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A STUDY ON ULTRASONOGRAPHIC EVALUATION OF GALLBLADDER MOTOR FUNCTION IN INTRAHEPATIC CHOLESTASIS OF PREGNANCY: A CASE CONTROL STUDY

Dr. Bhuriya Shailesh Chandubhai[1], Dr. Sabir Pasha Md[2], Dr. Satish Prakash Mathur[3], Dr. Naresh Kumar Munda[4]

[1] Assistant Professor, Department of Radiology, Faculty of Icare Institute of Medical Sciences and Research and Dr. B C Roy Hospital, Haldia, India.
[2] Associate Professor, Department of General Surgery, Faculty of Kanti Devi Medical College and Research Centre, Mathura,
[3] Associate Professor, Department of General Surgery, Icare Medical College, Haldia
[4] Assistant Professor, Department of Community Medicine, Faculty of Icare Institute of Medical Sciences and Research and Dr. B C Roy Hospital, Haldia, India

Corresponding Author

Dr. Naresh Kumar Munda

Assistant Professor, Department of Community Medicine, Faculty of Icare Institute of Medical Sciences and Research and Dr. B C Roy Hospital, Haldia, India

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ABSTRACT

Background: Intrahepatic cholestasis of pregnancy (ICP) is associated with impaired bile acid metabolism, potentially affecting gallbladder motility. **Objective**: To evaluate gallbladder motor function in ICP patients using ultrasonography compared to healthy pregnant controls. **Methods**: A case-control study of 33 ICP patients and 33 healthy pregnant women (matched for gestational age). Gallbladder volume was measured via ultrasound in fasting and postprandial states (30, 60, and 90 mins after a standardized meal). Gallbladder ejection fraction (GBEF) was calculated. **Results**: ICP patients showed significantly reduced GBEF (%) compared to controls ($p < 0.05$). Fasting gallbladder volume was similar, but postprandial contraction was impaired in ICP. **Conclusion**: ICP is associated with gallbladder dysmotility, possibly contributing to symptoms like pruritus and postprandial discomfort.

KEYWORDS: Cholestasis, Gallbladder.

INTRODUCTION

Intrahepatic cholestasis of pregnancy (ICP) complicates 0.1–2% of pregnancies, characterized by pruritus and elevated serum bile acids. Bile acids regulate gallbladder motility; their accumulation in ICP may impair contraction[1]. This study aimed to compare gallbladder ejection fraction (GBEF) in ICP versus healthy pregnancies using dynamic ultrasonography. Gallbladder disease, including gallstones (cholelithiasis), affects a significant portion of the population, with prevalence varying by region, age, and sex. Globally, approximately 6% of the population is estimated to have gallstones[2].

In the United States, it's estimated that 10% to 20% of adults will develop gallstones at some point in their lives. Gallbladder disease is more common in women than men and prevalence increase with age. Key points about the prevalence of gallbladder disease: Global Prevalence: A systematic review and meta-analysis found the pooled prevalence of gallstones to be 6.1%, with variations across regions. Regional Differences: Gallbladder disease prevalence is higher in South America compared to Asia. In India, there are significant regional differences, with North Indians having a higher prevalence than South Indians. Age and Sex

Gallbladder disease is more common in women and its prevalence increases with age. In the US, over 6.3

million men and 14.2 million women between 20 and 74 years old have gallstones. Symptomatic vs. Asymptomatic: The prevalence of gallbladder disease is higher in symptomatic individuals compared to asymptomatic ones[3].

METHODS

This study was conducted in tertiary hospital. After obtaining institutional ethical committee approval It was Case Control study conducted on 36 patients in the department of Radiology at a tertiary care Centre, from February / 2022 to August /2022.

Total 100 participant were approached to project among them 34 were excluded due to non-fulfilling of eligibility criteria and 66 were included on the basis of fulling of the eligibility criteria

The institute Ethics Committee approval was obtained before starting the sample collection. A written and informed consent was taken from the patient regarding the study in his/her vernacular language and English. In this study Patients were subjected to: A detailed history of sign & symptoms and its duration

