

Original Research Article

# Laparoscopic cholecystectomy for biliary dyskinesia in patient with an extended spectrum of ejection fraction on hepatobiliary iminodiacetic acid scan

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## Abstract

**Background:** Biliary dyskinesia is a condition where the gallbladder motility is seen as abnormal. Diagnostic imaging studies for biliary dyskinesia usually include a negative or inconclusive abdominal ultrasound or computed tomography followed by a hepatobiliary iminodiacetic acid (HIDA) scan. The HIDA scan is used to visualize the gallbladder and assess its motility. The motility is reported in the form of an ejection fraction (EF). Biliary dyskinesia is diagnosed if the EF is less than 35%. However, there are many patients with an EF of greater than 35% but are exhibiting all the signs and symptoms for biliary dyskinesia.

**Aim:** This study evaluated the efficacy of laparoscopic cholecystectomy as a treatment modality in symptomatic patients diagnosed with biliary dyskinesia with three distinct HIDA scan EF results.

**Materials and methods:** They were a total of 654 verified cases of laparoscopic Cholecystectomy done between January, 2013 and December 2016 at Westlake and West Suburban Hospital. A total of 163 cases out of the 654 had HIDA scan with calculated EF, therefore meeting the criteria to be included in this study. The patients pre and post-operative course was reviewed from their medical records and resolution of symptoms was determined by in phone interview.

**Results:** A total of 29 (18%) patients were lost to follow up. Out of the 99 cases interviewed in the first group (EF <35%) 91 (92%) cases reported complete symptom resolution post cholecystectomy. Out of the 18 cases interviewed in the second group (EF between 35%-50%) 13 (72%) cases reported

complete resolution post cholecystectomy. Out of the 17 cases interviewed in the last group (EF > 75%) 11 (65%) cases reported complete resolution of their symptoms

**Conclusion:** Our study indicates that patient suffering with symptomatic biliary dyskinesia and has a HIDA with EF less than 50% or EF greater than 75% will most likely benefit from laparoscopic Cholecystectomy and could be a reasonable option to offer symptomatic patients.

## Key words

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Biliary dyskinesia, HIDA scan, Laparoscopic cholecystectomy, Gallbladder motility.

## Introduction

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Laparoscopic Cholecystectomy has been used as the surgical treatment of choice for patients with symptomatic gallbladder disease since 1989 [1]. This surgical intervention is often supported by various imaging modalities that often show gallstones as the culprit for the signs and symptoms reported by the patients. However, there is a subset of patients who present with the typical symptoms of gallbladder disease in the absence of gallstones or structural abnormalities. The typical presenting symptoms include: biliary colic, right upper quadrant pain, epigastric pain, post-prandial discomfort with nausea and/or vomiting. In this subset of patients, imaging techniques such as abdominal ultrasound, computed tomography scan, endoscopic retrograde cholangiopancreatography are often inconclusive as they fail to reveal any abnormalities. Those patients are then referred for a hepatobiliary iminodiacetic acid scan with cholecystokinin stimulation (CCK-HIDA) to measure the functionality of the gallbladder. The CCK-HIDA scan provides a numerical ejection fraction (EF) of the gallbladder. The diagnosis of biliary dyskinesia is made when the gallbladder has an EF of less than 35 per cent [2]. Historically, these patients are offered cholecystectomy as a treatment option. Over the recent years, physicians have noticed many acutely and chronically symptomatic patients with EF of greater than 35%. The treatment approach for this subset of patient is still undetermined, with some physicians choosing symptomatic relief over cholecystectomy. However, various literatures are now showing successful prognosis post laparoscopic

cholecystectomy in these patients with higher EF on HIDA while still symptomatic [2-4].

The goal of this study is to evaluate the role of laparoscopic cholecystectomy in an expanded range of EF on HIDA scan. This study will focus on three specific EF categories and they are: EF less than 35%, EF between 35%-50%, and EF greater than 75%. This study hopes to show the percentage of patients who experienced improvement of symptoms post laparoscopic cholecystectomy in all three groups.

