



## Hepatic Pseudolymphoma Mimicking a Hypervascular Tumor: A Case Report

### 과혈관성 종양으로 오인된 간의 가성림프종: 증례보고

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Hepatic pseudolymphoma is a rare benign liver mass that is characterized by proliferation of non-neoplastic lymphocytes extranodally. To the best of our knowledge, only 46 cases have been reported in the English literature. We described the case of a 75-year-old woman with hepatic pseudolymphoma mimicking a hypervascular tumor. After the histological confirmation of the rectal neuroendocrine tumor, CT scan revealed a 1.0 cm-sized, poorly-defined and low-density nodule in the liver. On MRI, the hepatic nodule showed an arterial enhancement and a low-signal intensity on the hepatobiliary phase. On diffusion-weighted imaging, the hepatic nodule showed a high signal intensity on a high b-value. On fluorodeoxyglucose (FDG) positron emission tomography (PET)/CT, it revealed a high standardized uptake value nodule. The US showed the hypoechoic nodule and the US-guided biopsy confirmed the hepatic pseudolymphoma.

#### Index terms

Liver  
Pseudolymphoma  
Multidetector Computed Tomography  
Magnetic Resonance Imaging  
Ultrasonography

## INTRODUCTION

Hepatic pseudolymphoma, also known as reactive lymphoid hyperplasia or nodular lymphoid hyperplasia is a benign nodular lesion, histopathologically characterized by marked proliferation of non-neoplastic, polyclonal lymphocytes forming follicles with germinal centers (1, 2). The lesion is encountered in various organs such as orbit, lung, skin, and gastrointestinal tract. However, the involvement of liver is extremely rare (3, 4).

We describe a rare case of hepatic pseudolymphoma misdiagnosed as hepatocellular carcinoma (HCC) or neuroendocrine tumor (NET) metastasis that developed in a patient who had primary biliary cirrhosis (PBC) and a rectal NET and discuss

the imaging features of CT, MRI, fluorodeoxyglucose (FDG) positron emission tomography (PET)/CT and intraoperative US.

## CASE REPORT

A 75-year-old female with a history of PBC was referred to our hospital for the further evaluation and treatment of a rectal NET which had been detected and confirmed in an outside hospital. On admission, physical examination did not reveal any significant abnormalities. The laboratory tests revealed anemia (Hemoglobin: 11.7 g/dL). The results of liver function tests were aspartate aminotransferase: 36 U/L, alanine aminotransferase: 20 U/L. Hepatitis B virus surface antigen was negative

