



## The Wandering Liver: A Case Report and Review of Literature

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### Introduction

Wandering liver or hepatoptosis is a rare entity in medical practice. It is also known as floating liver and hepatocolonic vagrancy. It describes the unusual finding of, usually through radiology, the alternate appearance of the liver on the right and left side, respectively. . The first documented case of wandering liver was presented by Heister<sup>1</sup> in 1754. Two centuries later In 1958, Grayson<sup>2</sup> recognized and described the association of wandering liver and tachycardia. In his paper, Grayson details the classical description of wandering liver documented by French in his index of differential diagnosis. In 2010 Jan F. Svensson et al<sup>3</sup> described the first report of a wandering liver in a neonate, reviewed and discussed the possible treatment strategies. When only displaced, it may wrongly be thought to be enlarged liver

Wandering liver may be related to the Chilaiditi syndrome, which consists of interposition of a portion of the colon or, less frequently, the small intestine between liver and right diaphragm when the patient is upright, associated with abdominal pain, nocturnal vomiting, anorexia, and distension with loss of liver dullness<sup>4</sup>. There is an association between Chilaiditi syndrome and colonic volvulus<sup>5</sup>.

A literature review reveals that there are few reported cases of wandering liver (hepatoptosis) much as the condition was reported as early as the 17<sup>th</sup> Century and no case has been documented in Uganda. However, the possibility of hepatoptosis as a differential diagnosis for right hypochondrial swelling and pain may not be obvious for most clinicians and may have contributed to the limited number of reported cases. This review has been prompted by a patient we managed in January 2012 at Nsambya Hospital for a painful abdominal mass. The patient had undergone various investigations and consultations, however, the true nature of her condition was only discovered at exploratory laparotomy and the diagnosis thus made postoperatively.

### Case Presentation

M.N., a 70 years old female Ganda was referred to us from a private clinic, She presented a history of right hypochondrial region abdominal pain associated with abdominal distension for a period of three months. The pain was worse during the day and felt some relief at night. There was associated early satiety, anorexia and weight loss. She gave a history of constipation for a week prior to the referral. She denied any history of vomiting, diarrhea, dyspepsia or previous history suggestive of peptic ulcer disease. She also complained of palpitations, exertional dyspnoea and exhaustion which were worse on standing.

### Past history

She was a known hypertensive on treatment with amlodipine and losartan. She had a caesarean section thirty years ago, hernia repair twice and had also undergone pericardiocentesis once. She had no history of trauma or back pain. She was a peasant farmer, a widow with eight children and had never smoked cigarettes nor taken alcohol.

### **Clinical findings and investigations**

On examination, she was found to be an elderly sick looking lady with mild wasting. She was afebrile and had moderate pallor but had no jaundice. The cardiorespiratory system was normal. The abdomen was distended in the right upper quadrant with an obvious mass close to the umbilical region. The mass was tender, hard, mobile and freely moved from right to left and downwards up to the periumbilical area. It felt nodular with the larger nodules measuring about 10cm x 10cm. There was ascites. The rest of the abdomen, rectal examination and other systems were normal. The differential diagnoses included mesenteric cyst and ovarian cyst.

### **Investigations**

A CT scan reported suspected pancreatic mass, normal liver and other abdominal organs. A differential diagnosis of an intraabdominal malignancy (suspected primary being large bowel) was made and various investigations were done.

1. Abdominal –pelvic ultrasonography reported a right paracolic gutter mass obstructing the lumen.
2. CEA Tumour marker was elevated to twice the normal value (4.55)
3. Liver function tests – Normal
4. Colonoscopy – No colonic tumour seen
5. Complete blood count (Hb. 8.1 g/dl)
6. Cardiac ECHO and ECG (extrasystoles on ECG)
7. CXR showed dilated cardiomyopathy

A decision was made to perform an exploratory laparotomy.

### **Operative Findings**

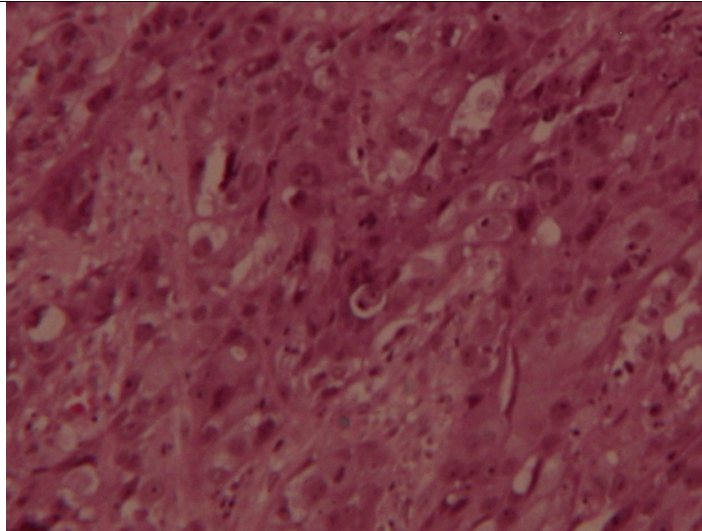
There was moderate straw-colored Ascites. The liver was enlarged with multiple, hard masses involving the right and left lobes. The masses were of varying sizes and were more in the right lobe; the largest was about 8 cm in diameter and was located in the right lobe. There were adhesions onto the omentum and transverse colon.



