



Complete Dissolution of a Small Gallstone After Three Months of Ursodeoxycholic Acid Therapy: A Case Report

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Abstract

Cholelithiasis is a common biliary tract disorder frequently encountered in clinical practice. Laparoscopic cholecystectomy remains the standard treatment for symptomatic gallstones; however, nonsurgical therapy with ursodeoxycholic acid (UDCA) may be considered for selected patients with small, uncomplicated gallstones. We report the case of a 68-year-old woman who presented with right upper quadrant abdominal pain. Abdominal ultrasonography revealed a solitary gallstone measuring 0.58 cm without evidence of cholecystitis. The patient was treated with ursodeoxycholic acid at a dose of 500 mg daily. Follow-up ultrasonography performed after three months of therapy demonstrated complete resolution of the gallstone. This case highlights that UDCA may serve as an effective nonsurgical treatment option for selected patients with cholelithiasis, particularly those with small solitary gallstones without inflammatory findings. Clinicians should consider UDCA as a therapeutic alternative for patients who are unsuitable for surgery or decline operative intervention, with routine ultrasonographic follow-up recommended to assess treatment response.

INTRODUCTION

Cholelithiasis is a condition characterized by the formation of crystalline deposits within the biliary system, primarily composed of cholesterol, bilirubin, and bile salts (Anjum et al., 2023). The process of gallstone formation involves several mechanisms, including cholesterol supersaturation in bile, impaired gallbladder motility, and crystal nucleation. Cholelithiasis is one of the most common gastrointestinal disorders worldwide and represents a significant health concern in clinical practice (Anjum et al., 2023; Tanaja et al., 2023).

The global prevalence of cholelithiasis is estimated to range from 10% to 15% among the adult population, with a higher incidence in women than in men (Lang et al., 2022; Lazarchuk et al., 2023; Ning et al., 2025; Wang et al., 2024). In the Asian region, the prevalence of cholelithiasis is reported to be lower, ranging from approximately 3% to 10%, whereas the national prevalence in Indonesia remains uncertain (Lammert et al., 2016; Tanaja et al., 2023). The risk of cholelithiasis increases with age and is influenced by various factors, including sex, obesity, dietary patterns, and metabolic conditions (Lammert et al., 2016).

Cholesterol gallstones are the most common type, accounting for approximately 90%–95% of all cholelithiasis cases. Most cases are asymptomatic; however, approximately 20% of patients may develop clinical symptoms such as right upper quadrant abdominal pain, nausea, or dyspepsia (Lammert et al., 2016; Tanaja et al., 2023). Under certain conditions, cholelithiasis may progress to more serious complications, including acute cholecystitis, cholangitis, and biliary pancreatitis, which can be potentially life-threatening if not appropriately managed (Tanaja et al., 2023).

The management of cholelithiasis can generally be divided into operative and nonoperative approaches (Acker et al., 2025; Chowdhury et al., 2026; Room et al., 2025; Shenoy et al., 2022; Viscosi et al., 2022). Laparoscopic cholecystectomy remains the standard treatment for patients with symptomatic cholelithiasis. However, a nonoperative approach may be considered for selected patients, including those with a high surgical risk or those who decline surgical procedures. Nonoperative management includes dietary modification, pain management, and gallstone dissolution therapy (Lammert et al., 2016; Tanaja et al., 2023).

One of the dissolution therapies widely used for cholesterol gallstones is ursodeoxycholic acid (UDCA) (Buyuker et al., 2025; Grześkowiak et al., 2026; Lee et al., 2024; Mathialagan et al., 2026; Sung et al., 2024). UDCA works by reducing cholesterol saturation in bile, inhibiting intestinal cholesterol absorption, and increasing cholesterol solubility, thereby facilitating the gradual dissolution of cholesterol gallstones. This therapy is considered most effective in patients with small gallstones (<15 mm), a limited number of stones, noncalcified stones, and preserved gallbladder function (Mathialagan et al., 2026; Hidayah & Pramana, 2025).

Although UDCA represents a promising nonsurgical therapeutic alternative, its effectiveness has several limitations. The therapeutic response may be reduced in patients with large or multiple gallstones, as well as in those with impaired liver function or cholestasis. In addition, UDCA therapy generally requires a prolonged treatment duration of approximately 6–12 months, with periodic ultrasound examinations to monitor treatment response (Lammert et al., 2016; Hidayah & Pramana, 2025).

