Case Report

A Case of Elevated Alpha-Fetoprotein and Acute Liver Failure Due to Use of Herbal Medicine

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ABSTRACT

Alpha-fetoprotein (AFP) is a serum glycoprotein created during gestation and is produced from the fetal liver and yolk sac. In some cases, AFP elevation has been associated with chronic and acute liver diseases and a limited number of cancers. AFP is a useful tumor marker in tumor diagnosis. This study presents a 46-year-old woman with no remarkable medical history who developed acute liver failure (ALF) due to the use of over-the-counter herbal medicine and was referred to our hospital for liver transplantation (LT). Imaging evaluations and laboratory test results demonstrated no evidence of malignancy or carcinoma. After LT, the histopathological report revealed no evidence of malignancy. The AFP level led into the normal range within 1 week after surgery. An increase in AFP serum level often occurs after cancer and malignancy, but in some cases, it can also occur after non-cancerous diseases. As we reported in this case, the increase in AFP occurred after ALF and returned to its normal range after LT.

Keywords: Acute liver failure, Alpha-fetoprotein, Tumor markers, Carcinoma

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INTRODUCTION

Alpha-fetoprotein (AFP) is created during gestation and is produced from the fetal liver and yolk sac. This is a serum glycoprotein with approximately 70 kDa molecular weight. In some cases, AFP elevation has been associated with chronic liver diseases and a limited number of cancers (1). Some tumors produce AFP and increase its levels in the serum. Therefore, AFP is a useful tumor marker in tumor diagnosis, such as hepatocellular carcinomas (HCC), hepatoblastomas, and yolk sac tumors. Most AFP-producing cancers originate in the stomach, bile duct, and pancreas (2). In recent years, a considerable impetus to the study of the immunology of liver disease has been provided by the discovery of various antigens, such as AFP (3). AFP is used or under investigation for screening and early detection of patients with HCC. AFP is the most

common and most frequently used biomarker (4).

Acute liver failure (ALF) is defined by a rapid deterioration in hepatic function, with progressive encephalopathy and coagulopathy developing within 26 weeks of symptom onset in individuals without pre-existing liver disease (3). The management of ALF has until recently been conservative, and newer therapeutic modalities such as bio-artificial liver, hepatocyte transplant, and extracorporeal liver assist devices have not yet been proven to be successful (5).

Here, we report a case with elevated AFP levels due to acute liver failure following the use of herbal medicines without any detected carcinomas or malignancies.

CASE REPORT

A 45-year-old woman presented to Firouzgar Hospital, Tehran, Iran, for liver transplantation (LT) because of ALF, without any medical history (no hepatitis, no inherited diseases, such as hemochromatosis and Wilson disease). She complained of jaundice, ascites, nausea, vomiting, fatigue, weakness, and weight loss. Our patient developed ALF due to the use of over-the-counter herbal medicine since 7 months earlier, according to her statements.

In the initial examination, vital signs were stable. Her recent abdominal computed tomography (CT) and magnetic resonance cholangiopancreatography, showed decreased liver volume along with irregularity surface and heterogeneous enhancement in the arterioportal phase in favor of cirrhotic changes, and marked ganglion basal wall thickening and edema were noted. In the same way, abdominal magnetic resonance imaging (MRI) revealed evidence of irregularity of border and parenchymal heterogenicity of the liver without heterogeneous parenchymal enhancement in favor of cirrhotic changes, and mild ascites.

According to the results of the laboratory test, the AFP serum level was elevated to 1198 ng/dL (normal range < 8.5), cytomegalovirus Antibody (CMV Ab) (IgG) > 1000 AU/ML (> 14 meant positive), CMV Ab (IgM): 8.46 AU/ML (> 12 meant positive), anti- epstein-barr virus (EBV) (IgG): 25.9 (> 11 meant positive), cancer antigen (CA) 19-9: 1150 U/mL (> 40 meant positive), hepatitis B virus core antibodies (HBC) Ab was positive and venereal disease research laboratory test (VDRL) was negative. Therefore, suspicions turned to malignancy and cancer. So, thorax, brain, abdomen, and pelvis CT were performed after hospital admission (Figures 1, 2, 3). CTs did not reveal any mass or tumor.

Also, breast mammography and sonography were performed, and we did not reach any tumors of this origin. Moreover, a liver biopsy showed no evidence of malignancy. After these examinations, LT was performed. The histopathological report revealed no evidence of malignancy (Figure 4). After LT, AFP serum level had decreased from 1198 ng/dL to 59.5 ng/dL. AFP returned to normal levels within 1 week after surgery, and in 7 months after that, it was still in a normal range. The patient had no postoperative complications and was discharged after 10 days of operation. She has been asymptomatic and in remission so far.

