



SONOGRAPHIC EVALUATION OF ANTERIOR ABDOMINAL WALL MASS AND DIAGNOSTIC ACCURACY OF HIGH FREQUENCY ULTRASOUND.

Radiodiagnosis

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ABSTRACT

Aim : Evaluation of anterior abdominal wall masses using high frequency ultrasound to find out various causes of anterior abdominal wall mass and diagnostic accuracy of high frequency ultrasound.

Materials and Methods: 50 patients with the clinical manifestations of various anterior abdominal wall lesions were included in this study. All patients were examined the anterior abdominal wall using 7.0-12.0 MHz high-frequency linear transducer with Color Doppler .

Results: Incisional hernia was the predominant anterior abdominal wall lesions followed by ventral hernias, lipomas, and hematomas cases. Least common was scar endometriosis, anterior abdominal wall sarcoma. the high-resolution ultrasound had an overall 100% accuracy for abdominal wall lesions.

Conclusion: High-frequency sonography is an accurate diagnostic imaging modality in anterior abdominal wall lesions and guide to management aspect.

KEYWORDS

Anterior abdominal wall, Desmoid tumor, High resolution, Incisional hernia, Ultrasonography, Ventral hernia

INTRODUCTION

Abdominal wall masses can present with acute or chronic presentation . some abdominal wall lesions often mimic intra-abdominal conditions and frequently present as palpable masses. Ultrasound is often the first line investigation . High frequency linear transducers allow detailed assessment of anatomy and high quality imaging of superficial pathology. The exact location of lesions with respect to the layers of the abdominal wall can be determined.

The masses are considered in respect to the layer of the abdominal wall from which they originate.

The abdominal wall consists mainly of skin, subcutaneous fat, fascia, and a muscle layer as well as the parietal peritoneum. on ultrasound the skin appears echogenic . The subcutaneous fat layer is variable in thickness and is usually hypoechoic. The muscles reveal medium-level echoes.

A wide range of imaging modalities is available for the evaluation of abdominal wall pathology ranging from plain X-ray abdomen ultrasonography (USG), computed tomography scan, and magnetic resonance imaging. With the introduction of high-frequency, high-resolution probes gave detailed examination, and recognition of different layers of the abdominal wall are 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. There is wide range of pathology effecting the anterior abdominal wall which ranges from simple fluid collection to hernias to complex neoplasms of the abdominal wall, hence early detection of this pathology with use of high resolution USG and further evaluation to be done.

MATERIALS AND METHODS

50 cases (both symptomatic and asymptomatic) of anterior abdominal wall lesions of all age group were included in this study. All cases with acute abdominal wall trauma and congenital lesions were excluded from the study. All patients included in the study underwent anterior abdominal wall USG using 7.0-12.0 MHz high-frequency linear array transducer coupled with Color Doppler equipment (samsungw80).

RESULT

Among 50 cases of anterior abdominal wall lesions which were subjected for high-resolution sonography most commonly and accurately detected lesions of anterior abdominal wall was Hernia 28 cases, 56% of total cases, (incisional hernia, 9 out of 28, inguinal hernia 8 out of 28, incisional hernia common in female where as inguinal hernia common in males, umbilical hernia 4 out of 28, epigastric hernia 4 out of 28), next common lesion was lipoma 8 cases (16%), endometriosis 5 cases (10%), abscess 3 cases (6%), suture granuloma 3 cases (6%), followed by desmoid, metastasis, rarely postop seroma.