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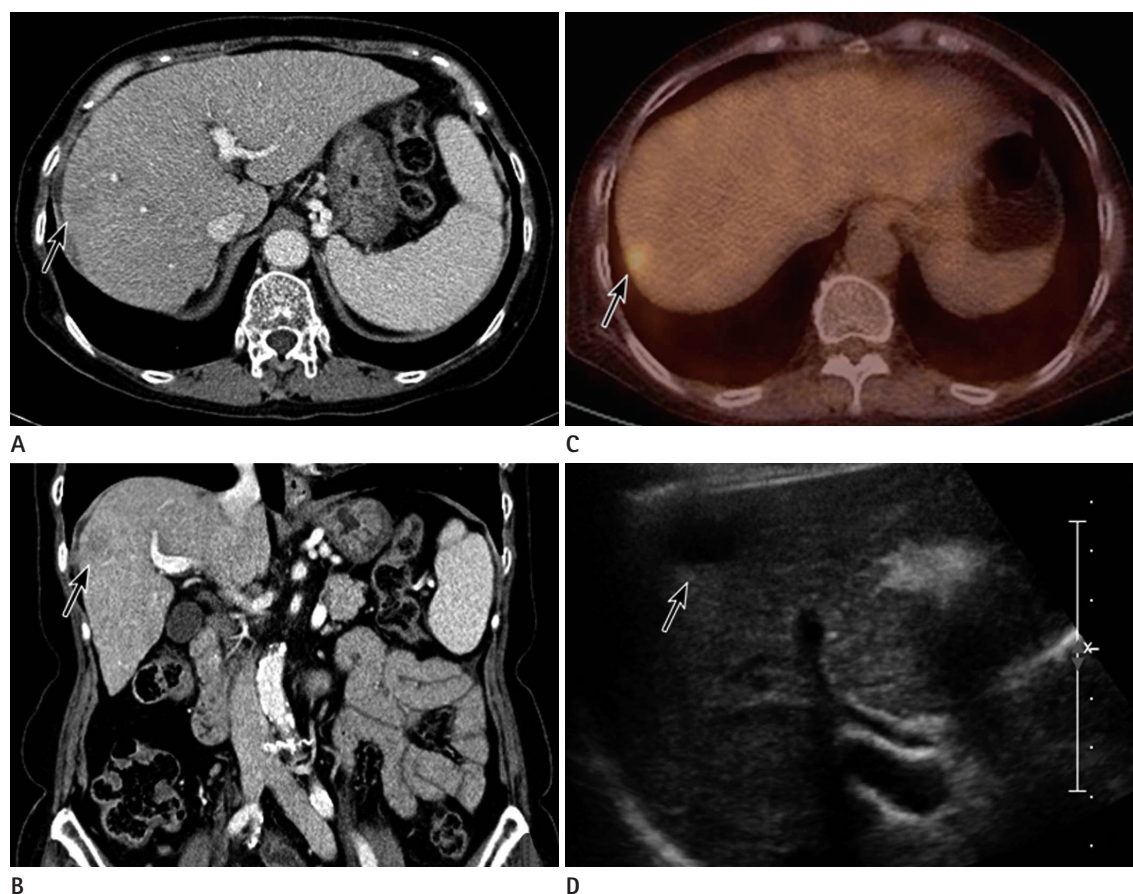
and the levels of tumor markers, including carcinoembryonic antigen, carbohydrate antigen 19-9, and alpha-fetoprotein were all within normal ranges.

An abdominopelvic CT (Sensation 64, Siemens Healthcare, Erlangen, Germany) scan was performed to evaluate the stage of the rectal NET. The CT scan revealed a 1.0 cm in size and a poorly-defined enhancing lesion in the left side of the rectal wall, and two enlarged lymph nodes around the rectum were observed. Subsequently, a colonoscopy and endoscopic ultrasound were performed, which showed a 1.0 cm in size, homogeneous, isoechoic lesion mainly located in the submucosal layers of the rectum.

The patient underwent an endoscopic submucosal dissection of the lesion but the lesion was removed in a piecemeal fashion instead of en bloc resection due to adhesion. The histological

examination documented a NET, moderately differentiated (G2); mitotic figures; 2/10 high-power field; and Ki-67; 2–5% positive, according to the World Health Organization (WHO) classification. The tumor invaded into the muscular layer.

The patient's abdominopelvic CT scan also showed a 1.0 cm in size, poorly-defined, slightly hypodense nodule in the liver segment 8 (Fig. 1A, B), and PET/CT also showed a high standardized uptake value (max SUV: 4.2) at the liver, suggesting hypermetabolic nodule (Fig. 1C). Upon additional diagnostic information, we performed a liver MRI (Ingenia 3.0T, Philips, Best, Netherlands) using gadoxetic acid (Gd-EOB-DTPA-Primovist®; Bayer-Schering, Berlin, Germany). The hepatic nodule showed a low-signal intensity on T1-weighted images (T1WI) and a high-signal intensity on T2-weighted images (T2WI). During the dynamic study, it showed homogeneous arterial en-



**Fig. 1.** A 75-year-old woman with a hepatic pseudolymphoma.

**A, B.** Axial contrast-enhanced CT image (**A**) and coronal reconstructed CT image (**B**) demonstrate an ill-defined low-attenuated nodule in the liver segment 8 (arrows).

**C.** Fluorodeoxyglucose (FDG) positron emission tomography (PET)/CT shows a high standardized uptake value (maximum standardized uptake value: 4.2) at the liver segment 8, suggesting hypermetabolic nodule (arrow).

