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# Fetal Anomalies

Dr. Sabrina R. Quddus.

Ultrasound has revolutionizxed the diagnosis of fetal anomalies. The imaging techniques of Ultrasonography has lately become much advanced like high-resolution 2D images, 3D scanning and Doppler etc. aiding the sonologists and the sonographers to visualize more clearly the fetal organs and structures. 3D Ultrasound offers new advantages to those families at risk due to having previous offsprings with specific malformations (cleftlip, micromelia etc.) by confirming normalcy with the present gestation. Considering the potential of this new technology, early diagnosis of ectopia cordis, phocomelia, hygroma colli, encephalocele and neural tube defects are exmples that will afford still unimagined future possibilities.1

Another advancement in fetal imaging is that a sonologist can now choose th focus the Ultrasound beam at a certain depth thus clearly visualizxing the organ or region of interest. The ability of Ultrasonography to detect intrafetal structures also depends on a balance between spatial resolution and contrast.2 A smaller sized structure can be visualized better and more easily due to its contrast to the surrounding.

Ultrasonography is a tomographic technique. Therefore appropriate position of the fetus is needed but a sonologist has no control over the fetal position, nor he/she has control over body habitus of the patient or the amount of liquor amnion eg. fetal kidneys can best be visualized in the prone position of the fetus but urinary bladder can not be well visualized then. A very thick and fatty maternal abdominal wall or oligohydramnios can compromise the image quality.

Pathological structures are better visualized than normal structures eg. A hydronephrotic kidney and distended bowel loops. But it is most difficult to be certain that a structure is missing eg. The stomach or portion of an extremity. Some stuctures can also be confused with others eg. A dilated tortuous ureter or multicystic enlarged kidneys can be confused with fluid filled bowel loops.

Fetal well being is the single most important information that the expecting parents and their close relatives want from the ultrasound scan. It relieves a lot of anxiety and gives them instant happiness. If a fetal anomaly is detected by ultrasonography the gynecologist as well as the parents can get ready to face it. They can make the decision whether to terminate the pregnancy or not. Mode of delivery of such cases is also influenced by the presence and kind of fetal malformation. Deliveries in special centers can be arranged with the facilities to manage and treat with imediate surgery of the neonate if needed.

Gross birth defects can usually be detected with relative case but to detect subtle abnormalities a good knowledge of obstetrics, genetics and fetal anatomy is needed. A detailed scan is needed by an expert sonologist in those at risk of fetal anomalies. If an abnormality is suspected or confirmed at the “level I scan”, the patient undergoes a “level II scan”. The level II scan, is also known as the “specialized” or targeted imaging for fetal anomaly (TIFFA) scan.3

In our country we have high resolution good quality real-time scanners, we have three dimensional scanners, fetal echocardiography, Doppler ultrasound but in invasive techniques we lag behind like amniocentesis under ultrasound guidance, percutaneous umbilical cord sampling, Chorionic villus sampling etc. In intrauterine treatment by fetal surgery also we are relucant to

take even the pioneer steps eg. Decompression of a distended fetal urinary bladder to relieve hydroureter and hydro-nephrosis to allow the kidneys to develop properly.
Thererofe it is high time that the expert sonologists of our country should come forward and take first steps in these revolutionary invasive procedures, so that the younger generation will also get the guidance and courage to carry on the work further ahead.

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# Correlation of Fetal Head Circumference with Menstrual Age in Bangladesh

Sabrina R. Quddus

The current prospective, cross sectional study was designed to determine fetal Head Circumference with its 2 standard deviations and its relation with menstrual age in Bangladeshi population. The study population consisted of 681 obstetric sonograms from 13 to 41 weeks' gestation in patients with optimal menstrual histories. The use of this table is recommended in clinical practice, to accurately determine mean fetal head circumference at each gestational age in Bangladesh. At 13 weeks the HC was found to be 86 mm +_ 10mm, at 20 weeks it was 175mm +_ 15mm, at 28 weeks it was 259mm +_ 22mm, at 36 weeks it was 318 mm +_ 24mm, at 38 weeks it was 327 mm +_ 26mm and at 40 weeks it was 333 mm +_ 26mm.

**Key words:** Head circumference, menstrual age, Bangladesh.

Fetal head circumference (HC) is an important parameter, which can be used not only to determine fetal age but also fetal growth and the type of growth restriction- symmetrical or asymmetrical. Prenatal compression of the fetal skull is common. It occurs more often in fetal malpresentation, such as breech, or in conditions of intrauterine crowding, such as multiple pregnancies. The fetal skull can also be compressed in vertex presentations without any obvious reason or as a result of an associated uterine abnormality such as leiomyoma.[1]

Because the biparietal diameter of the head can be misleading in cases associated with head shape changes (e.g. dolicocephaly)2 the HC is the measurement of choice for evaluation of head growth in utero3 and also for determining gestational age of fetus. In symmetric Intrauterine growth retardation (IUGR), fetal head size will frequently be compromised early in pregnancy and when dates are known unequivocally, a HC below the third percentile for age is cause for concern. In asymmetric IUGR, the growth of fetal head is typically normal until very late in pregnancy. For this reason measurement of the head in such cases will typically fail to diagnose IUGR early enough to impact clinical management.[4] The measurement of HC is valuable because the head-to-trunk ratio will allow the diagnosis of asymmetric IUGR.[5]

Various studies have determined that our fetal measurements are smaller than the Caucasian fetal measurement.6-11 Therefore we need reference tables of our own population. This prospective study was designed to determine the relationship between menstrual age and fetal head circumference with 2 Standard deviations (2SD) in a normal population.

A normative table for die fetal Head Circumference of our population will be produced.

## MATERIALS AND METHOD

The study population consisted of 681 healthy gravid women, studied in a cross sectional fashion from 13 to 41 weeks gestation. Their age ranged between 20 to 36 years and they belonged to the middle income group. All study subjects were Bangladeshis (Bangalees). The criteria for inclusion in the study was- Regular periods, no oral contraceptive for 3 months prior to

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conception, all patients had a known last menstrual priod that was consistent with an early clinical examination. All women had antenatal care started prior to 20 weeks gestation. No malnutrition or any medical, surgical or obstetric complication. On entry, all patients underwent a complete ultrasonographic examina-tion including measurements of the fetal biparietal diameter (BPD), Head circumference (HC), abdominal circumference (AC) and femur length (FL) using standard methodology. All circumference measurements were obtained by tracing the appropriate circumference using an electronic digitizer. A 3.5 MHz electronic curvilinear transducer was used for all examina-tions. Values were expressed as mean and 2 Standard deviations (2SD, sample) for the estimate in the tables, both in mm.

The HC was obtained at a level that shows a smooth symmetric head, a well-defined midline echo, Thalami, the cavum septi pellucidi, and the third ventricle, as for measuring a BPD. To obtain an accurate HC measurement, 60% to 70% of the skull outline should he displayed on the screen.12 Calipers that open to the outline of fetal head were used.

## RESULTS

Table I: Correlation of menstrual age with Fetal circumference in Bangladesh.

| Gestational age (wks) | Head circum ference (mm) | 2 SD (mm) | Gestational Age (Wks) | Head circumference | 2SD (mm) |
|---|---|---|---|---|---|
| 13 | 86 | 10 | 27 | 250 | 18 |
| 14 | 99 | 10 | 28 | 259 | 22 |
| 15 | 112 | 10 | 29 | 268 | 22 |
| 16 | 125 | 10 | 30 | 276 | 24 |
| 17 | 138 | 15 | 31 | 284 | 24 |
| 18 | 151 | 15 | 32 | 292 | 24 |
| 19 | 163 | 15 | 33 | 300 | 24 |
| 20 | 175 | 15 | 34 | 308 | 24 |
| 21 | 187 | 15 | 35 | 313 | 24 |
| 22 | 198 | 15 | 36 | 318 | 24 |
| 23 | 209 | 15 | 37 | 323 | 24 |
| 24 | 220 | 18 | 38 | 327 | 26 |
| 25 | 231 | 18 | 39 | 330 | 26 |
| 26 | 241 | 18 | 40 | 333 | 26 |
| | | | 41 | 333 | 26 |

## DISCUSSION

The two most often used charts of HC against gestational age are very similar.13,3 They both show that changes in HC, like BPD, tend to tail off towards term but the standard deviations are much less so the likelihood of identifying the growth retarded fetus may be higher.14 In this study too the changes in HC tailed off towards term from 13 mm per week at 13 weeks to 3 mm per week at term.

No study on fetal HC has so far been done on our population so correlation could not be made. In a study by Hadlock et al at 40 weeks HC was 350 mm,15 in Hansmann's study it was 349 mm,16 in another of Hadlock's study it was 346 mm,17 and in a study by Deter et al it was 359 mm.13 Whereas in this study it was 333 mm at 40 weeks menstrual age. This means there is a difference of 13 to 26 mm between fetal HC in Caucasian population and in Bangladeshi population at term. In one study by Hadlock et al 2SD throughout was +_ 19 mm.3 and in another study in increased to +_ 30 mm at term.17 Whereas in this study it gradually increased to +_ 26 mm at term.

In Hadlock et al's study 333mm was at 37 Weeks 3 days and in Hansmann's it was 35 weeks at 332 mm., whereas it was 333mm at 40 weeks in this study. This shows that there is a discrepancy of 3 to 5 weeks from our population near therm. therefore for accurate determination of fetal head growth and gestational age we need tables prepared on our own population.

## CONCLUSION

681 healthy gravid women were scanned from 13 to 41 weeks menstrual age. The head circumference increased gradually with menstrual age from 13 mm per week to 3 mm per week at term. The 2 SD also increased from +_ 10 mm to +_ 26 mm at term. At 13 Weeks the HC was 86 mm +_ 10 mm, at 20 weeks it was 175 mm +_ 15 mm, at 28 weeks it was 259 mm +_ 22mm, at 36 weeks it was 318mm +_ 24 mm, at 38 weeks it was 327 mm +_ 26mm and at 40 weeks it was 333 mm +_ 26mm.

As there is a discrepancy of 13 to 26 mm between HC at term in Caucasian population and Bangladeshi population. The normalcy of fetal head growth should therefore be judged against local population standards such as that given in Table I. More such studies on a larger study population should be undertaken.

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# Imaging of Fetal and Neonatal Hydronephrosis

M A. Taher

We found five cases of age range 30 weeks` gestation to 6 years suffering from fetal and neonatal hydronephrosis as confirmed by ultrasonography (3.5 to 8 MHz). The older boys and the girl also had radionuclide renograms under computerized gamma camera using technetium 99 metastable diethylene triamine pentaacetic acid (Tc 99m DTPA). Some of the patients improved by uro-surgical procedures as shown by clinical and sonographic follow-ups.

**Key Words :** Kidney, Ultrasound, Radionuclide Renogram.

Since most neonates are dehydrated and renal function is not optimal in the neonate, early imaging may underestimate the amount of obstruction present [1]. Instead, postnatal ultrasound should be performed at the end of the first week of life. If the renal pelvis continues to measure greater than 10 mm, we refer our patients to a pediatric surgeon or urologist. Although significant congenital hydronephrosis may result from vesicoureteral reflux, the usual cause is urinary tract obstruction. The most common site of obstruction is the ureteropelvic junction, followed by the ureterovesical junction [2]. Bladder outlet obstruction is often an obvious ultrasound diagnosis since the markedly enlarged, thick-walled bladder is readily seen. A variable degree of hydronephrosis is usually also seen. Bladder outlet obstruction occurs most commonly in male fetuses who are subject to the development of posterior urethral valves, and these bladders often fill the fetal abdomen. The proximal urethra is usually dilated as well, giving the bladder a pear or keyhole shape. Renal findings vary in fetuses with posterior urethral valves. In some cases, the kidneys are markedly hydronephrotic but otherwise normal in appearance. At the opposite extreme, the kidneys are small and echogenic, secondary to obstruction-induced cystic dysplasia. Complete bilateral urinary tract obstruction occurring in utero is fatal in postnatal life, and in some cases intervention in utero is attempted. Bladder drainage with urinary electrolyte analysis (for prognostic purposes), and placement of vesico-amniotic shunts (when renal function seems reasonable) have been attempted with variable success [3]. Hydronephrosis can be caused also by congenital obstruction of the ureteropelvic junction (PUJO), by ureteric stenosis or a calculus, or from external pressure on the ureters by a retroperitoneal or abdominal mass [4].

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## CASE REPORT

**Case 1 :** A boy of age 46 days was brought to this centre with the complaints of dribbling narrow stream of urine and swelling of lower abdomen. Ultrasonography (USG) revealed distended urinary bladder and bilateral hydronephrosis. The baby was operated for removal of posterior urethral valve and improved clinically as well as sonographically six months of age. Long-term follow-up is being done.

**Case 2 :** A boy of age 5 months was sent to this centre with a palpable lump in left loin. The referring physicians asked for sonogram. Findings show normal right kidney and hydronephrotic left kidney. A radionuclide renogram was requested by the uro-surgeon, which revealed normally functioning right kidney and obstructive features in left : arterial and secretary phases were depressed, and clearance was very slow.

**Case 3 :** A girl of age 6 years was sent to us by a pediatric surgeon for renogram. According to her father`s statement she had a lump on right side of abdomen since birth and it was growing gradually. Ultrasonography revealed grossly obstructed right renal tract (hydronephrosis and hydrureter) without any calculus and normal-looking left kidney. Tc 99m DTPA renogram revealed a normally functioning left kidney and non-functioning right kidney- - all phases of renal functions were grossly depressed in right side.

**Case 4 :** A boy of age 2 years 6 months was sent to us by a pediatric surgeon for renogram. His father had nephrectomy for hydronephrosis 3 years back. The boy`s mother noticed a lump in his abdomen since birth, and USG on 29 Oct. `03 showed congenital hydronephrosis on left side. Tc 99m DTPA renogram showed normally functioning right kidney and a swollen faint ring in the region of left kidney suggestive of poor function . The baby could not have pyeloplasty, however, he had left-sided nephrectomy on Oct. 2004.

**Case 5 :** Fetal hydronephrosis was diagnosed by ultrasonograaphy (USG) at 30 weeks of gestational age. Post-natal ultrasound (8 MHz) and radionuclide renogram (Tc 99m DTPA) at age 1yr, 1moth confirmed gross hydronephrosis and poor function in right kidney and mild pelvicaliectasis in left kidney. The parents of the boy were advised to have experts` opinion regarding pyeloplasty as soon as possible. His sisters and other close relatives had no history of kidney disease and the child was asymptomatic.

