Gallbladder agenesis and enterogastric reflux in an adult patient diagnosed by Tc99m HIDA SPECT-CT scintigraphy: a case report

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ABSTRACT

Background: Gallbladder agenesis is an extremely rare, usually asymptomatic anatomic variation. Enterogastric reflux (EGR) in a patient with gallbladder agenesis was not reported previously. We report a rare case of EGR in a patient with gallbladder agenesis, diagnosed on ^{99m}Tc HIDA (hepatobilliary iminodiacetic acid) SPECT-CT (single-photon emission computed tomography-computed tomography) scintigraphy.

Case Presentation: A 35-year-old female was referred to Nuclear Medicine Department for Tc99m HIDA scan. She had history of surgical exploration to remove the gallbladder due to suspicion of chronic cholecystitis. But intraoperatively gallbladder was not localized and the patient was referred for Tc99m HIDA scan. Tc99m HIDA scan along with SPECT-CT showed reflux of tracer into the stomach and non-visualized gallbladder. Further imaging by magnetic resonance cholangiopancreatography confirmed the diagnosis of congenital absence of the gallbladder.

Conclusion: We conclude that ^{99m}Tc HIDA SPECT-CT scintigraphy is helpful in evaluating the true etiology of biliary colic. It should be cautiously reported, mentioning the EGR if present as it may be the true etiology of biliary colic in patients with and without gall bladder. It prevents the added morbidity of surgery, performed with the suspicion of cholecystitis.

Keywords: Gallbladder agenesis, enterogastric reflux, Tc99m HIDA scan, SPECT-CT.

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Background

Gallbladder agenesis is a rare congenital anomaly of the biliary tract that can present a diagnostic and intraoperative dilemma to the surgeon [1]. Most affected individuals remain asymptomatic; however, some may present with symptoms that mimic gallbladder pathology, especially when there is concomitant enterogastric reflux (EGR). Ultrasonography is most frequently used diagnostic procedure for gallbladder pathology, with a drawback of operator dependency. This may lead to unwanted surgical procedure [2]. The presence of EGR on Tc99m HIDA scan have important implication in patients with suspected cholecystitis as it may be true etiology of biliary colic [3]. Therefore preopreative hepatobillary imaging with Tc99m HIDA SPECT-CT (single-photon emission computed tomography + computed tomography) scintigraphy may play an important role to solve this dilemma.

Case Description

A 35-year-old female, presented with biliary colic and underwent surgical exploration to remove the gallbladder with the suspicion of chronic cholecystitis. But during surgical exploration gallbladder was not localized at its normal anatomical location, exploration, and adehenolysis was done. Based on intraoperative findings, it was clear that the patient did not have an extrahepatic gallbladder. The symptoms remained unresolved, and the patient was referred to the Nuclear Medicine Department for Tc99m HIDA scan.

Patient was injected 5 mCi Tc99m labelled disofenin, and serial static imaging was done at 5, 15, 30, 45, 60 minutes, 2 hours, and 4 hours. Gallbladder was not visualized throughout the study, even on correlative SPECT-CT images (Figure 1). However, the activity is seen in the stomach, due to EGR as shown in SPECT-CT images (Figure 2). One of the differential diagnosis of radiotracer uptake in gastric area is free pertechnitate uptake, but non-visualization of stomach in initial images excludes this differential diagnosis. Magnetic resonance cholangiopancreatography (MRCP) of the patient was done to localize the gallbladder and to visualize the biliary ducts. But the gall bladder was not visualized, confirming the gall bladder agenesis.

