Section: General Surgery

Original Research Article

VALUE OF ULTRASOUND IN DIAGNOSIS AND ANALYSIS OF INGUINAL NEURODYNIA FOLLOWING INGUINAL HERNIA REPAIR

Siva Kumar G[1], Chinnaraja B[2], Abiramavalli R[3]

[1]Assistant Professor, Department of General Surgery, Government Mohan Kumaramangalam Medical College and Hospital, Salem, Tamil Nadu, India.
[2]Assistant Professor, Department of General Surgery, Government Karur Medical College and Hospital, Karur, Tamil Nadu, India.
[3]Assistant Surgeon, Uthiramerur GH, Tamil Nadu, India

Received : 15/11/2025
Received in revised form : 03/01/2026
Accepted : 21/01/2026

Keywords:
Ultrasound inguinal region, Neurodynia, Herniorrhaphy and Hernioplasty.

Corresponding Author:
Dr. R. Abiramavalli,
Email: suren17omalur@gmail.com

DOI: 10.47009/jamp.2026.8.1.76

Source of Support: Nil,
Conflict of Interest: None declared

Int J Acad Med Pharm
2026; 8 (1); 393-403

ABSTRACT

Background: Chronic pain is a late post-operative complication of inguinal hernia surgeries. Studies show that the incidence of inguinal neurodynia post inguinal herniorrhaphy is 54%. In around 50% of the patients presenting with chronic pain in the first year post surgery, there is a significant deterioration in the quality of life. This dissertation aimed to study the value of ultrasound in diagnosis and analysis of inguinal neurodynia following inguinal hernia repair, to understand the incidence of inguinal neurodynia following inguinal hernia repair, to find the cause for inguinal neurodynia following inguinal hernia repair and to correlate the ultrasound findings with operative findings. **Materials and Methods:** A Prospective Observational Study was done among 50 patients admitted to GMKMC hospital Salem with history of inguinal hernia repair presenting with chronic inguinal pain >3 months from November 2018 to October 2020. **Result:** The mean age is 52.9 years with a standard deviation of 13.1 years ranging between 24-75 years. The majority of the patients were males (n=45, 90%). Rest of them were females (n=5, 10%). Majority of them were diagnosed with right direct inguinal hernia (n=21, 42%). Majority of them had right open hernioplasty (n=26, 52%). Majority of them had unilateral hernia (n=38, 76%) while the rest had bilateral hernia (n=12, 24%). The median duration of pain is 7 months. Encapsulated effusion was present in 20% (n=10) of the participants. Scrotal edema was present in 11 (22%) cases. Varicocele was present in 5 (10%) cases. Epididymal cyst was present in 2 (4%) cases. Mesh shrinkage was present in 14 (28%) cases. Mesh plug was present in 5 (10%) cases. Recurrent hernia was present in 7 (14%) cases. Hydrocele of testis was present in 6 (12%) cases. Restricted spermatic cord motion at reconstructed deep ring was present in 10 (20%) cases. Spermatic Cord cyst was present in 2 (4%) cases. Testitis was present in 5 (10%) cases. Scar sutured in to the pubic tubercle was present in 1 (2%) case. Out of 50 cases, 42 (84%) cases correlated with operative findings, five cases (10%) were not applicable whereas in three cases (6%), it did not correlate. Sensitivity and specificity analyses shows that ultrasound is 100% sensitive (CI=91.6-100%) while it is only 62.5% specific (CI=24.5%-91.5%). It has a negative predictive value of 100% with an accuracy of 94%. **Conclusion:** For initial evaluation of the inguinal canal, ultrasound is the method preferred due to the following reasons; better sensitivity, low cost, good accuracy, wide availability, low maintenance of the equipment and a shorter learning curve for the examiners.

INTRODUCTION

A large number of factors cause emergencies involving the inguinoscrotal region. The symptoms may be nonspecific but very painful. If management is delayed, it might lead to complications which make it mandatory that an early and accurate diagnosis is made. The pain in the inguinoscrotal region is diverse ranging from mild dull aching pain to sharp acute agonising pain. Sometimes, it might present with a complete normal blood picture. An alteration in the leucocyte counts may indicate infection and sepsis. The diagnosis should be early to make a quick decision on the seriousness and severity of the condition and must be operated upon if it is a serious condition like torsion. This will also help in averting

ISSN (O): 2687-5365; ISSN (P): 2753-6556

post-operative complications. In the 2014 edition of guidelines for diagnosis and treatment of adult inguinal hernia, it was suggested that all cases be treated surgically.[1-5] Chronic pain is a late post-operative complication of inguinal hernia surgeries. Studies show that the incidence of inguinal neurodynia post inguinal herniorrhaphy is 54%. Around 50% of the patients presenting with chronic pain in the first year post surgery, there can be deterioration in the quality of life. Thus, chronic pain after inguinal hernia surgery has been considered as an indicator for assessment of the surgery. The diagnostic investigation of choice is the ultrasonography which is capable of identifying a vast range of conditions. It is also rapid, non-invasive, cost-effective and devoid of ionising radiation.[6-8] All these features makes it an effective tool for management even in emergency care. Apart from the tool, it is essential that the surgeon is familiar with the various ultrasound findings of the conditions involving the inguinoscrotal region. This will enable the examiner to make informed decisions on the conditions with accuracy and precision. Therefore, an ultrasound examination before and after the surgery is suggested as a good imaging method. An advanced form of ultrasound, UVAS gives more insight and helps a surgeon plan the management accordingly.[9]

Ultrasound helps in doing the following

1. Show the morphology, size and corrugation of the mesh
2. motion of the spermatic cord
3. continuity of the peritoneum

This also helps in assessing the condition of the patient and avoid re-operation. The anterior open inguinal Herniorrhaphy consists of two main steps

a) Separation of hernia sac and spermatic cord
b) Reconstruct the back wall of the inguinal canal

Literature states that chronic pain arises from viscera, somatic or neurological. Study shows that the most common type of pain is the somatic pain. This pain is due to the injury of the pubic tubercle when the ligament is sutured to the tubercle. On the other hand, visceral pain arises from the reproductive system.

