LOWER RIGHT QUADRANT PAIN: A SONO ANATOMICAL PERSPECTIVE

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ABSTRACT

Introduction: Ultrasonography has been found to be highly precise in evaluation of various abdominal masses. It is highly sensitive, non-invasive in nature and has no radiation risk.

Material & Methods: A prospective study aiming at sonographic evaluation of 133 patients with right lower quadrant pain/mass which includes patients of all age groups and both sexes was planned. In this study, the efficiency of ultrasonography over clinical assessment in determination of the organ of origin was evaluated in a systematic manner according to anatomy of the region.

Results: The maximum number of cases belonged to gastrointestinal (GI) pathologies (54%) followed by genitourinary (GU) pathologies (31.6%) while 14% non-gastrointestinal and non-genitourinary origin.

Keywords: Appendicular mass, intussusception, gastrointestinal, carcinoma caecum, genitourinary, myoma, lymph node mass.

INTRODUCTION

Ultrasound has high diagnostic accuracy in diagnosing the pathological nature of right iliac fossa masses (overall accuracy 90%) [1] while it is 100% accurate in case of appendicular mass, in detecting normal cases, normal variants (clinically diagnosed as right iliac fossa masses), uterine mass, lymph-nodal mass and ileocolic intussusception. Differential diagnosis of lower right quadrant pain depends upon the affection of various organs present in right iliac and right lumbar region and their surrounding anatomical relations. Right lower quadrant pops up with plethora of pathological conditions which are either confined to this corner or encroach towards it and victimize a large number of patients. Differential diagnosis of lower right quadrant pain according to regional anatomy are gastrointestinal (GI) causes e.g. appendicular mass/abscess/mucocele, ileocaecal tuberculosis, intussusception, inflammatory bowel disease, carcinoma caecum. Genitourinary causes (GU) include tube ovarian masses and myomas. Non-

gastrointestinal and Non-genitourinary causes include psoas abscess, ectopic kidney and post-traumatic masses. Ultrasonography (USG) has been found to be highly precise in evaluation of various abdominal masses [2] including the gastrointestinal, genitourinary and masses from various other systems. Because of its high sensitivity, non-invasive nature, lower cost, general accessibility and no radiation risk, it is widely used as a diagnostic tool. It not only provides image of mass independent of its and its vicinity organ function but also pioneers as method of choice for guided biopsies and fine needle aspirations [3]. It has been a boon to the pregnant patients by the virtue of lacking radiation risk.

MATERIAL AND METHODS

This is a prospective study of sonographic evaluation of patients with lower right quadrant pain/right iliac fossa (RIF) masses which includes patients of all age groups and both sexes. A total number of 133 patients

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referred from various clinical departments with pain/suspected RIF mass were included in the study and evaluated.

USG was done on ACCUSON 300 XE PREMIUM EDITION sonography machine with curvi-linear array transducer with frequency of 2-5 MHz, linear array transducer with frequency of 8-10 MHz and endovaginal probe of frequency 7 MHz in uterine and tuboovarian masses. Prior to performing USG, a verbal informed consent was obtained from patients. Detailed relevant history taking of patients was followed by thorough general, physical and abdominal examination before subjecting patients to USG examination.

Technique of Examination

Scanning was done in longitudinal and transverse directions covering all the areas of interest. For kidney and retroperitoneum, patients were also scanned in prone and lateral positions. Graded compression technique was utilized with exerting gentle compression with the high frequency transducer using both hands in same way when palpating abdomen. This technique displaced gas in bowel producing artifacts and precisely located the region of pathology by maximal tenderness if present. On gray scale sonography, following things of masses were evaluated: location, organ of origin, characteristics of mass (size, shape, margin echotexture, and calcification) and relation to adjacent organs.

This was followed by color Doppler examination with color flow mapping using low flow settings. The confirmation of data was done by fine needle aspiration cytology and biopsy, further radiological imaging (CT, barium study, intravenous urography, non-radiological tests, clinical and ultrasonographic) follow up.

