Original Article

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Fetal Cholelithiasis - A Case Series

Anil Kumar Shukla[1], Ajit Kumar Reddy[2]

[1]Professor, Department of Radiology, Rajarajeshwari Medical College & Hospital, Kambipura, Karnataka, India.

Email: shookla07@gmail.com, ORCID ID: 0000-0002-1508-3588

[2]Associate Professor, Department of Radiology, Siddaganga Medical College and Research Institute, Tumkur, Karnataka, India.

Email: drajitreddy@gmail.com, ORCID ID: 0000-0003-0095-1394

Abstract

We do not come across many cases of fetal gall stones. Our aim of the study is to discuss the ultrasonographic algorithm that we followed evaluating fetuses during pregnancy and after birth. We also evaluated the mothers gall bladder during pregnancy and postpartum. We imaged newborns where we found gall stones, for whom antenatal scan done elsewhere did not mention about it. Our purpose is to follow an algorithm for fetuses having gall stones and their mothers.

Keywords: Ultrasonography, Fetal gallbladder, gall stones.

Corresponding Author: Dr. Anil Kumar Shukla, Professor, Department of Radiology, Rajarajeshwari Medical College & Hospital, Kambipura, Karnataka, India.
Email: shookla07@gmail.com

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Introduction

Fetal gall stones are not a common finding; however, we have seen many cases in last few years. Our aim is to identify antenatal calculi, follow up till delivery as well as regular follow-ups of newborn and infant till 1 year. We also evaluated the mother's gallbladder during pregnancy and after delivery. Fetal stones resolve without any treatment and they continue do resolve upto one year in many series.[1,2,3,4] Our aim of this study was for comprehensive evaluation of fetus, infant and mother and derive an algorithm in this situation for future evaluation.

Subjects and Methods

We evaluated 13 fetuses having gall bladder (GB) echogenic foci at gestational age of 20 weeks or above. All cases were followed up every 6 weeks till maturity of fetus. Of these 6 fetuses continued to have calculi till term scan. Other 7 fetuses at maturity did not have stones. All newborn babies were asked to come to us for Ultrasonography (USG) after birth once the babies and mothers were stable. These 6 fetuses were followed after their birth every 15 days for next 3 months, later on every 3 months till 1 year of age. At end of 1 year we observed only 2 babies continue to have gall stones.

The mothers of the fetuses were also evaluated for GB and if they were positive, they were also followed up after delivery for 1 year. Only 5 mothers were found to have gall stones at time of pregnancy. They were assessed every time fetuses were evaluated. They were advised to continue regular USG and biochemical evaluation in future life [Table 1].

We saw 2 newborn babies coming to us for USG where we found that they had GB calculi (GBC). Their antenatal USG done elsewhere did not mention of gall stone (GS). We followed them and their mother's in the same way as our other patients.

When we performed obstetric scan (OBG) scan, we first did our routine evaluation of all parameters. Then we started seeing fetuses from thorax to pelvis in transverse scan. Gall bladder was identified very easily, it can be of variable shapes and distension. Normally it's clear, anechoic and fluid filled; however, when echogenic contents are seen it is to be considered abnormal. We found echogenic contents of variable sizes, shapes, echogenicity some showing acoustic shadowing. There was no fluid noted around the GB in any cases.

Follow up scans of newborn post-delivery was done when baby and mothers were stable. They were seen before feed was given to the baby so as to maintain GB distension. Mother's were instructed to bring babies before their next feeding was due.

Results

All the 13 fetuses that had gall stones during the first scan at time of about 20 weeks were seen at 28 weeks and 36 weeks of gestation. We found only 6 patients had gall

stones before delivery. These 6 newborn babies were asked to come for review scan after few days once baby and mother had settled down. They were followed up and by end of one year all babies were without any calculi. All Mother's were also followed up for one year and only two of them showed persistence of calculi [Table-2].