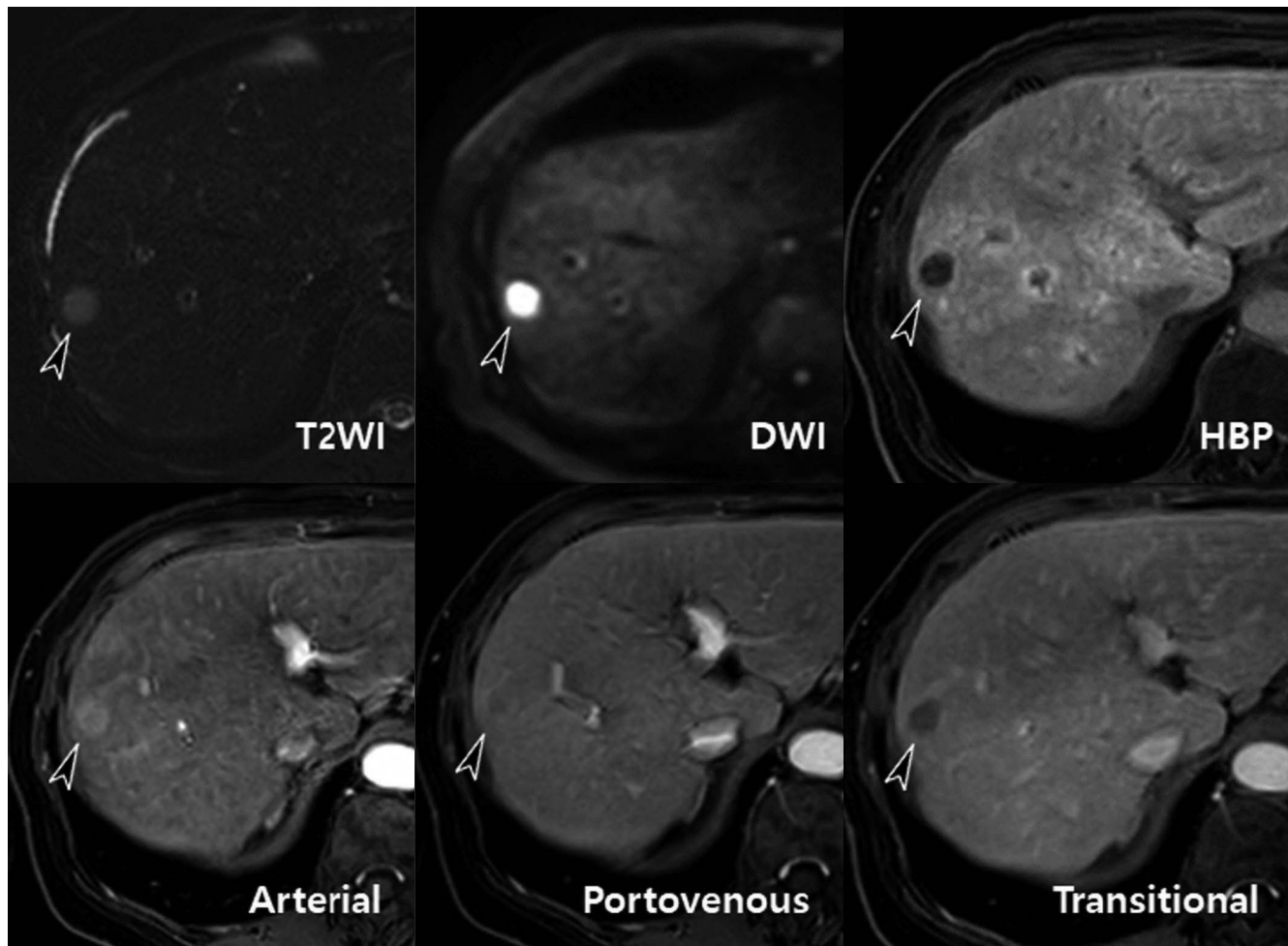
**D.** Intraoperative US shows a well-defined, markedly hypoechoic nodule in segment 8 (arrow).

hancement and a low-signal intensity on the porto-venous and transitional phase. On T1WI of the hepatobiliary phase, the nodule showed markedly low-signal intensity as compared with hyper-intense normal liver parenchyma. On diffusion-weighted imaging (DWI), the hepatic nodule showed a high signal intensity on a high b-value ( $1000 \text{ s/mm}^2$ ) (Fig. 1E). The nodule was absent of blood products or fat component.