## Materials and methods

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They were a total of 654 verified case of laparoscopic Cholecystectomy done between January, 2013 and December 2016 at Westlake Hospital and West suburban hospital. A total of 163 cases out of the 654 had CCK-HIDA scan with calculated EF as imaging modality before the procedure, therefore meeting the criteria to be included in this study. All laparoscopic cholecystectomy cases included in this study were performed by the same surgeon. The pre and post-operative course and outcomes of those 163 patients were reviewed from their medical records. The 163 patients were placed in three group based on their EF. The EF cut off for the three groups were as follow: EF less than 35%, EF between 35%-50%, and EF greater than 75%. There were no patients who underwent laparoscopic cholecystectomy with an EF of between 50% and 75%. The median age for our patient group was 46 years (range 20 to 99 years). 75% of the study case was female. The following were not of interest for the purpose of this study, hence excluded in the data accumulation. They are: demographic, economic

status, body mass index and family history. Diagnostic information for the included cases included signs and symptoms of gallbladder disease with appropriate lap reports indicating hemodynamic stability, and a CCK-HIDA scan with a reported EF. Resolution of symptoms was determined by a phone interview conducted by a single co-author. The phone interview consisted of asking the patients if they had full resolution, partial resolution or no resolution of their biliary symptoms since their cholecystectomy. The answers were recorded subjectively therefore no statistical analysis of the results was conducted.

## **Results**

During the 3 years reviewed they were 654 laparoscopic cholecystectomy done. 491 (75%) cases were diagnosed by using a positive abdominal ultrasound and or computed tomography of the abdomen and pelvis. The remainder of the cases, 163 (25%) were diagnosed with CCK-HIDA with EF and represent our study group. There were a total of 116 (71%) cases that have an EF of less than 35%. A total of 27 (17%) cases had an EF between 35% and 50%. The last group had 20 (12%) cases with an EF of greater than 75%. A total of 29 (18%) patients were lost to follow up, 17 patients in the first group, 9 patients in the second group and 3 patients in the third group. Out of the 99 cases interviewed in the first group (EF <35%) 91 (92%) cases reported complete symptom resolution post cholecystectomy. The remaining 8 (8%) cases reported partial relief. Out of the 18 cases interviewed in the second group (EF between 35%-50%) 13 (72%) cases reported complete resolution post cholecystectomy, 3 (16%) reported partial resolution of symptoms and 2 (11%) reported not resolution. Out of the 17 cases interviewed in the last group (EF > 75%) 11 (65%) cases reported complete resolution of their symptoms, 4 (23%) cases reported partial resolution of symptoms and 2 (12%) cases reported no resolution.

## **Discussion**

The medical society has agreed that the use of Laparoscopic cholecystectomy in the treatment of biliary dyskinesia, supported by an EF of less than 35% on HIDA scan, to be beneficial if not curative for most patients [1]. However, there have not been enough study or data to suggest if the same conclusion should be made of the patients who present with all the signs and symptoms of gallbladder disease but have an EF on HIDA scan that is above 35%, therefore is seen as normal. A recent research found that 11 (92%) out of 12 patients with EF over 80% who had laparoscopic cholecystectomy reported complete resolution with a mean follow-up of 16 months [3]. Another study presented at the Society of Nuclear Medicine 56th Annual meeting showed that 22 (79%) of the 28 patients with EF over 80% who had the laparoscopic cholecystectomy reported total resolution of their symptoms [4]. Our study showed that 92% of patients with EF <35% had complete resolution post cholecystectomy, 89% of patients with EF between 35% and 50% reported a significant improvement of symptoms (72% had complete resolution of symptoms) and 88% of patients with EF >75% (65% had total resolution of all symptoms) also reported a substantial improvement in their symptoms.

The symptoms of biliary disease can be debilitating to some patients. Unfortunately, a large population of patients with symptomatic biliary disease symptoms and a normal EF on HIDA do not receive a diagnosis [5]. The lack of diagnosis often results in delay of treatment if any. Most studies conducted in the last ten years, are showing favorable prognosis in the patients who had laparoscopic cholecystectomy with normal EF and hyperkinetic EF on HIDA [2, 3]. Although, the data are favorable, larger studies are warranted to verify reproducibility of these results.

## **Conclusion**

The data in this study are introductory but the findings do suggest that laparoscopic cholecystectomy in patients with EF less than

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50% or greater than 75% may be helpful. Furthermore, the results of this study suggest that offering cholecystectomy as a treatment to this subset of patients to be a sensible option.

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