Ultrasound is capable of detecting the following;

a) Motion of the spermatic cord
b) Flow within the spermatic veins

Therefore, ultrasound can accurately diagnose varicocele.

Torsion and post-operative stenosis pain of the spermatic cord is caused by hyperplasia of the scar that presents as pain during ejaculation or ejaculatory dysfunction. An oversized mesh plug or a small patch hole may cause compression and may lead to ischemic testis which is found in less than 1% of the cases. Neurological pain may be from the inguinal or genitofemoral nerves due to their accidental injuries. However, ultrasound has limited application in detecting the nerves. In case of neural pain, inguinal neurectomy is suggested. Intraoperative identification and protection are therefore necessary to avoid this pain. Surgical injuries may present as neuromas or transections or may be due to the scars impinging on the nerve. Therefore, proper standard operating procedures should be followed to reduce the incidence of chronic pain and other complications following inguinal hernia surgery. This dissertation aims to study the value of ultrasound in diagnosis and analysis of inguinal neurodynia following inguinal hernia repair, to understand the incidence of inguinal neurodynia following inguinal hernia repair, to find the cause for chronic inguinal pain following inguinal hernia repair and to correlate the ultrasound findings with operative findings.

Aim of the Study

The study aimed to understand the value of ultrasound in diagnosis and analysis of inguinal neurodynia following inguinal hernia repair

Objectives of the Study

Primary Objective:

- To study the value of ultrasound in diagnosis and analysis of inguinal neurodynia following inguinal hernia repair

Secondary Objective

- To understand the incidence of inguinal neurodynia following inguinal hernia repair
- To find the cause for chronic inguinal pain following inguinal hernia repair
- To correlate the ultrasound findings with operative findings.

MATERIALS AND METHODS

Study Design: Prospective Observational Study

Study Population: Cases admitted to GMKMC hospital Salem with history of inguinal hernia repair presenting with chronic inguinal pain >3 months

Study Period: Two years From November 2018 to October 2020

Sample Size: 50 patients

Inclusion Criteria

The patients who are presenting with chronic inguinal pain >3 months and had a history of inguinal hernia repair, during which artificial material was patched in preperitoneal space or the back wall of the inguinal canal was reconstructed by suturing

Exclusion Criteria

1. Patient who had known comorbid disorders of respiratory, cardiovascular or renal systems.
2. Patient who had refused participation
3. Patient who are younger than 18years

Methodology: The material for the study is taken from the cases admitted in the surgical ward and surgical accident and emergency ward under the Department of General Surgery, GMK Medical College &Hospital, Salem who had previously underwent inguinal hernia surgery and presenting with chronic pain.

Privacy/confidentiality of study subjects: Privacy of the subjects shall be maintained.

Statistical Analysis: All data were recorded in structured questionnaires, coded and entered in Microsoft Excel. The data was then cleaned, checked

ISSN (O): 2687-5365; ISSN (P): 2753-6556

for inconsistencies, missing values and prepared for analysis using SPSS v23. The data was then analyzed for descriptive statistics and inferential statistics. The tests for significance were run to statistically validate the data. The results were then tabulated and visualized in Microsoft word.

RESULTS

This Analysis aims to study the value of ultrasound in diagnosis and analysis of inguinal neurodynia following inguinal hernia repair, to understand the incidence of inguinal neurodynia following inguinal hernia repair, to find the cause for inguinal neurodynia following inguinal hernia repair and to correlate the ultrasound findings with operative findings. The analysis reveals the following findings; The mean age is 52.9 years with a standard deviation of 13.1 years ranging between 24-75 years. The median age is 55 years. The majority of the patients were males (n=45, 90%). Rest of them were females (n=5, 10%). Majority of them were diagnosed with right direct inguinal hernia (n=21, 42%). Bilateral direct inguinal hernia was seen in 8 (16%) cases. Majority of them had right open hernioplasty (n=26, 52%). Left open hernioplasty was done in 9 cases (18%). Majority of them had unilateral hernia (n=38, 76%) while the rest had bilateral hernia (n=12, 24%). All cases were diagnosed with inguinal neurodynia. The mean duration of pain is 7.4 months with a standard deviation of 2.8 months ranging between 3 to 16 months. The median duration of pain is 7 months. The side of pain is on the right for the majority of the participants (n=31, 62%) followed by left (n=11, 22%) and both sides (n=8, 16%). Encapsulated effusion was present in 20% (n=10) of the participants. Scrotal edema was present in 11 (22%) cases. Varicocele was present in 5 (10%) cases. Epididymal cyst was present in 2 (4%) cases. Mesh shrinkage was present in 14 (28%) cases. Mesh plug was present in 5 (10%) cases. Recurrent hernia was present in 7 (14%) cases. Hydrocele of testis was present in 6 (12%) cases. Restricted spermatic cord motion at reconstructed deep ring was present in 10 (20%) cases. Spermatic Cord cyst was present in 2 (4%) cases. Testitis was present in 5 (10%) cases. Scar sutured in to the pubic tubercle was present in 1 (2%) case. Out of 50 cases, 42 (84%) cases correlated with operative findings, five cases (10%) were not applicable whereas in three cases (6%), it did not correlate. Sensitivity and specificity analyses shows that ultrasound is 100% sensitive (CI=91.6-100%) while it is only 62.5% specific (CI=24.5%-91.5%). It has a negative predictive value of 100% with an accuracy of 94%.

Age Distribution

The mean age is 52.9 years with a standard deviation of 13.1 years ranging between 24-75 years. The median age is 55 years. The following table and figure shows the age distribution.