## DISCUSSION

Ultrasound is a popular and safe imaging modality in the neonates, as it is non-invasive and non-ionizing in nature. Radionuclide renogram is much less risky than intravenous urography (IVU), however, its interpretation is sometimes difficult--failure to visualize a kidney by Tc 99m DTPA does not preclude recoverable renal function5. A case of calcification of the arteries and obliterative endarteritis associated with hydronephrosis in a child aged six months was reported by Bryant and White in 19016. Complications of idiopathic arterial calcification of infancy include hematuria, hypertension, congestive cardiac failure and nonimmune hydrops7. This condition is usually fatal8, although spontaneous resolution of the calcification has been reported in one survivor9. A good news is that sonographic mild pyelectasis is seen in 3% of normal fetuses10. Although anatomic severity of hydronephrosis can be detected in utero by USG, relative functional renal impairment, important for surgical planning, cannot be determined without postnatal renal radionuclide scans11. Serial assessment of renal function form an important aspect of pediatric urology, particularly in children with hydronephrosis, vesicoureteral reflux and chronic pyelonephritis who may require repeated evaluation both pre-and post-operative12. In a child under 2 years of age the injection is via a pedal vein so that we may evaluate the possibility of inferior vena cava (IVC) occlusion. The child must not Valsalva during the injection or the IVC will occlude due to increased physiological intra-abdominal pressure13. Homsy et al showed that diuresis renograms performed in early infancy correlated poorly with follow-up examination at 3 to 6 months and suggested that the wash-out response on the initial examination should not be used to determine the need for surgery14. Therapeutically Koff and Campbell concluded that most infants whose hydronephrosis was discovered by prenatal ultrasound could be managed nonoperatively15. Gordon et al questioned the role of surgery because many neonatal hydronephrotic kidneys improved spontaneously and those that did have surgery did not show significant functional improvement16.

Since 85% to 90% of affected neonates may appear entirely normal on physical examination, prenatal detection of ureteropelvic junction obstruction permits early therapy of a correctable lesion that may otherwise remain unrecognized for years17. Obstruction frequently occurs at the ureteropelvic junction, the site of the first bifurcation of the ureteral bud. This represents the most common cause of neonatal hydrnephrosis18.

Computed tomography (CT) is indicated if sonographic findings are positive ; however, the advantage of avoiding CT is not trivial. CT is the largest contributor to medically induced ionizing radiation. Reports from one North American trauma center indicated that in 85% of pregnant patients treated, exposure exceeded the maximum recommended by the American College of Obstetricians and Gynecologists19. In That series, pregnancies were unsuspected in 11% of pregnant patients ; those patients had 100% fetal mortality. Fetal death was due to spontaneous abortion in 6 of 9 patients and elective abortion based on radiation counseling in 3 of 9.

## CONCLUSION

We hope that sonography and isotope renography may reduce the number of CT and nephrectomies, rather the babies should have timely pyeloplasty.

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# Ultrasound evaluation of autoimmune thyroid disease

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Total 231 clinically suspected autoimmune thyroid disease (AITD) cases were evaluated by ultrasound in Centre for Nuclear Medicine & Ultrasound, Khulna during the period from January 2003 to December 2004. The aim of of, study was to see the usefulness of ultrasound in autoimmune thyroid disease. Out of 231 cases, 92 (39.8%) were diffuse goitre, 5 (2.2%) were multinodular goitre, 7 (3%) were solitary nodule and 127 (55%) were normal thyroid gland. The echogenicity of the thyroid gland was normal in 33 (14.3%) cases and reduced/hypoechogenicity in 198 (85.7%) cases respectively. Regarding the functional status of thyroid gland, 144 (62.3%) were hypothyroidism, 26 (11.3%) were hyperthyroidism, 23 (9.9%) were sub-clinical hypothyroidism, 5 (2.2%) were sub-clinical hyperthyroidism and 33 (14.3%) were euthyroid and regarding the antibody status, 55 (23.8%) were positive and 176 (76.2%) were negative for thyroid microsomal antibody (TMAb). It was also found that the mean serum total T4 level was significantly lower in hypoechoice group than in normal echo group (p less than 0.01) and TMAb titre is higher in hypoechoice group than in normal echo group (p less than 0.001). Thus it was seen that ultrasound is useful in identifying patients with possible AITD, to exclude the coexistence of thyroid nodules, being useful in epidemiological studies and having an important contribution in the diagnosis of thyroid disorders.

**Key words:** Autoimmune thyroid disease, Ultrasound, Echogenicity, Thyroid microsomal antibody

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Autoimmune thyroid disease (AITD) is a triad of thyroid disorders-Hashimoto's thyroiditis, Graves' disease and primary thyroid atropy1. Hashimoto's thyroiditis is the most common cause of goitrous hypothy-roidism and affects women more often than men between the ages of 30 and 50. Graves' disease is the most common cause of spontaneous hyperthyroi-dism in patients younger than age 40 and a striking preponderance in women, presented with diffuse goitre, ophthalmopathy and rarely pretibial myxedema. Primary thyroid atropy is the end stage of autoimmune thyroiditis where goitre absent or gone unnoticed and occurs more common in women than in men between the ages of 40 and 601, Presence of thyroid autoantibodies (Thyroid microsomal antibody and antithyroglobulin antibody) in blood, usually in high titre, confirm the diagnosis though the frequency varies with higher frequency in Hashimoto's to lower frequency in primary thyroid atropy1. Recently some researchers worked with ultrasound for diagnosis of AITD as AITD is mirrored by hypoechoice pattern in ultrasound2,3,4,5. Ultrasound is a non-invasive, reproducible, easily available and cost effective imaging modality now becoming the first line of investigation for evaluation of thyroid disorders6. Here we attempted to see the usefulness of ultrasound in autoimmune thyroid disease.

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## MATERIALS AND METHODS

Between January 2003 to December 2004, we evaluated 231 cases of autoimmune thyroid disease by ultrasound in Centre for Nuclear Medicine & Ultrasound, Khulna. Detailed history especially family history and physical examination was done in all cases. Ultrasound, thyroid microsomal antibody (TMAb) and thyroid hormones of all patients were done. Ultrasounds were done using Toshiba Just Vision 400 machine equipped with 7.5 MHz linear probe. Patients were grouped as normal echo group and hypoecho group according to the echogenicity of the thyroid gland. TMAb were done by RIA method using kit from China Institute of Atomic Energy, Beijing. In our laboratory TMAb>20% is considered as positive. T3 and T4 were done by RIA and TSH was done by IRMA method using kit from China Institute of Atomic Energy, Beijing. Thyroid scan, radioactive iodine uptakes (RAIU) and fine needle aspiration cytology (FNAC) were done in selected cases.

## RESULTS

A total of 231 cases of autoimmune thyroid disease were evaluated of which 58 (25.1%) were male and 173 (74.9%) were female with female male ratio 2.98:1 and age ranged from 6 years to 70 years with mean 33.52 +_ 14.45 years. Age and sex distribution of the patients was shown in table-I. Ultrasound findings of AITD were shown in table-2. It was found that out of 231, 92(39.8%) were diffuse goitre, 5(2.2%) were multinodular goitre, 7 (3%) were solitary nodule and 127 (55%) were normal thyroid. Ultrasound echopattern, functional statuses of thyroid glad and thyroid autoantibody (TMAb) status were shown in table-3. It was found that out of 231, 198 (85.7%) showed hypoecho pattern and 33 (14.3%) showed normal echo pattern. Regarding the antibody status, 55 (23.8%) found thyroid microsomal antibody (TMAb) positive and 176 (76.2%) TMAb negative. Regarding the functional status of the studied cases, 144 (62.3%) showed hypothyroidism, 23 (9.9%) sub-clinical hypothyroidism, 26 (11.3%) hyperthyroidism, 5 (2.2%) sub-clinical hyperthyroidism and 33 (14.3%) euthyroidism. Table-4 showed the mean T4 and mean TMAb of hypo echo group and normal echo group of AITD. It was found that mean T4 of hypo echo group was lower than normal group ( 46.13 + 27.52 nmol/L Vs 94.64 + 34.04 nmol/L) and mean TMAb of hypo echo group was higher than normal echo group (35.67 + 20.80% Vs 10.72 +16.69%).

**Table-1: Age & Sex Distribution of Autoimmune Thyroid Disease**

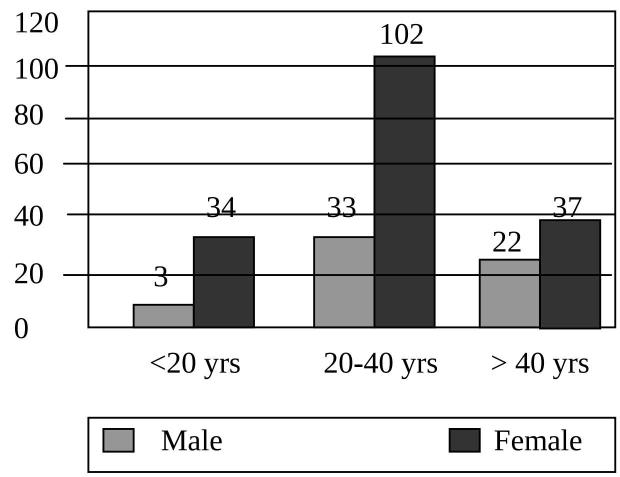


**Table-2: Ultrasound findings of autoimmune thyroid disease**

| Findings | Number of patients | Percentage |
|---|---|---|
| Diffuse goiter | 92 | 39.8% |
| Multinodular goiter | 5 | 2.2% |
| Solitary nodule | 7 | 3% |
| Normal thyroid gland | 127 | 55% |

**Table-3: Echo pattern, antibody status and thyroid functional status**

| Condition | Number | Percentage |
|---|---|---|
| Echo pattern | | |
| Normal echo | 33 | 14.3% |
| Hypo echo | 198 | 85.7% |
| Antibody status | | |
| TMAb positive | 55 | 23.8% |
| TMAb negative | 176 | 76.2% |
| Thyroid functional status | | |
| Hypothyroidism | 144 | 62.3% |
| Sub-clinical | 23 | 9.9% |

| | | |
|---|---|---|
| hypothyroidism | | |
| Hyperthyroidism | 26 | 11.3% |
| Sub-clinical hyperthyroidism | 5 | 2.2% |
| Euthyroidism | 33 | 14.3% |

**Table-4: Mean T4 and mean TMAb of normal echo group and hypo echo group**

| Echo pattern | mean T4 (nmol/L) | mean TMAb (%) |
|---|---|---|
| Normal echo | 94.64 + 34.04 | 10.72 + 16.69 |
| Hypo echo | 46.13 + 27.52 | 35.67 + 20.80 |

## DISCUSSION

Thyroid gland disease is most common endocrine disease in Bangladesh7. Iodine deficiency is one of the most important causes for such. As Bangladesh is the largest delta of the world, iodine deficiency disorders (IDD) exists in the country in the hyper endemic form8. Autoimmune thyroid disease is another aspect of thyroid disorders that can affect any individual at any time, which can be the result of hypothyroidism and hyperthyroidism. There was a general belief that such disorders are not a problem in Bangladesh. But Immunology department of BIRDEM did 732 case samples for antithyroid antibodies (anti thyroglobulin and antimicrosomal) that showed 56% (410/732) positive for antithyroid antibodies9. This data impress us to infer that AITD is not infrequent in Bangladesh and are fairly common in clinically suspected cases. Management of thyroid disorders depends on detection of exact cause. At present diagnosis of thyroid disorders is made easy in our country due to availability of nuclear medicine and other diagnostic techniques. This study focused on ultrasound evaluation of autoimmune thyroid disease. For diagnosis of AITD, antimicrosomal antibody and antithyroglobulin antibodies are being widely used10. Ultrasound from its beginning is being used for size and nodularity of thyroid gland11. Recently researchers are working with echo pattern of thyroid gland2,3,4,5. Rago T et al showed thyroid hypoechogenicity had a higher sensitivity than the positivity of thyroid autoantibody tests for diagnosing or predicting thyroid dysfunction5. In our study we evaluated 231 cases of clinically suspected AITD by ultrasound. Echogenicity of the thyroid gland were grouped as normal echo group and hypo echo group compared with the echog-enicity of adjacent muscles4. We did ultrasound, T3, T4 & TSH, and TMAb of all patients. Thyroid scan was done in 126 cases, RAIU in 45 cases and FNAC 15 cases. Regarding the structural abnormalities, our study showed that 92 (39.8%) were diffuse goitre, 5 (2.2%) were multinodular goitre, 7 (3%) were solitary nodule and 127 (55%) were normal thyroid gland. One of the 7 solitary nodules was a case of autimmune thyroiditis combined with papillary carcinoma. Regarding the functional status of thyroid gland, 144 (62.3%) were hypothyroidism, 26 (11.3%) were hyperthyroidism, 23 (9.9%) were sub-clinical hypothyroidism, 5 (2.2%) were sub-clinical hyperthyroidism and 33(14.3%) were euthyroid. Regarding the echo pattern, our study showed that 33 (14.3%) were normal echo cases and 198 (85.7%) were reduced/hypoecho and regarding the antibody status, 55 (23.8%) were positive and 176 (76.2%) were negative for TMAb. This study also showed that the mean serum total T 4 level was significantly lower in hypoechoice group than in normal echo group. (p less than 0.01) and thyroid microsomal antibody (TMAb) titre is higher in hypoechoice group than in normal echo group (p less than 0.001) that suggest thyroid hypoechogenicity is related with AITD and possibly a hypothyroid state.

## CONCLUSION

From the study we conclude that autoimmune thyroid disease is not uncommon in our country and as ultrasound is cost effective, now-a-days easily available modality even in thana level in our country, it can be used in identifying patients with possible AITD, being useful in epidemiological studies and having an important contribution in confirmation of diagnosis.

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# Hepatic Haemangioma: Sonographic detection and Follow-up

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Hepatic cavernous haemangiomas are benign tumours of the liver that are often an incidental finding on sonographic examination of the liver. Between January 1998 to December 2001, hepatic haemangioma was diagnosed in 21 patients during sonographic examination of the abdomen at Centre for Nuclear Medicine and Ultrasound, Khulna. Of them 16 were female and 5 were male with age ranges from 27 to 65 years. Twelve lesions measured less than 2 cm, 5 were between 2-3 cm, 4 were between 3-4 cm and 1 measured 4.6 cm. 17 had uniform hyperechoic pattern, 2 were echogenic with relatively irregular margin and 2 were hypoechoic. The diagnosis was supported by TC-99m RBC scintigraphy in 5 cases with uniform hyperechoic pattern. Fifteen cases were available for follow-up evaluation for at least one year. Ultrasound examination was done at intervals of 3, 6, 9 & 12 months. During follow-up, 2 patients had worsening symptoms and the lesion increased in size and change in echotexture with presence of multiple small new focal lesions and were finally diagnosed as metastatic disease in liver. 13(86.87%) of 15 patients did not show any change in size and echotexture of the lesion and the patient remained well clinically. We may conclude that when initial sonographic diagnosis is not definitive for hepatic cavernous haemangioma then follow-up ultrasound studies at regular interval are highly valuable to diagnose this condition.

