Original Research Article

Study of pediatric abdominal pathologies by USG

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Abstract

Background: USG is most useful imaging and diagnostic modality for pediatric patients since it is radiation free. It allows imaging in multiple planes, permits repetitive examination and requires no biological function. It helps in characterization of lesion (solid /cystic), its localization whether Peritoneal or retroperitoneal, to know its extent, its spatial relationship, for FNAC/Biposy and drainage of fluid and follow up of cases. **Materials and Methods:** We have studied 80 cases during period Jan 1997–July 99. Study was carried out by Aloka SSD630, 3.5 Mhz and Linear transducer 5Mhz 38 were intraperitoneal, 37 retroperitoneal, 3 were mixed pathologies and 2 parietal wall abscesses. Intraperitoneal were from GB, Liver, Spleen, GIT and Retroperitoneal were from Pancreas, Adrenals, Kidneys and lymph nodes. **Results:** In the present study of 80 cases male child cases were more 63.75% and female child cases were less 36.25%. Intraperitoneal pathologies were more i.e 38% and retroperitoneal were little less i.e 37%.Renal pathologies were maximum, carried highest number, 28 cases. **Conclusion:** In our study we could make out organ of origin of pathologies, nature of masses like benign and malignant and measurement of lesion. Our findings correlated well with operative findings and FNAC findings. Also we could ascertain extend of lesion and effect on contigous organ.
Key Word: Peritoneal, Retroperitoneal, Hepatoblastoma, Intussusception, Wilms tumor.

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INTRODUCTION

Children with abdominal problems frequently present with abdominal pathologies in Surgery and Pediatric department and are frequently send for radiological evaluation and diagnosis. The use of USG in examination of abdominal masses was first described by Howry and Bliss in 1952 and later by Weld and Reid in 1954. X rays, IVEU, Barium studies all have been attempted for diagnosis[1]. But USG is single most accurate, radiation free, repetitive, tool which helps in characterization o f pathology solid or cystic, defining extent of lesion with its multiplane imaging and effect on contiguous organ along with ease of follow up and FNAC, requires no biological function. Its availability at periphery and Low cost further makes it most popular for patients and clinician. It's being non invasive, portability and chattel makes it most useful in acute abdominal conditions in pediatric patients like Intussusception, appendicitis, nectrotising colitis, renal colics, CHPS[2]. Clinically abdominal pathologies can be divided in to intraperitoneal, retroperitoneal and parietal wall lesions. In this study of 80 patients of fewer than 13 years, we have found 38 cases of intraperitoneal and 37 patients of retroperitoneal, 2 of parietal wall abscesses and 3 of mixed pathologies. Intraperitoneal may arise from liver, gall bladder, spleen, GIT. Retroperitoneal may arise from pancrease, adrenals, kidney and lymphnodes. The aim and objectives of study is to establish accuracy of USG as

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a primary screening procedure in abdominal masses in infants and children. To determine size of mass and its organ of origin as well as nature of mass cystic/solid, as benign lesion are mostly cystic and solid are mostly malignant. To know the response of treatment in the cases of abscesses and chemoradiotherapy response in cases of malignant masses. To know the effect of contiguous organ as spatial relationship of mass is important for a surgeon as IVC is a sensitive boundary between retroperitoneum and anterior abdomen. Renal and adrenal masses lift the venacava anteriorly and Hepatic masses will push it's posteriorly. To know the presence of metastasis though rare in pediatric population except for Nephroblastomas and Neuroblastomas.

MATERIALS AND METHODS

Study settings and period: This study was carried out in Government Medical College, Aurangabad from-Jan 1997 to Aug 1999 referred from department of Surgery and Pediatrics from same hospital.

Inclusion criteria

- All patients from 0-13 years referred with abdominal complain from Pediatric and Surgery department.

Exclusion criteria

- Patients who refused for examination and patients above 13.

Procedure: Total 80 patients form either set less than 13 years with an abdominal complain were subjected for this prospective randomized study, diagnosis was further confirmed by IVP and barium study, FNAC/Biopsy and also with operative findings. Scanning was performed by ALOKA SSD-630, real time Bmode ultrasound unit with 3.5 mhtz convex sector sometimes linear transducer of 5 mhtz. Patients were scanned with empty stomach and full bladder when needed after thorough application of aquasonic jelly in abdomen in supine decubitus sitting positions, in a friendly environment for children. Mild sedation was done when was needed with the consent of parents and the clinician.

Statistical analysis: The data was expressed in number and percentage. Microsoft excel 2003 used for analysis.