Table 1: Age Distribution

S. No	Parameters	Age (in years)
1	Mean	52.960
2	Median	55.000
3	Mode	55.0a
4	Std. Deviation	13.0899
5	Minimum	24.0
6	Maximum	75.0

Table 2: Gender Distribution

S.No	Gender	Frequency	Percentage
1	Male	45	90
2	Female	5	10
	Total	50	100

Table 3: Diagnosis

S.No	Diagnosis	Frequency	Percentage
1	Bilateral Direct Inguinal Hernia	8	16.0
2	Bilateral Indirect Inguinal Hernia	4	8.0
3	Left Direct Inguinal Hernia	6	12.0
4	Left Indirect Inguinal Hernia	4	8.0
5	Right Direct Inguinal Hernia	21	42.0
6	Right Indirect Inguinal Hernia	7	14.0
7	Total	50	100.0

Table 4: Procedure done

S. No	Procedure Done	Frequency	Percentage
1	Bilateral Laparoscopic Hernioplasty	8	16
2	Bilateral Open Hernioplasty	4	8
3	Left Laparoscopic Hernioplasty	1	2
4	Left Open Hernioplasty	9	18
5	Right Laparoscopic Hernioplasty	2	4
6	Right Open Hernioplasty	26	52
7	Total	50	100.0

ISSN (O): 2687-5365; ISSN (P): 2753-6556

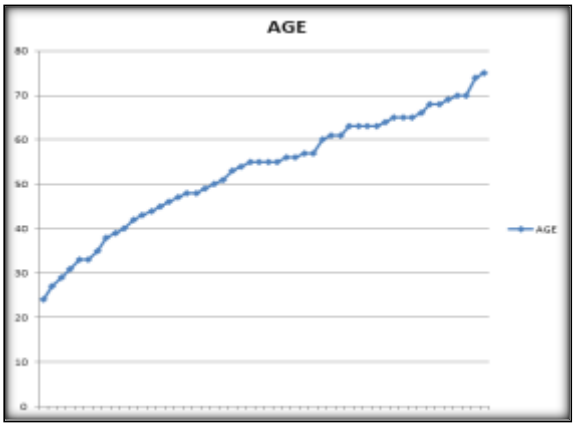


Figure 1: Age Distribution

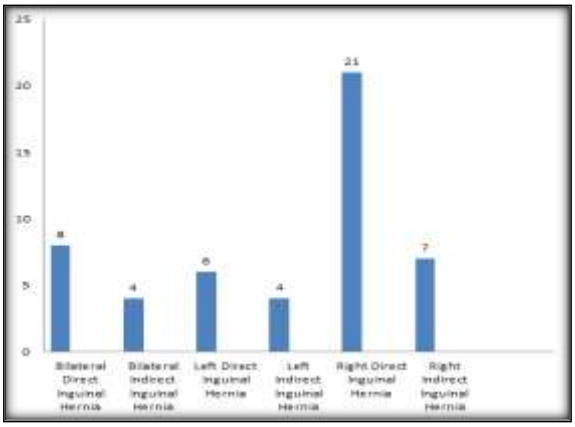


Figure 3: Diagnosis

Gender Distribution

The majority of the patients were males (n=45, 90%). Rest of them were females (n=5, 10%). The following table and figure shows the gender distribution.

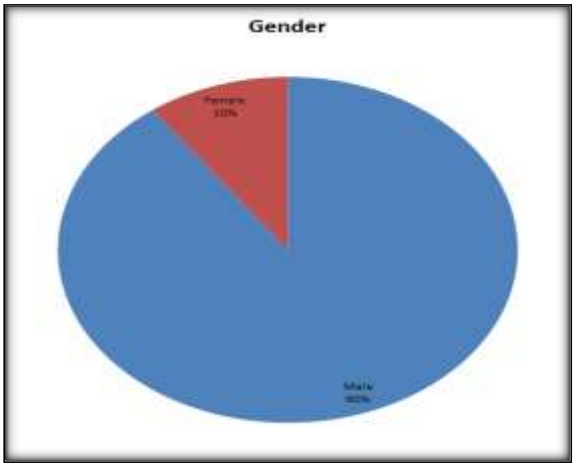


Figure 2: Gender Distribution

Procedure Done

Majority of them had right open hernioplasty (n=26, 52%). Left open hernioplasty was done in 9 cases (18%). Following figure and table shows the procedure done.

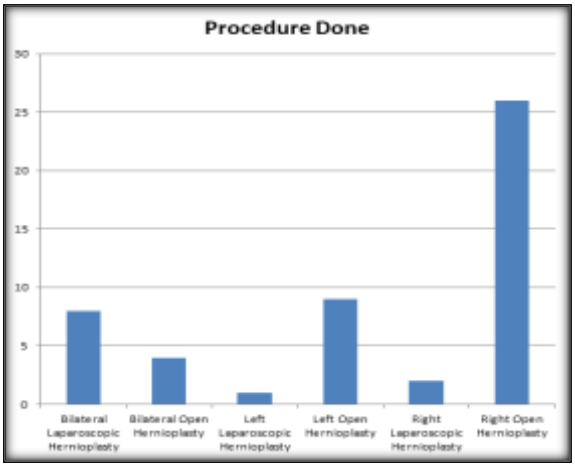


Figure 4: Procedure done

Diagnosis: Majority of them were diagnosed with right direct inguinal hernia (n=21, 42%). Bilateral direct inguinal hernia was seen in 8 (16%) cases. Following table and figure shows the diagnosis.

Unilateral or Bilateral Hernia: Majority of them had unilateral hernia (n=38, 76%) while the rest had bilateral hernia (n=12, 24%). Following figure and table shows unilateral or bilateral hernia incidence.

