

# The Prehensile Evaluation of Inguinal Region: Sonographic Spectrum of Various Pathologies, Experience in our Tertiary Care Hospital.

Dr Rabiya Siraj\*, Dr Rizwan Ajmal\*, Dr Bushra Shamim\*, Dr Bisma Rizwan\*, Dr Jawaid Iqbal \*, Dr Quratulain Haroon \*

\*Liaquat National Hospital and Medical College Karachi

## Abstract-

**Background and Objective:** As far as, inguinal region is concerned, diverse group of abnormalities can be enlisted. Ultrasonography is currently considered as paramount modality for imaging inguinal region and valuable for assessing differential diagnosis of wide-ranging pathologies related to these diseases. There is a lot of overlapping and intersections in sonographic findings across many inguinal lesions, but some acquaintance with clinical indications and sonographic findings, one will be able to predict and facilitate a precise diagnosis for further management.

**Keywords:** Inguinal Region, Ultrasonography, Abnormalities.

## I. INTRODUCTION

There is a lengthy list of distinct groin anomalies and because of their comparable clinical manifestations, many doctors find it difficult to differentiate between groin lesions when making a differential diagnosis (Shadbolt CL et al., 2001). Ultrasonography is currently considered as primary imaging modality for evaluating wide range of diseases in inguinal regions being subdivided into benign and malignant pathologies. Ultrasound proved to be one the effective and low-cost safest modality being available to label variable type of herniation in different anatomical landmarks (Yang DM et al., 2007). An indirect or direct inguinal hernia is the most frequent anomaly in the inguinal area. Many conditions, including spermatic cord hydrocele, undescended testis, hematomas, inflammation, abscesses, pseudoaneurysms, malignant or benign tumors, enlargement of benign or metastatic lymph nodes, etc., can mimic hernias. Five times more common than direct hernias, indirect inguinal hernias are the most common disease encountered and are associated with a low likelihood of strangulation (Lee RK et al., 2013; Young J et al., 2007)

## II. MATERIAL AND METHODS

This is a retrospective study, done at Radiology Department, Liaquat National Hospital. All the patients came for ultrasound inguinal region were included. After taking informed consent, the

demographic data including the age and gender was recorded. Patients were then evaluated for different inguinal regional pathologies using 7.5 MHz probe & Ultrasound machine (both grey and color Doppler imaging). Variable types of hernia, cryptorchidism, pseudo aneurysms, hematoma, collection/abscess and benign tumors were assessed... Data was then compiled and analyzed through statistical package for Social Sciences (SPSS) Version 21

## RESULTS

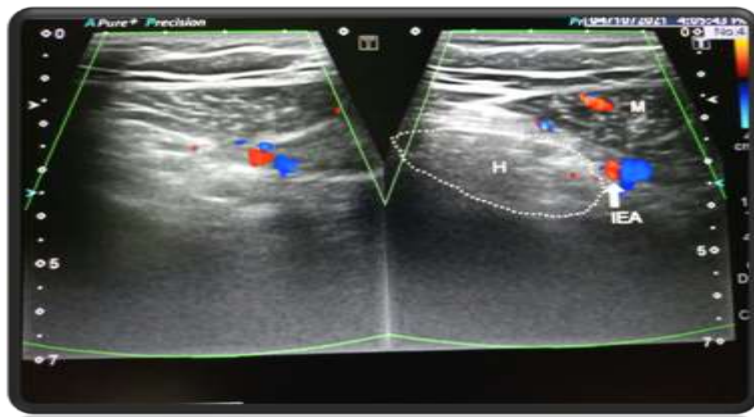
Inguinal regional diseases were examined in 126 instances in total. Of these, n=105 (83 percent) were males, and the remaining 21 instances (17 percent) were females. For both genders, thirty to thirty-five years old has been determined to be the median age. Of the patients, 76% (n = 96) had a unilateral inguinal scan, while the remaining 23 percent (n = 30) had a bilateral scan. Of these, 56.3 percent (n=71) had diseases related to the inguinal region upon review; the remaining patients were normal. It was discovered that 10.3 percent (n=13), 5.6 percent (n=7), and 3.2 percent (n=4) of the cases were positive for femoral, indirect, and direct hernias, respectively. 3.2 percent of those examined had cryptorchidism (two cases had unilateral and two others had bilateral cryptorchidism). Only five patients (4 percent) were confirmed to have real aneurysms, and 3 cases (2.4 percent) were examined for false aneurysms. The remaining 10.3 percent of patients (n = 13) had hematoma formation, 7.9 percent had collection/abscess (n = 10), 6.3 percent had edema (n = 8), and 3.2% had benign tumors (n = 4). Only two cases of malignant lymph nodes were discovered out of the total forty-seven individuals (n = 37.3 percent) with benign lymph nodes.