Statistical Analysis

The sensitivity of detecting RIF mass by USG was 90.76% and it is 100% specific (accurate in detecting true negative). The positive predictive value of USG was 100% in detecting masses correctly i.e. 100% accurate in detecting true presence of mass. The negative predictive value was 20%. Shows predictive value of negative test is 20%.

OBSERVATIONS AND RESULTS

It was found that USG is 100% efficient in detecting psoas abscess, intra-abdominal abscess, parietal haematoma and lymph node mass whereas it is 75% accurate in detecting parietal abscess as compared to clinical examination which can detect psoas abscess to 75% accuracy and intra-abdominal abscess to 50% accuracy, but it can only detect one third of prietal abscess, parietal haemetoma and lymph node mass. In case of localized collection, where USG can detect one third of confirmed cases, clinical examination was unable to detect.

According to symptoms especially pain and presence/absence of mass in the affected area, clinical assessment and further sonographic evaluation was done to detect the organ of origin as per the anatomy of lower right quadrant of abdomen mainly right iliac region, partly right lumbar and right iliac region (Table 1-4, Figs. 1-8). In the present study, maximum number of cases was found in 30-45 years age group (39%) followed by 15-30 years age group (35.4%), 0-15 years age group (10%) and 45-60 years age group (12%). Least number of patients was seen above 60 years of age group (3%). Male to female ratio was found to be 1:1.5. The common presenting symptom in all patients was pain in abdomen followed by vomiting and fever in almost 44- 45%, rest in line were GI complaints followed by menstrual irregularities (Table 5). Though the mass was palpable in 68.4% cases.

Table 1: Comparison of efficiency of USG and clinical assessment in correctly detecting the organ of origin in gastrointestinal pathologies in RIF

Type of mass	No. of confirmed cases	Percentage	No. of cases detected by organ of origin	
			By USG	By Clinical Evaluation
Appendicular mass	52	72.2%	52	42
Carcinoma caecum	2	2.7%	2	0
Colitis	10	13.8%	9	8
Ileocolic intussusception	3	4.16%	3	2
Ileocaecal tuberculosis	3	4.16%	2	1
Carcinoma colon	2	2.7%	1	0
Acute mesenteric lymphadenitis	2	2.7%	2	2
Total	72	100%	70	55

Table 2: Comparison of efficiency of USG and clinical assessment in correctly detecting the organ of origin in genitourinary pathologies in RIF

Type of mass	No. of confirmed cases	Percentage	No. of cases detected by organ of origin	
			By USG	By Clinical Evaluation
Right sided ovarian mass	22	51.1%	22	12
Uterine mass	7	16.2%	7	4
Renal mass	2	4.65%	2	0
Left sided ovarian mass	1	2.32%	1	0
Tuboovarian mass	5	11.6%	4	1
Right sided ectopic pregnancy	2	4.65%	2	2
Ruptured graffian follicle	2	4.65%	2	0
Ectopic iliac right kidney	2	4.65%	2	0
Total	43	100%	42	19

Table 3: Comparison of efficiency of USG and clinical examination in correctly detecting the organ of origin in non-GI and non-GU pathologies in RIF

Type of mass	No. of confirmed cases	Percentage	No. of cases detected by organ of origin	
			By USG	By Clinical Evaluation
Right psoas muscle abscess	4	100%	4	3
Intra-abdominal abscess	4	100%	4	2
Parietal abscess	4	100%	4	1
Parietal haematoma	3	100%	3	1
Lymph nodal mass	2	100%	2	1
Localized collection	1	100%	1	0
Total	18	100%	1	7

Table 4: Detection of palpable RIF masses by USG

	Mass Present	Mass Absent	Total
Ultrasound +ve	118	0	118
Ultrasound -ve	12	3	15
Total	130	3	133

Table 5: Distribution of frequency of symptomatology in patients with RIF mass

Symptom (n=133)*	No of cases	Percentage
Pain in abdomen	100	100%
Fever	44	33.2%
Mass discovered by the patient	29	21.8%
Vomiting	44	33.0%
Gastrointestinal complaints (diarrhea, constipation, blood in stools)	37	27.8%
Menstrual irregularities	18	13.5%
Loss of appetite	23	17.2%
Weight loss	10	7.5%
Abdominal distension	6	4.5%
Bladder complaints (increase or decrease frequency of micturition, burning micturition, hematuria)	8	6.0%