Cavernous haemangioma is the most common benign tumour of the liver, with a prevalence of 0.4% to 7%[1]. Most of the hepatic cavernous haemangiomas (HCH) are clinically asymptomatic. Ultrasound examination for unrelated reason has detected more cases of haemangioma incidentally. The distinction between the haemangiomas and other space occupying masses is important for proper management. Several imaging methods like ultrasonography, liver scintigraphy with Tc-99m-labeled red blood cell, computed tomography and magnetic resonance imaging have been used for differentiating HCH from other space occupying lesion of liver[2,3,4]. Ultrasonography is a valuable imaging modality for the initial evaluation of HCH. The aim of this study is to assess the usefulness of follow-up sonographic evaluation in patient with suspected hepatic haemangiomas to diagnose this condition.

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## MATERIALS AND METHODS

Twenty one patients with hepatic focal lesions suspected of cavernous haemangioma on ultrasonography were studied. The study was carried out in Ultrasound unit of the Centre for Nuclear Medicine and Ultrasound, Khulna between January 1998 to December 2001. Sonographic evaluation was done with a Siemens Sonoline SL-2 real time ultrasonogram equipped with 3.5 MHz linear and sector transducer. Upper abdominal sonography was done in empty stomach with adequate bowel preparation at our Centre. These patients were studied in a supine and right anterior oblique position. Follow-up ultrasound examination was done at 3, 6, 9 & 12 month. The size, location and echotexture of the lesion were carefully noted during sonographic procedures. Clinical and biochemical assessment of liver function was also done during initial evaluation and follow-up visit. Tc-99m- labeled red blood cell scintigraphy of liver was performed in few cases during initial sonographic detection of HCH. Liver scan using Tc-99m sulfur colloid was done in few cases during follow-up evaluation.

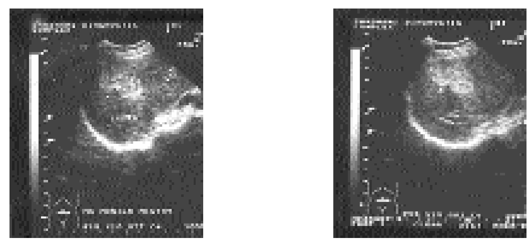
## RESULTS

Of the 21 patients with suspected hepatic cavernous haemangiomas, 16 were female and 5 were male with age ranges from 27 to 65 years. 17 patients had no symptoms and four had right hypochondriac pain. Twenty patients had solitary lesion and one patient had two lesions. 19 lesions were located in right hepatic lobe and three in left lobe. The lesions were 1.5 to 4.6 cm in diameter. 12 lesions were 1.5 to 2 cm in size, 5 lesions were 2-3 cm, 4 lesions were 3-4 cm and 1 lesion was 4.6 cm. Of these 22 lesions, 18 were homogeneously echogenic mass with smooth border (Group- I), 2 were echogenic focal lesion with relatively irregular margin (Group- II) and 2 had hypoechoic lesion with rounded, well-defined margin (Group- III). In Group- I, 5 patients undergoing Tc-99m-red blood cell scintigraphy had a diagnosis consistent with HCH. The diagnosis was uncertain in rest of the cases. All had completely normal liver function tests.

Out of 21 patients, 15 cases were available for follow-up evaluation. Two patients had worsening symptoms with abnormal liver function tests and finally diagnosed as metastatic liver disease. The lesions increased in size and changes in echotexture with multiple small new focal lesions on follow-up ultrasound examination. Liver scintigraphy using Tc-99m sulfur colloid also revealed multiple focal lesions consistent with ultrasound findings. Of them, one had Group-II and another had Group-III sonographic appearance during their first visit. 13(86.87%) of 15 patients did not show any change in size and echotexture of the lesions on follow-up ultrasound studies (Figure-I). All these patients remained well clinically and also had normal liver function tests.

## DISCUSSION

Hepatic cavernous haemangioma is the second most common tumour of the liver. They are mostly asymptomatic and commonly found as an incidental finding on sonographic examination of the abdomen[5]. Increased availability and use of high-resolution real-time sonography has increased the likelihood of discovering asymptomatic cavernous haemangioma of the liver. Four (19.05%) of our 21 cases presented with right hypochondriac pain. HCH is more common in females and can occurr in any age group, but it is most frequently found in older people[6]. 16 (76.19%) of our 21 patients were female. Majority of the lesions (86.36%) were located in right lobe of the liver, that is consistent with other studies[7,8].



A B

Figure-I: Ultrasound image of liver showing a solitary haemangioma. A, Ultrasound scan at the time of first visit shows a uniformly echogenic haemangioma (3.5x2.6 cm) in superolateral aspect of right lobe of liver. B, Follow-up ultrasound 6 months later showing no change of size and echotexture of haemangioma.

The distinction between the benign hepatic haemangioma and other space occupying masses, especially primary and metastatic malignancy is important so that an appropriate management may be pursued. Most of these tumours are small, discrete and usually solitary and multiple lesions are also found in about 10% of cases[7]. In this study, one patient had two lesions in right lobe of liver. Ultrasonography is very sensitive method for detecting small HCH but the sonographic appearance is variable. Three types of sonographic patterns were observed in our study population. 18(81.82%) of 22 lesions were hyperechoic with smooth margin and 5 of them undergoing Tc-99m-labeled red blood cell scintigraphy had a diagnosis consistent with HCH. 2 (9.09%) were hyperechoic with irregular margin and 2 (9.09%) were hypoechoic. No patient had abnormal liver function tests during their first visit in the study. Liver enzymes in patients with cavernous haemangioma in the absence of other liver disease are typically normal[9].

During follow-up, two (13.33%) of 15 patients had worsening symptoms and abnormal liver function tests. Ultrasound showed multiple focal lesions of variable sizes and varying echogenicity in liver consistent with metastatic liver disease. The size and echotexture of the majority of lesions (86.67%) remains stable on follow-up ultrasound examinations. All these patients had normal liver function tests. This finding suggest the static nature of benign hepatic cavernous haemangioma which is consistent with other studies10,11. From the study, it is observed that clinical and sonographic follow-up is very helpful to make a diagnosis of HCH even in a small hepatic lesion. We may conclude that though initial sonographic diagnosis is nonspecific for HCH but follow-up ultrasound studies are highly valuable to diagnose this condition where other imaging modalities are not available.

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# Ultrasonographic evaluation of hepatobiliary, pancreatic & splenic diseases: A study of 3081 cases at the Center for Nuclear Medicine & Ultrasound, Barisal

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For the evaluation of hepatobiliary, pancreatic & splenic diseases ultrasonography can be used for the diagnosis as well as for screening.3081 patients were studied retrospectively who were referred to the Center for Nuclear Medicine & Ultrasound, Barisal for ultrasonography of hepatobiliary system including pancreas & spleen. This study was carried out to observe the disease spectrum in this region. Out of 3081 patients 2061 (77%) had normal ultrasonographic findings & rest 33% were pathological. Acute and chronic liver disease, amoebic liver abscess, HCC, biliary ascariasis, cholelithiasis, acute pancreatitis & diffuse splenomegaly were the common pathology in our study. The evaluation of gall stone and hepatic focal lesions with real time ultrasonography has proven to be an extremely useful procedure. For HCC surveillance and detection of small focal lesions in cirrhotic liver ultrasonography is the most widely used technique. For the follow up of other cases like liver abscess after treatment, biliary ascariasis & acute pancreatitis, ultrasonography can play very important role. Moreover to exclude other causes of upper abdominal pain pathology particularly in acute upper abdominal pain, real time sonography can be used as a quick & convenient procedure.

Center for Nuclear Medicine &Ultrasound, Barisal has been delivering service to the population since 1989.In the southern part of the country about 1000 patient per month are being benefited with the help of ultrasound & safe use of nuclear medicine procedure from this center. In this center different organs are examined by ultrasound like abdomen, pregnancy evaluation, breast, thyroid, testes, eyeball etc. but we were intended to high light the ultrasonographic evaluation ofhepatobiliary, pancreatic & splenic diseases in this study. We studied 3081 patients who came to this center for hepatobiliary & pancreatic imaging through April-Nov. 2004.Study showed some diseases were very common in this region and some others were not, may be due to geographical or socioeconomic condition.

It is well documented that hepatobiliary disease is a common problem in Bangladesh as well as other

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parts of the world, among these acute hepatitis, chronic parenchymal liver disease, biliary ascariasis, cholelithiasis are much more common than other diseases. Pancreatic diseases are not so common like in developed countries. This examination is cost effective, well tolerated, required minimal preparation and noninvasive. The evaluation of gall stone and focal hepatic lesions with real time ultrasonography has proven to be an extremely useful procedurel8. Considering its cost benefit ratio ultrasonography can be used as a diagnostic tool as well as screening procedure for abdominopelvic organs.

## MATERIAL AND METHODS

This was a retrospective study and data were collected from office record file.3081 patients were studied who were referred to this center for ultrasonography of hepatobiliary system including pancreas & spleen. We divided patients in different age groups. Normal groups were segregated from the pathological groups. Diseases were classified according to organ involved like liver, gall bladder, biliary tree, pancreas & spleen. Again sub-classification was made for observing disease spectrum. Splenic & pancreatic diseases also included because there pathology are interrelated to some extent.

For adult population the liver size is 12.5cm vertically along the midclavicular line, spleenic length up to 1 0.5cm along its long axis, gall bladder- 8x3cm, common bile duct up to 8mm in diameter at porta hepatis & pancreas up to 20mm in breadth at the body were considered to be normal. Patients remained fasting for at least six hours and in emergency situation examination were done without any preparation. In case of poor visualization of gall bladder & pancreas two days bowel preparation was given. All images were obtained by 3.5 & 5 MHz curvilinear transducer (Aloka SSD-11 00).

## RESULTS OF THE STUDY

A total of 3081 patients were studied, among them 2061(77%) had normal ultrasonographic findings and 1020 (33%) patients were pathologic. Liver & splenic diseases were more commo in male; gall bladder & biliary pathology were common in female as expected. Pancreatic pathology was slightly higher in male than that in female.

Among the 635 patients of hepatic & splenic diseases 133 patient (4.3%) were suffering from chronic parenchymal liver disease, 111 patients (3.6%) had fatty change in liver and 94 patients (3%) had hepatic abscess (65 patients had single abscess in right hepatic lobe). 75 patients (2.43%) presented with acute hepatitis. 53 patients (1.7%) had HCC and 15 patient with metastatic lesions. Splenic diseases were rare other than diffuse enlargement, 2 patients in this study had spleenic abscess & 1 patient had spleenic calcifications.

Out of 190 patients of gall bladder diseases 105 patients had cholelithiasis (3.4%); associated with gall stone 21 patients presented with acute cholecystitis and 2 patients with chronic cholecystitis. In this study 12 patients had carcinoma of the gall bladder. Gall bladder polyp and adenomyomatosis are rare form of gall bladder disease in our country as the study showed.

The study showed biliary ascariasis is very common and out of 152 patients of biliary obstruction 105 had roundworm in their common bile duct. 12 patients had choledochothiasis and only 2 patients had choledochal cyst. Cholangiocarcinoma and carcinoma of the head of the pancreas causing biliary obstruction is not common. Regarding gall bladder & biliary tree- 59 patients were presented with slightly thick walled gall bladder, relatively larger gall bladder and mildly dilated CBD with or without history of gall bladder operation.

Out of 44 patients 23 patients were presented with acute pancreatitis, 6 of them had mild ascites & 6 patients had pseudo pancreatic cyst. Those who developed pseudo pancreatic cyst, most of them (4 out of 6) had history of blunt trauma to there abdomen.

## DISCUSSION

Evaluation of the hepatic parenchymal structures, biliary tree, pancreas and spleen are the most important procedures in sonography regarding diagnosis as well as a screening procedure. Detection & analysis of focal liver diseases may be difficult & confusing. All standard noninvasive imaging modalities are insensitive detectors of focal hepatic disease. Some studies have suggested that sonography is less sensitive than CT & MRI2.Despite this, other studies show that modern sonography can perform well in detecting focal liver disease 3,4,5. Since all modalities are imperfect, there is no single "best test". The best approach is to use clinically tailored imaging strategies that take advantage of the strengths of CT, MRI & Sonography [1].

It is well documented that >95% of gall bladder cancer are associated with gall stone22. In this study out of 12 one patient had associated gallstone. On ultrasonography gall bladder growth represents as large, irregular fungating mass that contains low-level echoes within the gall bladder & obscuring the wall; the mass may be of heterogeneous, solid or semisolid echo texture [18].

Stones in the common bile duct occur in 10-15% of patients with gallstones. Primary CBD stones are thought to follow bacterial infection secondary to parasitic infestation with ascaries lumbricoides22. Carcinoma of the common bile duct shows tubular branching with dilated intrahepatic ducts, gall bladder may be smaller or normal in size with or without associated gallstones18. The cause of cholangiocarcinoma is unknown but it is associated with gall stones & primary sclerosing cholangitis23. The choledochal cyst predispose to stone formation, stenosis & stricture, pancreatitis, obstructive biliary complications and bile duct carcinoma in adult22. We observed only 3 patients with choledocal cysts and one of which was associated with calculus & carcinoma within the cyst.

Ultrasound scanning can confirm the diagnosis of acute pancreatitis, although in the earlier stages the gland may not be grossly swollen. The ultrasound scanning is also useful because it may show gallstones, biliary obstruction or pseudocyst formation22. 0n ultrasonography pancreas may be normal in size, focal or diffuse enlargement, hypoechoeic (due to oedema), enlargement of the head causing depression on IVC & dilated pancreatic duct19. We observed 23 patients of acute pancreatitis, among them 6 patients had pseudopancreatic cyst, 2 patients had round worm within the main pancreatic duct & 6 patients had ascites, 4 patients with pseudopancreatic cyst had history of blunt trauma to the abdomen.

A less common pathology adenomyomatosis is a hyperplastic change in the gallbladder wall; multiple papillomas are seen along the gallbladder wall-causing rig down echoesl9. Regarding gall bladder & biliary tree examination significant number of patients had unexplained mildly dilated common bile duct, relatively larger gall bladder, slightly thick walled gall bladder etc but most of them had upper abdominal discomfort. Biliary dyskinesia has been introduced to describe this condition; the dyskinetic disorder may affect either gall bladder or the sphincter of Oddi and patients only complaints of recurrent epigastric pain or right upper quadrant pain22. Gall bladder perforation is more common in diabetics and patients with acalculus cholecystitisl.Gall bladder perforation and pericholecystic abscess formation are the primary causes of sepsis in acute cholecystitis due to delay in diagnosis [23,24].