We saw GB foci in various forms -1) Single echogenic focus 2) Multiple echogenic foci 3) Numerous tiny foci 4) Decreasing with passage of time 5) No change in number upto six months 6) Decrease in number after six months 7) Disappear by one year in majority.

Fetal mothers were also seen for their GB same time when fetus was assessed, findings were noted as – 1) Normal 2) Numerous tiny foci 3) Sporadic 4) Requiring follow up.

Individual results case wise from normal fetal gall bladder (FGB), fetal GB calculi, post delivery babies and their mothers.

Case 1- Normal fetal gall bladder is to be identified in all the cases. We should do it first in transverse scan starting from thorax to upper abdomen. It can be identified by seeing the liver on right side of spine as an elongated anechoic area majority of time in its tissue [Figure 1]. If GB is well distended or partially distended it can be well seen and can be differentiated from vessels easily. However if in doubt we use Doppler to separately identify vessels.

Case 2- This fetus had multiple echogenic foci in the lumen of GB first seen at 32 weeks of gestation. These foci were freely mobile. Review of baby was done post-delivery, once baby was stable clinically. This baby was seen on 2nd day post-delivery. Gall bladder showed multiple echogenic foci. Baby was evaluated again after 30 days which showed same findings. After 3 months less foci were seen. Scanning at 6 months showed further reduction in foci in gallbladder. Scanning at one year showed no foci [Figure 2 a,b,c,d,e,f]. Mother of the baby was evaluated when fetus was seen which showed micro calculi in her gall bladder. She was followed up 6 monthly and did show disappearance of micro calculi at the end of 1 year.

Case 3- The fetus was matured, and we observed gbc few days before delivery. After four days post-delivery baby was evaluated again for gbc which were more or less the same. Next visit of baby was after 3 months which did show few echogenic foci [Figure 3 a,b,c]. Mother of baby did not show any gbc.

Case 4- First time this fetus was evaluated at 32 weeks of gestation, this fetus gall bladder was contracted with few echogenic foci. Baby's gall bladder two days post-delivery showed few calculi. Review after three months still showed multiple calculi [Figure 4 a,b,c]. Mother of baby did not show any gall bladder calculi.

Case 5- This fetus was evaluated at about 24-weeks gestation. Gall bladder was contracted and full of echogenic foci. Post delivery review was done when baby was seven days old which showed persistent gall bladder foci [Figure 5 a,b]. Mother of baby did not show any gall bladder calculi.

Case 6- This fetus was evaluated at about 28-weeks' gestation showed partially distended gall bladder with echogenic foci. Seven days after delivery baby's gall bladder showed multiple tiny calculi [Figure 6 a,b].Mother of baby did not show any gall bladder calculi**.**

Case 7- This fetus was evaluated at about 28-weeks' gestation showed partially distended gall bladder with multiple echogenic foci [Figure 7]. Mother of baby did not show any gall bladder calculi**.**

Case 8-This fetus was evaluated at about 24-weeks' gestation which showed a contracted gall bladder with few echogenic foci [Figure 8]. Mother of baby did not show any gall bladder calculi.

Case 9- This fetus was evaluated at about 28-weeks' gestation, gall bladder showed few echogenic foci [Figure 9]. Mother of baby did not show any gall bladder calculi

Case 10- This fetus was evaluated at about 24-weeks' gestation, gall bladder showed single echogenic focus of about 14 mm [Figure 10]. Mother of baby did not show any gall bladder calculi**.**

Case 11- This fetus was evaluated at about 24-weeks' gestation, contracted fetal gall bladder and packed with echogenic foci [Figure 11]. Mother of baby did not show any gall bladder calculi.

Case 12- This fetus was evaluated at about 28-weeks' gestation, gall bladder showed few echogenic foci [Figure 12]. Mother of baby did not show any gall bladder calculi**.**

Case 13- This fetus was evaluated at about 32-weeks' gestation gall bladder was packed with echogenic foci [Figure 13]. Mother of baby did not show any gall bladder calculi.

