Inpatients versus Outpatients: Which Gallbladder Ejection Fraction is More Accurate in Confirming a Clinical Diagnosis of Chronic Cholecystitis? A Retrospective Case Series

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INTRODUCTION

- A low gallbladder ejection fraction (GBEF) determined by a cholocystokinin (CCK) augmented hepatobiliary (HIDA) scan is often used to confirm the presence of chronic cholecystitis[1,2,3]
- Gallbladder function in acutely sick or hospitalized patients may be adversely affected by comorbid diseases and therapeutic drugs[1,3]
- CCK cholescintigraphy performed on an asymptomatic outpatient may be more accurate
- At our institution, CCK cholescintigraphy is sometimes conducted on hospitalized patients with a positive study supporting a treatment plan consisting of eventual laparoscopic cholecystectomy

OBJECTIVE

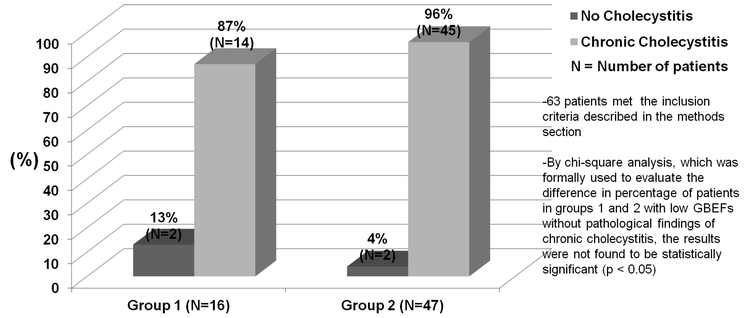
- To determine whether GBEFs calculated for hospitalized patients are more likely to be falsely low when compared to outpatients based on postoperative pathology following cholecystectomy

METHODS

- Results of every HIDA scan performed over a 2.5 year period (07/2010 – 12/2012) were reviewed
- Cases diagnostic of cystic or common duct obstruction and post-cholecystectomy cases were excluded.
- HIDA scans (Figure 1) demonstrating gallbladder tracer uptake, biliary to bowel tracer clearance, and low GBEFs (less than 35% defined at our institution), on patients who subsequently underwent laparoscopic cholecystectomies at our institution for a presumed diagnosis of chronic cholecystitis, were categorized into two groups: Inpatients (Group 1) and outpatients (Group 2).
- Correlation to postoperative pathological findings, clinical notes, and surgical reports was made.
- All HIDA scans were performed using Tc99m Mebrofenin (Choletec) and Sincalide (Kinevac), which was infused at a rate of 0.01 µg/kg over 60 minutes

RESULTS

Percentage of Inpatients & Outpatients With or Without Pathological Findings of Chronic Cholecystitis



-63 patients met the inclusion criteria described in the methods section

-By chi-square analysis, which was formally used to evaluate the difference in percentage of patients in groups 1 and 2 with low GBEFs without pathological findings of chronic cholecystitis, the results were not found to be statistically significant ($p < 0.05$)