Other than diffuse enlargement, splenic diseases are not common as our study showed.2 patient presented with spleenic abscess & 1 with calcification. Pathology of the spleen is splenomegaly, congestion of the splen, storage disease, diffuse disease, lymphopoietic abnormalities & focal disease19. Enlargement of the spleen may cause upper abdominal pain (due to stretching of the splenic capsule or ligaments) and enlarged spleen may encroach upon surrounding organs such as the left kidney, pancreas, stomach & intestines25. Focal splenic defects include cyst, abscess & tumours (benign-haemartoma, haemangioma, cystic lymphangioma etc. malignant haemangiosarcoma & lymphoma are common). Spleen is the 10th most common site of metastasis which may originate from the breast, lung, ovary, stomach, prostate or melanoma18. With hepatic calcification spleenic calcifications are better visualized with sonography than CT making "starry sky" appearance & it may occur due to tuberculosis, pneumocystic carinii or cytomegalovirus infection [26,27,28].

## CONCLUSION

Ultrasonography can play very important role for the diagnosis of hepatobiliary, pancreatic & splenic diseases. With a few limitations this very safe & convenient procedure can be used as a screening test and in surgical emergency it is possible to get valuable information quickly that could help to reduce the morbidity & mortality. For follow up of the disease processes like chronic parenchymal liver disease, hepatitis, pancreatitis & biliary ascariasis it can be used confidently. So regarding the cost benefit ratio ultrasonography can be used as a first line of investigation suspecting upper abdominal pathology as a diagnostic or screening procedure.

**Table I. Age group of patients according to organ involved: (Total patient=3081)**

| Organ involved | Up to 5 yrs | 6 to 18 yrs | 19 to 50 yrs | >51 yrs |
|---|---|---|---|---|
| Liver &Spleen | 27 | 57 | 385 | 152 |
| Gall bladder | 2 | 4 | 120 | 54 |
| Biliary tree | 3 | 19 | 83 | 30 |
| Pancreas | 1 | 6 | 29 | 7 |
| Total | 33 | 86 | 617 | 243 |

**Table II. Sex distribution of the pathological group:**

| Liver &Spleen | Gall bladder | Biliary tree | Pancreas |
|---|---|---|---|
| M: 417 | 70 | 55 | 24 |
| F: 218 | 120 | 97 | 20 |
| Total: 635 | 190 | 152 | 44 |

**Table III. Hepatobiliary, Splenic and Pancreatic disease spectrum: 1020 of 3081 patients (67 % normal findings)**

| | Liver & Spleen | Gall bladder | Biliary tree | Pancreas |
|---|---|---|---|---|
| Total pt. | 635 | 190 | 152 | 44 |
| 33% | 21% | 6% | 5% | 1% |

**Table IV. Liver & Splenic disease spectrum:**

| Pathology | No of patients | Percentage (%) |
|---|---|---|
| CLD. | 133 | 4.31% |
| Fatty Change | 111 | 3.6 % |
| Hepatic abscess | 94 | 3 % |
| Hepatomegaly | 85 | 2.75 % |
| Acute hepatitis | 75 | 2.43 % |
| HCC | 53 | 1.7 % |
| Only Splenomegaly | 32 | 1 % |
| Hepatosplenomegaly | 19 | 0.6 % |
| Metastasis | 15 | 0.48 % |
| Hemangioma | 11 | 0.35 % |
| Hepatic cyst | 4 | 0.12 % |
| Splenic abscess | 2 | 0.0 6% |
| Splenic calcification | 1 | 0.03 %. |

**Table V. Gall bladder disease Spectrum:**

| Pathology | No of patients | Percentage (%) |
|---|---|---|
| Pathology | No of patients | Percentage (%) |
| Cholelithiasis | 105 | 3.40 % |
| Acute calculus cholecystitis | 21 | 0.68 % |
| Acalculus echolecystitis | 16 | 0.51 % |
| Chronic calculus choelcystitis | 2 | 0.06 % |
| Carcinoma of the gall bladder | 12 | 0.38 % |
| Gall bladder Polyp | 1 | 0.03 % |
| Adenomayomatosis | 1 | 0.03 % |
| Others | 32 | 1.03 % |

**Table VI. Causes behind biliary tree obstruction:**

| Cause of Obstruction | No. of patient | Percentage (%) |
|---|---|---|
| Ascariasis | 105 | 3.04 % |
| Choledocholithiasis | 12 | 0.38 % |
| Cholangiocarcinoma | 3 | 0.09 % |
| Ca. head of the pancreas | 3 | 0.09 % |
| Choledochal cyst | 2 | 0.06 % |
| Others | 27 | 0.87 % |

**Table VII. Pancreatic disease spectrum:**

| Pathology | No. of patient | Percentage (%) |
|---|---|---|
| Acute pancreatitis | 23 | 0.7 % |
| Ca. head of the Pancreas | 6 | 0.2 % |
| Chronic pancreatitis | 2 | 0.1 % |
| Duet calculus | 1 | 0.03 % |

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# High frequency sonography for the diagnosis of photodamaged skin: A study on 50 photodamaged individuals

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The development of high frequency sonography (<20MHZ) has gained increasing importance since the last decade. The application of high frequency studies to dermatology is very challenging. Advancements in technology will improve the correlation of clinical with high frequency ultrasound finding in the assessment of several skin diseases. Changes in the dermis associated with again can be detected by high frequency skin ultrasonography. In photoaged skin, this technique shows shows a sub-epidermal low echo-genic band (SLEB) that is probably an ultrasound manifestation of elastosis. A prospective syudy of 50 patients with photodamaged recruited from ODP of the University Hospital of Wales, Cardiff, U.K. Initially a clinical assessment of photodamaged was done, later objective measurement of photodamage was taken using an A-Scan Ultrasound. The mean age of the group was 67.6+8.35 years. There was a strong correlation (r=0.96) between global mean VAS Score and Mean SLEB Values in different site.

The development of high frequency sonography (20MHz) has gained increasing importance since the last decade. In this field A-model Scanner were used firstly in the measurement of skin thickness.(1) 1984 the first commercial available 20 MHz B-Scanning system was introduced with axial and lateral resolution of 200 micron and 75-80 micron respectively, rendered two dimensional sonographic imaging in dermatology possible. Since then culaneous sonography has increasingly been used to investigate drug effects on human skin. The resolution of 20 MHz ultrasound is sufficient for studying pathological changes and pharmacological effects in the dermis and subcutaneous fat.(2) The application of high frequency studies to dematology is very challenging. Advancements in technology will improve the correlation of clinical with high frequency ultrasound finding in the assessment of several skin diseases.

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Several methods of ultrasonography have been developed: Method A, Method B, Scanning C method and Doppler ultrasound. They were based on different acoustic features of various tissues.

Today, dermalosonography is used in diagnosis Cutaneous neoplasm, inflammatory skin disease and skin diseases of unknown etiology. Apart from that, it is used in differentiating bening and malignant tumors and may be helpful in monitoring morphea, dermato-myosities, cutaneous sarcoidosis, erthema nodosum, allergic diseases, post thrombolic syndrome, physiologic

aging and aging due to sun exposure. It can be used in noninvasive monitoring of local treatment, therapeutic responses and adverse effects. (3,6)
Human skin, like all other organs, under goes chronological again. In addition, unlike other organs, skin is in direct contact with the environment and therefore undergoes aging as a consequence of environmental damage. The primary environmental factor that causes human skin aging is UV irradiation from the sun. This sun-induced skin aging, is a cumulative process. The new insights regarding convergence of the molecular basis of chronological aging and photoaging provided exciting new opportunities for the development of new anti-aging therapies.(5)

Solar or actinic elastosis refers to the histologic alternations observed by light microscopy in dermis of person with long-term exposure to the sun. Histologically, the predominant features is aggregates of elastin like ('elastotic') material in the dermis below a narrow grenz zone consisting of small, horizontally oriented collagen fibers. This sub-epidermal grenz zone is presumed to be newly synthesized collagen. (7)

Changes in the dermis associated with aging can be detected by high frequency skin ultrasonography. In photoaged skin, this technique shows a sub-epidermal low echo-genic band (SLEB) that is probably an ultrasound manifestation of elastosis and edema in the papillary dermis.(4)

To determine whether SLEB can be used as a quantitative marker of photoaging, we have conducted this study using A-Mode ultrasound.

## METHODS & MATERIALS:

This was a prospective study of 50 patients with photodamaged recruited from the dermatology outpatient department of the University Hospital of Wales, Cardiff, U.K. All skin types of both sex, aged more than 40 years were included in the study. Patients having chronic skin diseases were excluded from the study. Informed consent were taken.

The study procedure was carried out in two different steps. Initially a clinical assessment of photodamage was done, later objective measurement of photodamage was taken using an A-Scan ultrasound.

A clinical assessment of Sundamage was performed with the help of a visual analogue scale (VAS). This battery powered self contained instrument consists of a slide, a screen and a power button. The slide can be moved from left (0) to right (100). During the assessment the scale was moved from the left to the right according to severity of the clinical sign as perceived by the investigator, with 0 representing absence of the sign and 100 maximum severity. Then the reading on the scale was recorded. The following parameters were measured: Fine and Coarse Wrinkling, actinic lentigens, mottled pigmentation, yellowness, telangectasia, purpura, Coarseness, Comedones and pseudoscar.

The Cutech Dermal Monitor DM70 unit has been used for measuring skin thickness. Which has the pulser and amplifier and the Oscillo-scope (l Watsu SS 5710). These connected to a proble which has a transducer. The probe case is filled with distilled water. When a reading is required the probe is placed on the site selected. This is done in a way such that no air is trapped between the probe and the skin. The thickness of the skin is measured by the high frequency echo (20MHz). The reading of the echo is received by the transducer which is displayed on the oscilloscope. The cursors on the oscilloscope are positioned on the peaks. The reading is then displayed on the screen in millimeters. Sub-epidermal low echogenic band (SLEB) and full skin thickness measurements were recorded.

## RESULTS

A total of 50 patients were included in the study. The mean age of the group was 67.6±8.35 years. The age range was between 57 to 85 years . All the patients involved were Caucasian.

About 80% of study group patients were of skin type II and III.

Measurement of full facial thickness was recorded by A-Scan ultrasound. The region of low amplitude echoes just beneath the surface in the A-Scan (SLEB) was also recorded (Table-1)

**Table 1: Mean Values of ultrasound in mm (SD)**

| Site | U/S (Full thickness) | SLEB |
|---|---|---|
| RUS | 2.09(0.18) | 0.84(0.13) |
| RMS | 2.15(0.17) | 0.52(0.15) |
| RLS | 1.95(0.24) | 0.60(0.09) |
| LUS | 2.12(0.17) | 0.81(0.11) |
| LMS | 2.14(0.18) | 0.79(0.12) |
| LLS | 1.94(0.14) | 0.63(0.06) |

SUS (Right upper segment), RMS (Right middle segment), RLS (Right Lower Segment), LUS (Lower upper segment), LMS (Lower middle segment), LLS (Left lower segment).

Nine clinical features were assessed using a visual analogue meter in each section of the face (Table II)

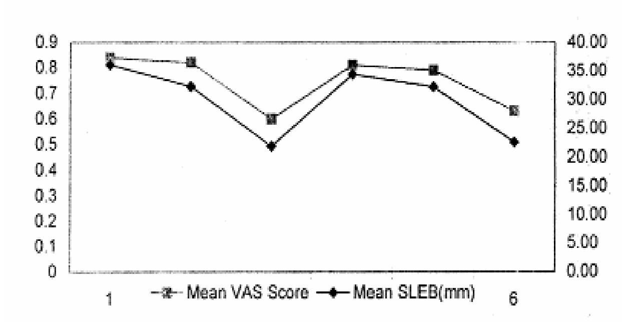
**Table 2: Mean Values Analogue Scale Score (SD)**

| Site* | Fine Wrinke | Coarse Wrinkle | AC. Lenti | Mot Pigmentation | Yellowness |
|---|---|---|---|---|---|
| RUS | 47.7(12.0) | 54.6(11.1) | 38.7(13.5) | 41.6(12.2 | 49.4(11.3) |
| RMS | 44.2(12.8) | 50.1(13.1) | 35.8(14.6) | 35.2(11.9) | 41.8(13.0) |
| RLS | 35.9(8.0) | 32.2(6.9) | 21.1(8.8) | 22.3(7.3) | 36.7(10.4) |
| LUS | 46.8(13.1) | 54.7(11.4) | 34.5(14.3) | 37.4(13.6) | 50.3(11.4) |
| LMS | 44.5(13.9) | 52.3(12.7) | 32.6(13.5) | 36.(14.0) | 45.3(12.7) |
| LLS | 32.7(6.7) | 33.6(22.5) | 22.5(11.0) | 23.7(6.5) | 34.3(9.9) |

| | Telenjectasia | Coaarse-ness | Pseudosca | Comedone | Mean |
|---|---|---|---|---|---|
| RUS | 34.0(16.2) | 44.8(15.9) | 9.3(15.8) | 3.8(10.0) | 36.0(7.33) |
| RMS | 40.0(19.4) | 38.7(15.9) | 2.65(8.9) | 2.2(8.0) | 32.3(6.9) |
| RLS | 19.6(9.4) | 26.0(7.8) | 20(1.4) | 2.6(9.3) | 21.9(2.9) |
| LUS | 31.8(14.8) | 41.1(16.7) | 7.8(15.0) | 1.7(7.5) | 34.4(7.3) |
| LMS | 39.3(18.5) | 38.0(15.0) | | 7.7(5.4) | 32.2(7.2) |
| LLS | 25.8(9.7) | 28.2(9.1) | | 2.3(4.5) | 22.6(4.0) |

There was a strong correlation (r=0.96) between Global Mean VAS Score and Mean SLEB values in different site (Fig 1)

Fig 1: Correlation between GLOBAL Mean VAS Scores and Mean SLEB Values in different sites




## DISCUSSION

Our study shows a strong correlation between clinical assessment and ultrasound assessment of photodamaged individual (r=0.96).