RESULTS

Sex distribution of 80 cases of abdominal pathologies male 51 cases (63.75%) and of females 29 cases (36.25%). So the incidence was more in male child as compared to female child. In this study among the Intraperitoneal pathology GIT carry highest incidence and among them cases of Intussuception and CHPS were the highest. We have found 2 cases of hepatic abscess, Hepatoblastoma-2, Hydatid cyst-1, Cholidochal cyst-2. Among the retroperitoneal cases, renal cases were most common distribution of Renal cases was like this-Hydronephrosis including Pyonephrosis-11 cases (39.2%, highest incidence among renal cases), tumors-9 cases (32% next highest), Ectopickidney (horse shoe) 2 cases (7.1%), Renal cystic disease 5 cases (17.5%) and Urinoma 1 case . Most frequent cause of hydronephrosis was Congenital PUJ obstruction-7 cases (63%) next common causes was Posterior Uretheral valve-2 cases (18.18%) and stones-2 cases (18.18%). There were mixed cases having Retro and Intraperitoneal involvement one of them had hepatic involvement of lymphoma along with retroperitoneal lymph nodes. In another case hepatic and splenic involvement of lymphoma was found along with retroperitoneal lymph nodes in third mixed case of lymphoma there was bowel lymphoma along with retroperitoneal lymph nodes (Table-1-3).

Table1: Distribution of patients based on age and location of lesion

Observation	Number	Percentage (%)
Age (Years)		
0-1	18	22.5
1-5	23	28.75
5-14	39	48.75
Location of lesion		
Parietal wall	2	2.5
Intraperitoneal	38	47.5
Reteroperitoneal	37	46.25
Mixed Intra and Reteroperitoneal	3	3.75
Parietal wall	2	2.5

Table 2: Distribution of patients based on the lesion in different systems

System	Number	Percentage (%)
Intraperitoneal (n=39)		
H-S megaly	11	28.94
Hepatobilliary	7	18.42
Splenic	2	5.26

Gastrointestinal tract	18	47.36
Gastrointestinal system (n=18)		
Congenital Hypertrophic Pyloric Stenosis	5	27.77
Duplication cyst of stomach	1	5.55
Intussusception	6	33.33
Intestinal obstruction	1	5.55
Bowel masses	2	11.11
Mesenteric cyst	1	5.55
Perforation peritonitis	1	5.55
Appendicular abscess	1	5.55

Table 3: Distribution of patients based on the lesion in different systems

System	Number	Percentage (%)
Retroperitoneal (n=37)		
Renal	28	75.67
Adrenal (neuroblastoma)	4	10.81
Pancreatic (pseudocyst)	3	8.1
Lymphoma	2	5.4
Lymphoma (n=6)		
Reteroperitoneal	2	33.32
Reteroperitoneal+intraperitoneal	3	49.98
Intraperitoneal	1	16.66
Retroperitoneal	2 NHL	
Intraperitoneal	1 bowel loop lymphoma	

Table 4: Somatometric parameters from 1 month to 15 years of age group

Age (Months)	LIVER		SPLEEN		RIGHT KIDNEY		LEFT KIDNEY	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
1-6	6.88	0.70	5.075	0.79	4.86	0.48	5.03	0.50
7-12	7.65	0.93	6.008	0.79	5.42	0.64	5.58	0.52
13-18	8.35	0.62	6.02	0.74	5.51	0.51	5.85	0.48
19-24	8.50	0.85	6.25	0.89	5.75	0.49	5.99	0.59
25-48	8.73	0.89	6.81	0.92	6.3	0.68	6.64	0.80
49-72	9.12	0.83	6.93	0.70	6.98	0.56	7.12	0.58
73-84	9.31	0.99	7.65	0.85	7.55	0.52	7.72	0.53
85-120	9.87	0.87	7.59	0.84	7.49	0.72	7.7	0.74
121-144	10.63	1.07	8.17	1.07	8.34	0.72	8.56	0.62
145-180	11.61	0.88	8.91	0.97	9.15	0.53	9.4	0.62

Table 5: USG diagnostic Criteria of CHPS

Features Abnormal	Normal
Pyloric length >18 mm	14-15 mm
Transverse py. Diameter >15	10-15 mm
Muscle wall thickness >4 mm	1.8±0.4 mm
Pyloric volume >15 ml	<15 ml
Short axis view target sign	Normal
Long axis view Cervix sign	Normal
Relaxation of pylorus not open	(+)
Gastric peristalsis delayed	Normal

(Py. Volume = 0.25 x (Py Diameter) 2 X Py Length, According to Radiopedia 2013, Average Pyloic volume >1.5 cm3 is suggestive of CHPS).