Case 14- This fetus was evaluated at about 38-week gestation, gall bladder packed with echogenic foci [Figure 14]. Mother of baby did not show any gall bladder calculi**.**

Case 15- This case was brought to us as a 20 days old baby, no antenatal scanning was done by us. Fetal scanning report done elsewhere failed to mention anything about gall bladder calculi. Baby's gall bladder however showed echogenic foci [Figure 16]. Mother of baby did not show any gall bladder calculi**.**

Case 16- Baby was brought to us when 20 days old and gall bladder showed numerous tiny echogenic foci. After 3 months baby's gall bladder showed reduction in number of foci. [Figure 17a,b]. Mother of baby did not show any gall bladder calculi**.**

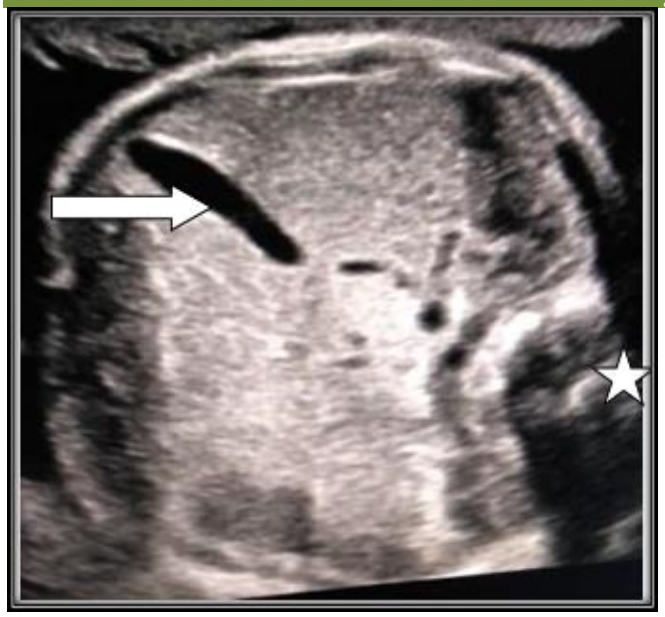

Figure 1: Normal fetal gall bladder. Normal fetal gall bladder is seen as anechoic elongated area (arrow) which is seen on right side of spine (star) surrounded by liver.

Case 17- Mother was examined at the same time when we found fetus gall bladder is showing numerous tiny micro calculi. She never new about it, she was followed up whenever we assessed her baby and in one year her gall bladder was free of the micro calculi [Figure 17].

Case 18- Mother was examined at the same time when we found fetal gall bladder micro calculi. She never new about it, she was followed when ever we assessed her baby and in one year her gall bladder got free of the micro calculi [Figure 17].

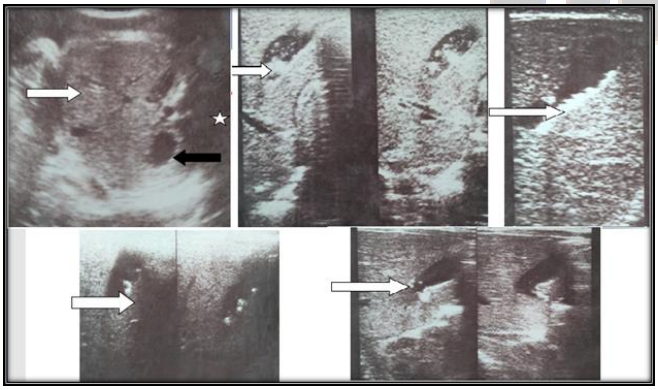

Figure 2: a) Fetal GB b) 2 days after birth showing multiple GB focci c)30 days after birth d) 3 months e) 6 months f) 1 Year.