Intrinsic or chronological aging is observed in those areas of the skin which are habitually covered and not exposed to sun or other environmental factors. In these areas, aging is characteristically, manifested by smooth pale and finely wrinkled skin and may be superimposed by beaging growths, such as cherry heamangioma and seborrhetic keratosis. In contraste, extrinsic skin aging is manifested by roughness, yellowness, fine and coarse wrinkle, hyper and hypopigmentation, Purpura, telangiectasia and variety of benign and malignant neoplasms (8, 9) Photoaging is superimposed on intrinsic aging.

The ultrasonic measurement of solar elastosis showed subepidermal low echogenic band (SLEB) which had a strong correlation with global visual analogue scale (VAS). Edward et al(10) described SLEB as a good parameter for the assessment of photodamage. AI Aboosi(11) showed (SLEB) increases in actinic elastotic skin. Our study has supported these finding.

To avoid instrumental bias, photodamage was initially assessed clinically before objective assessment (ultrasound reading) were carried out. All the methods we used for the assessment of photodamage were noninvasive. Kumar and

Marks(12) used a VAS scale to measure the severity of photodamage and included four signs of solar elastosis. They thought it was reproducible, consistent and sensitive. We believe that the VAS method is more subjective and biased due to a lack of baseline. Perhaps the addition of more clinical features to the assessment of sundamage and introduction of inter observer observation could improve the result.

The objective method we used to assess photodamage was an A-Scan ultrasound which is a simply, highly reproducible technique for measurement of skin thickness.(6) SLEB thickness is quite a good representative of solar elastosis, according to Edward et al(8). The thickness of the SLEB which has been show to relate to elastotic degenerative change and thus to photodamage. Many authors(10) showed that U/S result of solar elastosis have a good correlation with the histologic measurement. According to Serup et al(13) some structural features are better visualized by U/S than histology and vice versa. They Mentioned that the advantage of U/S is its noninvasiveness and immediate result.

## CONCLUSION

Like radiology, dermatology is often referred to as a visual specialy, where in a majority diagnosis can be made by visual inspection of the skin. Diagnosis of skin disease in dermatology is largely non invasive. There is a clear cut need for an objective noninvasive mean of assessing the skin that will supplement the data gathered by the physician, particularly during the conduct of clinical trials of therapeutic agents. Advances in ultrasound transducer technology can lead to improvements in the assessment of skin disease. Ultrasound imaging of the skin before and after treatment can add an important objective assessment in the clinical evaluation of new therapeutic agents that are designed to reverse disease-induced changes in the skin.

# Biliary Ascariasis as a cause of upper abdominal pain: USG Study in a Sub-Urban Hospital

Farida Haque

Abdominal ultrasound is a routine investigation in almost all the centers for evaluation of upper abdominal pain. Especially in sub-urban areas where other imaging modalities are not widely available ultrasonography is the only choice. Here the study result of 48 selected patients suspected of biliary cause of upper abdominal pain is reported. The study shows 13 patients having round worm either in common bile duct or in gall bladder. It seems biliary ascariasis is still a very common cause of upper abdominal pain especially in a rural or sub-urban areas.

Ultrasound plays an important role in evaluation and subsequent management of upper abdominal pain especially in sub-urban areas where ultrasonography is the only imaging modality available. Upper abdominal pain has got various etiology. Among the various causes roundworm is almost a rare cause in western and other developed countries. However in our part roundworm is still very common and often found even in biliary channel causing acute upper abdominal pain.[1, 2]

## MATERIALS AND METHODS

The study was done in a sub urban hospital from January-December 2003. 48 selected patients were taken having acute upper abdominal pain. Only strongly suspected cases of biliary etiology were included in the study. Most of the patients were of low socio-economic group living in a slum or rural areas. Age range was 20 - 45 years of mixed sexes. The ultrasonography was done by Justvision 400, Toshiba scanner with a 3.5 MHz transducer.

## RESULTS

Among the 48 patients 11 patients showed roundworm in common bile duct. 2 patients had roundworm in gall bladder. 14 patients had gallstones and 6 had stones in common bile duct. 1 patient showed features of acute pancreatitis. 3 patients had other positive findings and 11 patients did not show any positive findings in ultrasonography. (Table -1)

**Table 1 - Ultrasonographic Findings**

| **Findings** | **No. of patients** | **Percentage** |
|---|---|---|
| Roundworm in CBD | 11 | 22.9 |
| Roundworm in GB | 2 | 4.2 |
| Cholelithiasis | 14 | 29.1 |
| Choledocholithiasis | 6 | 12.5 |
| Pancreatitis | 1 | 2.1 |
| Others | 3 | 6.3 |
| Negative USG | 11 | 22.9 |
| Total | 48 | 100 |

## DISCUSSION

Upper abdominal pain is a common problem. Biliary diseases are also common to contribute in upper abdominal pain3. Ultrasound is the imaging modality of choice for investigating gallbladder diseases. Starting from normal variants various pathologies of gallbladder can be diagnosed by ultrasonography. Sensitivity and specificity for diagnosing gallbladder diseases by ultrasound is also quite high4. Though uncommon in western and developed part of world, roundworm infestation is still endemic in many areas of the world and is probably second only to gallstones as a cause of acute biliary symptoms3. The present study is consistent with the statement where 22.9% cases showed roundworm in common bile duct and 4.2% in gallbladder thus contributing in 27.1% cases in total. This is a study in a sub-urban hospital and most of the patients were from low socio-economic group. This may also contribute the high percentage of ascariasis in the series. In a large series of patients of upper abdominal pain Ansari et al found biliary ascariasis in 2.2% of their patients5. But when we consider only biliary causes then still the percentage of roundworm in biliary channel is quite high. Ultrasound scans demonstrate the worms in the common duct or gallbladder as a single or multiple strips, coils or amorphous fragments6. Transverse section demonstrates target lesion. The writhing movements of the living worm are striking on real-time scanning. Sometimes displacement of the worm may also be shown in subsequent scans.

Conclusion

Bangladesh is an endemic zone for Ascaris Lumbricoids infestation. The infestation is more common in rural areas. For evaluation of upper abdominal pain especially in a sub-urban hospital or center, possibility of biliary ascariasis should always be taken into consideration.

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# Musculoskeletal Ultrasound

Kanu Bala, Firoz Ahmed, Haider Ali Khan

Musculoskelatal ultrasound is one of the leading edges of ultraonography Soft tissues such as fibroconnective tissue, fat and muscle contribute more tan 50% of mass of the human body. Despite the importance of the soft tissues of the musculosedletal system, the pathology of these tissues remains poorly understood. Magnetic resonance imaging [MRI] has contributed significantly the diagnosis and management of internal joint derangement. However, the diagnosis of chronic repetitive injury, work-related injury, inflammation and ncection in soft tissues has not changed significantly during the explosive growth of MRI 1. Ultrasound provides highly detailed information regarding the normal anatomy and pathologyical processes seen in superficial skeletal tissues. The examination is quick and requires no patient preparation and consequently it is well tolerated y patients. A gentle increase in transducer compression helps to clicit the point of maximal tencerness and comfirm whether a demonstrated sonographyc abnormality is clinically relevant ("sonographic palpation")[2].

A physical limitation ofthe modality is transducer size i.e. a smasll footprint provides only a small field of view permitting examination of only a narow area at a time whilst a large footprint produces difficulty in maintaining skin contact over often-irregular limb surface contours3. The greatest limitation, however is the requirement for. a soft tissue window which means that deep intra-articular and spinal structures are often not demonstrable sonographically

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## IMAGING TECHNIQUES

**Transducer :**

The majority of examinations can be performed using a long 7.5 MHz linear transducer (Figure-1].

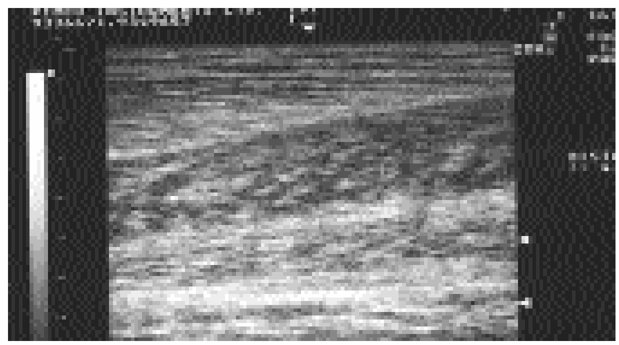

**Figure-1: Exanination of Muscle using 7.5 MHz linear transducer**

This will provide excellent resolution. Obese patients may require a 5.0 MHz linear transducer for better penetration. Curved areas like anterior part of ankle joint, or popliteal fossa require furvilinear transducer to fit the area of interest [Figure-2]

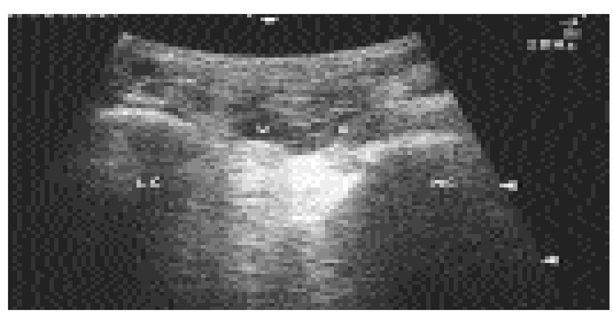

**Figure-2: Examination of popliteal fossa using 5.0 MHz curvilinear transducer**

**Split Screen :**

A split screen facility is useful for musculoskeletal ultrasound because it is important to compare contralateral sides [Figure-3]. Direct comparison must be done with caution in cases of tendinitis and other overuse injuries as changes may be evident bilaterally even when symptoms appear to be unilateral. Bone contours can be used as landmarks when comparing contralateral limbs in order to better assess asymmetry.' As with all ultrasound examinations tissues should be examined in both longitudinal and transverse sections (i.e. two different planes) in order to eliminate artefacts and maximize examination sensitivity.

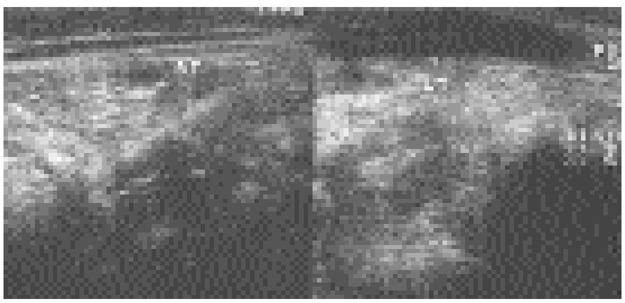

**Figure-3: Split screen images are comparing contralateral sides of abdominal muscles.**

**Field of View :**

One of the significant limitations of ultrasound imaging has been its limited field of view [FOV]. Muscles and tendOns are very long structures, some extending over two joints. Split screen facility provides lengthening of FOV [Figure-4].

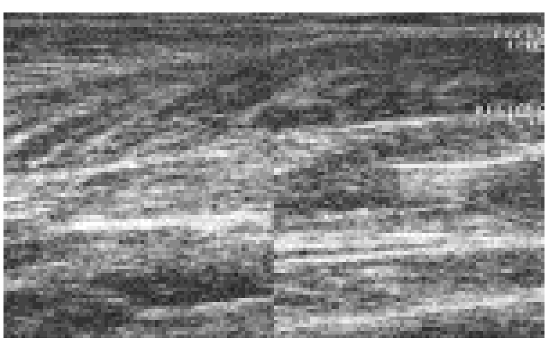

**Figure-4: Spit screen facility is providing lengthening of field of view.**

Recent advances in computer technology have made pes-sible extended field of view-ultrasound imaging without the use of an arti'Culated ann or special positions sensors [Figure-5].

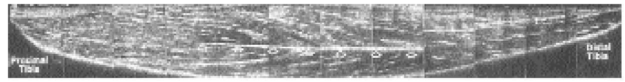

**Figure-5: Extended field of view is an advantage available in some ultrasound systems [From van Holsbeeck MT & Introcaso JH]**

**Stand-off Media :**

Modem transducers with their high near field resolution have reduced the need to use a cumbersome stand-off medium, although it can be beneficial to use liberal amounts of coupling gel for imaging subcutaneous structures especially when transducer angulation is required the thicker gel layer improving transducer-surface contact.

**Transducer Compression :**

Increased transducer compression as mentioned earlier can be helpful in eliciting the pale of patient symptoms. It can be used to distinguish between synovial fluid and synovial thickening fluid being "ballottable" unlike synovium, which is relatively non-compressible4. Whilst scanning beware of applying excessive transducer pressure over superficial bursae as this may Compress away from view small fluid collections. Effusions may also be underestimated if too much transducer compression is applied.

**Dynamic Studies :**

Effusions can also be underestimated if a dynamic examination is not performed, especially effusions in the supra-patellar pouch in the knee [Figure-6] and the subacromialsubdeltoid bursae of the shoulder. A . dynamic study is useful for observing tendon discontinuity or impingement. Small muscle tears similarly may become more readily apparent during muscle contraction. During examination of the shoulder the rotator cuff should always be examined dynamically to look for signs of subacromial or acromioclavicular impingement, adhesive capsulhis and medial subluxation of the long head of biceps tendon.

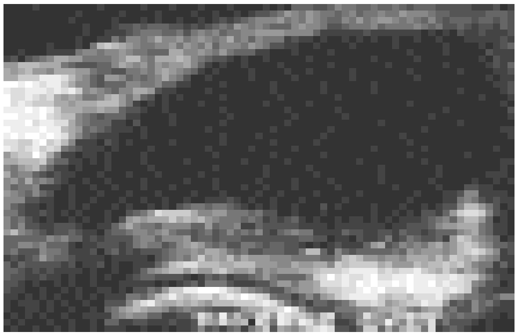

**Figure-6: Dynamic examination is useful in Baker's cyst.**

## ANISOTROPBY :

This is a technical artefact occurring when the axis of the transducer is not orthogonal to a structure resulting in an apparent reduced echogenicity i.e. beam-obliquity artefact or anisotropy. Linear structures such as tendons are particularly susceptible to such changes the resulting hypoechoic area of tendon potentially being confused with tendinitis this also producing decreased tendon echogenicity. Anisotropy artefact occurs when a tendon that is being examined is not taut. Therefore, the patella tendon should be examined with the knee fully flexed and the Achilles tendon examined with the foot in plantar flexio,n in order to avoid bowing of the tendon.

Once the examiner is aware of this artefact it can be used advantageously to identify normal structures e.g. localisation of the long head of biceps tendon in the bicipital groove in transverse section by slowly angling the transducer cranially and caudally [Figure- 7]. In order to distinguish between tendinitis and anisotropy artefact the transducer should be slowly angled backwards and forwards so as to produce a structure of maximal echogenicity. Any persistent hypoechoic area in this way reflects pathology rather than artefact.