**Figure 1.** Wandering with Nodular Masses



**Figure 2.** Wandering Liver Delivered out of the Wound



**Figure 3.** Histological Findings of hepatic adenocarcinoma

On palpation of the diaphragmatic surface of the liver, it was noted that the whole liver was easily displaced downwards and was wholly delivered out of the wound (Figures 1,2). The liver was also easily moved from right to left. The entire right hemidiaphragm was visualized. The cecum and ascending colon were freely mobile. The small bowel, stomach, pancreas and spleen were normal. There were no enlarged mesenteric nodes seen and no peritoneum seeding.. A liver mass biopsy was taken from one of the nodules.

#### ***Postoperative follow up***

The post-operative period was uneventful; the patient was discharged on the 5<sup>th</sup> post-operative day to be followed up in the oncology unit and also recommended use of an abdominal binder or support.

The histology report showed hepatic adenocarcinoma originating from the intrahepatic bile ducts.

#### **Discussion**

Wandering liver and hepatoptosis are terms applied to a liver which leaves its normal anatomical position<sup>1</sup>. Wandering liver describes the phenomenon where the liver moves freely from the right side of the abdomen to the left. It is believed to be associated with a persistent ventral mesentery, and most reported cases were diagnosed during investigations of intestinal obstruction. There are only a few presentations of asymptomatic wandering liver, and there is no clear course of treatment of those cases<sup>3</sup>.

The mobility of the wandering liver varies from minimal displacement which is partial ('floating lobes', diseased gall bladder) to total liver displacement (whole liver away from its normal position). It is commoner in women and is seen mainly after forty years of age<sup>1,2,3,4</sup>.

The operative findings describe lax or absent suspensory ligaments of the liver and a long colonic mesentery. It has been reported that the cause of hepatoptosis is related to the laxity and elongation of the liver supports which include the abdominal wall, the bowels, falciform, coronary, triangular, the gastro-hepatic, hepato-renal and the hepato-colic folds of the peritoneum; and the inferior vena cava<sup>6,7,8</sup>. When the liver moves in various directions the vein easily followed suit, so much so that it becomes easy to pass the finger around the posterior surface of the vein. Its close adherence to the central tendon of the diaphragm, plays the greatest role among the hepatic supports.

In one study, it was observed that a force of 35 to 40 kg is necessary to tear the liver from the diaphragm and when the inferior vena cava is divided a force of twenty kilogrammes suffices for the same purpose. As a result of his experiments he considered that the pressure of the abdominal wall and of the intestines was a feeble support to the liver, sufficient to prevent that organ pulling too heavily on its ligaments<sup>6,9</sup>.

Many congenital defects in the suspensory apparatus have been described. The position occupied by the displaced liver varies much, and it is only from lack of suspicion that very many cases of slight displacement have not been recorded. Most commonly the malposition of the liver has only been found accidentally during exploratory operations or in autopsies<sup>9</sup>. As noted in our case, the diagnosis was made intra-operatively. The pathological anatomy observed was the elongated and lax attachment onto the central tendon of the diaphragm and the inferior vena cava, the whole liver was easily delivered into the surgical wound and could easily be moved to the left.

### **Aetiopathogenesis**

Hepatoptosis may be congenital or acquired. Congenital cases are due to the absence of the coronary and suspensory ligaments. Most commonly hepatoptosis is acquired, and is due to relaxation of its means of support. Elongation of the ligaments has rarely been noticed, but weakening of the abdominal wall and enteroptosis is common and deprives the liver of the support of the intestines. The determining causes of hepatoptosis are generally mechanical. Among these are repeated strains, heavy work, violent exercise, severe forced expiration, corsets, etc. The pendulous condition of the belly wall which may follow pregnancy is a fruitful cause of floating liver. Other causes include increase in weight of the liver, atrophy of the connective tissues, uniting that organ to the diaphragm.

Partial hepatoptosis is common. Sometimes its cause has escaped the clinician, but generally it is a hypertrophic elongation of a part of the liver caused by the dragging of a weighty tumor in a neighboring organ which has become adherent to the liver, or of a diseased gall-bladder (Riedel). Corsets exert a marked effect on the liver<sup>9</sup>. Complete hepatoptosis is considered to be more common in women than in men. Severe cases are rare but slight ones are common. There are varying liver positions found at laparotomy that are attributed to the pathological anatomy mentioned above. Concomitant disease has been noticed in the mobile liver itself as well as in other abdominal organs. Floating kidney, intestinal ptosis, uterine displacements, herniae and varicoceles are common in cases of hepatoptosis. In our case, hepatic adenocarcinoma was found as well as a mobile caecum and ascending colon. There was no fixation posteriorly.

