



Original Article

Gallbladder Disease in Pregnancy

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Abstract

Objective : To assess the prevalence & incidence of biliary sludge and stones during pregnancy and to measure the changes in gallbladder volume. **Method and Material :** The study was on 276 healthy pregnant females. Questionnaires were obtained at entry & gallbladder ultrasounds were done in each trimester & 2-4 weeks postpartum. Gallbladder volume was measured at each ultrasound. **Results :** The incidence of biliary sludge and gallbladder stones during pregnancy was found to be 14.4% and 6.67% respectively. The prevalence of gallstone disease increased with advancing gestational age and the increase in gallbladder volume was also statistically significant ($p < 0.001$). At 2-4 weeks postpartum gallstones have disappeared in 15% while sludge disappeared in 38.7%. Amongst antenatal women with gallstone disease most were asymptomatic while itching was the commonest presenting symptom. A statistically significant correlation was found between gallstone disease and advanced age, high parity, prolonged breast feeding & raised BMI. **Conclusion :** Biliary sludge and stones develop frequently during pregnancy and are usually asymptomatic.

Key words: gallbladder, biliary sludge, gallstones, ultrasonography.

Introduction

Gallbladder disease has a higher incidence in women than in men and is particularly high in multigravid women. The patient with gallbladder disease has been classically described as “fair, fat, forty and fertile”. Pregnancy is considered to be one of the major risk factor for cholesterol cholelithiasis. The incidence of gallstone disease ranges from 3.3 to 12% in pregnant

women. In women with pre-existent gallstones pregnancy may bring out symptoms, including pain and even acute cholecystitis. In the postpartum period after gallbladder motility is restored, sludge and stones may pass from the gallbladder causing biliary colic or other complications. Alternatively, postpartum changes in bile composition may favour regression of sludge or stones. Pregnant women routinely undergo real time ultrasound scanning of the pelvic area. Extension of this procedure to the upper part of the abdomen to look for gallstones in the gallbladder is easily performed and offers a unique opportunity for early diagnosis. A grey scale ultrasound has been shown to have a remarkable sensitivity and specificity for the detection of gallstone disease. It is surprising that very few investigations using cholecystosonography have been performed, to serially monitor the changes of the gallbladder during

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pregnancy. Therefore, it is useful to evaluate the gallbladder in a group of healthy pregnant women through a series of ultrasound examinations performed during the course of their pregnancy.

The present study was undertaken with the aim to determine the prevalence and incidence of biliary sludge and gallbladder stones during pregnancy and to measure the changes in gallbladder volume.

Material and Method

The present study was conducted on 276 antenatal women attending the outpatient and inpatient department of obstetrics & gynaecology in SRN & KNM Hospitals, Motilal Nehru Medical College, Allahabad during a period of one year from 2006-2007. This was a prospective study.

Before the performance of the ultrasound examination, all cases completed a questionnaire that sought pertinent demographic data and obstetric history with special emphasis on symptoms of gallbladder disease. After the obstetric ultrasound evaluation had been completed, ultrasonography of upper abdomen was performed with a standard imaging protocol using a 3.5 MHz sector scanning convex transducer to look for gallstones and biliary sludge. Gallbladder volume was determined at the time of each antenatal ultrasound.

Women were examined after fasting for at least 4 hours or having drunk only sips of water, in the supine position, in the oblique position right side up, during the change from one position to another and in the standing position. The transducer was manoeuvred to measure the length (L), width (W) and height (H) of the gallbladder in two perpendicular planes. The volume of the gallbladder was then calculated by the ellipsoid method using the formula –

$$\text{Volume} = 0.524 \times L \times W \times H$$

Sludge was defined as material of low echogenic activity that typically forms a layer in the most dependent portion of the gallbladder. It may or may not shift with postural changes but fails to produce acoustic shadowing. Stones were defined as high amplitude echoes greater than 2mm in diameter that are within the gallbladder lumen and that change with the patient's position (by gravity). Women were scheduled for an entry ultrasound during their first trimester of pregnancy if

possible. Other wise their second trimester ultrasound was their entry examination. Additional ultrasounds were then scheduled during the second trimester and/or early third trimester.

Based on findings of ultrasound the cases were divided into two groups, group I included 50 cases of gallbladder disease and group II comprised 190 cases that were found to be free from gallbladder disease. Women who developed new sludge, new stones or had progression of baseline sludge to stones were considered to have incident gallstone disease. Women with incident gallstone disease and also those who were having sludge or stones at the entry ultrasound examination had follow up after delivery & an ultrasonographic examination was carried out 2 to 4 weeks postpartum.

During the study no patient received medication to dissolve the gallbladder stones.

Results

Table 1 shows the baseline data of women in the two groups. Women with gallbladder disease showed higher mean age, parity, body mass index and longer mean duration of breast feeding as compared to those who remained free of gallstone disease.