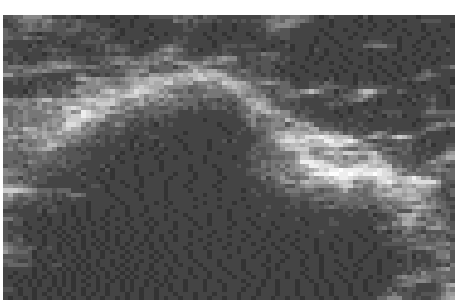

**Figure-7: Head of biceps tendon in bicipital groove.**

## NORMAL TISSUE CHARACTERS

The ecltogenicity of tissues varies not only with incident beam obliquity5 and transducer6 frequency e.g. as transducer frequency increases the Achilles tendon appears brighter.

### Tendons :

These are the most frequently studied structures in musculoskeletal ultrasound. the most commonly evaluated tendons bejng the rotator cuff, Achjlles and patella tendons3. All tendons have similar ultrasound characteristics whatever their site. Sonographically tendons appear as a well defined, brightly echogenic band with a longitudinally aligned fine internal fibrillar pattern . This fine fibrillar pattern becomes mere clearly visible at higher (10-15 MHz) ultrasound frequencjes. The fibriJJar pattern reflects the tightly packed paralJeJ JongitudinalJy arranged collagen bundles of the tendon [Figure-g].

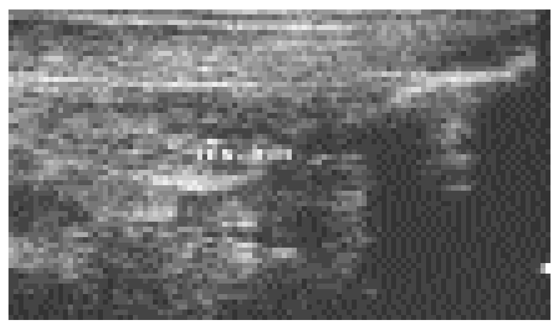

**Figure-8: Fibrillar pattern of tendo-achilles.**

Most tendons are surrounded by a synovial sheath, which appears in cross-section as a fine dark halo surrounding the tendon. Large tendons such as the Achilles and patella tendons do not have a synovial sheath but are enveloped by loose areolar connective tissue called a paratenon 7, this appearing as a thin highly echogenic line on the tendon surface. A normal tendon is round (e.g. long head of biceps tendon)~ an oblique ellipse (e.g. Achilles tendon) or rectangular (e.g. patella tendon) in cross-section8.

Dynamic real-time imaging is needed to examine tendons throughout their physiologic range of motion. Unear array transducers provide optimal jmages, having thejr sound beam perpendicular to the tendon throughout the imaging field. The location of the tendon is established relative to easily recognized bony landmarks.

**Ligaments :**

Many ligaments of the hand, wrist, shoulder, hip, knee and ankle can be examined sonographically. Sonographically ligaments are similar to tendons4 [Figure-9]. They are composed of dense regular connective tissue. There is more interweaving of the collagen fibres in ligaments giving them a less regular sonographic appearances.

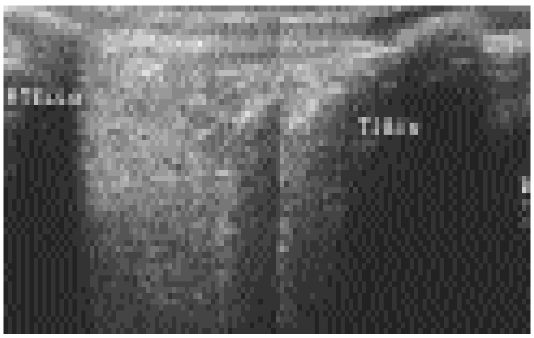

**Figure-9: Sonography of tibio-patellar ligament**

**Muscle :**

Uoltrasound was the first imaging modality available for the evaluation of muscle pathology. The muscle fibres are grouped into bundles surrounded by the perimysium (connective tissue containing blood vessels, nerves and adipose tissue). A sheath of dense connective tissue called the epimysium surrounds the entire muscles.9. The muscle fibres themselves are hypoechoic, however, both the perimysium and epimysium are markedly echo genic. Accordingly muscle images obtained along the long axis of a muscle display a pennate (featherlike) structure [Figure- 10].

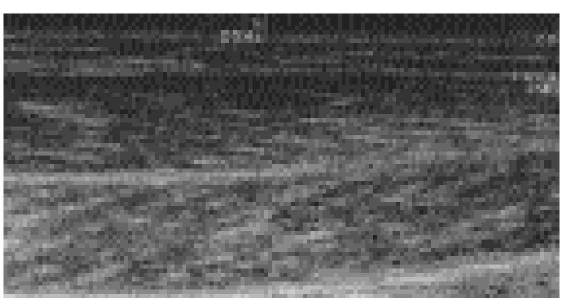

**Figure-10 : Ultrasound of muscle**

In the transverse plane the echogenic fibroadipose septae surrounded by hypoechoic muscle bundles results in a "starry sky" appearance1. The individual muscles may be identified as they are separated by the brightly echogenic lines of the perimuscular aponeuroses I°. Muscle is general:ty less echogenic than subcutaneous fat or tendons. The echogenicity of contracted muscle is often less than that of relaxed muscle II due to the obliquity of the striae 1°.

**Bone :**

A cortical bone surface is usually highly echogenic with profound posterior acoustic shadowing [Figure-II]. The surface scanning capability of ultrasound is ideal for evaluating irregular bony contours. These anatomic landmarks often help in the location of overlying soft-tissue structures e.g. the long head of biceps tendon in the bicipital groove or ulnar nerve over the posterior aspect of the medial epicondyle of humerus. Sometimes irregulatirty of the articular surface of bones can be demonstrated.

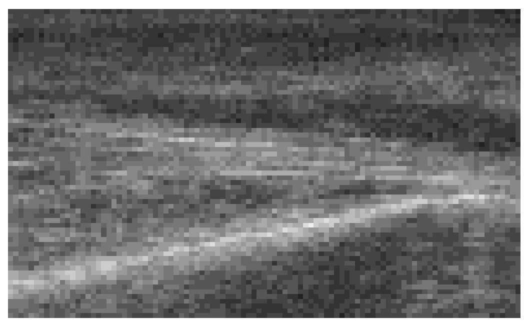

**Figure-11: Only cortical surface is seen in bone ultrasounbd.**

**Nerves :**

These are highly echogenic and have a fibrillar texture similar to that oftendons4,lohowever, the internal longitudinal echoes are much longer than those seen in tendons.

**Fatty Tissue :**

The sonographic appearance of fat varies depending on anatomic site, age, sex and hormonal status among other factors, Fat appears less echogenic as the ratio of fat to lean body mass increases. Fibrous septae are echogenic relative to the fat lobules and subsequently as the fat lobules become larger the overall echogenicity of fat decreases' [Figure-I2].

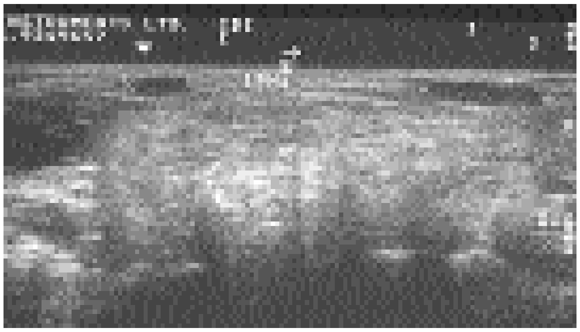

Figure-12: Fat appears less echogenic.

**Hyaline Cartilage :**

The hyaline cartilage which covers the intra-articular portion of long bones can be evaluatioed by ultrasound Children have more hyaline cartilage because of addictive effect of joint cartilage and growth cartilage. Articular cartilage in children and young adults is anechoic and can be mistaken as fluid in the joint [Figure-I3]. But its echogenicity slowly increases with age4.

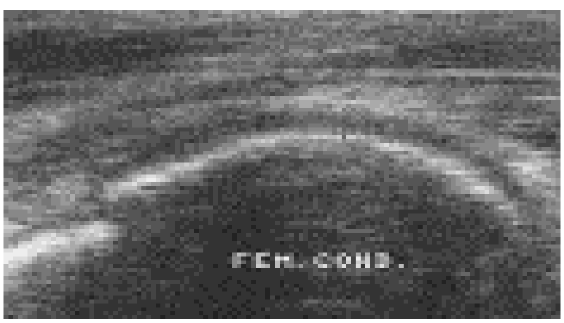


**Figure-13: The image is showing hyaline cartilage as less echogenic, uniform zone.**

**Bursae :**

Bursae are sac like structures to facilitate movement of musculoskeletal structures 12. This provides a large surface area occupying little volume under normal circumstances. W@hen positioned between two structures, this arrangement allows mobility and gliding of one structure over the other. Prepattelar bursae is an example and not seen unless inflamed [Figure-I 4].

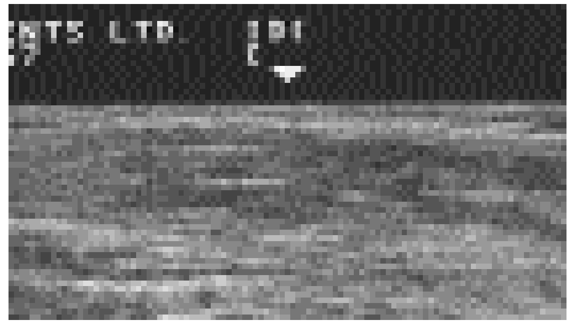

**Figure-14: Pre-patellr bursae is only seen when inflamed.**

**Skin & Subcutaneous Tissue :**

Skin is composed of epidermis and dermis. Statified squamous epithelium forms the epidermis, which may be up to 2 rom thick in palm and soles. The dermis is the primary supporting structure of skin and it typically measures 1 to 3 rom. The subcutaneous tissue consists of loose connective tissue and fat cells. Thickness varies greatly, depending on region of body and the body habitus of the patient [Figure-1 5]

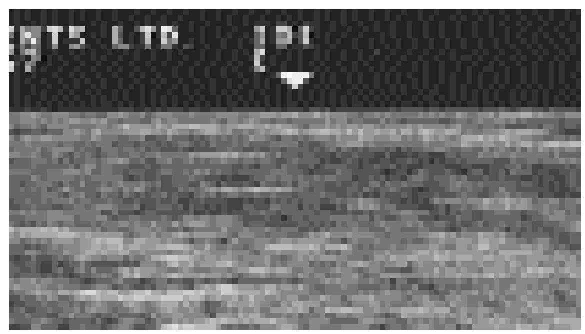

Figure-15: Skin and subcutaneous tissues are well visualized y short focus transducers.

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# Diagnostic importance of ultrasound in dermatology

1Md. Samiul Huq, 2Shaikh Zinnat Ara Nasreen, 3Hafizur Rahman Chowdhury

The development of high frequency sonography (<20MHz) has gained increasing importance since the last decade. In this field A-mode Scanner were used firstly in the measurement of skin thickness.(1) 1987 the first commercial available 20 MHz B-Scanning system was introduced, with axial and lateral resolution of 200 micron and 75-80 micron respectively, rendered two-dimensional sonographic imaging in dermatology possible. Since then cutaneous sonography has increasingly been used to investigate drug effects on human skin. The resolution of 20 MHz ultrasound is sufficient for studying pathological changes and pharmacological effects in the dermis and subcutaneous fat.(2) The application of high frequency studies to dermatology is very challenging . Advancements in technology will improve the correlation of clinical with high frequency ultrasound finding in the assessment of several skin diseases

Several methods of ultrasonography have been developed: Method A, Method B, Scanning C method and Doppler ultrasound. They were based on different acoustic features of various tissues.

Today, dermatosonography is used in diagnosing: Cutaneous neoplasm, inflammatory skin diseases and skin diseases of unknown etiology. Apart from that, it is used in differentiating benign and malignant tumors and may be helpful in monitoring morphea, dermato-myosities, cutaneous sarcoidosis, erythema nodosum, allergic diseases, post thrombolic syndrome, physiologic aging and aging due to sun exposure. It can be used in noninvasive monitoring of local treatment, therapeutic responses and adverse effects.(3,6)

Human skin, like all other organs, under goes chronological aging. In addition, unlike other organs, skin is in direct contact with the environment and therefore undergoes aging as a consequence of environmental damage. The primary environmental factor that causes human skin aging is UV irradiation from the sun. This sun-induced skin aging, is a cumulative process. These new insights regarding convergence of the molecular basis of chronological aging and photoaging provide exciting new opportunities for the development of new anti-aging therapies.(5)

Solar or actinic elastosis refers to the histologic alterations observed by light microscopy in dermis of person with long-term exposure to the sun. Histologically, the predominant features is aggregates of elastin like ('elastotic') material in the dermis below a narrow grenz zone consisting of small, horizontally oriented collagen fibers. This sub-epidermal grenz zone is presumed to be newly synthesized collagen.(7)

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Changes in the dermis associated with aging can be detected by high frequency skin ultrasonography. In photoaged skin, this technique shows a sub-epidermal low echo-genic band (SLEB) that is probably an ultrasound manifestation of elastosis and edema in the papillary dermis.(4)

The objective method we used to assess photodamage was an A-Scan ultrasound which is a simply, highly reproducible technique for measurement of skin thickness.(8) SLEB thickness is quite a good representative of solar elastosis, according to Edward et al(10). The thickness of the SLEB which has been show to relate to elastotic degenerative change and thus to photodamage. Many authors (9) showed that U/S results of solar elastosis have a good correlation with the histologic measurement. According to Serup et al(11) some structural features are better visualized by U/S than histology and vice versa. They mentioned that the advantage of U/S is its noninvasiveness and immediate result.

## CONCLUSION

Like radiology, dermatology is often referred to as a visual speciality, where majority of diagnosis can be made by visual inspection of the skin. Diagnosis of skin disease in dermatology is largely non invasive. There is a clear cut need for an objective noninvasive mean of assessing the skin that will supplement the data gathered by the physician, particularly during the conduct of clinical trials of therapeutic agents. Advances in ultrasound transducer technology can lead to improvements in the assessment of skin disease. Ultrasound imaging of the skin before and after treatment can add an important objective assessment in the clinical evaluation of new therapeutic agents that are designed to reverse disease-induced changes in the skin.

