



HIGH RESOLUTION SONOGRAPHY IN THE EVALUATION OF ANTERIOR ABDOMINAL WALL LESIONS

Dr.O.Sridhar Babu Assistant Professor Sri Venkateswara Medical College, Alipiri Road, Tirupati-517507.

Dr.N.S.Vidya Assistant Professor Sri Venkateswara Medical College, Alipiri Road, Tirupati-517507.
- Corresponding Author

ABSTRACT **Introduction:** Abdominal wall lesions often mimic intra-abdominal conditions and frequently present as palpable masses. Early detection of these pathology with use of high resolution USG and other cross sectional imaging has revolutionized the treatment options for the surgeons. So the aim of the study to determine role of high resolution sonography in the evaluation of anterior abdominal wall lesions.

Methodology: The present study is a study of 50 cases of anterior abdominal wall lesions were evaluated using high resolution Ultrasonography with high frequency linear array probe. (7-12 MHZ) and diagnostic accuracy were determined.

Results: Among 50 clinical suspected Anterior Abdominal wall lesions most common indication for high resolution sonography was incisional hernia, followed by anterior abdominal wall lump which is relatively a non-specific clinical diagnosis, which later turned out be different lesions on high resolution sonography as well as histopathology. We found lipomas in 4 cases out of 50cases (8%) correlated with histopathological finding.

Conclusion : In our study design diagnostic accuracy of sonography was 97.6% in evaluation of hernias, lipomas, desmoid, dermoid, hematoma and resolving abscess. We felt multidisciplinary approach involving physicians /surgeons, radiologists and pathologists for betterment of the patients to diagnose anterior abdominal wall lesions accurately and for further surgical management.

KEYWORDS :

Introduction

Abdominal wall lesions often mimic intra-abdominal conditions and frequently present as palpable masses. This is more common with patients who have a thick abdominal wall with a large layer of fat. Pathologic processes that may involve the abdominal wall occasionally raise diagnostic challenges because of the low specificity of physical findings. The most common situation when a sonographic examination of the abdominal wall is needed is when there is a doubt about a palpable abdominal mass to decide whether it is in the abdominal wall or inside the abdominal cavity. Sometimes a clinically suspected intra-abdominal mass proves to be in the wall, and sometimes an abdominal wall lesion is seen as an incidental finding on abdominal sonography performed for some other reason. Often patients with chronic abdominal pain need an examination of the abdominal wall, especially when a positive Carnett sign suggests the cause of pain to be in the abdominal wall.^{1,2}

Carnett's sign is an eponymous finding on clinical examination in which (acute) abdominal pain remains unchanged or increases when the muscles of the abdominal wall are tensed). A positive test increases the likelihood that the abdominal wall and not the abdominal cavity is the source of the pain (for example, due to rectus sheath hematoma instead of appendicitis).^{3,4} A negative Carnett's sign is said to occur when the abdominal pain decreases when the patient is asked to lift the head; this points to an intra-abdominal cause of the pain.

Pathology of the anterior abdominal wall is a challenge not only for the clinicians but also for the radiologist due to availability of wide range of imaging modalities for the evaluation of abdominal wall pathology ranging from plain X-ray abdomen to high resolution USG, CT scan, and magnetic resonance imaging.^{5,6,7}

With the introduction of high-frequency, high-resolution probes, detailed examination and recognition of different layers of the abdominal wall is now possible on USG examinations. A high-resolution examination is capable of deciding whether an abnormality is in the abdominal wall or inside the abdominal cavity. Physical findings in abdominal wall pathologies have low specificity and often a clinically suspected intra-abdominal lump proves to be in the abdominal wall. Typically when Carnett's sign is positive, a USG examination of the abdominal wall is advised. High resolution USG due to its cost effectiveness, easily availability, lack of non ionizing radiation and good accuracy rate makes it a supreme imaging modality in the evaluation of abdominal wall pathology.^{9,10} There are wide range of pathology affecting the anterior abdominal wall which range from simple fluid collection to hernias to complex neoplasms of the abdominal wall, hence early detection of these pathology with use of

high resolution USG and other cross sectional imaging has revolutionized the treatment options for the surgeons. So the aim of the study to determine role of high resolution sonography in the evaluation of anterior abdominal wall lesions.

Methodology:

The present study is a study of 50 cases of anterior abdominal wall lesions that were seen consecutively in the department of radiology during a 2 year study period, referred from tertiary care hospitals (mainly from the department of surgery and pediatrics). These cases were evaluated using high resolution Ultrasonography with high frequency linear array probe. (7-12 MHZ). The main source of data for the study was patients from the following teaching hospitals attached to tertiary care hospitals.

All cases with clinical manifestations of anterior abdominal wall lesions, cases of all age groups were included in the study. All cases with acute abdominal wall trauma were excluded from the study.

All patients referred to the department of radio diagnosis with the clinical manifestations of various anterior abdominal lesions in a period of 2 years were subjected for the study. All patients included in the study underwent anterior abdominal wall. Ultrasonography using 7.0-12.0 MHZ high frequency linear array transducer coupled with color doppler equipment (Philips Envisor CHD). This was followed by pelvic scan using 3.5-5.0 MHZ transducer when ever required.

All cases were critically evaluated using high resolution sonography (7-12 MHZ) with colour doppler followed by surgical or pathological confirmation when ever needed. Findings during surgery and histopathology reports were noted and compared with the sonographic features for assessing accuracy of high resolution sonography. All cases referred to the department of Radio-diagnosis with high degree of clinical suspicion of anterior abdominal wall lesions were evaluated using high resolution Ultrasonography with high frequency linear array probe. (7-12 MHZ).