DISCUSSION

We have found large no of hepatic and hepatobiliary cases amongst the peritoneal case they are as liver abscesses (2 cases), Hepatic Cysts (1-Hydatid Cysts), Cirrhosis of liver and portal hypertension and Hepatic tumors/Metastasis. Heptosplenomegaly in this study we have found 11 cases of hepatosplenomegaly which is a major group of Intraperitoneal pathology. Causes of hepatosplenomegaly were anemia (3), ALL (3), Portal Hypertension (3), CML (1) case and Thalassemia (1). For biometery of Liver and Spleen our referrals were C. Mattlesteadt and David Cosgroovand Kathmandu

University Medicaljournal[3]. Liver size is also rapidly assessed by relating the degree to which Liver overlaps the right kidney. Hepatic measurements are taken in midclavicular and mid line of body. Hepatic, splenic and renal length in healthy children with normal Somatometric parameters from 1 month to 15 years of age group (Table-4). Portal hypertension in this study we found 3 cases of portal hypertension in the present study. Sonographic findings in Portal Hypertension include Splenomegaly, ascites and portosystemic collaterals (PSC). Portal vein diameter exceeds >13mm initially but with development of PSC, caliber of portal vein decreases. Splenic vein diameter is >12mm initially. Main sites of PSC are Gastroesophageal junction, paraumbilical vein, intestinal and within gall bladder wall. Demonstration of recanalisation of umbilical is highly specific sign of PHT (UV diameter >3mm). Direct visualisation of esophageal varices is difficult. Their presence is inferred by thickening of esophageal wall, irregularities of air containing column. Portal vein thrombosis may develop as a complication of coagulative disorders, cirrhosis of liver etc. On US correlation partial thrombus appears as an echogenic band in the wall of vessel. As thrombus organizes it appears more echogenic and nonmobile. Complete occlusion may lead to cavernous transformation of PV in which small collateral vessels develop around thrombosed PV. It appears as solid elongated structure at porta hepatis surrounded by winding channels. In our study patients of portal hypertension hepatosplenomegaly along with collaterals at splenic hilum were found. Liver echotexture was altered in two patients. In one patient, SPG was performed which reveled collaterals at Splenic hilum. Main portal vein was narrowed due to fibrosis. Gastric varices were also noted in this patient (Figure-1(a) and 1(b).

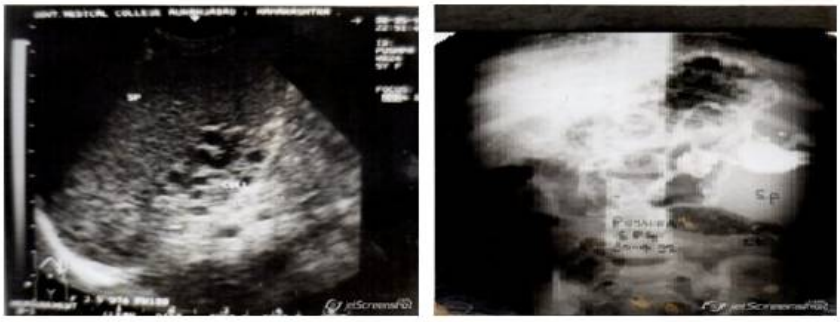


Figure 1A: Figure 1B:

Figure 1(a) and 1(b): Splenomegaly with Splenic Collaterals USG (1a) and SPG (1b)

Two cases of hepatic abscesses were found during the period of study. Our aims were to (a. Differenciate these hypoechoic lesions from other hypoechoic lesions), (b. To determine number, size, location, margins of lesion along with features of liquefaction within it), (c. To differentiate pyogenic from amoebic liver abscess) and (d. Follow up response of t/t). Our diagnosis was Pyogenic liver abscess in both as correlated wit and text books. There were coarse internal echoes within hypoechoic lesions along with thick irregular wall. Both hypoechoic lesions were in right lobe of liver and were associated with post enhancement and pleural effusion which again favoured pyogenic nature of abscesses. Size of lesions was decreased in follow up scan after antibiotic therapy. While USG findings of amoebic abscesses are thin, regular wall with anechoic contents in contrast to thick wall of Pyogenic lesions. On FNAC contents were plurulent instead of Anchovy Sauce.

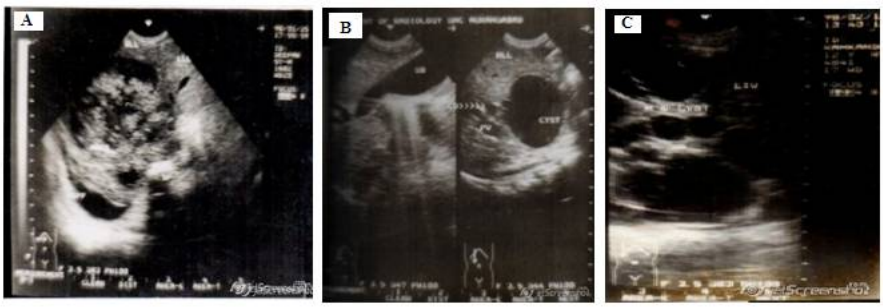


Figure-2 (a), 2(b) and 2(c): Rt. Lobe liver abscess (2a), Choledochal Cyst and Dilated IHBR (2b) and Liver Hydatid (2c)