DISCUSSION

In the present case, the preoperative diagnosis was elevated AFP due to ALF, not malignancy or carcinomas, which this ALF happened due to the use of herbal medicine. The prognosis in patients with ALF is too variable and depends on the etiology, interval between jaundice and encephalopathy, age, and the degree of coagulopathy (6). Our patient had signs and symptoms of ALF, including jaundice, ascites, and nausea. Because of the high AFP, we had suspicions of cancer. Clinical techniques such as imaging and histology methods are only able to detect liver carcinomas like HCC (7). Imaging examination and serological tests are mostly used for the early diagnosis of HCC. However, advances in CT and MRI technology have greatly improved the diagnostic performance of HCC (8).

So, we performed these examinations on our patient, but we did not achieve any clues for cancer. Curative surgical options, including hepatic resection and LT are available, with acceptable outcomes if HCC is diagnosed at an early stage (9). LT has dramatically improved survival in patients with ALF (6). So, after all examinations, LT was done for this patient. ALF accounts for 8% of indications for LT in Europe and 7% in the United States (10). Before the era of LT, ALF mortality rates ranged between 80% and 85% (6).

Increased serum AFP levels have been approved and used as a clinical biomarker for liver cancer detection

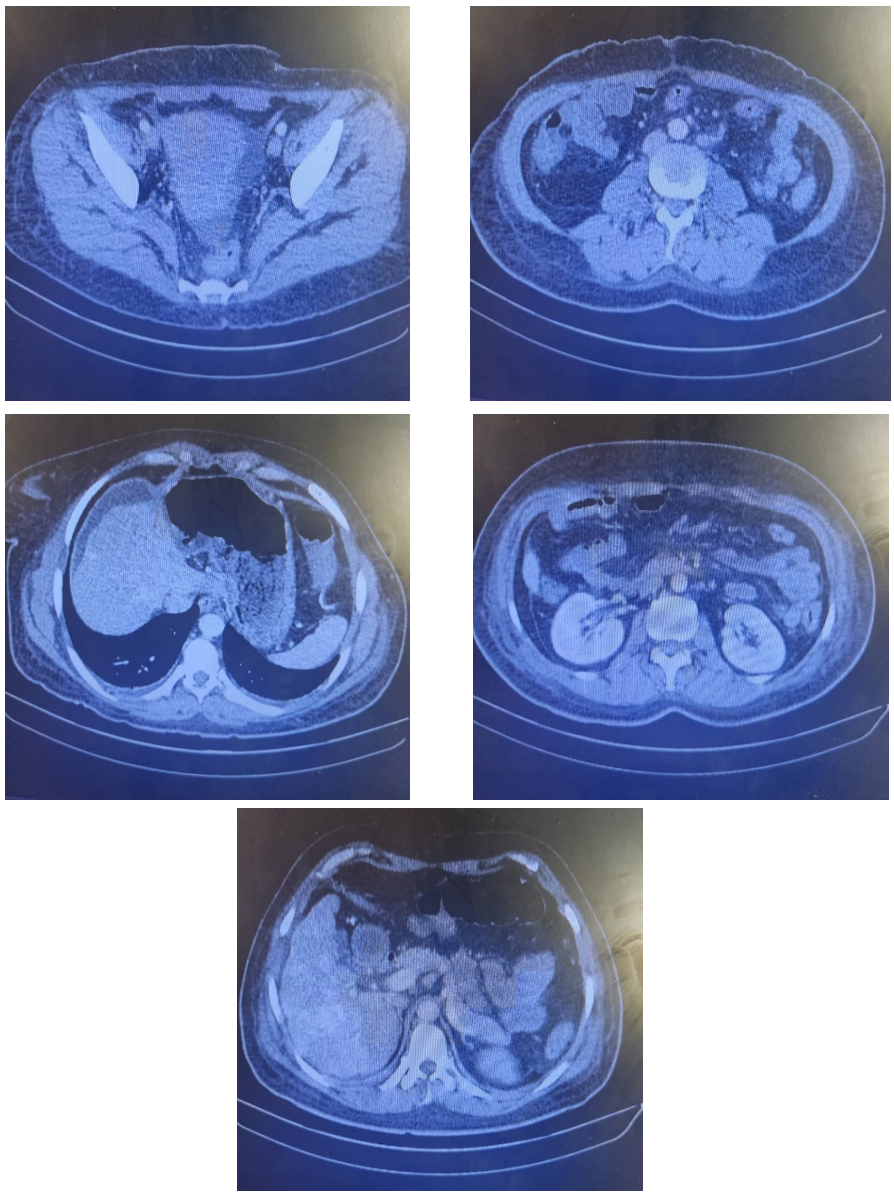

Figure 1. Spiral computed tomogram showed no evidence of any mass or malignancy in the kidneys, lungs, liver, pancreas, and spleen

since 1980s. However, elevated serum AFP levels have been observed in patients suffering from other cancers and non-cancerous diseases (11). AFP levels also increase in non-malignant and some non-oncological conditions such as acute/chronic hepatitis and cirrhosis, or in normal pregnancy (9, 12) and in a few types of cancers being a diagnostic and monitoring biomarker (12). A case study reported that the elevation of AFP could also occur in benign liver diseases, such as hepatitis and cirrhosis (13).

