

Research Article

SITUS INVERSUS TOTALIS WITH HBV- A RARE ASSOCIATION

Parveen Malhotra¹, Ankit Chahal², Aakansha³, Rahul Siwach⁴, Pradeep Kumar⁵, Arun Dalal⁶

¹⁻⁶Department of Medical Gastroenterology and HealthMap Diagnostics Private Limited, PGIMS, Rohtak, Haryana, India

*Corresponding Author

Parveen Malhotra,

Article History

Received: 25.04.2026

Revised: 25.05.2026

Accepted: 30.05.2026

Published: 09.06.2026

Citations:

Malhotra, P., Chahal, A., Aakansha, Siwach, R., Kumar, P., & Dalal, A. (Year). Situs inversus totalis with HBV: A rare association. *J Surg Radiol*, V5(6) 199-203

Abstract: *Introduction:* Situs inversus totalis is rare but compatible with life when not associated with pathologies like primary ciliary dyskinesia. It is having unknown aetiology but may be associated with certain cardiopulmonary conditions. Patients are usually diagnosed with situs inversus during evaluation for other medical conditions as in our case report where patient was being evaluated for chronic HBV infection. Patients diagnosed with this condition must be counselled and reassured that they can live a normal life. *Case report:* A sixty-seven-year-old female having non-significant past history, was detected to be suffering from chronic hepatitis B virus (HBV) infection on routine screening. She was inactive carrier with low HBV DNA quantitative viral load and normal transaminases level and fibroscan score of 6 Kpa. On detailed evaluation, she was found to be having Situs inversus totalis as evidenced by chest X-ray, ECG, Ultrasonogram abdomen and Fibroscan. The HBV DNA quantitative load was 2110 I.U./ml with normal liver function test. The ultrasound abdomen revealed mild hepatomegaly and liver on left side and spleen on right side. The computed tomography scan chest showed apex of heart on right side, right lung on left side and left lung on right side. The computed tomography scan abdomen revealed liver & ileo-caecal junction on left side, whereas spleen, stomach and sigmoid colon on right side. The chest x-ray showed left ventricular apex on left side, trachea deviated to left side, right lung which is wide and short on left side, gastric bubble on right side and left diaphragm was raised due to presence of liver on left side. The ECG showed classical severe right sided deviation, inversion of P, QRS complex and T wave in lead I, upright QRS complex in AVR lead and poor progression of R wave in V1-V6 chest leads. There were no complaints regarding chest, cardiovascular, abdominal or neurological system. She was inactive carrier; hence antiviral was not started and was put on six monthly follow up. All her family members were screened for hepatitis B and were found to be negative, hence were given complete course of HBV vaccination. *Conclusion:* Our case report is a rare in which situs inversus totalis is seen in HBV patient. As per our knowledge and search, there is no case report of the same in literature. There is any association between the two or is a co-incidental finding, is further area of research.

Keywords: Dextrocardia, Situs inversus totalis, Ultrasonogram abdomen, Chest X-ray, Electrocardiogram, CT Scan abdomen, Chronic Hepatitis B, HBV DNA Quantitative

INTRODUCTION

Situs inversus totalis (SIT) is a rare congenital condition where the major visceral organs in the chest and abdomen are transposed to the opposite side of the body, creating a mirror image of the normal anatomical arrangement. [1,2] This includes the heart being on the right side (dextrocardia) and the liver and gallbladder on the left. It's a relatively rare condition, estimated to occur in about 1 in 10,000 live births. [3] The majority of these patients have no major health issues, but can have associated other congenital conditions like heart defects (especially dextrocardia), splenic abnormalities (asplenia or polysplenia), duodenal atresia, primary ciliary dyskinesia (PCD), Kartagener's syndrome which is a genetic disorder characterized by the triad of SIT, bronchiectasis and chronic sinusitis. It's due to defects in the structure and function of cilia, which are responsible for clearing mucus from the airways. [3] While many individuals with situs inversus totalis are asymptomatic, it's important to be aware of the condition for proper diagnosis and management of any associated health issues. During surgical procedures, especially organ transplantation, knowledge of the reversed anatomy is crucial to avoid complications. Situs inversus totalis