However, under specific conditions, gallstone dissolution may occur within a shorter period, particularly in patients with favorable stone characteristics. Therefore, this case report aims to describe the successful use of ursodeoxycholic acid therapy in a patient with a small solitary gallstone that achieved complete resolution after three months of treatment. This report provides clinical insights by demonstrating that UDCA monotherapy may achieve rapid gallstone dissolution in appropriately selected patients, offering a safe and cost-effective alternative to surgery for individuals who are unsuitable for or decline surgical intervention. Furthermore, this case emphasizes the importance of careful patient selection based on stone characteristics to optimize therapeutic outcomes and provides practical guidance for clinicians considering nonoperative management of symptomatic cholelithiasis, potentially reducing the need for cholecystectomy and its associated risks in selected patient populations.

METHOD

This study was a case report describing the successful use of ursodeoxycholic acid (UDCA) therapy in a patient with cholelithiasis. The patient was a 68-year-old woman who presented with right upper quadrant abdominal pain accompanied by nausea and was diagnosed with cholelithiasis based on abdominal ultrasonography. Initial examination revealed a solitary gallstone measuring 0.58 cm without signs of cholecystitis or other complications.

The patient received nonsurgical therapy with ursodeoxycholic acid (UDCA) at a dose of 500 mg per day divided into two administrations for three months. In addition, supportive therapy with omeprazole 20 mg twice daily was administered. During the treatment period, the patient's medication adherence, changes in clinical symptoms, and potential adverse effects were monitored.

Treatment success was evaluated through repeat abdominal ultrasonography after three months to assess gallstone resolution. The evaluated data included clinical characteristics, physical examination findings, ultrasound results before and after therapy, and clinical response during treatment. The findings were presented descriptively to illustrate the therapeutic response to UDCA in a case of uncomplicated cholelithiasis with a small gallstone.

RESULTS AND DISCUSSION

Case presentation

A 68-year-old woman came with complaints of upper right abdominal pain that spread to heartburn. The pain initially felt to disappear, but in the past week it became more permanent and more severe. Complaints are accompanied by nausea that appears occasionally without being accompanied by vomiting. The patient has a history of acid reflux disease before. A history of chronic diseases such as diabetes mellitus, hypertension, and liver disease is denied.

On physical examination, the general condition of the patient was found to be good with vital signs within normal limits. Abdominal examination showed intestinal noise within normal limits, no abdominal distension, and pressure pain in the upper right quadrant region. Murphy's sign was negative.

A supporting examination in the form of an initial abdominal ultrasound conducted on August 5, 2025 showed a gallbladder of normal size, unthickened walls, no sludge images, and a gallstone measuring 0.58 cm was found. Based on the findings, the patient was diagnosed with cholelithiasis without signs of cholecystitis.

The patient was then given ursodeoxycholic acid (UDCA) therapy at a dose of 500 mg per day divided into two doses, as well as omeprazole 20 mg twice a day. Therapy was given for three months and patients were reported to be compliant in taking the medication. The patient's weight during therapy is around 65 kg.

A follow-up evaluation was carried out with an abdominal ultrasound examination on November 11, 2025. The results of the examination showed that the gallbladder was of normal shape and size, the walls were not thickened, and no gallstones, masses, or sludge were found. Overall, the sonography results of the upper abdominal organs were within normal limits. During the therapy period, patients also reported improvements in clinical symptoms in the form of reduced upper right abdominal pain and nausea complaints.

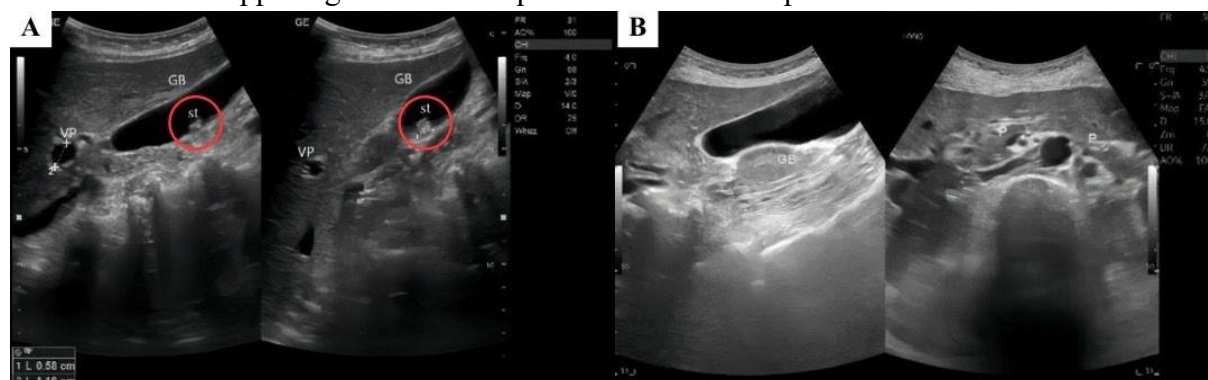


Figure 1. Comparison of ultrasound results before and after UDCA therapy.
(A) Initial ultrasound showed a single gallstone measuring 0.58 cm with no signs of cholecystitis.
(B) Ultrasound evaluation after three months of therapy showed no visible gallstones or sludge.