Table 5: Unilateral or Bilateral Hernia

S.No	Unilateral or Bilateral Hernia	Frequency	Percentage
1	Bilateral	12	24
2	Unilateral	38	76
	Total	50	100

Table 6: Duration of pain

S. No	Duration of pain (in months)	Frequency	Percentage
1	3 months	2	4.0
2	4 months	5	10.0
3	5 months	6	12.0
4	6 months	8	16.0
5	7 months	7	14.0
6	8 months	6	12.0
7	9 months	8	16.0
8	10 months	2	4.0
9	12 months	4	8.0
10	14 months	1	2.0
11	16 months	1	2.0
	Total	50	100

ISSN (O): 2687-5365; ISSN (P): 2753-6556

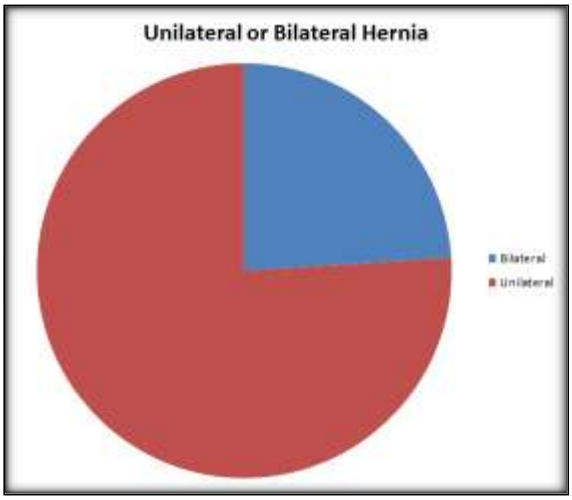


Figure 5: Unilateral or Bilateral Hernia

Duration of Pain

The mean duration of pain is 7.4 months with a standard deviation of 2.8 months ranging between 3 to 16 months. The median duration of pain is 7 months. The following table and figure shows the duration of pain.

Figure 6: Duration of pain

Table 7: Duration of pain

S.No	Parameters	Duration of pain (in months)
1	Mean	7.4200
2	Median	7.0000
3	Mode	6.00a
4	Std. Deviation	2.80735
5	Minimum	3.00
6	Maximum	16.00

Side of Pain: The side of pain is on the right for the majority of the participants (n=31, 62%) followed by left (n=11, 22%) and both sides (n=8, 16%). The following table and figure shows the side of pain.

Table 8: Side of Pain

S.No	Side of Pain	Frequency	Percentage
1	Both Sides	8	16.0
2	Left	11	22.0
3	Right	31	62.0
	Total	50	100

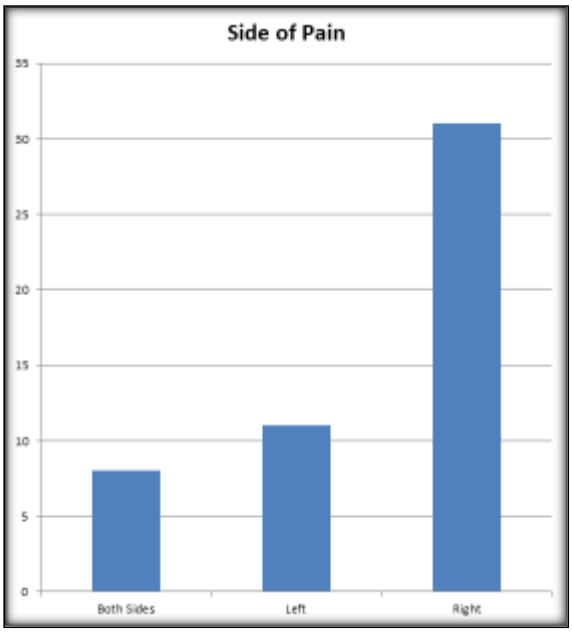


Figure 7: Side of Pain

Diagnosis: Following tables and figures shows the diagnosis of the participants. Five patients (10%) did not have ultrasound findings.

Encapsulated effusion was present in 20% (n=10) of the participants.

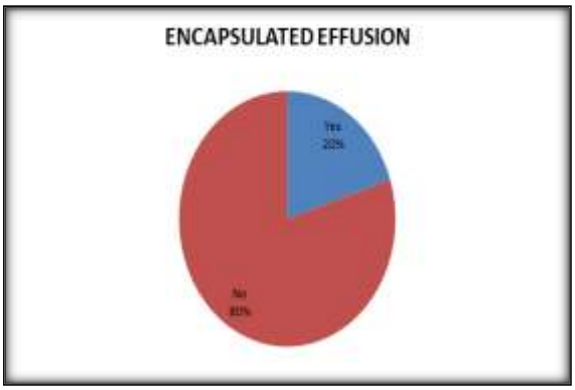


Figure 8: Encapsulated effusion

Scrotal edema was present in 11 (22%) cases.

ISSN (O): 2687-5365; ISSN (P): 2753-6556

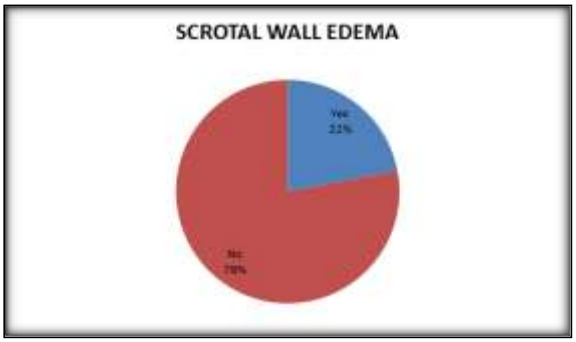


Figure 9: Scrotal edema

Varicocele was present in 5 (10%) cases.