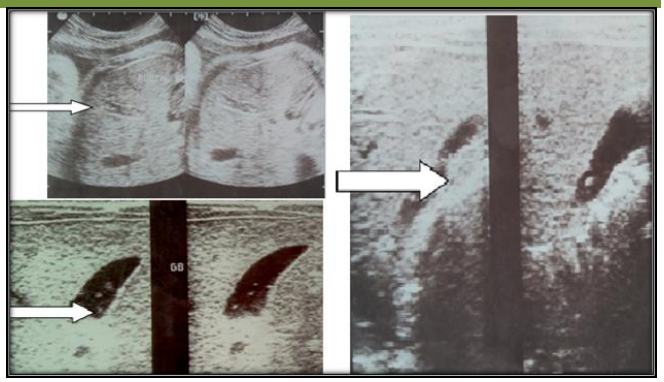

Figure 3: a) Fetal – few gb echogenic foci b) after birth c) after 3 months.

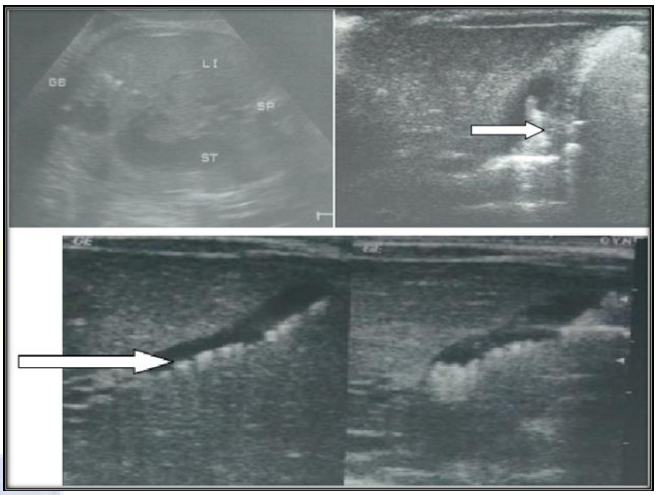

Figure 4: a) Fetal Gb partially distended with few echogenic foci b) @ days after birth c) Baby is 3 months old.

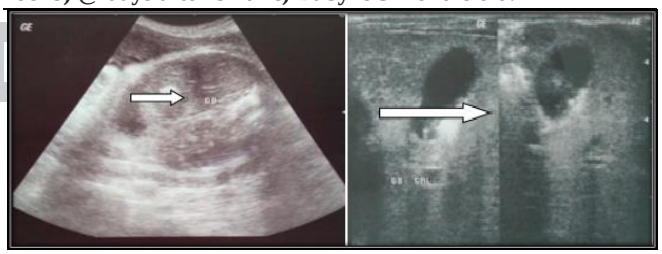

Figure 5: a) Fetal Gb dense shadowing b) baby after 7 days.

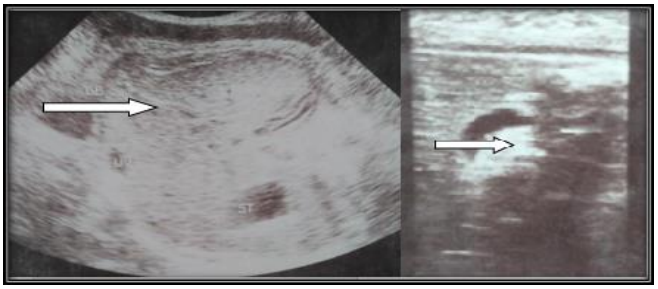

Figure 6: (a) Fetal gb foci (b) Baby after 7 days showing few gb echogenic foci.