Source: Authors' documentation based on patient's medical records

Cholelithiasis is a condition characterized by the formation of gallstones due to cholesterol supersaturation, impaired gallbladder motility, and the process of nucleation of crystals in bile (Anjum et al., 2023). Most of the gallstones that form are cholesterol stones, which have the potential to be treated non-surgically using a dissolving agent such as ursodeoxycholic acid (UDCA) (Anjum et al., 2023; Tanaja et al., 2023).

In this case, the patient showed complete gallstone resolution after three months of UDCA therapy. These findings suggest that the resolution time in this case is relatively faster than previous reports in the literature. UDCA works by lowering the saturation of cholesterol in bile, inhibiting the absorption of cholesterol in the intestines, as well as increasing the solubility of cholesterol, thus gradually dissolving the gallstones that form (Mathialagan et al., 2026).

The standard therapy for symptomatic cholecystitis is cholecystectomy, specifically laparoscopic cholecystectomy. However, non-operative therapy can be considered in patients with certain characteristics, such as small stones, limited numbers, and no complications. In these conditions, UDCA is one of the therapeutic options that can be used with fairly good results (Tanaja et al., 2023).

A retrospective cohort study by Buyuker et al. (2025) reported that UDCA was able to completely dissolve gallstones in about 60% of patients, with an average resolution time of 4.2 ± 1.5 months. The study also showed a relationship between stone size and therapy success, with smaller stones having a higher success rate.

When compared to these results, the cases we reported showed a faster response, i.e. complete loss of gallstones within three months. This difference may be due to the characteristics of the stones in the patient, namely a single stone with a relatively small size (0.58 cm), without any signs of cholecystitis or other complications. This condition is in accordance with the criteria of patients who are known to have an optimal response to UDCA therapy. The success of therapy in this case is also likely to be influenced by the patient's adherence to taking medication regularly, which plays an important role in achieving optimal therapeutic levels for the gallstone dissolution process. This shows that proper patient selection is a key factor in determining the success of dissolution therapy using UDCA. Patients with small, limited number, and uncomplicated gallstones tend to provide a more optimal therapeutic response.

Another study by Lee et al. (2024) showed that combination therapy between UDCA and polyunsaturated fatty acids (n-3 polyunsaturated fatty acids) tends to have a higher rate of gallstone dissolution than single UDCA therapy (45.7% vs 9.9%), although the difference has not been statistically significant. Nevertheless, the radiological response in the combination group was shown to be significantly higher than that of UDCA monotherapy (90.5% vs 41.7%; $p < 0.05$), suggesting that the effectiveness of therapy can be improved through a combination approach in certain patients.

However, in this case, the use of UDCA as monotherapy has provided optimal results with complete gallstone resolution. This confirms that in patients with appropriate characteristics, UDCA monotherapy can still be an effective option without the need for additional therapy.

In addition, research by Jang et al. (2026) showed that UDCA significantly lowered the risk of gallstone formation compared to placebo. These findings support the role of UDCA in

modifying bile composition, particularly in lowering cholesterol saturation, which plays a role not only in the prevention but also in the process of gallstone dissolution.

During the therapy period, patients in this report also experienced improvements in clinical symptoms in the form of decreased upper right abdominal pain and nausea, which was in line with improvements in radiological findings. No side effects were found during the course of therapy.

This case report has several limitations. Analysis of the composition of gallstones is not carried out directly so the type of stone is only estimated based on clinical and ultrasound findings. In addition, an objective evaluation of gallbladder function was not performed, and there was no long-term follow-up to assess the likelihood of recurrence of gallstones after therapy.

Overall, this case suggests that UDCA can be an effective non-operative therapy option in selected patients with cholelithiasis, particularly in small, uncomplicated gallstones. In addition, these findings also suggest that under certain conditions, gallstone dissolution can occur in a shorter time than reported in the literature.

CONCLUSION

Ursodeoxycholic acid (UDCA) therapy may be an effective nonsurgical option for selected patients with cholelithiasis, particularly those with small solitary gallstones without complications. This case demonstrates that gallstone dissolution can occur within a relatively shorter period than previously reported in some studies. These findings highlight the importance of appropriate patient selection in determining the success of UDCA therapy. Clinicians should consider UDCA as a therapeutic alternative for patients with small solitary gallstones who are unsuitable for surgery or decline operative intervention, with routine ultrasonographic follow-up at three months recommended to evaluate treatment response and guide further management decisions.

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