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# Acute Pancreatitis due to round worm in Pancreatic Duct

K B M Abdur Rahman

Ascaris lumbricoides infects approximately one billion people worldwide(1). It is regarded as the most common parasitic infection in human(2). The parasite can migrate into the biliary tract and create very serious biliary problems such as recurrent pyogenic cholangitis, gallstones, pancreatitis(3), and intrahepatic abscesses(6). Acute pancreatitis caused by Ascaris lumbricoides is also rare in endemic areas

## CASE REPORT

A 30-year-old man with central upper abdominal pain for 3 days was referred to the ultrasound center for examination of hepatobiliary system. On ultrasound examination his hepatic parenchymal echo-texture was normal. Gall bladder walls were slightly thickened and the lumen was clear. Common bile duct & intrahepatic biliary channels were normal in caliber. The pancreas was swollen, 27mm in thickness. There was an elongated (about 9cm in length & 3mm in width), non-shadowing echogenic structure within the proximal part of pancreatic duct (figure 1). There were more living worms- "ribbon-like" "echogenic structures" moving within the lumen of small gut, posterior to gall bladder (figure 2). The diagnosis was made as acute pancreatitis due to worm in main pancreatic duct. Meanwhile his serum amylase was estimated which was elevated.

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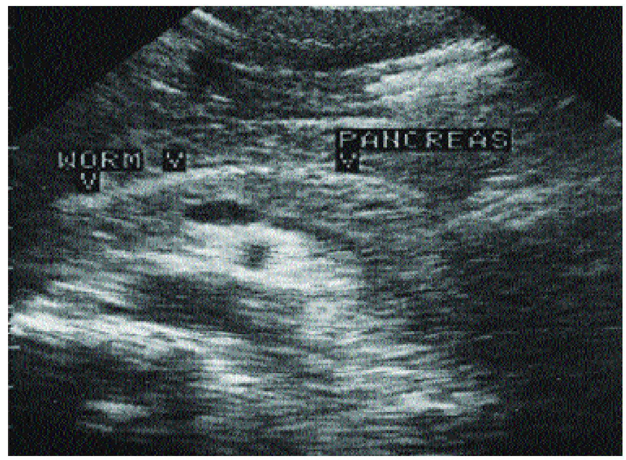


**Figure 1. An elongated echogenic structure the worm within MPD**

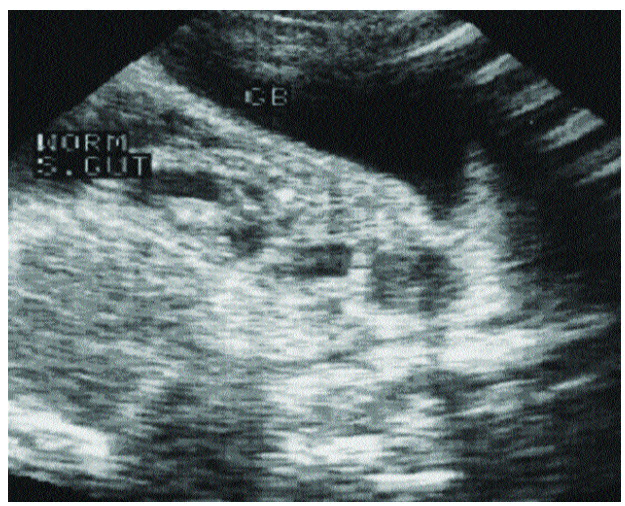


**Figure 2: gall bladder walls are thickened and there are worms in small gut lumen**

## DISCUSSION

A lumbricoides infects approximately 1 billion people worldwide. It is distributed throughout the tropics and subtropics and is also present in other humid regions. Most cases occur where there is poor fecal sanitation.

The human infection life cycle begins by ingestion of an egg, with the larvae hatching in the small intestine. The larvae invade the small-bowel mucosa, migrate through the circulatory system to the lungs, invade the alveoli, ascend the tracheobronchial tree, and then are swallowed into the small intestine where they mature into adult worms(1). Ascarids may reach 40 cm in length(1) with a width of 3-6 mm. Intestinal infestation is often asymptomatic. Migration of worms into the biliary tree is a well-known complication, which may result in biliary colic, cholecystitis, cholangitis, intrahepatic abscesses(6), or pancreatitis. After cholelithiasis, it is the second most common cause of acute biliary symptoms worldwide(4).

The diagnosis of biliary ascariasis can be established by means of microscopical examination of ascaris eggs in the bile samples (5) and fecal samples. An A lumbricoides worm occasionally is identified in stool or vomitus (1). Hepatobiliary ultrasonography is also a safe and non-invasive procedure that permits the identification of the roundworm, which moves and changes position while alive(3). A ribbon-like, non-shadowing structure with a highly echogenic wall and a less echogenic centre image (so called "double wall" pattern) at the sagittal ultrasonography of the gall bladder is strongly demonstrated as a live ascaris in the gall bladder. A lumbricoides in the biliary ducts usually manifests as an echogenic tubular structure, compared with bile, and has a diameter of approximately 3-6 mm, a relatively hypoechoic center, and a more echogenic wall (fig: 3). It may exhibit slow movement. Ascarids typically lie parallel with the long axis of the bile duct(4). They may be coiled. If multiple, they may completely fill the bile duct, producing either the "spaghetti sign"(4), or if they are very densely packed in the bile ducts, they may appear amorphous and manifest as hyperechoic pseudotumors.

Ultrasonography can detect worms in the biliary tract and pancreas and is a useful noninvasive technique for diagnosis and follow-up of such patients. Endoscopic retrograde cholangiopancreatography (ERCP) can help diagnose biliary and pancreatic ascariasis, including ascaris in the duodenum. Also, ERCP can be used to extract worms from the biliary and pancreatic ducts when indicated.

The management of biliary ascariasis is easy if a part of the worm is visible outside the papilla of Vater. The worm can then simply be caught and removed. However, if the worm has migrated fully inside the bile duct, then endoscopic sphincterotomy is required to pass retrieval devices inside the bile duct. Occasionally, however, the worm may migrate inside the bile duct in the process of being trapped in a retrieval device(8).

Endoscopy was successful in the treatment of Ascaris infestation resistant to medical therapy in 19 of 25 patients. Surgery remains important in the management of infestations complicated by biliary or pancreatic strictures and stones, or worms in the gallbladder(9).

In endemic countries, ascariasis should be suspected in patients with pancreatic-biliary disease, especially if a cholecystectomy or sphincterotomy has been performed in the past. Endoscopic management results in rapid resolution of symptoms and prevents development of complications(10).

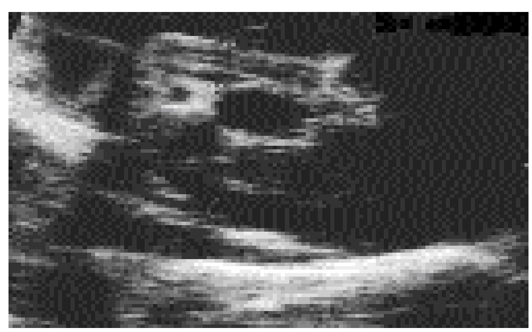

**Figure 3: A ribbon-like, non-shadowing structure with a highly echogenic wall and a less echogenic centre image**

## CONCLUSION

Ultrasonography is an excellent diagnostic tool and endoscopic management is very effective and safe in the treatment of these patients(8). And pyrantel pomoate, mebendazole, albendazole, and levamisole are effective drugs and can be used for mass therapy to control ascariasis in endemic areas(7).

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# Prenatal diagnosis of neck cystic hygroma in a living fetus - an interesting case report

1Faria Nasreen, 2Md. Sazzad Hossain

A young woman was referred to Center for Nuclear Medicine and Ultrasound (CNMU), Comilla for ultrasonography to see the pregnancy profile. Ultrasound revealed a single live fetus of 20 weeks having neck cystic hygroma. The patient was sent to the referring obstetrician for proper counselling and eventually had artificial termination. Here, our aim is to highlight the role of ultrasonogram in detecting fetal anomaly in the earlier stages of pregnancy for proper management.

Cystic hygromas are multiloculated cystic structures that are benign in nature. They form as the result of budding lymphatics and, thus may occur anywhere in the body, although they are most frequently encountered in the neck( 75%) and axilla (20%). Most cystic hygromas are evident at birth (65%) with the remainder evident by the time the individual is aged 2 years(2). Prenatal diagnosis of cystic hygroma is very important in clinical medicine. Ultrasonogram is a very important modality for diagnosing prenatal neck cystic hygroma. Here we report a case of living fetus with neck cystic hygroma which was sonographically diagnosed and eventually terminated.

## CASE REPORT

A young woman aged 19 years was referred to CNMU, Comilla for ultrasonography to see pregnancy profile. She had a history of 5 months amenorrhoea. She was a second gravida with another child of 2 years age. Her previous pregnancy was uneventful and the child was healthy. There was no history of consan-guineous marriage. Transabdominal ultrasound was done by real time Aloka SSD 1100 FLEXUS 2-D ultrasound scanner. Ultrasound examina-tion showed a single live fetus of 20 weeks gestational age. There was a fairly big cystic mass with few septations arising from the back of the fetal neck and extending laterally as well as downwards along nearly the whole length of the spine. There was soft tissue oedema and nuchal fold thickness was also increased. There was no other associated fetal anomalies such as ascites, pleural and pericardial effusion. Placenta was posterior in position , away from the os . Amniotic fluid volume was normal. The patient was sent to the obstetrician for proper counselling and management. The patient could not afford to do the chromosomal tests. Later on the patient underwent artificial termination of the fetus.

## DISCUSSION

Cystic hygroma is a congenital malformation of the lymphatic system appearing as either single or multiloculated cavities filled with fluid. Lymphatic channels are formed from a series of clefts that develop in the mesenchyme around the sixth week of gestation. From these channels, sacs are formed that establish drainage with venous system. Failure to establish venous drainage results in dilated disorganized lymph channels, which, in the largest form , present as cystic hygromas(2). They arise most frequently in the

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posterior triangle of the neck. This failure in lymphatic drainage may also result in the generalized oedema of hydrops fetalis.

Several sonographic features aid in the diagnosis of fetal cystic hygroma. Hygromas are generally located on the posterolateral aspect of the neck, cystic in appearance and are frequently divided by random, incomplete septa. As they arise from paired jugular lymph sacs which may enlarge to meet at the posterior midline, a septum representing the nuchal ligament may be visualized. Associated hydrops are manifest sonographically as ascites, pleural effusion, pericardial effusion and skin oedema.

The differential diagnosis for cranio-cervical masses include encephalocele, meningomyelocele, cystic teratoma, branchial cleft cyst and nuchal oedema. Teratomas are uncommon and are generally solid. Encephaloceles have associated calvarial abnormalities and contain brain tissue. Meningomyeloceles are uncommon in the cervical region and have associated spine abnormalities(4). Approximately half of the fetuses having cystic hygroma have monosomy X (Turner syndrome), while 10-15% of cases have trisomy 18,21 or 13(4). Fetal chromosome and structural malformations should be taken into account when predicting the long term prognosis. Both the frequency of hydrops fetalis and the maximum size of the cyst were more significantly associated with a poor prognosis(3). The rate of abnormal karyotype was found to be 61% and the global rate of unfavourable outcome, independent of karyotype result , as high as 96%(7). These data suggest that cautious genetic counseling should be offered when such cystic hygromas are noticed during the first 15 weeks of gestation , even with a normal karyotype. The prognosis for cystic hygroma in the 2nd or 3rd trimester is intrauterine death.

Prenatal diagnosis of cystic hygroma is very important in respect to the long term prognosis. If cystic hygroma is detected earlier , artificial termination or intrauterine treatment (Sclerotherapy using OK-432) can be done(6). If detection of cystic hygroma is delayed it may lead to IUD or a baby with chromosomal and structural abnormalities. Even with a large cystic hygroma artificial termination is very difficult requiring unnecessary surgical procedures for the mother.

In conclusion , we recommend very careful ultrasound scanning in the 1st, 2nd trimester for detection of cystic hygroma along with determination of nuchal fold thickness for suspecting any non obvious anomaly. Although the diagnostic rates by 2-D US and 3-D US do not vary, 3-D US may add novel visual depiction of the lesion in 3-D after reconstruction and thus assists substantially in prenatal consultation(5).

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# Sonographic evaluation of multifocal neuroblastoma - A case report

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Neuroblastoma is a relatively common adrenal malignant tumour in childhood But it can arise from sympathetic chain ganglia anywhere in the body.A 2yrs & 9months aged girl came to the Center for Nuclear Medicine & Ultrasound, Barisal for the evaluation of abdominal lump. She had a deep-seated abdominal lump and protrusion of right eyeball with unsteady gait. On ultrasonography a well-circumscribed heterogeneous bright echo genic mass was detected at the medial aspect of left kidney; another solid hypoechoeic irregular mass was detected at the lateral aspect of right eye. Both were reported as neuroblastoma and high VMA level went in favour of diagnosis. Such a case of neuroblastoma with multifocal origin is depicted here.

Key : Words: Neuroblastoma, Multifocal origin, Ultrasonography.

Neuroblastoma is a malignant tumour-usually found in the adrenal glands. This kind of tumour arises from sympathetic chain ganglia and adrenal medulla, may be detected on antenatal sonography or at birth. Clinical. findings include nystagmus and an unsteady gait. The peak age of incidence is 2 yrs. Two thirds of cases arising in the abdomen originate in the adrenal glands.

## CASE REPORT

A 2 yrs and 9 months aged girl was sent to the center for Nuclear Medicine and Ultrasound, Barisal on 27th October for the ultrasonography of abdomen. She got admission in the Sher-E-Bangla medical college hospital with the complaints of visual impairment in the right eye along with protrusion of the eyeball and conjunctival congestion. On examination there was a deep-seated lump in the left upper abdomen and pediatrician sent the patient specially evaluation of the mass. The girl was very restless and crying all along with difficulty in walking.

On ultrasonography using both 3.5MHz & 5MHz probes, there was a well- circumscribed solid, heterogeneous, bright echo genic soft tissue mass (10.4x7 .2cm) in the left upper abdomen and displacing the left kidney downwards and laterally. The mass was completely separated from from left kidney, spleen and tail of the pancreas. There was no focal lesion in liver or enlarged abdominal lymph nodes. We reported that lesion as adrenal neuroblastoma. There was another solid irregular hypoechoeic mass in the right eye (3.4x2.4cm) at the lateral aspect-that was also designated as neuroblastoma. Her VMA test was performed and the level was very high.

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## DISCUSSION

The neuroblastoma is a relatively common adrenal tumour, can rarely occur as a primary CNS tumour. 80% of cases present during the first decade of lifel. The peak incidence of neuroblastoma is between the ages of 2months and 2yrs and this second most common abdominal tumour of childhood sometimes can be difficult to differentiate from wilm's tumour2. Wilm's tumour is usually well defined and relatively homogenous, whereas neurob-lastoma is usually quite heterogeneous with irregular hyperechogenic areas caused by calcification3,4. This kind of tumour is poorly defined and locally invasive into the adjacent tissue and surrounding the major .vessels so that usually inoperable.