(SIT) can coexist with Hepatitis C Virus (HCV) infection, leading to Hepatocellular Carcinoma (HCC) but till date any case report with Chronic hepatitis B with situs inversus is available in literature. It can be co-incidence or there is any definitive association between the two, is area of future research

CASE REPORT

A sixty-seven-year-old female having non-significant past history, was detected to be suffering from chronic hepatitis B virus (HBV) infection on routine screening. She was inactive carrier with low HBV DNA quantitative viral load and normal transaminases level and fibroscan score of 6 Kpa. On detailed evaluation, she was found to be having Situs inversus totalis as evidenced by chest X-ray, ECG, Ultrasonogram abdomen and Fibroscan. The HBV DNA quantitative load was 2110 I.U./ml with normal liver function test. The ultrasound abdomen revealed mild hepatomegaly and liver on left side and spleen on right side. The computed tomography scan chest showed apex of heart on right side, right lung on left side and left lung on right side. The computed tomography scan abdomen revealed

liver & ileo-caecal junction on left side, whereas spleen, stomach and sigmoid colon on right side. The chest x-ray showed left ventricular apex on left side, trachea deviated to left side, right lung which is wide and short on left side, gastric bubble on right side and left diaphragm was raised due to presence of liver on left side. The ECG showed classical severe right sided deviation, inversion of P, QRS complex and T wave in

lead 1, upright QRS complex in AVR lead and poor progression of R wave in V1-V6 chest leads. There were no complaints regarding chest, cardiovascular, abdominal or neurological system. She was inactive carrier; hence antiviral was not started and was put on six monthly follow up. All her family members were screened for hepatitis B and were found to be negative, hence were given complete course of HBV vaccination.

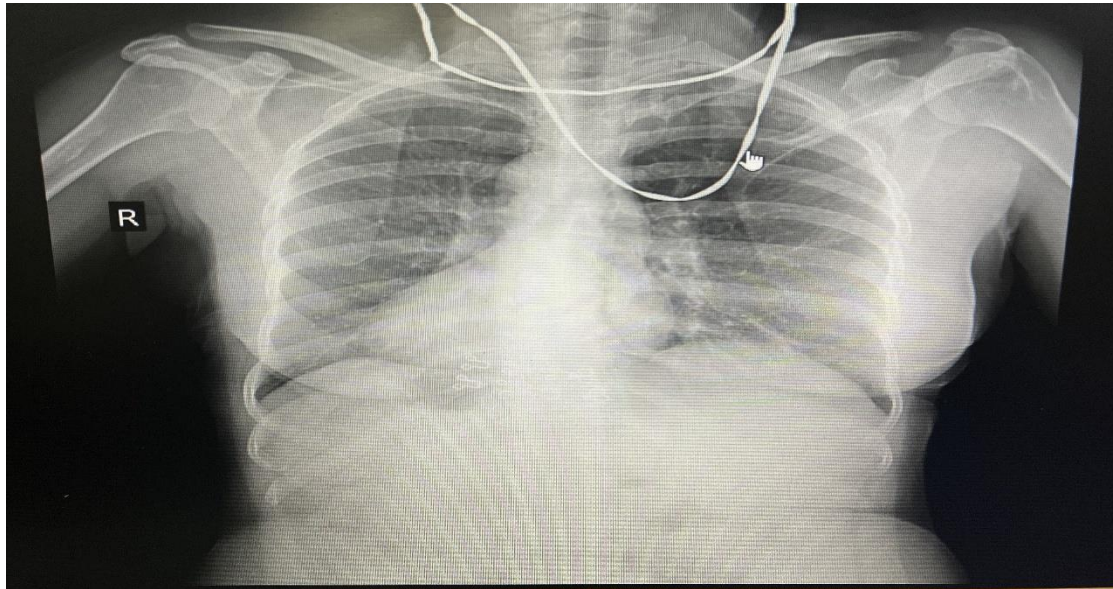


FIGURE 1- Chest x-ray left ventricular apex and Aortic Knuckle on right side, wide Broad right lung on left side, Tracheal deviation on left side, Gastric bubble on right side, left hemi-diaphragm raised due to liver beneath.

