as a benign entity in the tumour of the liver and intrahepatic bile ducts. MCN-L possesses the potential for malignant transformation. According to the WHO MCN-L is rare, with an incidence of one case per 20000-100000 persons.[2] MCN-L has a predilection for middle-aged women and it accounts for < 5% of all cases of hepatic cystic diseases with a low malignant transformation rate and good prognosis.[2,5] The propensity to transform into malignancy ranges from 3% to 6%.[6]

Mucinous cystic neoplasms of the liver, formerly known as cystadenomas or cystadenocarcinomas, represent uncommon cystic tumours found either within the liver parenchyma or, less commonly, in the extrahepatic bile ducts.[2,7] Predominantly affecting women, these tumours typically manifest during the fifth and sixth decades of life.[2,4] Our case is a fifth-decade female.

On Ultrasonography MCN typically manifests as a solitary, sizable cystic mass, often exhibiting multiple compartments (multiloculated), though occasionally appearing as a single chamber (unilocular) in a minority of cases (6%–10%). These masses commonly feature internal partitions (septa), calcifications within their walls, and occasionally nodules on the inner surface. A significant proportion, ranging from 69% to 76%, is located within the left hepatic lobe, with a particular inclination for segment IV.[11,12] On CT imaging, when invasive carcinoma is not present, MCN typically appears as a large, well-defined, multiloculated cystic mass enclosed by a fibrotic capsule.

Table 1: Comparison of clinical, radiological and treatment in the current case and reported cases of MCN-L

	Soni et al[4]	Nakayama et al[8]	Yeh et al[9]	Rodriguez et al[10]	Index Case
Age/Sex	55/F	71/F	50/F	35/F	52/F
Location	Hilum of liver; No connection with bile duct	Medial Segment of Liver; No connection with bile duct	Segment of liver; No connection with bile duct	Right lobe of liver; No connection with bile duct	Left lobe of liver; No connection with bile duct
Treatment	Laparoscopic deroofing of the cyst	Left Segmentectomy	Left hemi-hepatectomy with cholecystectomy	En-bloc resection of cyst	Laparoscopic deroofing of the cyst
Outcome	Asymptomatic and free of disease	Asymptomatic and free of disease	Asymptomatic and free of disease	Asymptomatic and free of disease	Asymptomatic and free of disease

The internal partitions exhibit varying thickness and can be located centrally or peripherally within the cyst. Notably, the presence of septa, particularly those originating from the cyst wall without indenting it, represents highly sensitive features of MCN (94% and 100%, respectively). Mural calcifications, found in 47%–63% of cases, are also highly specific for MCN (90%). Additionally, features such as mural irregularities or nodules (20%–27%) and intra-cystic debris (21%–40%) may be observed. Furthermore, contrast enhancement may accentuate the capsule, septa, and nodules.[11,13] Our case on ultrasound and CT showed a well-defined multiloculated cystic lesion in the left lobe of the liver with internal septations (Table 1)

Two studies showed elevated serum CEA and CA-19.9 levels in a series of cystadenomas, however, they did not help differentiate between hepatic and biliary cysts.[14,15]

Treatment of a benign Cystic neoplasm is usually a complete resection of the tumour.[16] In our case, as the diagnosis on imaging was a likely hydatid cyst only partial deroofing of the cyst with drainage was done due to the large size of it.

Grossly the cyst is well circumscribed, has a thick fibrous capsule and is well demarcated from the adjacent liver parenchyma.[17] They usually do not have any connection from the biliary system. The loss of capsular integrity, solid area and presence of capillary excrescence is suggestive of an invasive carcinoma.[2,18] Our case showed a multiseptated cyst with a thin wall and absence of solid area and papillary excrescence which was similar to other cases in the literature.

The wall of mucinous cystic neoplasms consists of three distinct layers. The innermost layer typically comprises columnar or cuboidal epithelial cells, occasionally exhibiting a squamous-like appearance. These cells present with pale, eosinophilic cytoplasm and nuclei oriented toward the base. The middle layer, defining the entity, is characterized by subepithelial ovarian-type stroma.[17,18] This layer contains densely packed spindle-shaped cells with elongated nuclei and minimal cytoplasm, surrounded by collagen fibres. Finally, the outermost layer is a fibrous capsule.[3,17,18] Our case showed a simple cyst having columnar mucinous lining and sub epithelium showed ovarian type stroma. There was no evidence of dysplasia. (Figure 2)

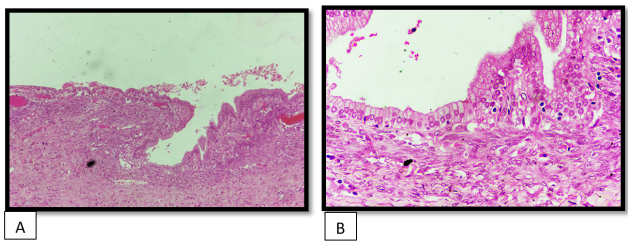

Figure 2: Photomicrograph (**A**) shows subepithelium with ovarian-like stroma (H&E stain; X100 magnification). Photomicrograph (**B**) shows a cyst lined by cuboidal to columnar epithelium with mucinous cytoplasm and basally oriented nuclei. (H&E stain; X400 magnification)

The ovarian-like stroma in MCN-L shows positivity for immunohistochemistry stages such as estrogen receptor (ER), progesterone receptor (PR) and WT1.[6] In our case, the stroma exhibits strong nuclear positivity for estrogen receptor. The lining epithelium shows cytoplasmic positivity for CK7 (Figure 3)

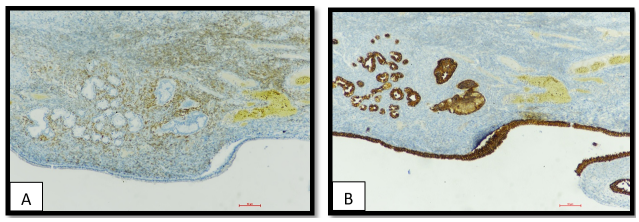

Figure 3: Photomicrograph (**A**) shows IHC Estrogen receptor staining(10x), Stroma was immunoreactive for estrogen. Photomicrograph (**B**) shows IHC CK7 staining(10x), Epithelial lining was immunoreactive for CK 7

The diagnosis of MCN-L preoperatively on cross-sectional imaging can be elusive, thus leading to the possibility of missed cases having gone untreated and an explanation for its rarity compared with counterpart neoplasms.[5]

The differential diagnosis of MCN-L includes intraductal papillary neoplasm of the bile duct (IPNB) and intrahepatic cholangiocarcinoma with cystic change.[4]

The ovarian-like stroma found in pancreatic mucinous cystic neoplasms has been suggested to exhibit hormonal responsiveness, as indicated by estrogen receptor expression observed through both immunohistochemical and gene expression analyses, mirroring observations in liver mucinous cystic neoplasms. They showed expression of StAR, CYP17, CYP19, 17b hydroxysteroid dehydrogenase 1, CYP11.[19] DNA sequencing showed overexpression of hedgehog and WNT pathways, however, the likes of KRAS and others have failed to provide an early marker of dedifferentiation.[3,6]

4. Conclusion

The low incidence of MCN-L leads to unclear recognition of this disease in terms of aetiology, pathogenesis, and prognosis, and difficulties in diagnosis before surgery. At present, radical resection and pathological examinations are reasonable treatment strategies. However, MCN-L is a rare disease and occurs at a lower frequency as compared to MCN-P; further investigations are necessary to clarify the biological malignancy of these tumours.

5. Source of Funding

None.

6. Conflict of Interest

None.

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