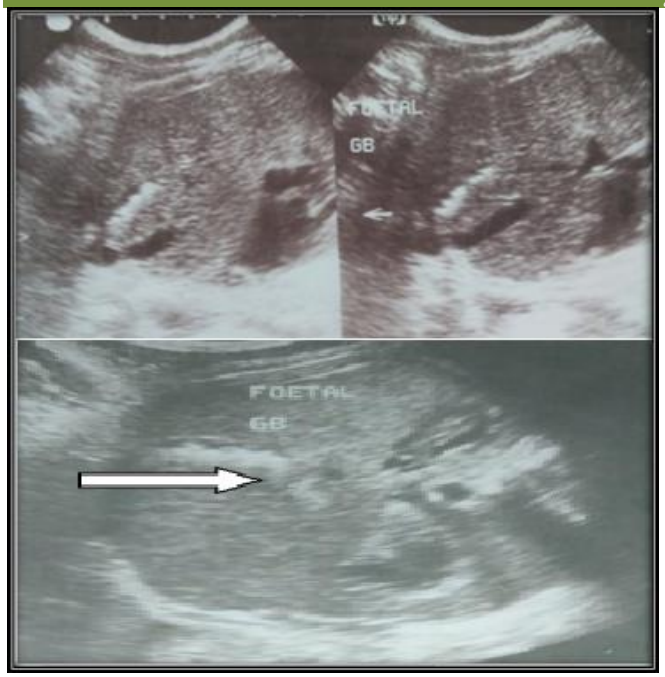

Figure 7: Multiple Fetal Gb foci

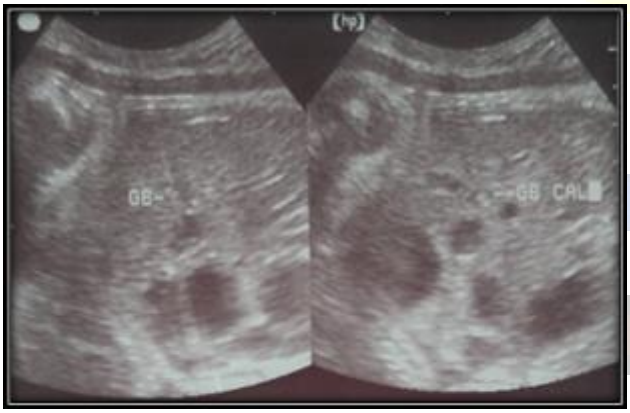

Figure 8: Fetal Gb is contracted with few foci

Figure 9: Fetal GB showing few echogenic foci.

Figure 10: Fetal GB is showing single big echogenic focus.