In another case study, immunohistochemical analysis showed that the tumor cells were positive for AFP, and the serum AFP level decreased dramatically to the normal level after resection of the tumor. These facts suggest that the tumor cells apparently produced AFP (14). The serum AFP level may reflect the induction of stem cells in patients with ALF (15).

CONCLUSION

Our patient was presented with elevated AFP following ALF. Due to our knowledge about increasing AFP due to

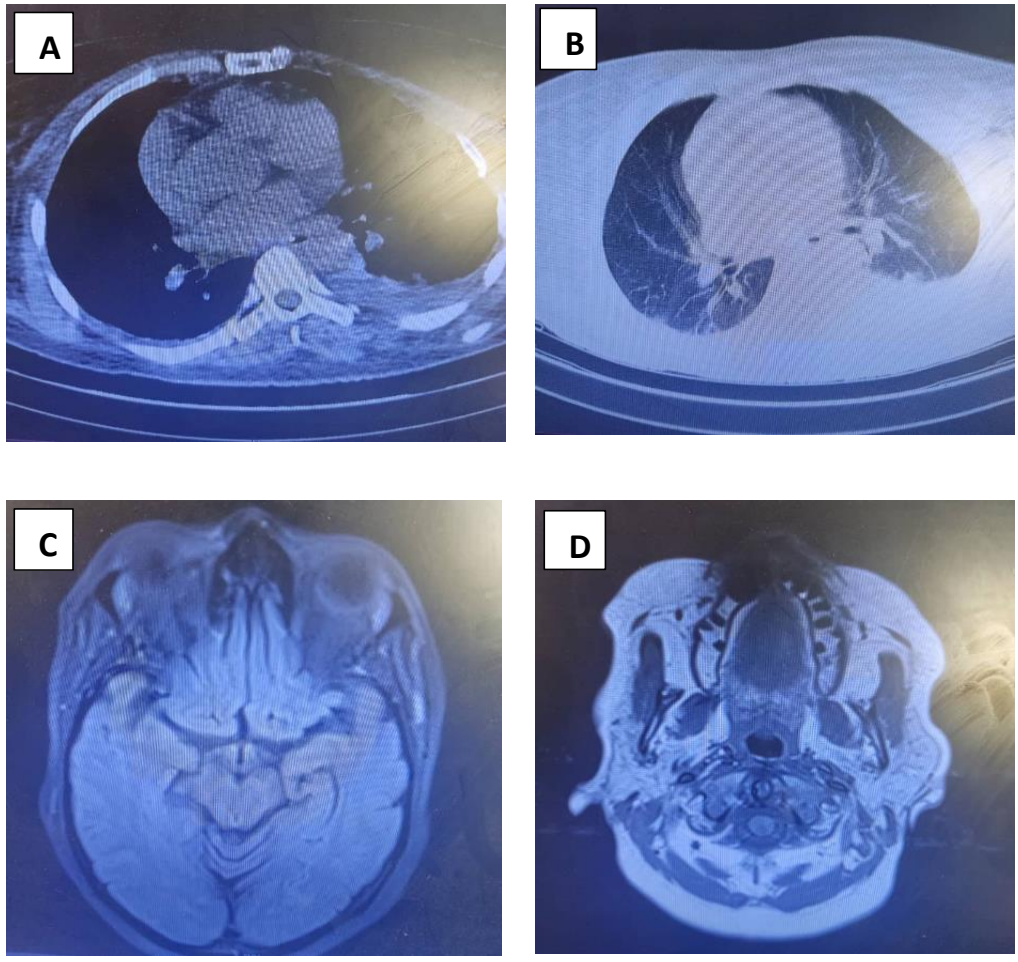

Figure 2. A and B show thorax, and C and D show brain contrast-induced tomograms, which revealed no abnormality in these origins