Total Patients	126	100.00%
Normal	55	43.70%
Abnormal	71	56.30%

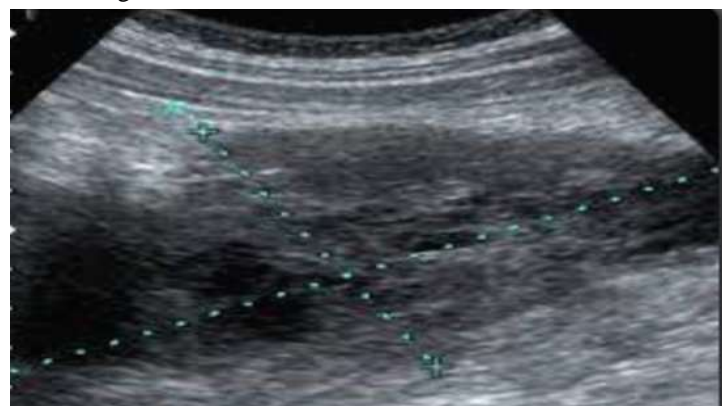
**Table 1: Demographic Information of Participants**

Variables	Groups	Count	frequency
Inguinal hernia	Direct	7	5.55%
	Indirect	13	10.31%
	Femoral	3	2.38%
Cryptorchidism	u/l	2	1.59%
	b/l	2	1.59%
	REJR	0	0.00%
LN	Benign	5	3.96%
	Malignant	2	1.59%
Aneurysm	Yes	4	3.17%
	Pseudoaneurysm	3	2.38%
Hematoma	Yes	3	2.38%
Inflammation	Collection	5	3.96%
	Edema	6	4.76%
	Abscess	2	1.59%
Tumors	Benign	5	3.96%
	Malignant	0	0.00%
Hydrocele	Yes	7	5.55%
Spermatocele	Yes	2	1.59%
	<b>Abnormal</b>	<b>71</b>	<b>56.30%</b>

**Figure 1:** Ultrasound of inguinal region shows herniated sac containing fat lateral to the inferior epigastric artery (marked as dotted line). H- Hernia IEA-Inferior epigastric artery



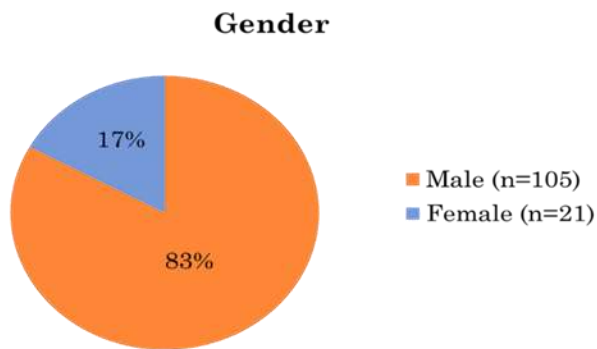
**Figure 2:** Ultrasound image shows an ill-defined lobulated heterogeneous area with no significant vascularity likely more in favor of inguinal Collection/hematoma.



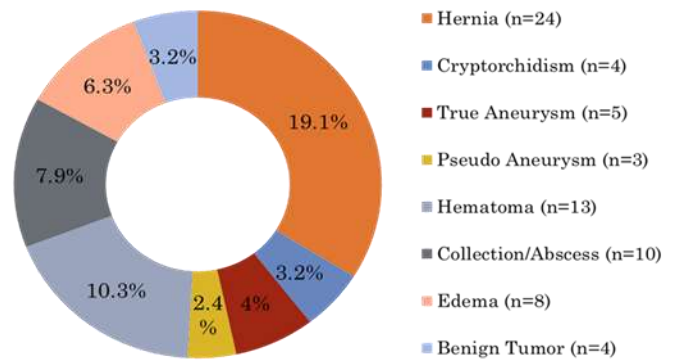
**Figure 3:** Ultrasound image shows classic yin-yang sign of Pseudo aneurysm.



**Figure 4: Gender Distribution**

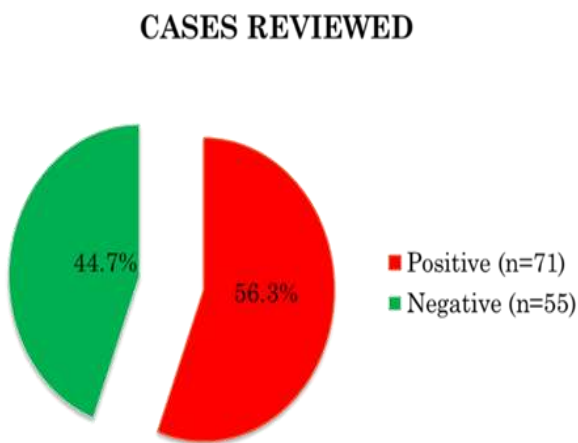


**INGUINAL REGION PATHOLOGIES**



**Figure 6: Inguinal Region Pathologies**

**Figure 5: Cases Reviewed**



## DISCUSSION

A crucial anatomical zone in a person's body, the inguinal area has drawn attention from medical researchers because of its intricate structure and vulnerability to a variety of illnesses. The inferior epigastric artery, the inguinal ligament, and the lateral edge of the rectus abdominis are the three key soft-tissue markers that determine inguinal region orientation (Burkhardt JH et al., 2011). These marks show where a direct inguinal hernia is located and establish the limits of the Hasselback triangle. The deep or inner inguinal ring, which is the source of an indirect inguinal hernia, is located directly superior and medial to the inferior epigastric artery's origin (Jamadar DA et al., 2006). The arterial canal, which denotes the site of an arterial hernia, is the region indirectly to the femoral vascular and below the inguinal ligament.