Fig. 1: USG showing Carcinoma caecum

Fig. 2: USG showing intussusception & Gut signature intussusception

Fig. 3: USG showing appendicitis

Fig. 4: USG showing caudally fused horse shoe kidney

Fig. 5: USG showing Rt. lateral uterine wall myoma

[illegible]

DISCUSSION

Out of total of 72 cases of gastrointestinal pathologies, 52 cases were appendicular masses (Fig. 3) followed by 10 cases of colitis. Two cases of carcinoma colon and 2 of carcinoma caecum (Fig. 1) were found. Jadvar et al. (1997) noted that out of 10 cases of colitis, 9 were diagnosed as infectious and was tubercular in nature [5]. Seven cases of infectious colitis showed positive stool culture for *E. histolytica* and 2 had positive blood culture for *Campylobacter jejuni* in a child [6], while remaining one case of tubercular colitis was finally diagnosed on colonoscopic biopsy and histopathology. In all the cases diagnosed as appendicular pathology, appendicitis was found to be most frequent finding which is similar to previous studies [7,8]. There were also 3 cases of ileocolic intussusception (Fig. 2) and 3 cases of ileocaecal tuberculosis. In GU pathologies out of 22 ovarian masses (Table 3), 5 were malignant, 14 benign and 3 were haemorrhagic cyst (Fig. 8). All were right sided GU pathologies except one was a huge left ovarian haemorrhagic cyst. There were 7 uterine leiomyomas extending to right iliac fossa (Fig. 5). Two cases of right adnexal ectopic pregnancy with loculated hematoma was seen extending in RIF (Fig. 7). There were 2 cases of congenital etiology which comprised of left sided caudal crossed fused renal ectopy and 1 right ectopic iliac kidney (Fig. 4). Next in number was psoas pathology which included two cases of psoas abscess (Fig. 6). USG in cases of psoas abscess revealed hypoechoic collection in right psoas muscle and bulky psoas muscle [9].

Aspiration of pus in case of abscess and haemorrhagic fluid in case of hematoma confirmed the diagnosis. The culture of the pus revealed the growth of staphylococcus. Three cases that had no masses in RIF on sonographic examination and were considered normal but clinically masses were palpated [10]. One case clinically suspected of ileocaecal tuberculosis but sonography revealed no lesion. The present study constituted appendicular masses mainly acute appendicitis [11] as maximum number of cases and

diagnosed correctly, which shows efficiency of ultrasound in diagnosing appendicular masses especially in gravid patients with symptoms of appendicitis [12]. The second most common pathology was right ovarian mass which was almost similar to previous studies [13,14] extending to RIF. Barker & Lindsell [2] and Millard et al. [3] in their studies stated that in any patient with palpable RIF mass, USG should be the primary investigation. The initial consideration in evaluation of right lower quadrant pain or mass is whether the lesion is present or not. In the present study, 3 masses were normal variant (i.e. low lying kidney) [7]. The sensitivity and specificity of ultrasound for detection of right iliac fossa mass was found to be 100% which is similar to previous studies [2,3] which also showed high sensitivity and specificity of ultrasound for detection of presence of abdominal and RIF masses respectively.

CONCLUSION

USG can detect pathologies which are inaccessible to clinical examination. It lacks hazards of radiation. It has high diagnostic accuracy in diagnosing the pathological nature of RIF masses (over all accuracy 92%) while it is 100% accurate in appendicular mass. It is also highly accurate (100%) in detecting normal cases and normal variants (low lying kidney) clinically diagnosed as RIF masses, uterine mass, lymph-nodal mass and ileocolic intussusception. USG had 100% sensitivity, specificity, positive predictivity [4] and negative predictivity and accuracy in detecting presence of mass in RIF in present study.

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