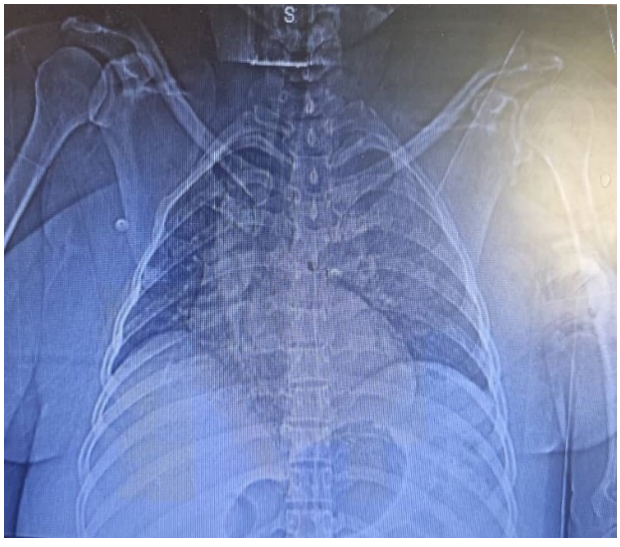

Figure 3. Chest radiograph shows no masses or tumors

malignancies or carcinomas, our suspicion led to cancer, but after performing different examinations, the diagnosis of cancer was ruled out. We should be alert that, in some cases, high AFP can happen after non-cancerous conditions.

ACKNOWLEDGMENTS
Not applicable.

AVAILABILITY OF DATA AND MATERIALS
Not applicable.
Declarations

ETHICS APPROVAL AND CONSENT TO PARTICIPATE
This research was conducted according to the Declaration of Helsinki 2013 guidelines.

CONSENT FOR PUBLICATION
Informed consent for publication was obtained from the patient.

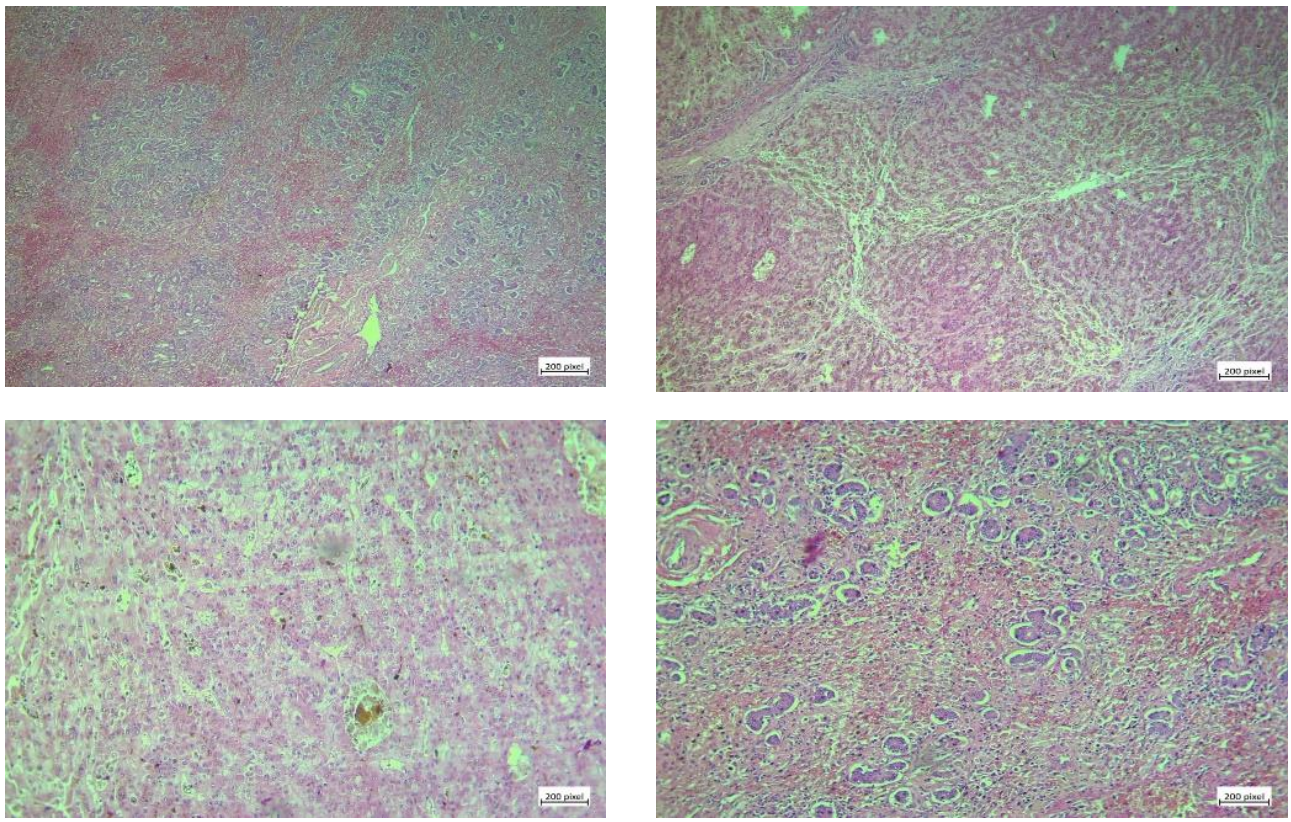

Figure 4. Histopathological report of the liver shows no evidence of malignancy

CONFLICT OF INTEREST

The authors declare no conflict of interest related to this work.

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