Our experiences performing sonographic assessments at the tertiary care facility have been immensely illuminating, offering invaluable insight into the obstacles and successes of inguinal disease diagnosis. Generally, ultrasound of the groin and abdominal cavity requires a high-resolution ultrasonic probe (10 to 12 megahertz). Sometimes, to see the deeper features of the lesion, like the origin of the hernia and the size of the tumor, a second low-frequency scan (5 to 7 megahertz) is required (Rumak C et al., 2011). Additional techniques such as the dynamic Valsalva maneuver, compression, and standing-position radiography may be necessary in order to fully evaluate the lesion. By applying a prolonged and/or broad perspective, more clarity about the lesion's proximity to surrounding normal structures is obtained. Using color and power-Doppler ultrasound methods substantially facilitates the assessment of the blood flow of the lesion and the identification of surrounding vessels (Lehner K et al., 2023).

The location of the inferior epigastric artery is crucial for the accurate diagnosis of indirect as well as direct inguinal hernia. In order to accurately differentiate among the two types of hernias, locate this crucial artery by positioning the linear transducers horizontally in the lower part of the abdomen, close to the midpoint. Under the posterior rectus sheath, the artery can be seen in cross-section. When the transducer is moved from superior-medial to inferior-lateral orientation, the junction of the artery and the exterior iliac artery is shown. Located laterally to the point where the external iliac artery and the inferior epigastric artery come together, the deep inguinal ring forms the proximal entry of an inguinal canal (Wu WT et al., 2022). By turning the transducer 90 degrees or

rotating it in tandem with the outside iliac artery, one can efficiently adjust it to visualize the inguinal canal and see its cross-section. The deferens artery and testicular arteries are housed in the spermatic cord, an intricate tubular tissue found in the inguinal canal of males (Picasso R et al., 2021). Because the cylindrical ligament is the only visible tissue inside the canal, it can be difficult to identify the inguinal canal in women (Karbasian N et al., 2022). There were 126 individuals in all that had been included in our study. Of them, 56.3 percent had no inguinal diseases found on their tests. Males were found to have a greater frequency of indirect hernias, which were detected in the majority of those who screened positive. Hematoma development was the 2nd most frequent diagnosis, with collection/abscess instances coming in second. While some individuals tested positively for femoral hernias, others had been diagnosed with direct hernias as well. 4.4 percent of the cases also showed abnormalities in their vascular structures.

Hernias, including both indirect and direct femoral and inguinal hernias, are the most common anomaly in the inguinal region, according to a study by Caserta NM et al. (2021). A number of hernia-like lesions were also found in the study, including hematomas, both malignant and benign tumors, inflammation, abscesses, and undescended testicles. According to many studies, the most common abnormality in the groin area was a hernia including peritoneal fluid, omental fat, and intestine loops (Park HR et al., 2016). In addition, lipomas, which are remarkably comparable to our findings, were the most common benign tumor seen in the inguinal region. A second study by Stavros AT found that the majority of hernias found on sonography have no bowel. It's true that most hernias are made entirely of fat. The fat might have a preperitoneal or intraperitoneal origin (mesenteric or omental). According to Stavros AT et al. (2010), the 2nd most prevalent hernia discovered contained intraperitoneal fat along with bowel. Therefore, the capacity to noninvasively identify a variety of anomalies among various inguinal lesions is extremely important, and ultrasonography has proven to be practical because to its dynamic capabilities, widespread availability, and low cost. Because of its flexibility, widespread availability, and low cost, ultrasonography has shown to be a practical method for noninvasively detecting a variety of abnormalities among various inguinal lesions.

## I. CONCLUSION

There is number of diverse abnormalities one can list regarding pathologies of inguinal region.

Ultrasonography considered today as one the effective, safest and cheapest imaging tool for assessing inguinal lesions due to its ability of dynamic scanning. Clinicians get puzzled off due to mimicking nature of different inguinal lesions but in constellation with clinical history and imaging findings, we can bridge ourselves to precise diagnosis and favorable treatment.

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#### Authors

**First Author** – Dr Rabiya Siraj  
Senior Registrar Radiology  
Liaquat National Hospital and medical college 4x

**Second Author** - Dr Rizwan Ajmal  
Assistant Professor Radiology  
Liaquat National Hospital and Medical College

**Third Author** – Dr Bushra Shamim  
Associate professor Radiology  
Liaquat National Hospital & Medical College

**Fourth Author** – Dr Bisma Rizwan  
Resident Medical Officer Radiology  
Liaquat National Hospital and Medical College

**Fifth Author** – Dr Jawaid Iqbal  
Assistant Professor Radiology  
Liaquat National Hospital and Medical college

**Sixth Author** – Dr Quratulain Haroon  
Senior Registrar Radiology  
Liaquat National Hospital and Medical College

**Correspondence Author**  
Dr Rabiya Siraj  
Senior Registrar Radiology  
Liaquat National Hospital and medical college 4x