The imaging work-up usually includes CT or MRI to define haemorrhage, calcification, further extent of disease and metastasisl.2.MRI is particularly useful because the tumour can extend into the spinal canal and cause neurological symptoms2.

Neuroblastoma is usually highly echogenic and intrinsic calcification may be identitied5,6. However a cystic form of neuroblastoma has also been described and the adjacent kidney is displaced inferiorly and at times laterally5,7. The disease is often disseminated at the time of presentation; careful sonographic evaluation of the liver should be made for evidence of metastatic disease6. Because intraspinal extension is reported to occur in as many as 15% of patients and as ltrasonogrpahy can successfully define the spinal canal in young infants, such examination should be considered in the initial assessment of the infant with suspected neuroblastoma8.

Microscopically neuroblastoma resembles medulloblastoma because of its small dense cells variations in pathology. Some tumours show differentiation to ganglion cells,but do not have a better prognosis. These tumours appear to form a spectrum of tumours of embryonal origin, ranging from the aggressive,poorly differentiated and quite slow growing neurocytomas. The intraparenchymal tumors found in children resemble in clinical behavior of the paraneoplastic endocrine tumours (PNEJ' s), with neuraxis spread and occasional extraneuronal metastasis. This tumour may present as slowlr growing intraventricular mass in adults and may grow to large size before discovery.

The most important clue to the presence of neuroblastoma is opsoclonus (dancing eyes and feet, cerebella ataxia and possibly encephalopathy9,10. The presence of which confers a better prognosis. Optimal treatment may consist of radical excision with postoperative radiation though definitive evidence that radiation increases survival is lacking. Because of the frequency of local recurrence and CSF metastasis prophylactic spinal irradiation mar be justified. Long term follow up appears to have a greater than 30% 5 years survival.

Neuroblastoma is a common abdominal malignant tumour of childhood and ultrasono-graphy can play very important role to differentiate it from wilm's tumour as well as for the evaluation its extension and postoperative assessment.

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# Pancreatic pseudocyst-A Case Report

1Fahmin Rahman, 2Kanu Gopal Bala

Pseudocysts are collections of pancreatic fluid with. a high amylase content, surrounded by a fibrous wall 1. Pseudocyst fonnation is a well-known complication of pancreatitis. The fluid collections may occour with in the pancreatic mass, or in the peripancreatic spaces, or elsewhere within the abdomen following either acute pancreatitis or in chronic pancreatitis without any history of a previous acute episode2. .

Here a case of pancreatic pseudocyst is presented.

## CASE HISTORY

A 28 years old man was admitted in hospital with the complain of epigastric lump for two weeks. He had history of sudden, severe upper abdominal pain, radiating to back six weeks ago. He also complain of vomiting.

Physical examination revealed a painless lump in his upper abdomen. Complete blood count showed moderate leucocytosis. Seram amylase was 1100 u/ml. Liver function were mildly elevated. Patient was referred to sonologist for ultrasonography of hepatobiliary system and pancreas.

## SONOGRAPHIC FEATURE

Liver is normal in size and shape. It shows unifonn parenchymal echotexture all over. No focal lesion is seen. Gall bladder is nonnal in size and shape. Wall thickness is within nonnallimit. No echogenic structure is seen in the gall bladder. Both intra and extra hepatic biliary tree are not dialated.

Tow adjacent cystic areas are seen in front of the pancreas behind the stomach. The larger one measuring about IOIxl09 mm (Fig-I) and smaller one about 55x76mm (Fig-2). No debris or calcification are seen within the cysts.

Fig-l Fig-2

Fig-l & Fig-2: Shows two adjacent cystic areas in front of the pancreas behind the stomach, larger one measuring about 101 x 109mm and smaller one about 55x76mm.

## DISCUSSION

A pancreatic pseudouyst is a fluid collection that has developed a well- defined non epithelialiged wall in response to extra vasated engymes. It is generally spherical in shape and distinct from other structures. Approximately 4 to 6 weeks are necessary for a fluid collection to enclose it self by forming a wall composed of collagen and vascular granulation tissue. Pseudocystr occour in 10% to 20% of cases of acute pancreatitis most commonly of alcoholic or biliary origin3. In chronic pancreatitis the cyst is a consequence of duct obstruction and are reported in 25% to 40% cases3. Patients who have presented abdominal pain or presently elevated of pancreatic amylase should be suspected of harbouring a pseudocyst2.

Ultrasound is the initial imaging modality of choice to monitor a pseudocyst and provide guidance during intervention. Classically a pseudocyst is seen on ultrasonographic examination as a well-defined, smooth walled, anechoic structure with acoustic enhancement. Occasionally, they may also appear solid or complex, especially during formation. As a pseudocyst matures, serial scanning will generally

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reveal gradual clearing of the internal echoes. Debris with in a pseudocyst may occur with complications such as hemorrhage or infection.

A pseudocyst may also remain multiloculated without complications and may develop calcifications within wall. A heavily Calcified pseudocyst may be difficult to see on ultrasonograms because of presense of shadowing.

Complications have been reported in 30% to 50% of the patients with a pancreatic pseudocyst. Complications include haemorrhage, obstruction, acute peritonitis3.

In the early stages pseudocysts may regress and disappear, but if there is no improvement by 6 weeks, percutaneous drainage is required and can be curative1. Endoscopic cystogastrostomy or duodenostomy is a recent alternative approach; however, it may be more time consuming than the radiologically-guided percutaneous approach. If the above techniques are unavailable, if the anatomy precludes their usage, or if a pseudocyst is extensively multioculated, a surgical decompression should be used.

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# Choledochal cyst with complete biliary obstruction: diagnosed by ultrasonography & hepatobiliary isotope scan-a case report

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Choledochal cyst is a rare congenital abnormality of the bile duct. This is not a true cyst but rather dilatation that may occur anywhere in the biliary system and thought to be a result of refluxing the pancreatic juice. It may predispose to stone formation, biliary obstruction, pancreatitis, peritonitis resulting from a ruptured cyst & bile duct carcinoma. Ultrasonography reflects the specific type of the Choledochal cyst & Cholecyntegraphy can differentiate obstructive from nonobstructive dilatation of the bile duct.A 7months old boy got admission in the Barisal medical college hospital with the complaints of intermittent jaundice & upper abdominal pain for 3 months with persistent severe jaundice for 1month.He was referred to the Center for Nuclear Medicine & Ultrasound,Barisal for ultrasonography & hepatobiliary scan.Ultrasonography revealed an irregular outlined cyst at the porta heaptis with mild intrahepatic biliary dilatation. His biochemical picture was consistent with obstructive jaundice. Hepatobiliary isotope scan with 99mTc-BrIDA showed persistent radiotracer uptake in liver with nonvisualization of the biliary tree & failure of biliary to bowel transit even after 24hrs.Finally the case was reported as Choledochal cyst with complete biliary obstruction.

Choledochal cysts are congenital dilatations of the common bile duct, presenting most often in children before age 10 with nonspecific symptoms of jaundice, recurrent abdominal pain or both. The cysts predispose to stone formation, stenosis and stricture, pancreatitis, obstructive biliary complications and bile duct carcinoma in the adult1. Ultrasound can demonstrate the cyst, its position, associated biliary obstruction and its long-term complications. Hepatobiliary isotope scan plays important role for the confirmation about choledochal cyst, hepatic function and biliary obstruction whether partial or complete. Here we depict a case of choledochal cyst with complete biliary obstruction. Liver function tests showed a biochemical picture consistent with obstructive jaundice. Radioisotope scanning revealed nonvisualization of the biliary tree & failure of the isotope to reach the intestine.

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## CASE REPORT

A 7months old boy weighing 7kg got admission in the Sher-E-Bangla Medical College Hospital, Barisal with the complaints of jaundice for 4 moths. Initially he had an attack of intermittent jaundice and upper abdominal pain but for the last 1 month gradually severity of jaundice was increasing. For the evaluation of hepatobiliary system he was referred to the Center for Nuclear Medicine & Ultrasound, Barisal specially to exclude biliary atresia. On examination his gall bladder appeared to be smaller in normal size with slight thick wall and there was an irregular outlined cyst measuring 6.2x3.5cm at the commencement of common bilie duct along with dilated common hepatic duct & intrahepatic biliary tree; lower part of the common bile duct could not be outlined; liver & pancreas appeared normal. We recommended hepatobiliary isotope scan for further evaluation. Laboratory examination revealed increased serum bilirubin (19mg/dl), SGPT (50 mg/dl) & very high alkaline phosphatase (555 unit/L). Considering high bilirubin level he was advised to take Tab, Phenobarbitone 5mg/kg-body wt/day for 5 days prior to isotope scan. 1.5mci (200µci/kg body wt) 99m Tc-BrIDA was administered intravenously and acquisition were made at 5 minutes interval for 1 hr, next images were taken at 30minutes interval for 2hrs & as the tracer did not pass to the intestine within 3 hrs, delayed image was taken after 24hrs. Hepatobiliary scan showed good & uniform uptake of radiotracer by the liver but gall bladder & biliary tree could not be visualized even at 24 hr image that demonstrated complete biliary obstruction.

## DISCUSSION

Choledochal cyst is a third uncommon lesion that may cause bile duct obstruction2. The sonographic findings will reflect the specific type of Choledochal cyst that is present although typically a cystic extrahepatic mass will be present. Not infrequently, a portion of the dilated proximal bile duct can be seen extending into the Choledochal cyst. Despite reports to the contrary, intrahepatic bile duct dilatation is also commonly present3. The differential diagnosis includes other fluid filled masses such as hepatic cyst, pancreatic pseudocyst or enteric duplication cyst. Ultrasonogram can often suggest the correct diagnosis by accurately localizing the cyst to the biliary tree and showing its relationship to less distended portions of the biliary system & intrahepatic ducts3.

Although ultrasound can distinguish medical from surgical jaundice in more than 90% of cases, atypical cases will be encountered. Infrequently dilatation of the biliary tree can occur without jaundice4,5. The converse situation can also occur. A patient with obstructive jaundice may fail to exhibit dilatation of either the intrahepatic or extrahepatic bile ducts6,7. Occasionally patient may have an extrahepatic duct that changes rapidly in size (over a period of several minutes to several days)8,9. These prominent fluctuations most probably relate to the elasticity and associated distensibility of the duct.

Choledochal cyst may be associated with intermittent biliary obstruction and severe biliary cirrhosis; therefore early diagnosis is important11. Choledochal cyst may be result of pancreatic juices refluxing into the bile duct because of an anomalous junction of the pancreatic duct into the common bile duct, causing duct wall abnormality, weakness and outpouching of the ductal walls. These cysts are rare; the incidence is more common in females than males (4:1); with an increased incidence in infants (the condition may occur in adults). Choledochal cysts may be associated with gall stones, pancreatitis or cirrhosis. The patient presents with an abnormal mass, pain, fever or jaundice. The diagnosis may be confirmed with a nuclear medicine hepatobiliary scan. The majority of cases are thought to be congenital and result from bile reflux. The mass presents as a cystic dilatation of the biliary system12. Choledochal cysts appear as true cysts in the right upper quadrant with or without an apparent communication with the biliary system. The cysts are classified as follows12.

1. Localized cystic dilatation of the common bile duct.
2. Diverticulum from the common bile duct.
3. Invagination of the common bile duct into the duodenum.
4. Dilatation of the entire CBD and common hepatic duct.

A Choledochal cyst often presents clinically as obstruction, although many are asymptomatic. This is not a true cyst but rather dilatation that may occur anywhere in the biliary system. Ultrasonography may show a cystic structure but often cannot ascertain whether it connects with the biliary tract. Although complete obstruction would result in nonvisualization of the biliary tract on cholecyntegraphy, a partial obstruction can often be confirmed. With partial obstruction, 99mTc-

IDA tracer will fill the Choledocahl cyst, with prolonged retention. Delayed images are frequently helpful10. Pretreatment with Phenobarbital (5mg/kg/day for 5 days) before 99mTc -IDA imaging maximizes sensitivity by activating the liver excretory enzymes10. The lack of biliary clearance into the bowel by 24 hrs is predictive of biliary atresia. Severe forms of parenchymal liver disease may demonstrate clearance into the intestines by 24 hrs10. Cholecyntegraphy can differentiate obstructive from nonobstructive dilatation of the common bile duct. Patients with high-grade common bile duct obstruction of recent onset usually show good hepatic extraction and uptake, but no excretion of the radiolabeled bile into the biliary tree. There is a persistent hepatogram. The high intraductal pressure prevents excretion into the biliary ducts10.

99mTc-Br IDA (mebrofenin) radiopharmaceuticals have the same hepatocyte uptake, transport and excretion pathways as bilirubin. After i/v injection, this compound tightly bounds to protein in the blood, minimizing renal clearance. After hepatocellular uptake, the tracer is transported into the bile canaliculi by an active membrane transport system. Without being conjugated or undergoing significant metabolism they travel the same pathway as bilirubin, however, these compounds are subject to competitive inhibition by high level of serum bilirubin10. The relative flow into the biliary tree is determined by the patency of the bile ducts, sphincter of Oddi tone and intraluminal pressure10. Although bilirubin level greater than 5mg/dl result in poor image quality with 99m Tc-HIDA.99mTc-BrIDA can be effectively used with serum bilirubin levels as high as 20-30mg/dl because of their higher extraction efficiency10.

Choledochal cyst is a rare condition-affecting female 4 times as commonly as males, Japanese being more prone to the condition than other races. The symptoms & signs seldom become manifest before the age of 6 months (only half the cases present before the age of 20). The cyst may contain as much as 1-2 liters of bile. There are attacks of jaundice of the obstructive type, which are usually accompanied by upper abdominal pain and pyrexia due to infection. In most cases, a swelling is detected in the upper abdomen. In untreated cases; the condition ultimately proves fatal, due to ascending cholangitis, biliary cirrhosis or diffuse peritonitis following rupture of the cyst & carcinoma13. Treatment is the excision of the cyst & choledochojejunostomy13.

## CONCLUSION

Choledochal cyst though an uncommon form of congenital bile duct dilatation but if remain untreated it may predispose to stone formation, pancreatitis, biliary obstruction, cirrhosis & carcinoma therefore early diagnosis & management is important. Ultrasonogrphy suggests correct diagnosis by localizing the cyst & its communication with rest of the biliary system. On the other hand hepatobiliary isotope scan can play important role for the diagnosis of the cyst, hepatic function & differentiation of biliary obstruction whether partial or complete. Therefore the comprehensive evaluation of Choledochal cyst ultrasonogram & hepatobiliary scan should be done simultaneously.

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