Choledochal Cyst (CC) 2 patients were found to have cystic dilatation of CBD and Dilatation of IHBR .Corresponding to type IV Choledochal Cyst (as discussed by D Cosgrove) (Figure-2b). Also our case study matched with ultrasound spectrum of Choledochal Cyst given by H Kangarho[4]. David Cosgrove gave five possible types of Choledochal Cyst. 1. Spherical or fusiform dilatation of extrahepatic common duct (commonest), Type 1 can be associated with mild enlargement of IHBR further classified as 1a, 1b, 1c. Ia– GB arises from CC, Extra hepatic ducts dilated while IHBR is normal Type 1b EHBR are normal only Distal CBD is dilated. Type-1 c Fusiform dilataion of CHD and CBD along with Pancreato bililary malunion. 2. True Diverticulum of common duct.GB and CBD are normal. 3. Choledochocele (cystic dilatation of intraduodenal portion of common duct) 4. Combination of extra and intra-hepatic cysts. 5. Both Intrahepatic and extrahepatic duct involvement. Type 4a dilatation extends from CBD and CHD into IHBR with bilobar IHBR dilatation. Type 4b String of beads appearance –multiple dilatation of EHBR with a no intrahepatic dilatation. (Also considered as Caroli's Disease). Fluid within the cyst is echo free but occasionally precipitated bile salts represented as fine echoes. There is strong association between Choledochal Cyst and Pancreatic disease. Anomalies of pancreatic duct found in association with and indicate great risk of pancreatitis. Only one case of Hydatid cyst was encountered .In this patient along with hepatomegaly. There was large cystic a lesion in right lobe of liver which was having multiple daughter cysts (Figure-3). These daughter cysts develop from inner germinal layer giving Cart Wheel or Honey Comb appearance and when this layer gets detached and float in the large cyst gives it a Water Lilly sign. Hydatid cyst can be diagnosed on CT and USG .And complications on CT we can see signs of rupture as a defect in wall of cyst[5]. Findings are correlated with study of Dr Yuranga Weerakkody[6] .WHO classification 2001. [>CL: Uilocular Anechoic Cystic Lesion, no septations or internal echoes, >CE1:(Active Stage) Uniform Anechioc Cyst with fine internal echoes which may represent " Hydatid Sand", >CE2: (Active Stage) Cysts with internal septations represent walls of daughter Cysts described as multivesicular, rosette or Honey Combappearance, >CE3: (Transitional Stage) Evolving stage of daughter cyst within parent cyst .Daughter cyst may have detached laminated membranes (Water Lilly Sign),Or Daughter cyst within a solid matrix, >CE4: (Inactive Stage)Absence of Daughter Cysts ,mixed hypo or hyper echoic matrix (Ball of wool Sign), >CE5: (Inactive or degenerative Stage) Having calcified wall. (CL: Cystic lesion and CE: Cystic Echinococcosis)]. Hepatoblastoma there were two infants of less than 10 months of age having echogenic mass in right lobe of liver wit calcific foci within the mass. FNAC revealed round cell lesion s/o Hepatoblatoma. As per Western igures Abraham H Dachman *et al* 1987 hepatoblstoma are 2.8 %of all primary malignant tumors which to our study I.e 2.5 % (2 out of 23 tumors). They are ill defined, heterogenous, predominately hyperehoic masses of varying sizes with echopoor areas within the mass[7]. Calcifications are characteristic of hepatoblastoma. Displacement and stretching of extrahepatic and intrahepatic vessels is common .Tumor size can be variable may be large as 10-12cms.There can be a false capsule around mass. Ascites and retroperitoneal nodes are commonly associated. Hepatoblastomas are commoner than HCC and have got male predominance. Hepatic Lymphomas, Leukemias and Metastasis Lymphomas and leukemia's may infilterated into liver and sonographically produce hypoechoic areas which are generally diffuse. In leukemias multiple discrete masses as "Chloromas" are identified. These lesions are hypoechoic with no acoustic enhancement .Microscopic infilterates are more common in leukemias which can be seen with high resolution probe otherwise only hepatomegaly is appreciated. Some Metastatic lesions give bulls eye appearance and have dense center resulting from necrosis. Among the Splenic pathologies other than portal hypertension there can be Splenic Cysts, Splenic Abscesses. In the patients of portal hypertension hepatospenomegaly along with collaterals at splenic hilum were main findings. Liver echotexture was altered in two cases .In one patient SPG splenoportograhy was performed along with USG .Which showed collaterals at splenic hilum. Main splenicvein was narrowed due to fibrosis. Gastric varices wee also noted in this patient [Figure-1(a) and 1(b)]. Splenic cysts can be primary as epidermoid cyst or traumatic cysts. Splenic abcesses are very common here in our study we have found two cases of splenic abscesses referred with tender Splenomegaly .In both cases there were hypoechoic lesions in splenic parenchyma one was having regular margins and another was having irregular margins. Internal echoes were found in both cases .In one cases there were three discrete lesions. Sonographic features were correlated with study of Surendra Pawar and referral text books. One case had gross Splenomegaly due to Lymphatic infilteration which on biopsy found to be NHL. Bowel tumors can be [(1) Lyphoma (2) Adenocarcinoma (3) Mesenchymal tumors (4) Metastatic tumors][8]. These tumors are rare in pediatric age group. In this study we have found two cases bowel lymphoma and one case of rectosigmoidcarcinoma (Figure: 3 and 4).