Two hundred and seventy six women were enrolled in this study during their first or second trimester of pregnancy. Biliary sludge was found in four and gallstones

Table 1:
Baseline Data

	Gallstone disease positive (Mean)	Gallstone disease free (Mean)
Age (years)	30.24	27.56
Parity	2.18	1.13
Duration of breast feeding (months) in those who have breast fed	15.6	10.3
Body Mass Index (kg/m ²)	28.8	23.4

Table 2:
Ultrasonography findings

Trimester	No.	Stone		Sludge		Normal		Lost
		New	Old	New	Old	New	Old	
I trimester	206	-	2	-	3	201	-	
II trimester	251	2+2	2+3	14	1+1	66	160	25
III trimester	245	10+2	9	20	14	-	190	6

Table 3:
Prevalence of gallstone disease

Trimester	Stones	Sludge
First	0.97%	1.46%
Second	3.58%	6.37%
Third	8.57%	13.88%

Table 4:

Postpartum findings

3rd trimester ultrasound	Postpartum ultrasound
Sludge =34	Sludge persisted = 19 Disappeared = 12 Progressed to stone = none Withdrew from study = 3
Stones = 21	Stones persisted = 17 Disappeared = 3 Withdrew from study = 1

were found in five women at the entry examination. Fifty women developed “new” sludge, “new” stones or progressed from baseline sludge to stones (Gallstone disease positive group) and 190 women remained free of gallstone disease (Gallstone disease free group). Two cases developed “new” stones in the second trimester and 10 in the third, while four had progression of baseline sludge to stones two in each second and third trimester. Hence, the incidence rate for gallbladder stones was 2.23% and 5.08% in the second and third trimesters respectively.

In 14 (7.95%) women sludge appeared in the second and in 20(9.09%) women it appeared in the third trimester (Table 2).

Thus, the incidence of gallbladder stones and biliary sludge during pregnancy was 6.67% and 14.4% respectively.

The prevalence of sludge and stones in antenatal women as determined from the ultrasonographic findings shown in table 2 is given in table 3.

After delivery 51 women were studied within 2-4 weeks postpartum. Regression of sludge and stones was common. Gallstones disappeared in 15% while sludge disappeared in 38.7% (Table 4).

The mean volume of the gallbladders with and without abnormalities is shown in Table 5. Gallbladder volume increased with increasing gestational age by trimester and the changes in volume were statistically significant (p<0.001).

Sludge and stones were asymptomatic in most women while itching was the commonest presenting feature amongst symptomatic women. Only one woman developed cholecystitis for which she underwent cholecystectomy in the second trimester of pregnancy (Table 6).

Discussion

In present study, based on Ultrasonography done in first or second trimester and finally in third trimester the formation of stones within previously normal gallbladders or gallbladder having baseline sludge was noted in 16

Table 5:**Gallbladder Volume**

Trimester		Gallstone disease positive (Mean \pm SD)	Gallstone disease free (Mean \pm SD)
First	23.27 \pm 8.06	22.93 \pm 11.28	0.37
Second	30.91 \pm 5.70	30.26 \pm 6.74	0.08
Third	33.16 \pm 7.02	32.32 \pm 6.86	0.06

Table 6:**Presenting symptoms**

SYMPTOM	NUMBER	%
Asymptomatic	35	70
Itching	8	16
Jaundice	2	4
Pain in rt. upper quadrant	1	2
Vomiting & dyspepsia	3	6
More than one symptom	1	2

women (6.67%). Since regression of stones is relatively uncommon, this observation seems to confirm that pregnancy may predispose to the formation of biliary calculi. Our results were consistent with those of Bolukbas et al¹ who found incident stones in 6.3% of pregnant women.

All other series⁽²⁻⁵⁾ observed a lower incidence of stones. It may be because most of these studies were conducted outside India, in developed countries where women are more conscious about their body weight and have a lower parity. Also they do not breast feed for such long duration as do the majority of Indian women. Since all these are probable risk factors for cholelithiasis they may account for the lower incidence observed in their series.

The incidence of sludge during pregnancy was 14.4% in the present series. This phenomenon may be explained on the basis of increased cholesterol saturation of bile during pregnancy and associated gallbladder hypomotility leading to cholestasis. Near similar were the observations of Giangrande et al² and Bolukbas et al¹ who found the incidence to be 14.3% and 10.9% respectively.

Incidence was less in the series of Cynthia et al⁴ being 5.1% as compared to the present series, whereas it was more in the series of Maringhini et al³ (31%). The incidence was very low 0.68% in the series of Quintanilla et al⁶. This study showed a high rate of gallstone/sludge dissolution in the first month after delivery the rate of disappearance of gallstones and biliary sludge being 15% & 38.7% respectively. In the study of Maringhini et al a still higher rate of disappearance of stones (28%) and sludge (68.3%) was observed.

The fluctuating course of biliary sludge and gallstones (present during pregnancy and absent after delivery) may be attributed to the impressive modifications of bile and gallbladder motility that occur during pregnancy. The lithogenic bile and the gallbladder stasis that is present during all of pregnancy may favour the retention of bile, nucleation and crystal formation that finally generate sludge and stones. After delivery, biliary composition and gallbladder motility return to normal; thus, sludge and small stones may be eliminated or dissolved as reported previously⁴.

In the present study we measured the fasting gallbladder volume and it was observed that gallbladder volumes did not differ significantly between normal gallbladders and gallbladders with sludge or stones during the course of pregnancy itself, whereas the percentage of women with gallbladder abnormalities increased. This suggests that the pathogenesis of sludge or gallstones during pregnancy is at least partly mediated by factors other than increased gallbladder volume and subsequent stasis of gallbladder contents. Increased fasting gallbladder volume is, therefore, probably a permissive factor in gallstone formation.

Conclusion

The study concludes that biliary sludge develops fre-

quently during pregnancy, is usually asymptomatic and spontaneously disappears after delivery. Gallstones may also occur with increased frequency during pregnancy.

Utilization of real time cholecystosonography adds approximately 2-5 minutes to the time required for the ultrasound procedure. The presence of gallstones could be critical to the patient's future health and may be an indication for cholecystectomy. In as much as examination of the upper abdomen is a routine part of an intraabdominal surgical procedure similar logistic dictates that since cholecystosonography is so easily accomplished it should become a routine addition to an obstetric ultrasound examination.

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