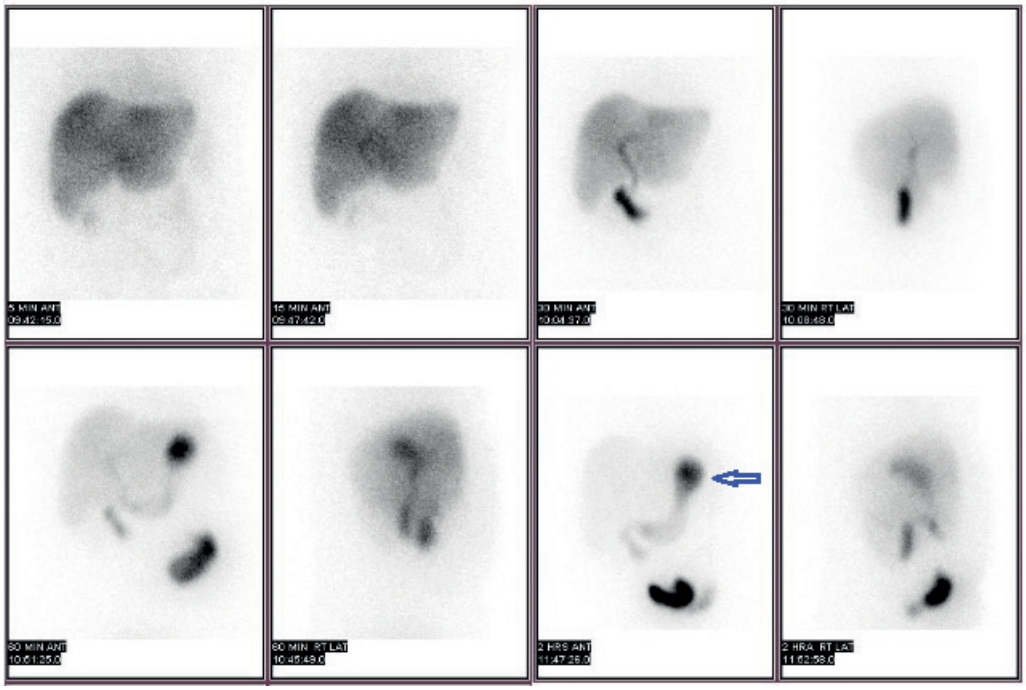

Figure 1. *Serial static images of ^{99m}Tc HIDA scan, showing normal hepatocellular uptake with nonvisualization of gallbladder and radiotracer uptake in gastric area (blue arrows).*

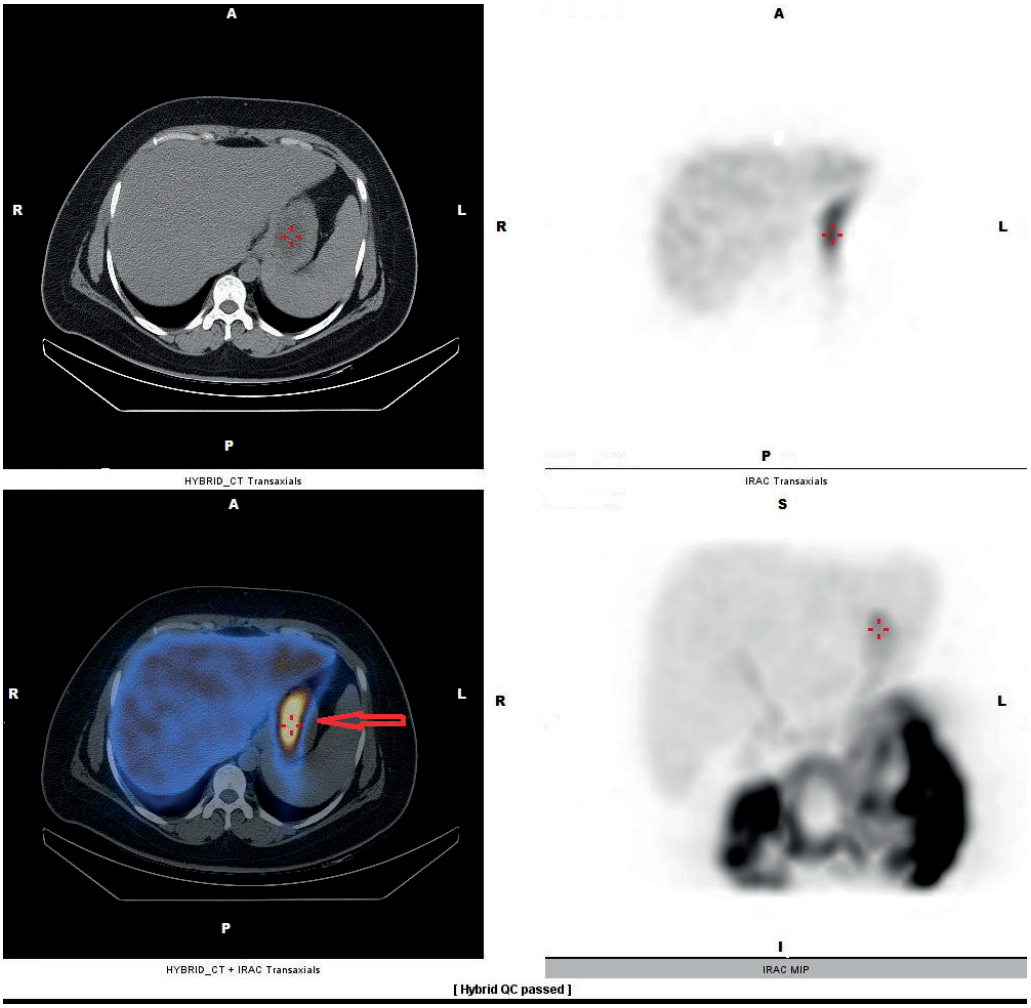

Figure 2. *Tc99m HIDA SPECT-CT scintigraphy, showing the absence of gallbladder and radiotracer uptake in the stomach (red arrow).*