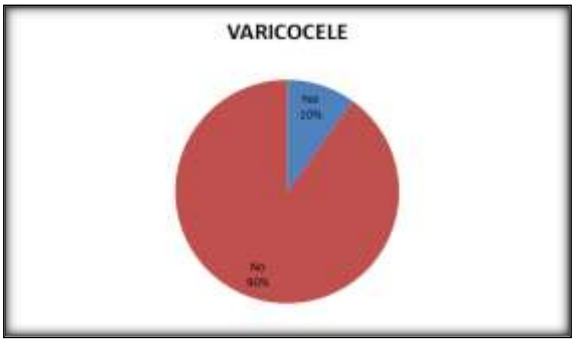


Figure 10: Varicocele

Epididymal cyst was present in 2 (4%) cases.

Table 9: Encapsulated effusion

S.No	Encapsulated Effusion	Frequency	Percentage
1	Yes	10	20
2	No	40	80
	Total	50	100

Table 10: Scrotal edema

S. No	Scrotal wall edema	Frequency	Percentage
1	Yes	11	22
2	No	39	78
	Total	50	100

Table 11: Varicocele

S. No	Varicocele	Frequency	Percentage
1	Yes	5	10
2	No	45	90
	Total	50	100

Table 12: Epididymal cyst

S.No	Epididymal Cyst	Frequency	Percentage
1	Yes	2	4
2	No	48	96
	Total	50	100

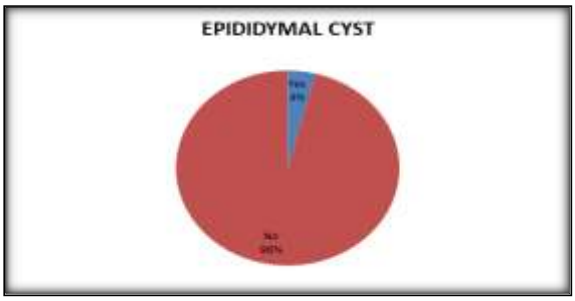


Figure 11: Epididymal cyst

Mesh shrinkage was present in 14 (28%) cases.

Mesh plug was present in 5 (10%) cases.

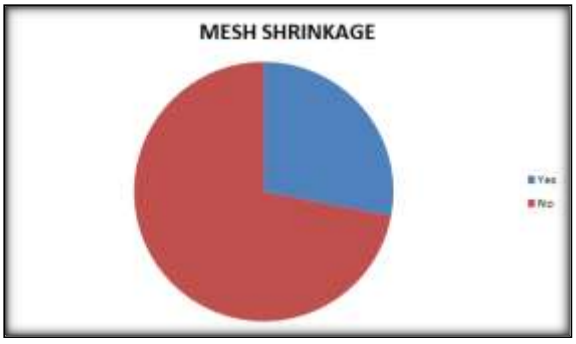


Figure 12: Mesh Shrinkage

Mesh Shrinkage

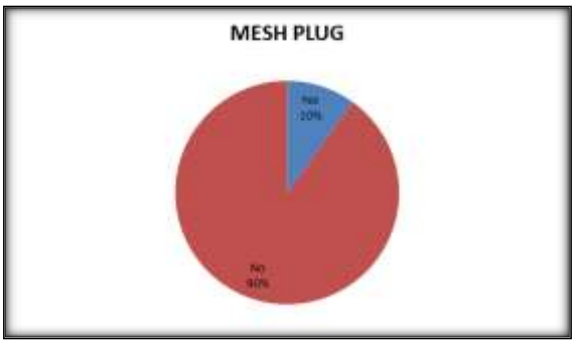


Figure 13: Mesh Plug

Recurrent hernia was present in 7 (14%) cases.

ISSN (O): 2687-5365; ISSN (P): 2753-6556

Table 13: Mesh Shrinkage

S.No	Mesh shrinkage	Frequency	Percentage
1	Yes	14	28
2	No	36	72
	Total	50	100

Table 14: Mesh Plug

S. No	Mesh PLUG	Frequency	Percentage
1	Yes	5	10
2	No	45	90
	Total	50	100

Table 15: Recurrent Hernia

S.No	Recurrent Hernia	Frequency	Percentage
1	Yes	7	14
2	No	43	86
	Total	50	100

Table 16: Hydrocele of testis

S.No	Hydrocele of Testis	Frequency	Percentage
1	Yes	6	12
2	No	44	88
	Total	50	100

Table 17: Restricted spermatic cord motion at reconstructed deep ring

S. No	Restricted Spermatic Cord Motion At Reconstructed Deep Ring	Frequency	Percentage
1	Yes	10	20
2	No	40	80
	Total	50	100

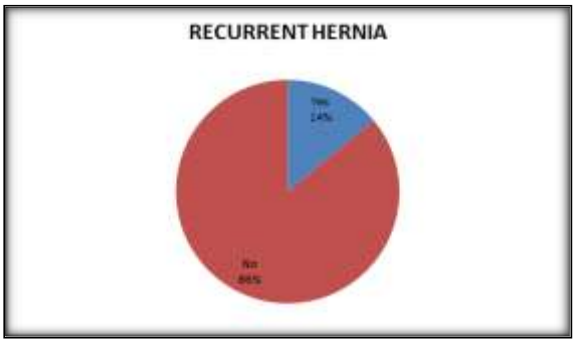


Figure 14: Recurrent Hernia

Hydrocele of testis was present in 6 (12%) cases.

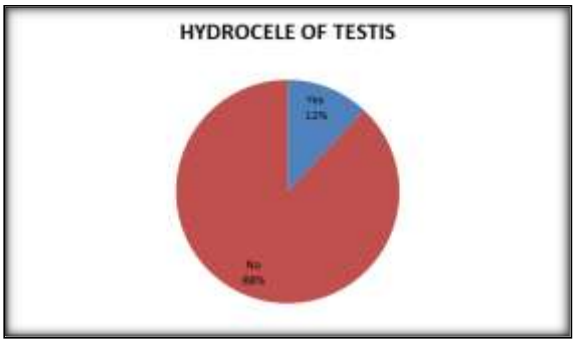


Figure 15: Hydrocele of testis

Restricted spermatic cord motion at reconstructed deep ring was present in 10 (20%) cases.