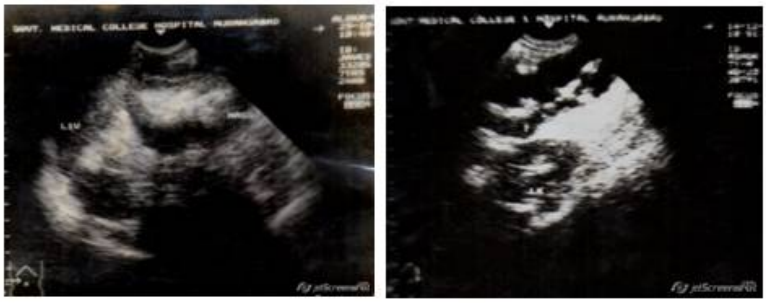


Figure 3 and 4: Bowel lymphoma appearance (3) and bowel lymphoma pseudo kidney (4)

Two case of lymphoma was found in our study (Figure:5and6). One of them was associated with intussusceptions and another was associated with retroperitoneal. Various pattern of bowel lymphoma have been described. [1. Exoentric type or polypoidal type-Here lesion extends in to mesentry in polypoidal manner. 2. Large lesion with pseudokidney apperarence due to thickening of bowel wall may be 3-10 cm in size. Bowel wall may be thick as 40x20 mm due to diffuse infiltration in bowel wall while the normal thickness is 3 mm other names given such lesion are Bull's eye lesion/Target lesion/hallo lesion/Doughnut/Cockade lesion .Most common sites of involvment are jejunum and ilium amd 3. Small anechoic masses of enlarge node]. There may be proximal dilatation of bowel loops. Differerential diagnosis of Pseudokidney lesion (Tumors: Adenocarcinoma/lymphoma/carcinoids, Inflammatory disease: Crohn's or Ulcerative colitis/Diverticulitis/ Appendicitis and Others: Intussuscepion/Ischemia of bowel). These finding have been described by Davide[9].

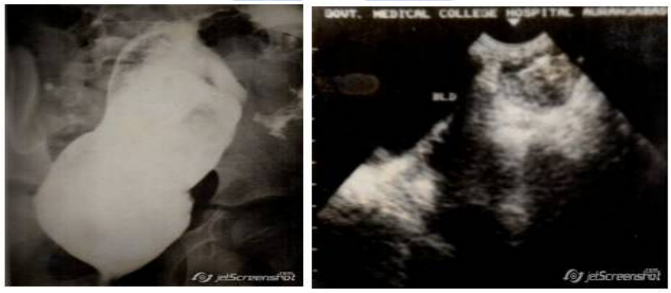


Figure-7(a) and 7(b): Distructive lesion Secondry to Rectosigmoid Adenocarcinoma (7a) Ba Enema and USG (7b)

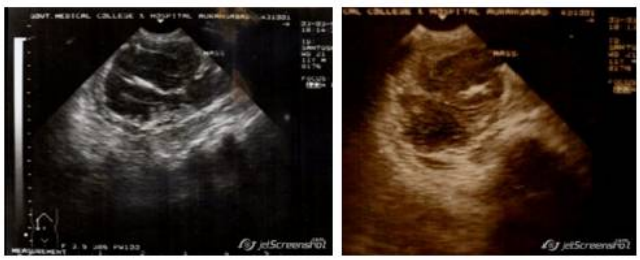
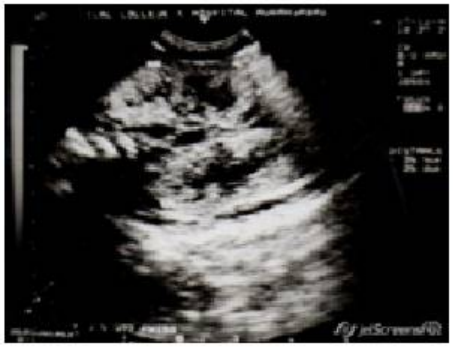


Figure 8(a) and 8 (b): Illeocolic Intussucception (8a) long and Trans scan (8b)