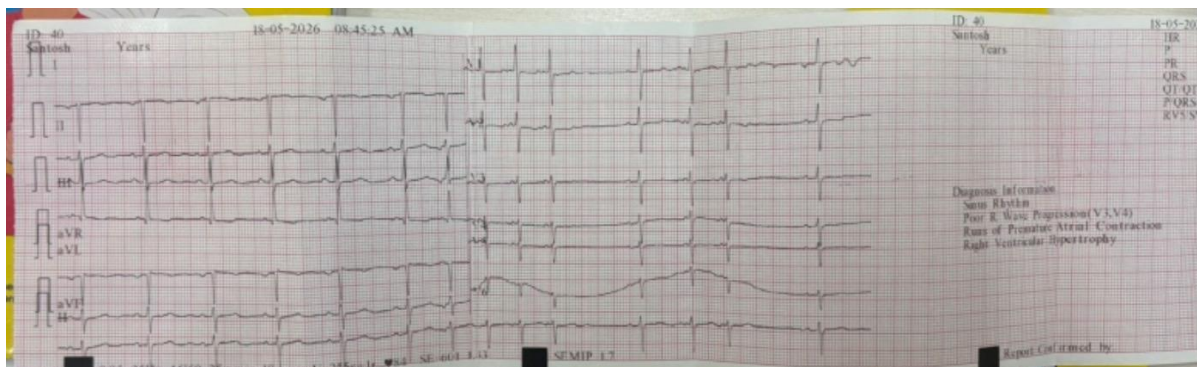


FIGURE 2- ECG showing classical features of dextrocardia as evidenced by inverted P, QRS complex and T wave in lead 1, upright QRS complex in aVR lead, poor progression of R wave in V1-V6 leads with severe right sided axis deviation.

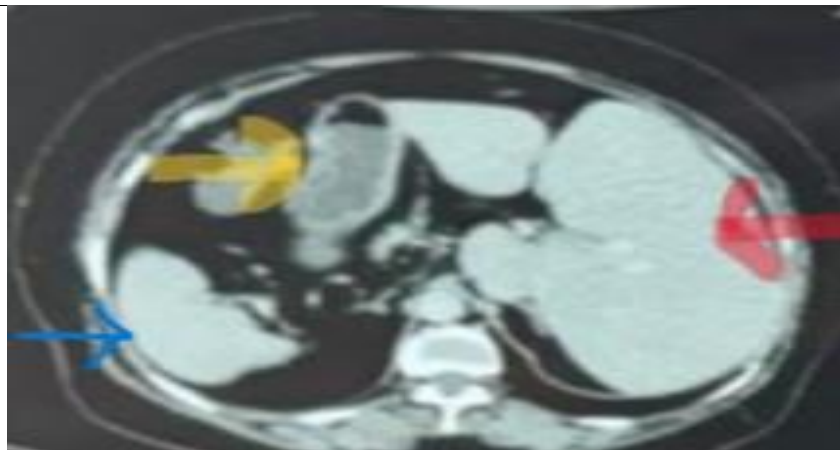


Figure 3- CT Scan Abdomen showing liver on left side (red arrow), stomach on Right side (yellow arrow) and spleen on right side (blue arrow)