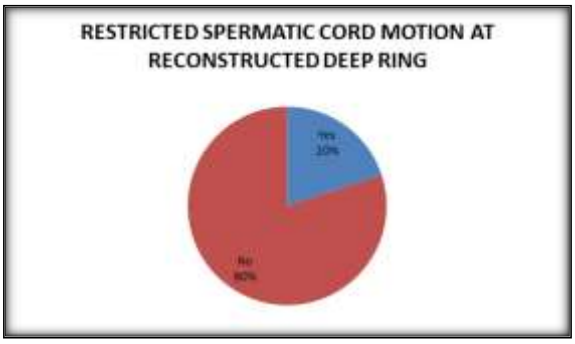


Figure 16: Restricted spermatic cord motion at reconstructed deep ring

Spermatic Cord cyst was present in 2 (4%) cases.

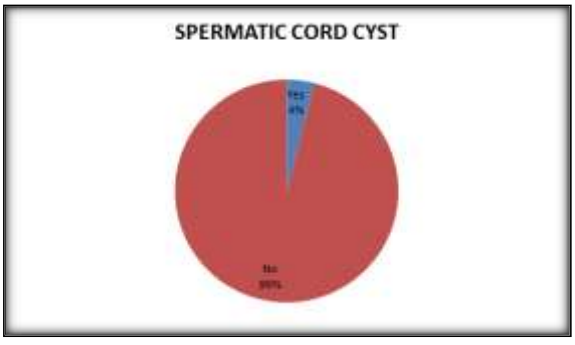


Figure 17: Spermatic cord cyst

Testitis was present in 5 (10%) cases.

Table 18: Spermatic cord cyst

S.No	Spermatic Cord Cyst	Frequency	Percentage
1	Yes	2	4
2	No	48	96
	Total	50	100

ISSN (O): 2687-5365; ISSN (P): 2753-6556

Table 19: Testitis

S.No	Testitis	Frequency	Percentage
1	Yes	5	10
2	No	45	90
	Total	50	100

Table 20: Scar sutured in to the pubic tubercle

S.No	Scar sutured in to the pubic tubercle	Frequency	Percentage
1	Yes	1	2
2	No	49	98
	Total	50	100

Table 21: Correlation with operative findings

S.No	Correlation with operative findings	Frequency	Percentage
1	Yes	42	84
2	No	3	6
3	Not Applicable	5	10
	Total	50	100

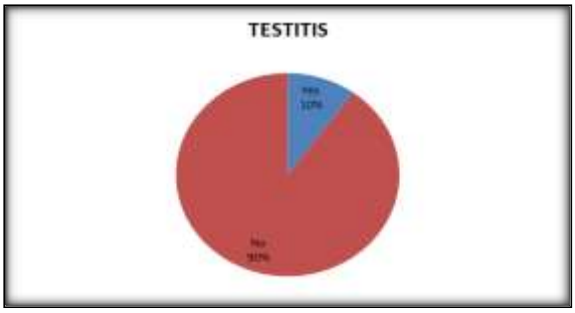


Figure 18: Testitis

Scar sutured in to the pubic tubercle was present in 1 (2%) case.

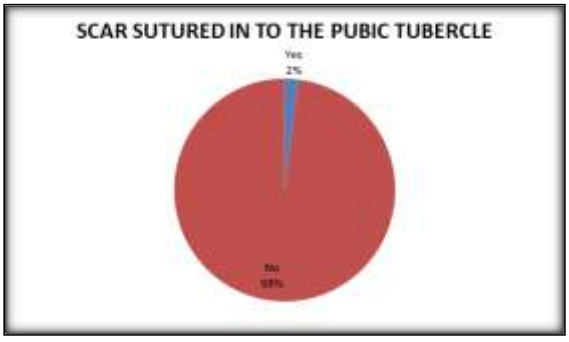


Figure 19: Scar sutured in to the pubic tubercle

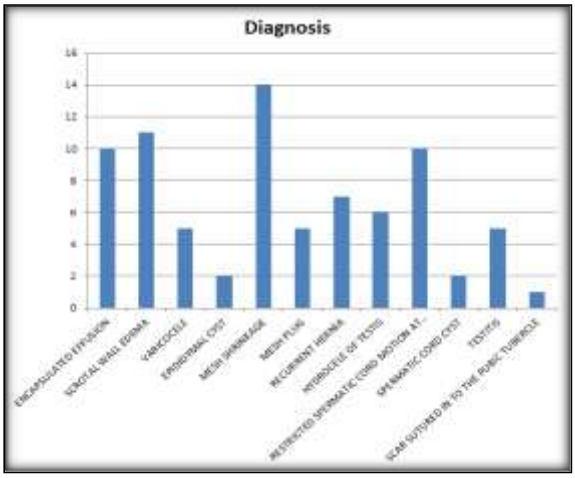


Figure 20: Diagnosis

Correlation with operative findings: Out of 50 cases, 42 (84%) cases correlated with operative findings, five cases (10%) were not applicable whereas in three cases (6%), it did not correlate. Following table and figure shows the correlation between ultrasound findings and operative findings.