Discussion

Gallbladder agenesis is a rare anatomical variation, occurring in 10-65 per 100,000 people. It predominantly affects females with ratio of 3:1 and reported median age of diagnosis is 46 years [4]. It is usually asymptomatic, but some individuals may present with a clinical picture, suggestive of gallbladder disease [5]. This presentation and the inability of abdominal ultrasonography to confidently diagnose agenesis of the gallbladder, can lead to diagnostic and intraoperative dilemma. Frequently it adds morbidity by exposing the biliary tree to iatrogenic injury without any benefit. Noninvasive imaging techniques like computed tomography, MRCP and endoscopic ultrasound and Tc99m HIDA SPECT-CT scintigraphy should be performed preoperatively in patients where ultrasonographic findings are equivocal. Compared to other noninvasive imaging modalities, Tc99m HIDA SPECT-CT scintigraphy not only confirm the gallbladder agenesis but also exclude EGR as the possible etiology of biliary colic [6].

Reflux of bile is one of the causes in patients with the biliary colic [7]. The reflux of duodenal contents (bile and digestive enzymes) into the stomach and, perhaps, eventually into the esophagus can cause upper GI symptoms often mimicking gallbladder disease [3]. Tc99m HIDA SPECT-CT scintigraphy provides physiologic assessment of the biliary system and not only confirms the gall bladder agenesis but also rule out EGR as the cause of biliary colic. Presence of EGR on Tc99m HIDA SPECT-CT scintigraphy, will help in the subsequent antireflux management of the patient [8].

It is likely that the congenital loss of gallbladder as a bile reservoir contribute to EGR as previous studies have shown the aggravation of EGR on post-surgical loss of the gallbladder. This fact has an important clinical implication, and it emphasizes the role of Tc99m HIDA scanning before cholecystectomy because the existing EGR may aggravate after cholecystectomy [9].

Previous reports have described the presence of EGR in patients with normal gallbladder but this case is unique in the context that the EGR is present in a patient with gallbladder agenesis [3]. This case provides an example of a rare but convincing clinical and radiologic mimic of cholecystitis which ultimately revealed to be a case of EGR with gallbladder agenesis by Tc99m HIDA SPECT-CT scintigraphy.

The following case report demonstrates how gallbladder agenesis and undiagnosed EGR, can potentially expose a patient to unnecessary surgery. It is important for radiologists to be aware of gallbladder agenesis and to recommend alternative imaging like Tc99m HIDA SPECT-CT scintigraphy while evaluating the patients with biliary colic, where gallbladder is not clearly visualized on routine imaging modalities.

Tc-99m HIDA SPECT-CT scintigraphy is a noninvasive imaging modality, to delineate the anomalous biliary anatomy and to diagnose any concurrent pathology mimicking gallbladder disease like EGR.

Conclusion

We conclude that ^{99m}Tc HIDA SPECT-CT scintigraphy is helpful in evaluating the patients with biliary colic noninvasively. It provides good delineation of biliary anatomy and rule out the EGR as possible cause of biliary colic. Thereby preventing the added morbidity of any invasive procedure like diagnostic laparotomy or cholecystectomy done with the suspicion of chronic cholecystitis.

What is new?

Intraoperative diagnosis of gall bladder agenesis is previously reported, but none of such patient was evaluated with HIDA scan for explanation of biliary colic like symptoms. This report not only emphasizes on the reporting of EGR if present, in such cases but also delivering a message to evaluate the EGR in patients with biliary colic before planning cholecystectomy, especially if gallbladder is not visualized on routine imaging modalities. Also, the previous reports have suggested the presence of EGR in presence of native gallbladder, but this report is unique in the context that the gallbladder is congenitally absent.

List of Abbreviations

EGR	Enterogastric reflux
HIDA	Hepatobiliaryiminodiacetic acid
SPECT-CT	Single-photon emission computed tomography + computed tomography

Conflict of interests

The authors declare that there is no conflict of interests regarding the publication of this case report.

Funding

None.

Consent for publication

Written informed consent was taken from the patient.

Ethical approval

Ethical approval is not required at our institution for publishing an anonymous case report.

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Summary of the case

1	**Patient (gender, age)**	35 years old, female
2	**Final diagnosis**	Gallbladder agenesis and EGR
3	**Symptoms**	Biliary colic
4	**Medications**	NA
5	**Clinical procedure**	Tc99m HIDA SPECT-CT scintigraphy
6	**Specialty**	Nuclear Medicine