The patient underwent lower anterior resection because of the muscular layer involvement of a primary rectal NET. Her hepatic nodule was suspected to be a hypervascular metastasis of a NET or HCC considering the radiologic findings and clinical history. The intraoperative US and the US-guided biopsy

were performed for differential diagnosis. On the US, the nodule appeared homogeneously and markedly hypoechogenicity compared to a normal liver (Fig. 1D). And then a radiofrequency ablation (RFA) was performed for the treatment.

Postoperative TNM staging of a primary rectal NET is pT-2N1b. Regional lymph node metastasis was identified histologically. Surgical margins were tumor free. The results of hepatic biopsy demonstrated a dense, diffuse infiltration of mature small lymphocytes with hyperplastic lymphoid follicle formation and the result of immunohistochemical stains were CD3: positive, CD5: positive, CD79a: positive, CD20: focally positive, Kappa and Lambda: positive, CD2: positive, TdT: negative, CD56:



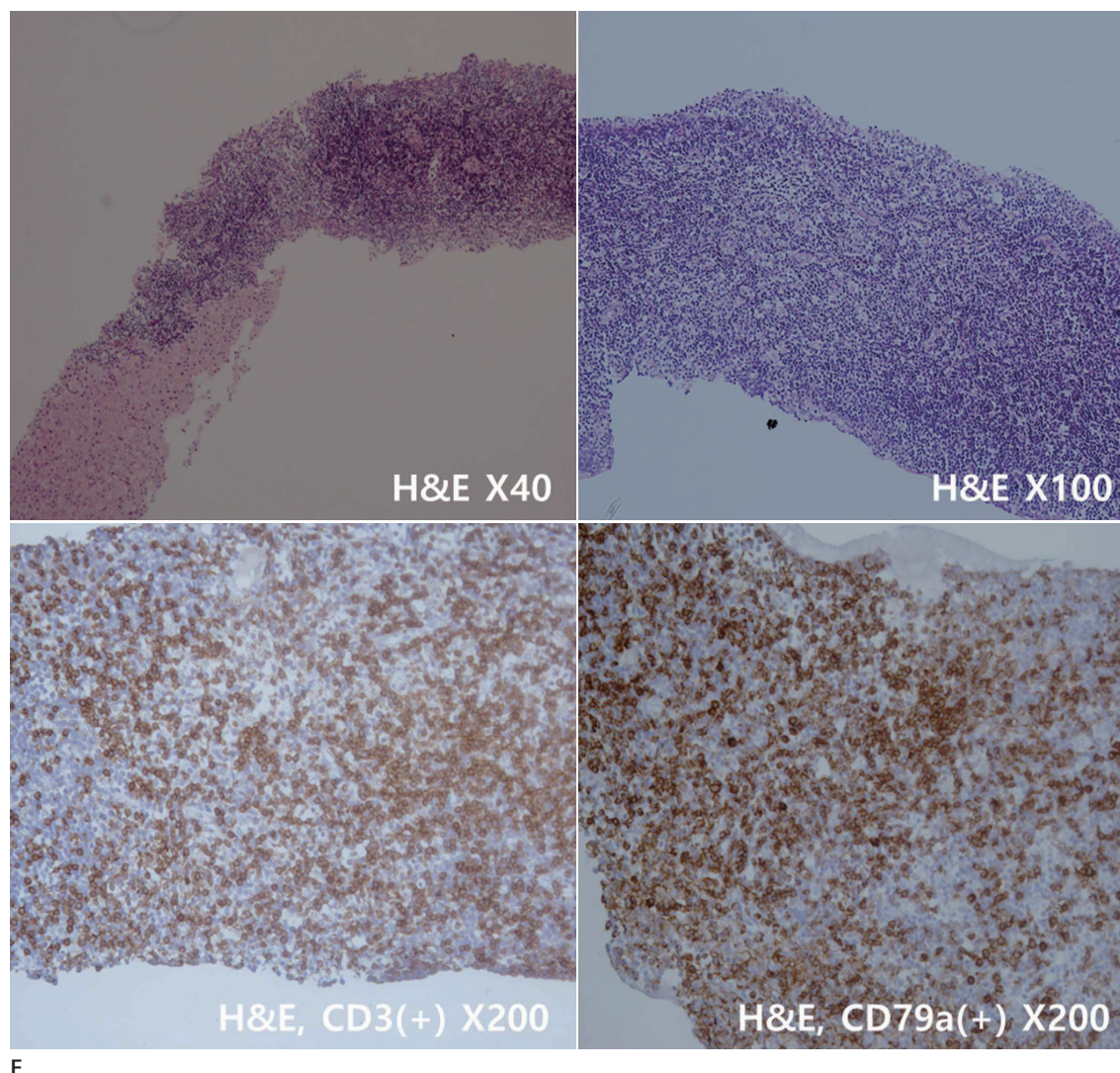
E

**Fig. 1.** A 75-year-old woman with a hepatic pseudolymphoma.

**E.** MRI finding of the hepatic pseudolymphoma using gadoxetic acid (Gd-EOB-DTPA-Primovist®). T2-weighted axial MR image shows a homogeneous high-signal intensity nodule in the liver segment 8 (arrowheads). On DWI, the hepatic nodule shows a high-signal intensity on a high b-value ( $1000 \text{ s/mm}^2$ ). Gd-EOB-DTPA enhanced dynamic MR images show a homogeneous arterial enhancement and low-signal intensity on the transitional phase. The nodule shows a markedly low-signal intensity on the hepatobiliary phase.

DWI = diffusion-weighted images, HBP = hepatobiliary phase, T2WI = T2-weighted images





F

**Fig. 1.** A 75-year-old woman with a hepatic pseudolymphoma.

**F.** Histological specimen shows diffuse infiltration of lymphoid cells seen adjacent to cirrhotic liver nodule (H&E stain,  $\times 40$ ) and lymphocytes are mainly composed of small mature lymphocytes admixed with scattered medium and large cells. There is no cytological atypia of lymphoid cells (H&E stain,  $\times 100$ ). Immunostaining revealed the lymphocytes to be composed of both T cells (positive for CD3) and B cells (positive for CD79a) (H&E stain,  $\times 200$ ).

H&E = hematoxylin and eosin stain

negative, CyclinD1: negative, consistent with hepatic pseudolymphoma (Fig. 1F).

After a year and 3 months, the patient is currently doing well with no sign of relapse after the RFA on the follow-up CT.