Figure 11: Fetal GB is packed with echogenic foci

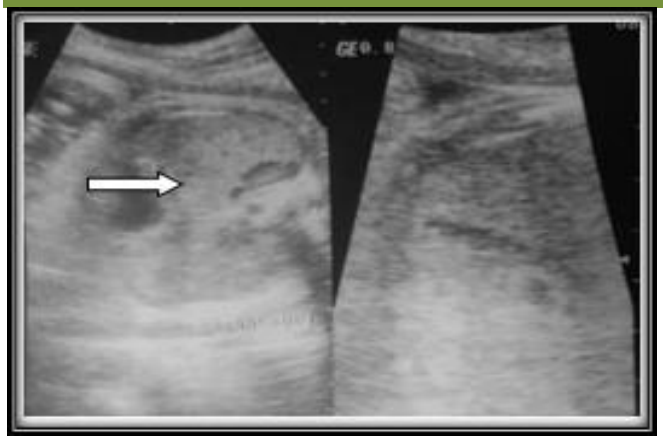

Figure 12: Fetal GB is packed with echogenic foci

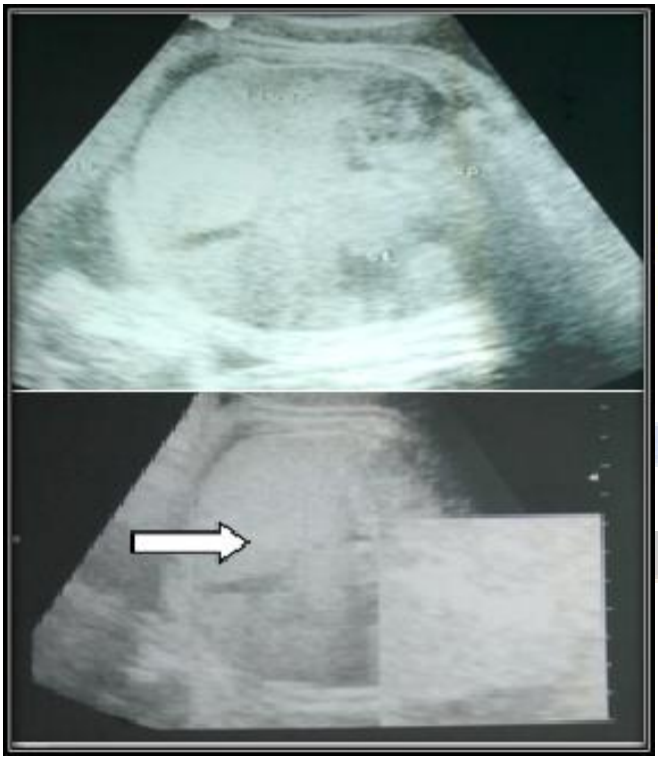

Figure 13: Fetal GB is packed with echogenic foci

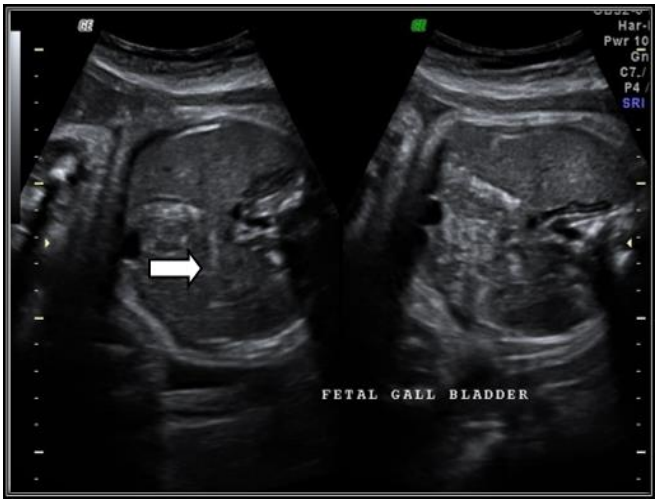

Figure 14: Fetal GB is packed with echogenic foci.