Rectosigmoid carcinoma patient was 6 year old male child present with lump and pain in left iliac fossa. On sonography it was mixed echogenic mass s of size 4x3 cm having pseudokidney appearance was found superio lateral to urinary bladder .Barium enema was done which revealed film defect in sigmoid colon with destruction and narrowing of proximal sigmoid colon along with shouldering effect. These finding are consistent with "Annular Constricting type of malignancy described by Carol Mittlsteadt. This malignancy prevalent in descending and sigmoid colon though rarely found in children .On biopsy it was rectosigmoid adenoarcinoma (Figure-7a and b). Intestinal Obstruction and or Dilatation of bowel loops one case of study with hugely distended bowel loops along with free fluid filled bowel loops with ascitis on USG. Postoperatively it was found to be obstruction secondary to Meckel's diverticulum. Small bowel obstruction is associated with dilatation of proximal loops. Most characteristic feature of intestinal obstruction on USG is intraluminal collection of fluid. In adynamic ileus dilated bowel loops reveal increased peristalsis, distension is less as compared to dynamic

ileus. In dynamic (obstructive) ileus fluid filled loops are perfectly rounded with minimal deformity at interface with adjacent loops of distended loops. Thickness of bowel wall is increased normal bowel wall thickness is 3-5mm.In obstructive ileus there is loss of definition of volvulae conniventis. One case of perforation peritonitis was observed. There was echogenic collection in peritoneal cavity. On plane X-ray KUB, air fluid level was observed which was changing its position. Laprotomy confirmed our diagnosis. Intussusception of USG highly accurate in diagnosis of intussusceptions with sensitivity of 98-100% for better then Barium Enema which can be reserved for therapeutic use. Intussusception is complex structure where in to intususcipien the receiving loops contain folded in to intussuceptum. The donnar loops which have two components the entering loop and the returning loop. The thickest component of intussuceptum is everted returning limb which together with thin intussucipien forms hypoechoic outer ring on axial scan. The center of intussuspian contain center of entering limb which is of normal thickness and is eccentrically surrounding via hyperechoic messentary giving crescent-in-doughnut/Pseudokidney sign. I C junction was commonly involved as described by Roger a pariety, and the cause here being lymph nodes (Figure-8a and b). Lorri Barr[10] described ring within Ring or Target or Bull's Eye lesion depending on its appearance and the plane of examination on longitudinal or transverse. Acute Appendicitis, Ultrasonographic study by high frequency probe is more accurate. In my study one case of appendicular abscess seen. Inflammed appendix is Noncompressible and shows no peristaltic activity with blind end. Muscle wall thickness (distance between echogenic mucosa to outer anechoic wall) is more then 1-2mm in children up to 6 year and 4-5mm in children more than 6 years. There is loss of echogenic mucosal and serosal lines with periappendicular collection in case of appendicitis. Appendicolith may be seen in the lumen of appendix. Ultrasound feature s of appendicitis in pediatric patients. Normal Lumen of appendix is echogenic area in appendicitis with fluid collection it appear anechoic. Inflammed appendix usually seen at the tip of caecum. But of it is retrocecal there is no bowel loops under interposed between appendix and laterl abdominal wall. It is seen as target sign on transverse scan and tubular on longitudinal scan. Chronic Hypertrophic Pyloric Stenosis (CHPS), this condition is caused by the thickess of muscular layer and failure of pyloric canal relaxation resulting gastric outlet obstruction .Clinically neonates/infants presents with nonbilious vomiting and consequently failure to feed, Dehydration, Hypochloramic alkalosis and conjugated jaundice. There may be visible peristaltic with palpable "olive". Ultrasonographc finding are hypertrophic muscular layer and abnormal elongation of pyloric canal and distended stomach pyloric canal diameter in our 5 cases were- 1.4 cm, 1.6 cm, 1.2 cm, 18 cm, 1.6 cm and pyloric length were 3.0 cm, 2.1 cm , 2 cm, 2cm and 2.25 cm and muscle length between 4-5 cm respectively. These values correspond to criteria given by Silvia CD[11], Cohen HL[12]. They are various sign given by different authors like "Target sign" "Cervix sign", "Double tract sign". Retroperitoneal masses can be grouped as under 1. Renal, 2. Adrenal, 3. Pancreatic and 4. Others. Renal Masses are (Cystic renal masses: a) Hydronephrosis/Pyonephrosis b) Renal cystic disease and Solid renal masses: a) Wilm's tumour b) Nephroblastomatosis c) Mesoblastic nephroma d) Multilocular cystic nephroma e) Renal lymphoma f) Angiomyolipoma). Renal cystic disease was found in 5% cases, 2 cases were of infantile polycystic disease. One of them was diagnosed in utero and was having posterior urethral valves also. Both neonates had raised echogenicity of kidneys along with increased size of kidney [(Figure-9(a)]. In one case IVP was done at 2 months of age [(Figure-9(b)] which showed enlarged kidneys with streaky pattern of renal parenchyma. One case was of adult polycystic kidney disease, though rare in pediatric age group. Cysts were distributed in both renal cortex and medulla, predominantly peripherally and were distorting renal capsule. Fourth case was of cystic disease mainly in medullary region and was having hepatic fibrosis also, so it was diagnosed as Juvenile polycystic disease.