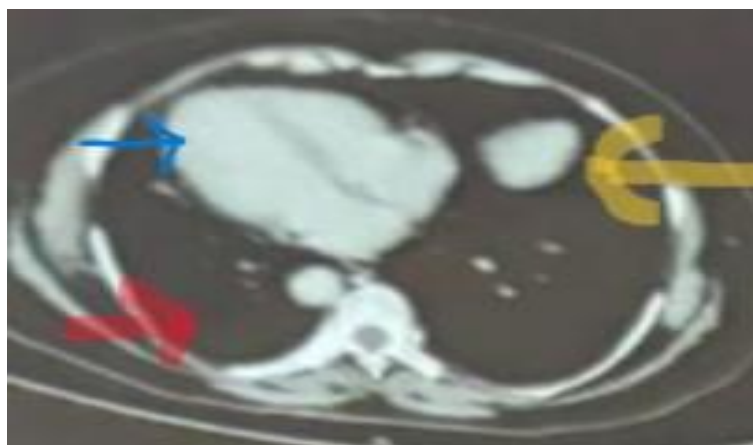


Figure 4- CT Scan chest showing cardiac apex on right side (blue arrow), right Lung which is broad and wide on left side (yellow arrow) and left lung which is narrow on right side (red arrow)

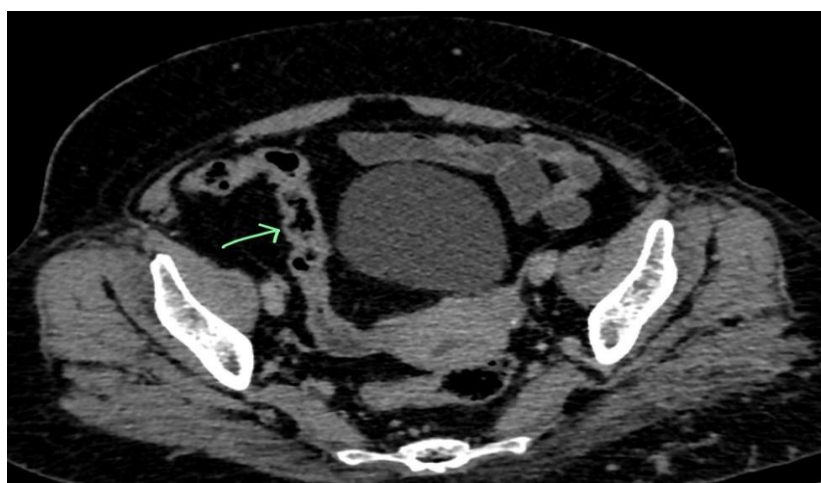


Figure 4- CT Scan abdomen showing sigmoid colon on right side (green arrow)

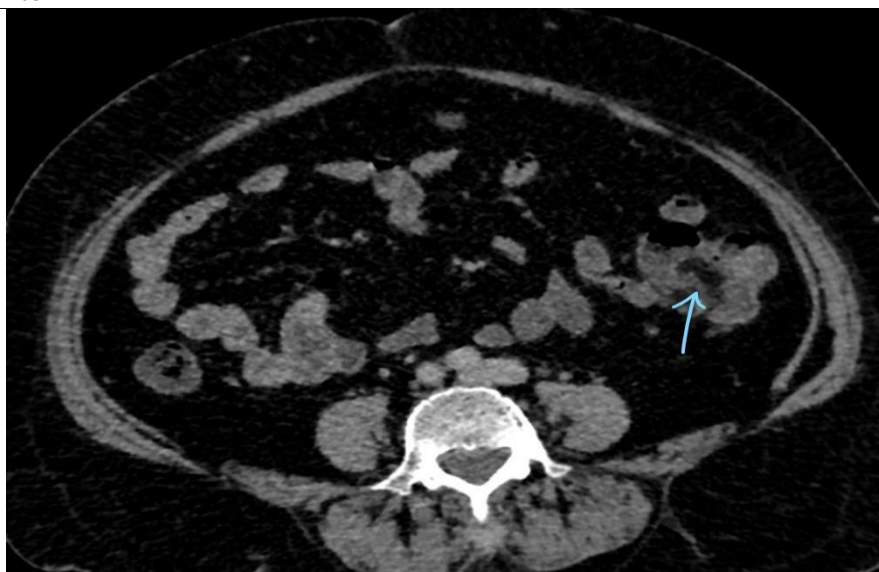


Figure 4- CT Scan abdomen showing Ileo-caecal junction on left side (blue arrow)