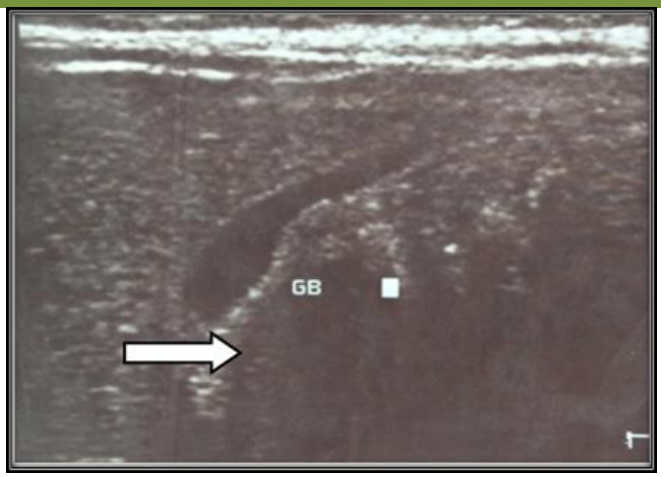

Figure 15: Baby 20 days old with few echogenic foci in GB

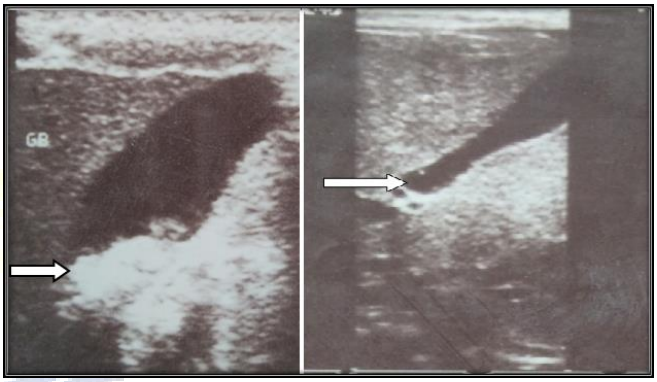

Figure 16: (a) Baby 20 days old with few echogenic foci in GB (b) after 3 months reduction in number of GB foci

Discussion

Definition - Gallstone disease refers to the condition where gallstones are either in the gallbladder or common bile duct. The presence of stones in the gallbladder is referred to as cholelithiasis, from the Greek "chol" = (bile) + "lith"= (stone) + "iasis"= (process).[5]

Risk factors can be birth control pills, pregnancy, family history, obesity, diabetes, liver disease, rapid weight loss. The Worldwide 10-15 % adults develop this disease.[5]

An ultrasonographic evaluation of fetal gall stones was well described by Brown. Gall stones in fetus was first reported by Potter in 1928, while doing autopsy of 2 fetuses. Spence in 1941 also described neonatal cholelithiasis.[1,2,3] All echogenic foci in gall bladder tend to resolve with advancement of pregnancy and the same was observed by us. There was no predisposing factor which was seen or any biochemical changes observed in maternal evaluation.

Management of obstetric care will not be affected as no abnormal parameters clinical or biochemical were observed in mother.[1,2] Retroplacental hematoma and increased cholesterol secretion may be the cause of fetal gallstone formation.[2] Hemoglobin's conversion to bilirubin may be another cause of fetal gall stones.[4]

There is no gender predilection for fetal gall stones. Resolution of fetal gallstones in all cases was not observed, in only few cases after delivery did it seem to resolve

without any surgical correction within one year.

The gallstones in fetuses normally tend to resolve by maturity of the fetus if evaluated at term. If not, then by 1 year majority of them resolve.[6,7,8]

Fetal GB – To be assessed at the time of anomaly scan. GB findings categorized as – a) Distended b) Contracted.

GB Foci -1) Single echogenic focus 2) Multiple echogenic foci 3) Numerous tiny foci 4) Decreasing with passage of time 5) No change in number upto six months 6) Decrease in number after six months 7) Disappear by one year in majority.

Mothers – 1) Normal 2) Numerous tiny foci 3) Sporadic 4) Requiring follow up.

The incidence of fetal gall stone is about 0.5 to 0.7 per 10,000 live fetuses. We have had an experience of over 35 years doing USG, but we have seen sporadic cases. Observation of gall bladder in fetus by 20 weeks will appear in form of sludge, slight echogenic foci, or foci with shadowing.[7,8,9,10,11,12]

We have seen 2 newborn fetuses showing gall stones which were not seen by us during fetal life, their previous fetal life USG report did not show any mention of GBC, suggesting the possibility that it might have been missed.

Pathophysiology- In addition, increased levels of the hormone estrogen, as a result of pregnancy or hormone therapy, or the use of combined (estrogen-containing) forms of hormonal contraception, may increase cholesterol levels in bile and also decrease gallbladder movement, resulting in gallstone formation.[5]

The presence of gallstones in the fetus does not alter the fetal prognosis or obstetrical management since complete resolution is seen in most of the cases in late third trimester or neonatal period which may be due to either spontaneous passage of gallstones during early neonatal period or dilution of cholesterol crystals with postnatal hydration.[10]

In our Indian setup when a lady is pregnant, she is asked to consume heavy cholesterol rich food. May be that is seen as the cause of diagnosing more cases of fetal GS. Diet, heavy meals, fiber, high protein, calorie were not seen in all pregnant women. Causes like diet/drugs for infertility does not matter as we have seen sporadic cases too.

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