### **Clinical features and diagnosis**

#### ***Partial hepatoptosis (Floating Lobes):***

Generally patients notice a tumor in right side of the abdomen. These tumors are of slow growth. Pain is the dominant symptom, may be severe and is often accompanied by palpitation, flashes of heat in the head, high fever, indigestion, anorexia, vomiting, etc. The patient becomes thin, weak, and may experience syncope attacks<sup>6,9</sup>. Physical examination reveals a distended abdomen which is not uniform and proportionate to the size of the floating lobe. Percussion shows the tumor to be continuous with the liver dullness, which is in its normal location. The tumor may be smooth, compact, and elastic, without pulsation or bruit; may be uneven and lobulated and movable transversely and antero-posteriorly.

#### ***Complete Hepatoptosis***

When hepatoptosis is slow and progressive the diagnosis is far from being easy. Generally the patients have suffered for a long time. Pain is almost always present. When slight, it consists in a feeling of weight and dragging in the abdomen or flanks, which is exaggerated on movement. Sometimes the pain is very severe resembling hepatic colic. Jaundice is generally rare or slight. There may be dyspnoea, flatulence and constipation. Palpitation, headache, visual troubles, and vertigo are common. The patient cannot attend to his work and is liable to become melancholic. Ascites and oedema have been noticed. Purpura has been reported in one case. The mentioned symptoms are not diagnostic; they are common to all visceral ptoses. Physical examination, especially when certain too long neglected methods are employed, is the only means of arriving at a diagnosis.

However, when it occurs suddenly, as during a fit of coughing, it gives rise to a feeling of tearing and torsion in the right side. There is acute pain in the abdomen and chest, difficulty in respiration, nausea, feeling of fullness in the abdomen, and tendency to syncope<sup>1</sup>. The pulse is frequent, weak, and irregular and the patient is in a state of great anxiety.

Often the abdominal wall is thin and flaccid. The skin is shrunken and faded. In the erect posture the intestines push the abdominal wall before them and descend in front of the pubis. In the supine position individual loops of gut may be seen. There may be prominences of the right flank. Glenard's sign is present (lower part of the umbilicus is hidden by a fold of skin; due to traction exercised by the liver on the suspensory ligament).

## Treatment

Treatment of partial hepatoptosis has been carried out in three ways:

- **By resection of the "floating lobe"**: Langenbuch in 1887 applied a chain of ligatures to the pedicle and cut away the lobe. In 1895 Bastianelli used an elastic ligature and then thermocautery
- **Fixation to the abdominal wall, -i.e., partial hepatopexy**: first performed by Billroth in 1884; the abdominal incision over the most prominent part of the tumor, several sutures passed through the "floating lobe," and cautiously fixed to the abdominal wall in such a manner as to secure apposition of the organ to the parietal peritoneum. The operation is easy and successful.
- **By cholecystotomy**: in those cases dependent on the existence of lesions of the gall-bladder, the operation gave excellent results.

## Medical Treatment

Should always to be tried first. Disorders of nutrition play an important role in the pathogenesis of wandering liver. A course of tonics and hydrotherapy is advisable<sup>4</sup>. This will only be of use in the mild cases, which are unfortunately rarely diagnosed. The use of electricity has been advised as an adjuvant to increase the tone of the abdominal muscles. Special abdominal bandages and binders have frequently been employed to sustain the displaced organ.

Svensson et al<sup>3</sup> recommend a nonoperative approach for an asymptomatic neonate with wandering liver, but this warrants a high grade of awareness and close follow-up. If the child would present with symptoms suggestive of bowel obstruction or circulatory compromise, we propose a laparoscopic exploration and an appropriate hepatopexy

## Surgical Management

Surgical treatment is necessary for a symptomatic patient when medical treatment fails. The operation of complete hepatopexy was first performed by Gerard Marchant in 1891. Different methods of hepatopexy have been described. One is to fix the liver to the diaphragm with stitches through



Glisson's capsule; another is to attach the round ligament to the right side of the abdominal wall. If the mesentery to the stomach or the transverse colon is elongated, they can be plicated to prevent volvulus.

### Conclusion

Hepatoptosis has been noted to be a rare condition. It should be considered in the differential diagnosis of all cases of hepatomegaly and in all other cases of epigastric and right hypochondriac discomfort as well as right hypochondrial mobile mass. Cardiac symptoms may be manifestations of hepatoptosis as noted in the literature review and so should be carefully studied in a patient with a right hypochondria mobile and painful mass.

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