DISCUSSION

Fabricius first described dextrocardia in 1600 AD, but Severinus was the first to describe it with a complete situs inversus. [2] According to estimates, the incidence lies between 1 in 10,000 and 50,000 live births [2,3]. The direct aetiology of this condition is not known; however, this autosomal recessive condition has been linked to a number of things, such as conjoined twinning, cocaine usage, and maternal diabetes [2,3]. Both males and females have equal predilection. Individuals with this disorder may also present with primary ciliary dyskinesia, congenital heart defects, and splenic abnormalities [3]. Situs inversus totalis (SIT) is a rare congenital condition where the body's internal organs are a mirror image of their usual positions. While many people with SIT can live normal, healthy lives, its presence can create challenges when diagnosing and treating other conditions, like hepatitis B (HBV) and C (HCV). There are potential implications of situs inversus totalis on HBV management. Due to the reversed organ positions, standard diagnostic imaging and physical examination findings may be atypical, making accurate diagnosis of HBV and related liver complications (e.g., cirrhosis, hepatocellular carcinoma) more challenging. Routine assessments of liver health and disease like liver biopsies or ultrasound examinations, might require specialized approaches due to the mirrored anatomy. In cases of severe liver disease due to HBV, liver transplantation might be necessary. However, the procedure can be technically more demanding in patients with SIT due to the inverted anatomy of blood vessels and bile ducts. Thorough assessment of a patient's anatomy and any associated conditions (e.g., heart defects, Kartagener syndrome) is crucial before any surgical or medical intervention. Procedures like central line placement or intubation may require altered techniques or monitoring methods (e.g., reversed ECG lead placement) to account for the mirrored anatomy.

Collaboration between various medical specialists, such as hepatologists, surgeons, radiologists, and genetic counsellors, is important for providing comprehensive care to patients with SIT and HBV. SIT association with HCV is well documented in literature [4-5] but our case report can be first one showing association between HBV and SIT. Our case was diagnosed early in non-cirrhotic stage, and as per nature of HBV, it passes through stage of cirrhosis before proceeding into Hepatocellular carcinoma. The patient has been advised to remain on regular follow up for early detection of hepatic or other systemic impairment.

CONCLUSION

Our case report is a rare in which situs inversus totalis is seen in HBV patient. As per our knowledge and search, there is no case report of the same in literature. There is any association between the two or is a co-incidental finding, is further area of research.

CONFLICT OF INTEREST- The authors declare that there was no conflict of interest and consent was taken from patient as well as parents before publishing this case report.

REFERENCES

1. Turk F, Yuncu G, Ozturk G, Ekinci Y, Semerkant T. Total situs inversus found coincidentally following a firearm injury. *J Forensic Sci*. 2013;58(1):232–233. doi: 10.1111/j.1556-4029.2012.02256.
2. Eitler K, Bibok A, Telkes G. Situs inversus totalis: a clinical review. *Int J Gen Med*. 2022; 15:2437. doi: 10.2147/IJGM.S295444. DOI: 10.2147%2FIJGM.S295444.
3. Edzie EK, Dzefi-Tetty K, Cudjoe O, Gorleku PN, Adu P. Incidental finding of dextrocardia with situs inversus in a 59-year-old ma [e-pub ahead of print]

Case Rep Radiol. 2019;2019 doi:
10.1155/2019/7107293

4. Li X, Fu Z, Zhong J, Cao K, Chen X, Ding N, Liu L, Zhai J, Qu Z. Coexistence of situs inversus totalis and hepatocellular carcinoma: A series of nine cases and a literature review. *J Interv Med*. 2022 Feb 26;5(1):46-49. doi: 10.1016/j.jimed.2021.12.007. PMID: 35586277; PMCID: PMC8947985.
5. Parveen Malhotra, Rahul Siwach, Anuj Sharma, Pranav Malhotra, Harman Singh, Sandeep, Kumar, Senti, Yogesh Sanwariya. Situs inversus totalis with HCV- A rare association *Positif Journal*. 2025. Volume 25, Issue 8, 2025- Pages 1-5.