Table 1. Ultrasound diagnosis of anterior abdominal wall mass

diagnosis	No of cases	Percentage
1.Hernia	28	56
2.Lipoma	8	16
3.Endometriosis	5	10
4.Abscess	3	6
5.Suture granuloma	3	6
6.Desmoid	1	2
7.Metastasis	1	2
8.Postop seroma	1	2
	50	100

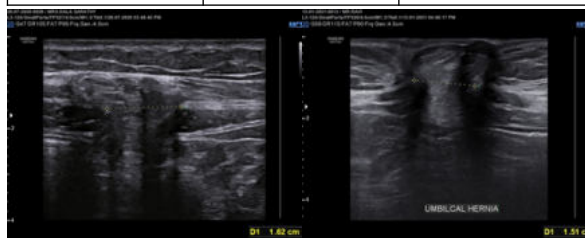


Fig.1.incisional hernia

Fig2. umbilical hernia

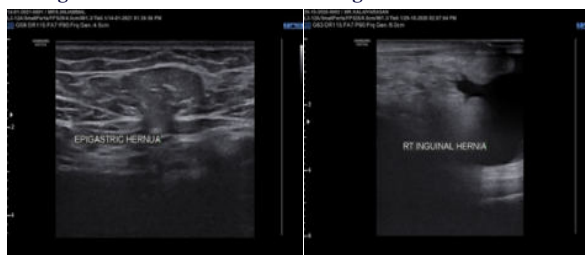


Fig3.epigastric hernia

Fig4.inguinal hernia

Table 2. The accuracy measures for the high-resolution ultrasound diagnosis

Accuracy measure	Value (%)	95% confidence interval (CI)
Sensitivity	100.00	88.78 to 100.00%
Specificity	100.00	85.18 to 100.00%
Positive predictive value	100.00	
Negative predictive value	100.00	
Overall accuracy	100.00	93.40 to 100.00%

DISCUSSION

Anterior abdominal wall lesions often mimic intra-abdominal conditions and frequently presents as a palpable mass. High frequency linear probe ultrasound has lead to the better characterization and diagnosis of the lesion. High frequency ultrasound gave detailed anatomy and origin of lesion and content and vascularity in hernia cases.

Anterior abdominal wall lesion are seen in all age group, some congenital lesion was there. Our study showed a high prevalence of anterior abdominal wall lesions in the age group of 20-40 years (60%), wherein the majority of cases were various types of incisional and ventral hernias. The higher prevalence of anterior abdominal wall lesions in the age group of 20-40 years probably explains the patients seeking medical/surgical attention more frequently than another age group due to various reasons.



Fig.5.suture granuloma

Fig6.Endometrioma

Although there is no much significance of sex wise prevalence of anterior abdominal wall lesions, vast majority of studies in the literature incisional hernia was more common in female because of Cesarean section which is the most commonly performed surgical procedure. With a high-frequency transducer, the fascial defect can be visualized underlying the hernia. Herniated bowel loops have a variable appearance depending on their air-fluid content and degree of obstruction. During the real-time examination, induction and reduction of a hernia can be observed.



Fig.7.abscess

Fig.8. lipoma

The patient is asked to cough or perform a valsalva maneuver while scanning over the suspected site is performed and with an increase in abdominal pressure, there will be better appreciation of hernia sac, site, and size of the defect and also contents of the hernia.

An incisional hernia develops as a late complication of abdominal surgery. It also has been seen after laparoscopic procedures. Most incisional hernias will present within the first year; sometimes incidentally detected on sonography or computed tomography. Sonography is very useful in ruling out a hernia at surgical sites and in monitoring the integrity of wire mesh implants (Figure 1)

A ventral hernia occurs typically where there is no muscle support along the linea alba in the midline in the epigastrium (Figure 3) or periumbilical region (Figure 2). The defect can be easily made out in high-frequency probe, and the defect size can also be measured. The hernia very often contains only fatty tissue.

Inguinal hernia (Figure 3) An indirect inguinal hernia occurs as a result of protrusion of the peritoneal sac and contents through the internal inguinal ring into the inguinal canal and sometimes into the scrotum. Depending on the content, namely, fluid, air-containing bowel, or fluid-containing bowel, inguinal hernias will have different appearances on sonography. Distended, adynamic bowel indicates obstructed loops.

Desmoid tumor arises from the fascia or muscle aponeurosis. It often develops at the previous surgical scar and is more commonly in female patients than in male patients. Sonologically shows lobulated solid, well defined heterogeneous mass with moderate blood flow.