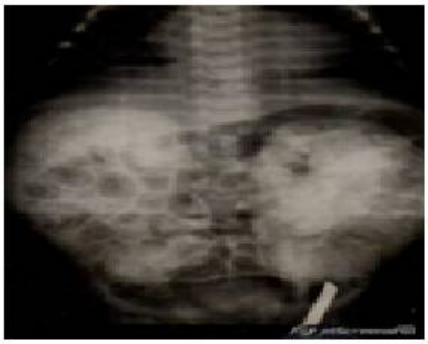


Figure 9(a) and 9(b): USG of antenatal polycystic kidneys (9a) and IVP Neonatal polycystic kidneys with parenchymal streaky pattern (9b)

Hydronephrosis is most coomon cause of pediatric abdominal lump, and in many of them it is associated with congenital PUJ obstruction leading to dilatation of pelvicalyceal system with progressive atrophy of renal parenchyma. Other causes of hydronephrosis in pediatric age group can be pyonephrosis secondary to stones and posterior urethral valve. In our study, congenital PUJ obstruction was found in 63.63% of all cases, stones in 2 cases (18.18%) and posterior urethral valves in 18.18% cases. Ectopic kidney was encountered in 2 cases of our study. Kidneys in both were para-infra umbilical and isthmus binding the 2 kidneys was seen at lower pole (Figure-10a and 10b). Associated complications, though common (like stones/hydronephrosis/infective changes), were not found in our study.

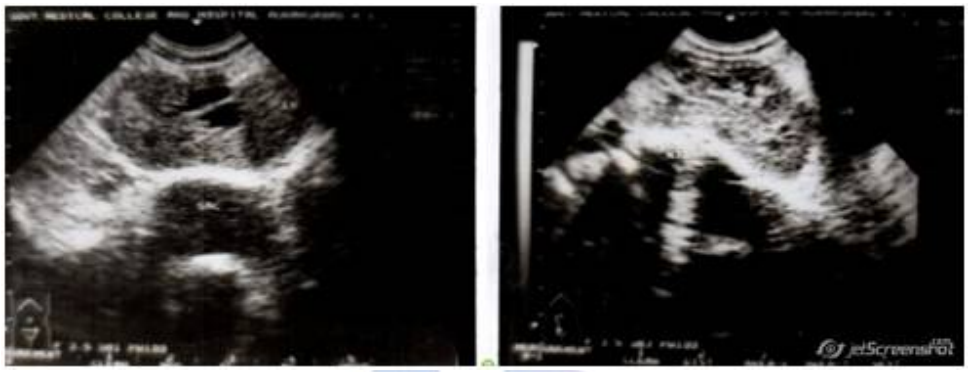


Figure-10(a) and 10(b): Horse shoe kidneys with fused lower poles Long (10a) and Trans Scan (10b)

Renal tumors In our study 9 cases of Wilm's tumour (WT) were found, which is 32% of all renal masses. Wilm's tumour is most common pediatric neoplasm and the peak incidence is seen at 3 to 4 years of age. Male-Female ratio was 60:40. Renal masses were of varying sizes (8-14cm) and echogenicity was variable, mostly more than that of liver. Anechoic areas were seen in between tumour masses. Calcification was not common. Final diagnosis was made with FNAC. In one female of age 6 and half years, after initial presentation and nephrectomy, secondaries were seen in liver and pelvis. National Wilm's tumour Study (NWTS staging) - Imaging spectrum of primary malignant renal neoplasm in children[13]. (Stage-I: Tumour confined to kidney without capsular or vascular invasion. No residual tissue after resection was found, Stage-II: Tumour beyond renal capsule and vessels were infiltrated with biopsy performed before resection or intraoperative tumour rupture, confined to the flanks, not involving peritoneal surface (Completely resectable tumour free margins), Stage-III: Positive lymph nodes in abdomen and pelvis, peritoneal invasion, tumour infiltration of urinary bladder or residual tumour at surgical margins, Stage-IV: Hematogenous metastasis (lung, liver, bone or lymph node metastases) outside abdominopelvic regions, Stage-V: Bilateral renal involvement at the time of diagnosis). Other tumors like Mesobalstoma, miltiloculated cystic nephroma and Angiomyolipoma, Renal lmphoma and renal leukemia are very rare. In our study only 1 patient of renal lymphoma was found. In this case, kidneys were enlarged and diffusely infiltrated by hypoechoic areas. Sonograpic feature were similar to those of Nephroblastomatosis has got strong relationship with Wilm's Tumour. Pancortical type of NBM is diffuse and is incompitible with life. There is complete loss of renal parenchymna with blastemmal tissue. It may be found after chemotheraphy in the patient of Wilm' tumour[14]. Adrenal tumours encountered in pediatric age group can be arranged in order of frequency as follows 1) Neuroblastoma, most frequent>4 cases(17.8% of all abdominal cases in our study),2) Ganglioneuroma, 3) Pheochromocytomas <5% and 4) Adrenal cortical tumours < 1%. Our findings were correlated with study of Gary M Amundson *et al* (ref 12). They studied 53 abdominal tumours, 19% of them were neuroblastomas. Peak age of incidence was 2 years. Sonographic features: Average size of tumour was 6-7 cm. Masses were inhomogeneous in echotexture but mostly echogenic. Echogenicity of these tumours increased after therapy. There may be anechoic areas within the tumour mass corresponding to necrosis or liquefied blood. Calcific foci are very common in neuroblastomas. Kidneys may be displaced by huge tumour mass but rarely invade the kidney. In advanced stage tumour may cross the midline and present bilaterally. Tumour may undermine the IVC and aorta lifting them off the spine. This feature helps in differentiating neuroblastoma from nephroblastoma. In few cases hepatic metastasis is seen causing hepatomegaly. Ascites is an associated finding many a times. Followup USG can determine in the change in tumour size as a result of therapy. Nodal, (abdominal as well as pelvic) involvement is common in children. In one case hepatic metastasis was seen. USG is not a reliable tool to diagnose total resolution of tumours lesions for which CT is recommended[15]. In our