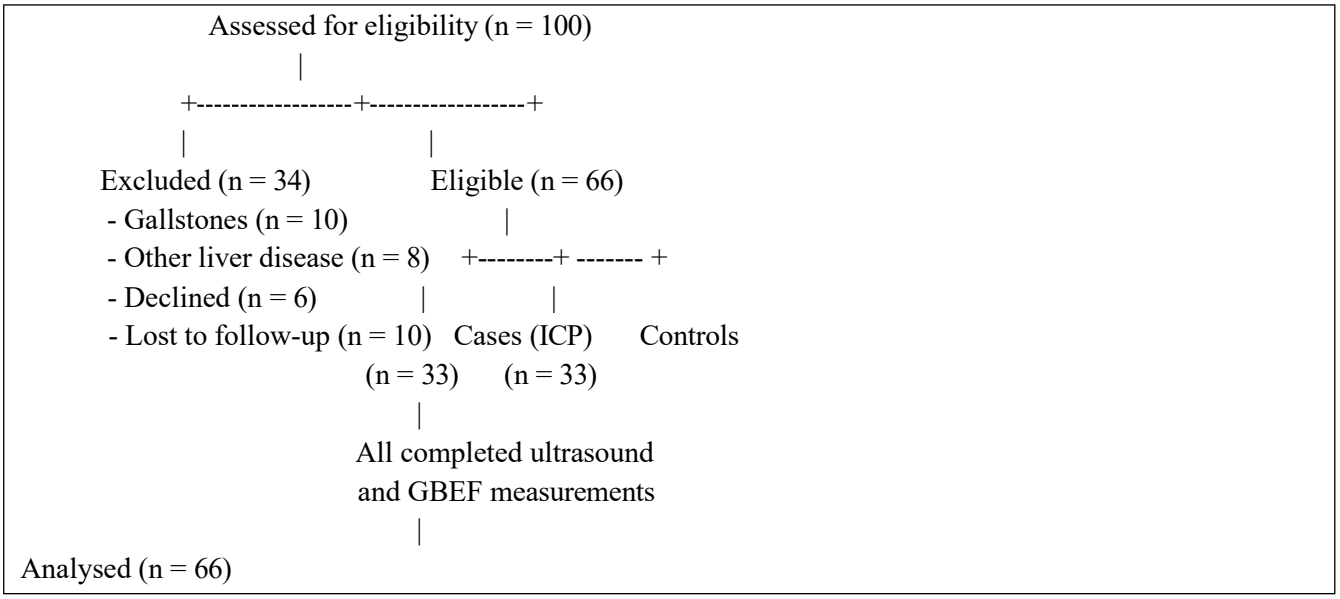
Study Design

Case-control study (33 ICP cases vs. 33 controls).

Inclusion Criteria: Singleton pregnancy, gestational age 28–36 weeks, ICP diagnosis (pruritus + serum bile acids >10 μmol/L).

Exclusion Criteria: Gallstones, prior cholecystectomy, hepatic diseases, or medications affecting motility.

Flowchart



Ultrasonography Protocol

Equipment: GE Logiq E9 (3.5–5 MHz probe).

Patient Preparation:

Overnight fasting (>8 hours).

Standardized meal: 240 mL Ensure Plus® (14g fat).

Measurements:

- Fasting volume **(V_0):** $V=0.52\times length\times width\times height$ $V=0.52\times length\times width\times height$.

Postprandial volumes at 30, 60, and 90 mins.

- **GBEF (%)** = $V0-VminV0\times100$ $V0V0-Vmin\times100$.

Statistical Analysis
Sample Size: 33/group (power = 80%, $\alpha = 0.05$, effect size = 15% GBEF difference).

Tests:

Independent t-test (GBEF comparison).

Repeated-measures ANOVA (volume changes).

Pearson correlation (GBEF vs. bile acids).

Software: SPSS v26.

RESULTS
ICP patients showed significantly reduced GBEF (%) compared to controls ($p < 0.05$). Fasting gallbladder volume was similar, but postprandial contraction was impaired in ICP.
Baseline Data: No differences in age, BMI, or gestational age. GBEF: Lower in ICP (55 ± 12% vs. 72 ± 10%; $p < 0.01$). Postprandial Volume: Higher in ICP at 60 mins (22.3 ± 6.1 mL vs. 14.2 ± 4.8 mL; *p = 0.003*).

DISCUSSION
ICP patients exhibit gallbladder hypo contractility, likely due to bile acid toxicity on smooth muscle. Limitations include small sample size; future studies should correlate GBEF with fetal outcomes[4].
Intrahepatic Cholestasis of Pregnancy (ICP) management focuses on reducing maternal symptoms and minimizing fetal risks. Treatment primarily involves medications like ursodeoxycholic acid (UDCA) to lower bile acid levels and relieve itching, along with monitoring fetal well-being and determining appropriate delivery timing[5].
Medication: Ursodeoxycholic Acid (UDCA): The primary medication for ICP, UDCA helps lower bile acid levels and reduce itching. It is generally well-tolerated, with potential side effects like nausea, vomiting, or diarrhoea. Other Medications: In some cases, other medications like antihistamines or cholestyramine may be used to manage itching. Fetal Monitoring: Nonstress Tests (NSTs): Regularly assess the fetal heart rate and its response to movement. Fetal Biophysical Profiles (BPPs): Provide a comprehensive evaluation of fetal well-being, including heart rate, movement, breathing, and amniotic fluid levels[6]. Continuous Electronic Fetal Monitoring (CEFM): Recommended during labor for women with severe ICP. Delivery Management: Timing of Delivery: Delivery timing is crucial and depends on the severity of ICP and bile acid levels. Bile Acid Levels : Women with bile acid levels above 40 μmol/L may be recommended for earlier delivery, potentially around 37-38 weeks. For levels above 100 μmol/L, delivery at 36 weeks may be considered, Steroids and Vitamin K:If early delivery is necessary, corticosteroids may be given to help mature the fetal lungs, and vitamin K supplements may be administered to prevent bleeding. Symptomatic Management: Topical Treatments: Cooling baths and topical emollients can help soothe itching. Loose Clothing: Wearing loose-

fitting, comfortable clothing can also provide relief. Diet: A balanced diet with adequate protein, fiber, and vitamin K intake is recommended. Rest: Adequate rest can help manage symptoms[7-9].
The only definitive cure is delivery of the baby.
Pregnant women with total serum bile acid concentrations of <40 micromol/L and mild itching can be offered symptomatic treatment, such as topical emollients and sedating antihistamines[10-13]. For women with total bile acid concentrations of <100 micromol/L, there is no increased risk of stillbirth compared with the background population, and thus early delivery (before 40 gestational weeks) to prevent stillbirth is not clearly indicated. However, it is important to continue to measure maternal serum bile acid concentrations because they may increase with advancing gestation[14-15].
The risk of stillbirth is increased for pregnant women with total serum bile acid concentrations of ≥100 micromol/L, and so delivery should be offered to these women at 35 to 36 gestational weeks.

CONCLUSION

Ultrasonography confirms impaired gallbladder motility in ICP, supporting its role in disease pathophysiology.

SOURCE OF FUNDING: No

CONFLICT OF INTEREST

The authors report no conflicts of interest

SUBMISSION DECLARATION

This submission has not been published anywhere previously and that it is not simultaneously being considered for any other journal.

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