Fluid collections Localized fluid collections in the abdominal wall may be due to seromas; abscesses or liquefying hematomas.

Suture abscesses are seen as irregular collections within the layers of the abdominal wall, around infected sutures; fragments of suture material may sometimes be seen within this collection (Figure 5).

Endometriosis of the abdominal wall usually develops as complication

of uterine surgery, due to seeding of endometrial tissue. Typically, it is seen as a focal mass at the scar of previous surgery. The size and the associated pain may vary cyclically (figure 6)

Abdominal wall abscess (figure 7) may be due to various causes like - A cold abscess secondary to tuberculosis of the ribs may present as a lump. USG reveals pockets of fluid, along the costal margin, with internal echoes.

Lipomas are the most common abdominal wall neoplasm. They are well defined, ovoid or pad like masses (Figure 8).

CONCLUSION :

The prevalence of anterior abdominal lesions was higher in the age group between 20 and 40 years. Incisional hernia was the most frequently encountered abdominal wall lesion. The most common indication for high-resolution sonography was palpable abdominal lump, which shows the low specificity of clinical examination in evaluation of anterior abdominal wall lesions. High-resolution sonography is an accurate tool in evaluation of various kinds of hernias (ventral, incisional, spigelian, and other types of hernias) and also emphasize on other anterior abdominal wall lesions other than hernias such as lipoma, desmoid, hematoma, dermoid cyst, metastatic lesion, and resolving abscess, where sonography was an excellent complementary tool for the surgical management. Diagnostic accuracy of sonography was 93.4 to 100% in evaluation of hernias, lipomas, desmoid, dermoid, hematoma, and resolving abscess.

RECOMMENDATIONS:

High-resolution USG is a very useful procedure which can be used for diagnosing the common abdominal wall lesions accurately.

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REFERENCES:

1. Moore KL, Agur AMR, Dalley AF (2011) Essential clinical anatomy, 5th edn. Lippincott Williams & Wilkins, Baltimore, MD, pp 117-131
2. Drake RL, Vogl W, Mitchell AWM, Gray H (2015) Gray's anatomy for students, 3rd edn. Elsevier/Churchill Livingstone, Philadelphia, pp 280-299
3. O'Rahilly, R. and Müller, F. Carpenter and Swenson (2008). Basic human anatomy: a regional study of human structure. W. B. Saunders Co., Philadelphia [online version, part 5 abdomen, chapter 25] Available at: <https://www.dartmouth.edu/~humananatomy/> [Accessed 18 Jul. 2019].
4. Lee RK, Cho CC, Tong CS, Ng AW, Liu EK, Griffith JF (2013) Ultrasound of the abdominal wall and groin. Can Assoc Radiol J 64(4):295-305
5. Gokhale S (2007) High-resolution ultrasonography of the anterior abdominal wall. Indian J Radiol Imaging 17(4):290
6. Ahn SE, Park SJ, Moon SK, Lee DH, Lim JW (2016) Sonography of abdominal wall masses and masslike lesions. J Ultrasound Med 35(1):189-208
7. Jayaram P, Pereira F, Barrett J (2018) Evaluation of dynamic ultrasound scanning in the diagnosis of equivocal ventral hernias with surgical comparison. Br J Radiol 91:1088
8. Babu OS, Vidya NS (2018) High-resolution sonography in the evaluation of anterior abdominal wall lesions. Indian J App Res 7:8
9. Devareddy MM, Devakar S, Chetan M (2016) Evaluation the sonographic appearance of spectrum of anterior abdominal wall lesions and to compare the sonographic features with pathological and operative diagnosis: a crosssectional study. Int J Scientific Study 4(7):112-119
10. El-Mekkawy El-Sayed E (2015) Role of ultrasonography and multidetector CT in imaging of anterior abdominal wall lesions. Int J Medical Imaging 3(5):98
11. Lou L, Teng J, Qi H, Ban Y (2014) Sonographic appearances of desmoid tumors. J Ultrasound Medicine 33(8):1519-1525