case diagnosis was confirmed by FNAC. In children etiology of Pancreatitis is different from adults and is mostly traumatic, idiopathic or infective. In all cases of pancreatitis GB and biliary tree should be looked for Choledochal Cysts which may be present with pancreatitis. Anomalous pancreatic duct and biliary duct also predispose to pancreatitis. In our study, 3 patients were diagnosed as pseudopancreatic cysts which were confirmed to be same from surgical side. Patient presentation was poorly localized abdominal pain with elevated amylases and lipases. On USG pancreas was found to be enlarged and hypoechoic. There was encysted collection in lesser sac of size 8 X 10 cm with fine internal echoes in one case. In 2 cases, 2 small areas of anechoic collection see at splenic hilum. Ascites and pleural effusion on left side was also associated 2 patients out of 3. In one patient, barium meal was performed as this patient was comparatively stable and afebrile. Stomach was pushed anteriorly and was elongated[16].

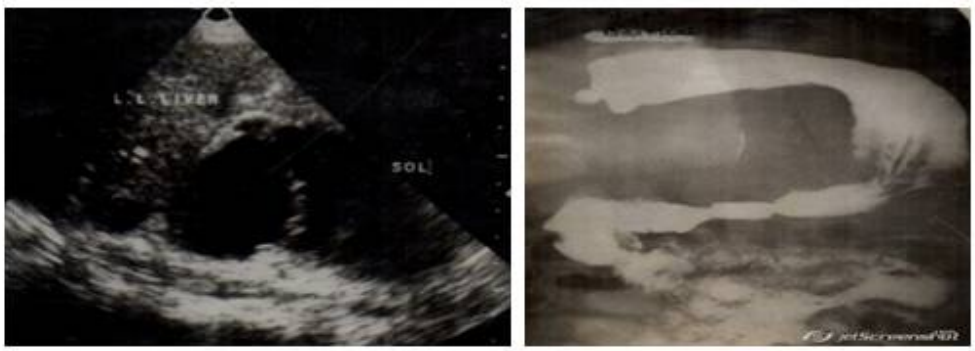


Figure-11(a) and 11(b): Pseudo cyst of pancreas: On USG showing anechoic collection in lesser sac (11a) and On Barium meal revealing impression over stomach and elon elongation of pyloric end (11b)

In pediatric age group, Non Hodgkins lymphoma is more common than Hodgkins lymphomas. Comparing with study of Keeplinksky 1994 (ref 15), median age of patients in our study was fiveand half year. Most of patients were referred for abdominal lumps. Retroperitoneal nodes were most commonly found. Lymphnodes were aggregated, hypoechoic and mostly paraaortic. Hepatic and Splenic involvement was diffuse as well as focal with reduced echogenecity. Bowel lymphomas were detected as pseudo kidney lesions. Bowel wall was thick, central echogenic lumen was seen. And there was no peristalsis in the involved loop. We have found 6 cases of lymphomas. Two cases were having retroperitoneal nodes. Three patients were retro and intraperitoneal involvement. One patient was having intraperitoneal involvement only. Among them two patients were of NHL, one patient was of bowel lymphoma .Hepatic involvement was seen in one case and splenic involvement was found in another case along with retroperitoneal nodes in both cases. Parietal wall abscess two cases of parietal wall abscess were found in our study. There was collection in anterior abdominal wall which was hypoechoic with internal echoes and shape of lesion was oval-spindle. Diagnosis was confirmed by aspiration of 30-40cc pus by Surgeons.

CONCLUSION

The present study concludes that renal pathologies were commonest in the present study .And next commonest were Hepatobiliary. Determination of organ of origin and measurement of lesions were found accurate in most of cases as confirmed by operative findings. Mass effect on "Contiguous organs" was assessed in each case like on IVC, Aorta and adjoining organs. Detection of fluid in peritoneal cavity or within pleural cavity helped in evaluation of lesions like in Pseudopancreatic cyst.

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