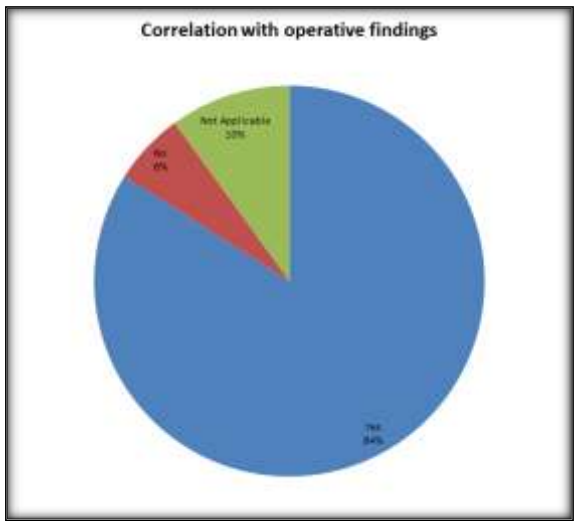
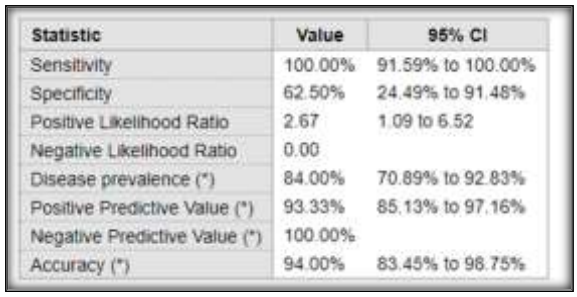


Figure 21: Correlation with operative findings

Sensitivity and Specificity Analyses: Sensitivity and specificity analyses shows that ultrasound is 100% sensitive (CI=91.6-100%) while it is only 62.5% specific (CI=24.5%-91.5%). It has a negative predictive value of 100% with an accuracy of 94%. Following figure shows the findings from the sensitivity and specificity analyses.



Statistic	Value	95% CI
Sensitivity	100.00%	91.59% to 100.00%
Specificity	62.50%	24.49% to 91.48%
Positive Likelihood Ratio	2.67	1.09 to 6.52
Negative Likelihood Ratio	0.00	
Disease prevalence (*)	84.00%	70.89% to 92.83%
Positive Predictive Value (*)	93.33%	85.13% to 97.16%
Negative Predictive Value (*)	100.00%	
Accuracy (*)	94.00%	83.45% to 98.75%

Figure 22: Sensitivity and specificity analyses

ISSN (O): 2687-5365; ISSN (P): 2753-6556

DISCUSSION

A large number of factors cause emergencies involving the inguinoscrotal region. The symptoms may be nonspecific but may be very painful. If management is delayed, it might lead to complications which make it mandatory that an early and accurate diagnosis is made. The pain in the inguinoscrotal region has a variety of symptoms ranging from mild dull aching pain to sharp acute agonising pain. Sometimes, it might present with a completely normal blood picture. An alteration in the leucocyte counts may indicate infection and sepsis. The diagnosis should be early to make a quick decision on the seriousness and severity of the condition and must be operated upon if it is a serious condition like torsion. This will also help in averting post-operative complications. In the 2014 edition of guidelines for diagnosis and treatment of adult inguinal hernia, it was suggested that all cases be treated surgically.[1] Chronic pain is a late post-operative complication of inguinal hernia surgeries.[2-4] Studies show that the incidence of inguinal neurodynia post inguinal herniorrhaphy is 54%. In around 50% of the patients presenting with chronic pain in the first year post surgery is associated with a deterioration in the quality of life.[5-7] Thus, chronic pain after inguinal hernia surgery has been considered as an indicator for assessment of the surgery.

The diagnostic investigation of choice is the Ultrasonography which is capable of identifying a vast range of conditions. It is also rapid, non-invasive, and low cost as well as devoid of ionising radiation. All these features make it an effective tool for management even in emergency care. Apart from the tool, it is essential that the surgeon should be familiar with the various ultrasound findings of the conditions involving the inguinoscrotal region. This will enable the examiner to make informed decisions on the conditions with accuracy and precision. Therefore, an ultrasound examination before and after the surgery is suggested as a good imaging method8. An advanced form of ultrasound, UVAS gives more insight and helps a surgeon plan the management accordingly.[8,9]

Ultrasound helps in doing the following.[10]

1. Show the morphology, size and corrugation of the mesh
2. motion of the spermatic cord
3. continuity of the peritoneum

This also helps in assessing the condition of the patient and avoids re-operation. The anterior open inguinal herniorrhaphy consists of two main steps.[11]

a. Separation of hernia sac and spermatic cord
b. Reconstruct the back wall of the inguinal canal

Literature states that chronic pain arises from viscera, somatic or neurological.[12,13] Study shows that the most common type of pain is the somatic pain. This pain is due to the injury of the pubic tubercle when the ligament is sutured to the tubercle.[14] On the other hand, visceral pain arises from the reproductive system.

Ultrasound is capable of the following;

i. Motion of the spermatic cord
ii. Flow within the spermatic veins

Therefore, ultrasound can accurately diagnose varicocele.

Torsion and post-operative stenosis pain of the spermatic cord is caused by hyperplasia of the scar that presents as pain during ejaculation or ejaculatory dysfunction.[15] An oversized mesh plug or a small patch hole may cause compression and may lead to ischemic testis which is found in less than 1% of the cases.[12,16] Neurological pain may be from the inguinal or genitofemoral nerves due to their accidental injuries.[17] However, ultrasound has limited application in detecting the nerves. In case of neural pain, inguinal neurectomy is suggested.[18] Intraoperative identification and protection is therefore necessary to avoid this pain.[19] Surgical injuries may present as neuromas or transections or may be due to the scars impinging on the nerve. This analysis aims to study the value of ultrasound in diagnosis and analysis of inguinal neurodynia following inguinal hernia repair, to understand the incidence of inguinal neurodynia following inguinal hernia repair, to find the cause for inguinal neurodynia following inguinal hernia repair and to correlate the ultrasound findings with operative findings. The analysis reveals the following findings; The mean age is 52.9 years with a standard deviation of 13.1 years ranging between 24-75 years. The median age is 55 years. The majority of the patients were males (n=45, 90%). Rest of them were females (n=5, 10%). Majority of them were diagnosed with right direct inguinal hernia (n=21, 42%). Bilateral direct inguinal hernia was seen in 8 (16%) cases. Majority of them had right open hernioplasty (n=26, 52%). Left open hernioplasty was done in 9 cases (18%). Majority of them had unilateral hernia (n=38, 76%) while the rest had bilateral hernia (n=12, 24%). All cases were diagnosed with inguinal neurodynia.