## DISCUSSION

Pseudolymphoma of the liver is an unusual benign lymphoproliferative lesion, first reported by Snover et al (5). To the best of our knowledge, 46 cases of pseudolymphoma in the liver

have been reported in the English literature (2).

The etiology and pathogenesis of hepatic pseudolymphoma are unknown. It presents as a solitary mass in more than 80% of cases (2). The average size of the tumor was 15 mm and most of the tumors were no more than 20 mm. The average age of the patients was 56.7 years with the female predominance (2). Our patient is a 75-year-old woman and her hepatic pseudolymphoma is solitary nodule approximately 1.0 cm in size.

Some studies may arise in association with autoimmune disease and chronic liver disease (viral hepatitis, PBC, and non-al-

coholic steatohepatitis) (2, 6). It is speculated that a reactive immunological response to a chronic infection or inflammation is related to the etiology of pseudolymphoma. Our patient shows to have a history of PBC. More importantly, many of the reported cases had an accompanying malignancy. And she was also confirmed a moderately differentiated rectal NET. So the immunoreaction against the cancer cells might be related to the development of pseudolymphoma (2, 6, 7).

It is difficult to make a definite diagnosis in most cases of hepatic pseudolymphoma based on imaging without a histopathological diagnosis. On US, most of the lesions are homogeneous hypoechoic or markedly hypoechoic nodules mimicking cysts (1, 4). On CT, the nodules tend to show hypodensity on precontrast images, slightly early enhancement in the arterial phase, and hypo to isodensity in the equilibrium phase (1, 7). On MRI, most of the lesions show low-signal intensity on T1WI, high-signal intensity on T2WI, high-signal intensity on DWI and low-signal intensity on the hepatobiliary phase of Gd-EOB-DTPA-enhanced MRI (1, 7). These radiologic findings are not specific in the discrimination of pseudolymphoma from other hepatic tumors. Especially, these findings are first cousins to those of HCC or hypervascular metastatic carcinoma, and most cases have been misdiagnosed as these based on image findings and clinical information (2, 6, 8). Our patient also showed a markedly hypoechoic single nodule on the US and the hypodense single nodule on the CT. The hepatic nodule showed a high-signal intensity on arterial phase and low-signal intensity on the portal-venous phase, transitional phase and hepatobiliary phase on the MRI.