Diagnostic accuracy of anterior abdominal wall lesion using high resolution ultrasonography and colour doppler will be determined by comparing with operative and histopathological findings, by performing diagnostic validity tests like sensitivity, specificity and predictive value. Statistical analysis was done by using validity. The sensitivity, specificity, positive predictive value, negative predictive value and diagnostic accuracy were determined.

Results:

The present study was carried out to look for various sonographic appearance of the anterior abdominal wall lesions and to compare the sonographic features with pathological & operative features. The

present study also intended to assess the accuracy of high resolution sonography with High frequency linear array probe in diagnosis of anterior abdominal wall lesions. A sample size of 50 cases was selected. Various patients with suspected anterior abdominal wall lesions and those anterior abdominal wall lesions which were picked up incidentally during routine sonography for some other cause were included in the study design.

TABLE 1 : SHOWING VARIOUS CLINICAL DIAGNOSED ANTERIOR ABDOMINAL WALL LESIONS

CLINICAL DIAGNOSIS		
	No.	%
INCISIONAL HERNIA	28	56
LUMP	11	22
ABSCCESS	1	2
EPIGASTRIC HERNIA	1	2
LIPOMA	4	8
UMBILICAL HERNIA	1	2
LIPOMA/NEUROFIBROMA	1	2
HEMATOMA	1	2
POST-OPERATIVE COLLECTION	1	2
SEBACEOUS CYST	1	2
Total	50	100

Among 50 clinical suspected Anterior Abdominal wall lesions most common indication for high resolution sonography was incisional hernia, followed by anterior abdominal wall lump which is relatively a non-specific clinical diagnosis, which later turned out be different lesions on high resolution sonography as well as histopathology.

TABLE 2 : SHOWING VARIOUS HIGH RESOLUTION SONOGRAPHY OF ANTERIOR ABDOMINAL WALL LESIONS

ULTRASOUND DIAGNOSIS		
LESIONS	No.	%
Incisional hernias	22	44
Ventral hernias	7	14
Anterior abdominal wall lipoma	4	8
Anterior abdominal wall haematoma	4	8
Desmoid tumour	2	4
Dermoid cyst.	2	4
Post operative seroma	1	2
External oblique pyomyositis.	1	2
Neurofibroma	1	2
Metastatic melanoma	1	2
Resolving abscess	1	2
Abdominal wall sarcoma	1	2
Others	3	6

Among 50 various clinically suspected anterior abdominal wall lesions which were subjected for high resolution sonography most commonly and accurately detected lesions of anterior abdominal wall was incisional hernia i.e. as many as 22 cases out of 50 cases (44%) followed by ventral hernias i.e. 7 case out of 50 cases (14%). We would like to emphasize another anterior abdominal wall lesions other than hernias which was common in our study was anterior abdominal wall lipomas i.e. as many as 4 cases out of 50 cases (8%) were in all 4 cases correlated with histopathological finding

Discussion :

This hospital based study conducted in patients with suspected / obvious / incidentally detected anterior abdominal wall lesions who were referred from a tertiary care hospital during a period of 2 years concludes the following observations.

We collected large number of anterior abdominal wall lesions of various types but we only included 50 cases of anterior abdominal wall lesions. The incidence of anterior abdominal lesions was higher in the age group between 20-40 years i.e. as many as 30 cases out of 50 cases (60%) which is higher, when compare to the similar kind of studies in the literature. We also observed a high incidence of anterior abdominal wall lesions in females when compare to males in our study group i.e. 33 cases out of 50 cases (66.66%) this may probably explains the higher incidence of surgeries in females eg. caesarean section and abdominal hysterectomy are the most commonly performed surgical procedure in the world literature.^{10,11,12}

In our study population ventral hernias was the most frequently encountered abdominal wall lesion i.e. 25 cases out of 30 cases (50%) followed by ventral hernias – 7 cases out of 30 cases (14%), abdominal wall lipoma – 4 out of 50 cases (8%), abdominal wall hematoma 4 out of 50 cases (8%), desmoid tumour 2 out of 50 cases (4%), dermoid cyst 2 out of 50 cases (4%).

Among 50 clinically suspected cases of anterior abdominal wall lesions the most common indication for high resolution sonography was palpable abdominal lump 11 cases out of 50 cases (22%) which is relatively a non-specific clinical diagnosis because vast majority of anterior abdominal wall lesions as well as intraabdominal lesions present as a palpable lump. This shows the low specificity of clinical examination in evaluation of anterior abdominal wall lesions. We showed that high resolution sonography is a accurate tool in evaluation of various kinds of hernias (ventral, incisional, spigelian and other types of hernias). We would like to emphasize on other anterior abdominal wall lesions other than hernias like lipoma, desmoid, hematoma, dermoid cyst, metastatic melanoma and resolving abscess where sonography was an excellent complementary tool for the surgical management.^{13,14,15} For eg desmoids are known to present in previous surgical / laprotomy scars in patients with pain at the local site, where in sonography can help us in locating the site size, shape, nature, vascularity and its relation to the surrounding structures and to exclude the other lesions like abscess In our study design diagnostic accuracy of sonography was 97.6% in evaluation of hernias, lipomas, desmoid, dermoid, hematoma and resolving abscess. We felt multidisciplinary approach involving physicians / surgeons, radiologists and pathologists for betterment of the patients to diagnose anterior abdominal wall lesions accurately and for further surgical management. We detected 50 cases of anterior abdominal wall lesions where in higher incidence was noted in females in the age group between 20-40 years. The most common abdominal wall lesions detected were various types of incisional hernias – 22/50- 44%, followed by ventral hernia – 7/50 – 16.6%. We showed that sonography has 97.6% accuracy in diagnosis of various types hernias, abdominal wall lipoma, hematoma, desmoid and dermoid cyst.

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