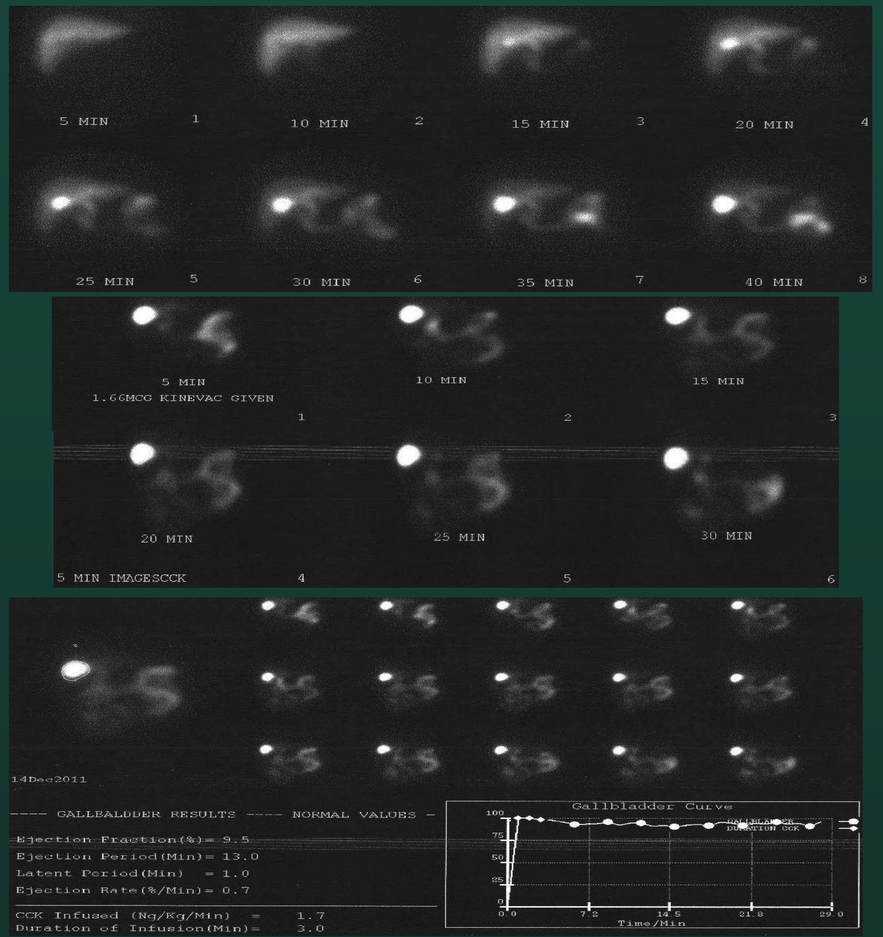


Figure 1: HIDA scan with low GBEF and cystic and common duct patency

DISCUSSION

- Percentage of patients with low GBEFs without pathological findings of chronic cholecystitis was higher in group 1 than in group 2 (13% for group 1 and 4% for group 2).
- There may be an increased percentage of false positive results on inpatients relative to outpatients when GBEFs are used to confirm the presence of chronic cholecystitis, stressing the importance in knowing that an abnormal GBEF is not diagnostic of chronic cholecystitis
- Falsely low GBEFs have been associated with conditions such as sprue, achalasia, diabetes, irritable bowel syndrome, sickle cell disease, and pregnancy, as well as medications such as morphine, atropine, octreotide, nifedipine, progesterone, and phentolamine[3]
- It is important for the interpreting radiologist and ordering physician to be aware and alert to the possibility of a falsely low GBEF result on a hospitalized patient with multiple comorbidities receiving many medications
- Understanding the patient's clinical scenario, setting, history, and medications could reduce the number of inpatients undergoing unnecessary surgery supported by a false positive result on CCK cholescintigraphy
- The results suggest that the outpatient setting is more suitable for CCK cholescintigraphy
- In a situation when the test is performed on an inpatient, direct communication between the radiologist and ordering physician regarding the patient's clinical context could further aid in anticipating a false positive study
- CCK cholescintigraphy should be used as an adjunct to a full diagnostic workup including patient history, clinical symptoms, physical exam findings, lab values, and exclusion of other disease processes
- The two patients from group 1 without pathological findings of chronic cholecystitis were not admitted for biliary disease
- Caution should be exercised when deciding to perform surgery for possible chronic cholecystitis in a patient with an admitting diagnosis unrelated to biliary disease
- The relatively smaller number of patients in group 1 ($n = 16$) as compared to group 2 ($n = 47$) is a limitation, and could account for the statistical uncertainty, but it does suggest that there is a degree of awareness of the limitations of CCK cholescintigraphy in the inpatient setting
- While all participating pathologists were board certified, the possibility of variable histopathological interpretation cannot be discounted

CONCLUSION

- The results suggest that GBEFs are more likely to be falsely low when calculated on hospitalized patients
- Therefore, caution should be exercised prior to performing a cholecystectomy on a hospitalized patient for a clinical diagnosis of chronic cholecystitis suggested by an apparently low GBEF on HIDA scan

REFERENCES

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3. Ziessman, H. A. Cholecystokinin Cholescintigraphy: Victim of Its Own Success? Journal of Nuclear Medicine. 1999; 40: 2038-2041.