The differential diagnosis of hypoechoic liver mass includes malignant tumors such as HCC, metastases, lymphoma and rare benign tumors such as focal nodular hyperplasia (FNH), hepatic adenoma, and hemangioma (9). When considering the MRI findings, FNH, hepatic adenoma and hemangioma could be excluded from the differential diagnosis. Besides the nodule showed a high-standardized uptake value on FDG PET-CT, the possibility of malignancy is more likely than that of benign tumor. Hepatic metastasis may show various echogenicity depending on the primary lesion. Dorffel and Wermke (10) reported that hepatic metastasis of a NET could show various echogenicity depending on their primary lesion. And they reported that it shows hypo-echogenicity or iso-echogenicity on the US if their

primary organ is a colon. Thus, all of the mentioned findings were considered, we could not make an accurate diagnosis between metastatic NET and hepatic pseudolymphoma.

Yoshida et al. (1) reported that some additional findings on multi-phasic contrast-enhanced CT and MRI examination about hepatic pseudolymphoma. On both of the modalities, they have a homogeneous mass without necrosis or calcification reflecting the intra-tumoral homogeneity and show irregularly-shaped perinodular enhancement on the arterial or equilibrium phase. A vessel-penetrating sign was also reported on CT during arterial portography, suggesting partial preservation of intra-tumoral portal tracts, which is not typical of HCC or metastatic tumors.

On a recent report, treatment methods of hepatic pseudolymphoma were recorded for 40 patients; resection in 32 cases (80%), liver transplantation in 3 cases, biopsy in 2 cases, ethanol injection in 1 case, autopsy in 1 case, and observation in 1 case (2). Majority of the reported cases were treated with surgical resection due to uncertain diagnosis. Since generally this lesion occurs with pre-existing liver disease simultaneously, accurate diagnosis is important to avoid unnecessary transplants or surgical resection.

In conclusion, the accurate diagnosis of hepatic pseudolymphoma is difficult because of its nonspecific radiologic findings. Nevertheless a single nodule is found in a patient with underlying chronic liver disease and malignancy, hepatic pseudolymphoma might be considered as a differential diagnosis to avoid unnecessary transplants or surgical resection. Although it is rare, knowledge of these recorded imaging findings will be helpful to radiologists when considering the possibility of hepatic pseudolymphoma as a differential diagnosis.

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## 과혈관성 종양으로 오인된 간의 가성림프종: 증례보고

임보라<sup>1</sup> · 장석기<sup>1\*</sup> · 연재우<sup>1</sup> · 백소야<sup>2</sup> · 박상종<sup>3</sup> · 김혁중<sup>1</sup>

간의 가성 림프종은 비종양성 림프구의 절 외 과다증식에 의해 형성되는 드문 양성 종양이다. 검색한 바에 따르면 현재까지 영문으로 46예가 보고되었다. 우리는 75세 여자환자에서 과혈관성 종양으로 오인된 간의 가성 림프종 증례를 보고하고자 한다. 조직검사상 직장의 신경내분비 암종이 진단된 후 시행한 조영증강 전산화단층촬영에서 1.0 cm 크기의 경계가 불분명하고 낮은 감쇄를 보이는 결절이 간에 관찰되었다. 자기공명영상에서는 동맥 조영기에 조영 증강을 보이고, 20분 지연기 조영 영상에서 저신호 강도를 보이며, 확산강조영상에서 고신호 강도를 보였다. Fluorodeoxyglucose (이하 FDG) positron emission tomography (PET)/CT에서는 FDG의 섭취 증가를 보였다. 초음파에서는 저에코성 병변으로 관찰되었고, 초음파 유도 하 조직검사를 통하여 간의 가성 림프종으로 확진 되었다.

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