The mean duration of pain is 7.4 months with a standard deviation of 2.8 months ranging between 3 to 16 months. The median duration of pain is 7 months. The side of pain is on the right for the majority of the participants (n=31, 62%) followed by left (n=11, 22%) and both sides (n=8, 16%). Encapsulated effusion was present in 20% (n=10) of the participants. Scrotal edema was present in 11 (22%) cases. Varicocele was present in 5 (10%) cases. Epididymal cyst was present in 2 (4%) cases. Mesh shrinkage was present in 14 (28%) cases. Mesh plug was present in 5 (10%) cases. Recurrent hernia was present in 7 (14%) cases. Hydrocele of testis was present in 6 (12%) cases. Restricted spermatic cord motion at reconstructed deep ring was present in 10 (20%) cases. Spermatic Cord cyst was present in 2 (4%) cases. Testitis was present in 5 (10%) cases. Scar sutured in to the pubic tubercle was present in 1 (2%) case.

ISSN (O): 2687-5365; ISSN (P): 2753-6556

Out of 50 cases, 42 (84%) cases correlated with operative findings, five cases (10%) were not applicable whereas in three cases (6%), it did not correlate. Sensitivity and specificity analyses shows that ultrasound is 100% sensitive (CI=91.6-100%) while it is only 62.5% specific (CI=24.5%-91.5%). It has a negative predictive value of 100% with an accuracy of 94%.

For initial evaluation of the inguinal canal, ultrasound is the method preferred due to the following reasons;

1. Better sensitivity
2. Low cost
3. Good accuracy
4. Wide availability
5. Low maintenance of the equipment
6. Shorter learning curve for the examiners
7. It is essential that B mode ultrasound imaging is used in conjunction with colour and spectral Doppler ultrasound. This must be done to do a comparison to the opposite side. Clinical correlation and physical findings are basic.

CONCLUSION

This analysis aimed to study the value of ultrasound in diagnosis and analysis of inguinal neurodynia following inguinal hernia repair, to understand the incidence of inguinal neurodynia following inguinal hernia repair, to find the cause for inguinal neurodynia following inguinal hernia repair and to correlate the ultrasound findings with operative findings. The analysis revealed the following findings. The mean age is 52.9 years with a standard deviation of 13.1 years ranging between 24-75 years. The median age is 55 years. The majority of the patients were males (n=45, 90%). Rest of them were females (n=5, 10%). Majority of them were diagnosed with right direct inguinal hernia (n=21, 42%). Bilateral direct inguinal hernia was seen in 8 (16%) cases. Majority of them had right open hernioplasty (n=26, 52%). Left open hernioplasty was done in 9 cases (18%). Majority of them had unilateral hernia (n=38, 76%) while the rest had bilateral hernia (n=12, 24%). All cases were diagnosed with inguinal neurodynia. The mean duration of pain is 7.4 months with a standard deviation of 2.8 months ranging between 3 to 16 months. The median duration of pain is 7 months. The side of pain is on the right for the majority of the participants (n=31, 62%) followed by left (n=11, 22%) and both sides (n=8, 16%). Encapsulated effusion was present in 20% (n=10) of the participants. Scrotal edema was present in 11 (22%) cases. Varicocele was present in 5 (10%) cases. Epididymal cyst was present in 2 (4%) cases. Mesh shrinkage was present in 14 (28%) cases. Mesh plug was present in 5 (10%) cases. Recurrent hernia was present in 7 (14%) cases. Hydrocele of testis was present in 6 (12%) cases. Restricted spermatic cord motion at reconstructed deep ring was present in 10 (20%) cases. Spermatic Cord cyst was present in 2 (4%) cases. Testitis was present in 5 (10%) cases. Scar sutured in to the pubic tubercle was present in 1 (2%) case. Out of 50 cases, 42 (84%) cases correlated with operative findings, five cases (10%) were not applicable whereas in three cases (6%), it did not correlate. Sensitivity and specificity analyses shows that ultrasound is 100% sensitive (CI=91.6-100%) while it is only 62.5% specific (CI=24.5%-91.5%). It has a negative predictive value of 100% with an accuracy of 94%.

For initial evaluation of the inguinal canal, ultrasound is the method preferred due to the following reasons;

a. Better sensitivity
b. Low cost
c. Good accuracy
d. Wide availability
e. Low maintenance of the equipment
f. Shorter learning curve for the examiners

Limitations

This study has the following limitations;

- It is a single center study which affects the generalizability of the results
- The sample size is small which affects the validation

Future recommendations

- Similar studies should be done using a multicentric design
- A larger sample size with widespread representation across the country is necessary

REFERENCES

1. Chinese Society for Hernia and Abdominal Wall Surgery CHCoS. Guidelines for diagnosis and treatment of adult inguinal hernia (2014 edition). Chinese Journal of Surgery. 2014;52:481–3.
2. Mudge M, Hughes LE. Incisional hernia: a 10 year prospective study of incidence and attitudes. Br J Surg. 1985;72(1):70–1.
3. Luijendijk RW, et al. A comparison of suture repair with mesh repair for incisional hernia. N Engl J Med. 2000;343(6):392–8.
4. Stoppa RE. The treatment of complicated groin and incisional hernias.World J Surg. 1989;13(5):545–54.
5. Poobalan AS, Bruce J, Smith WC, King PM, Krukowski ZH, Chambers WA.
6. A review of chronic pain after inguinal Herniorrhaphy. Clin J Pain. 2003;19(1):48–54.
7. Poobalan AS, bruce J, King PM, et al. Chronic pain and quality of life following open inguinal hernia repair. Br J Surg. 2001;88:1122–6.
8. Callesen T, Bech K, Kehlet H. Prospective study of chronic pain after groin hernia repair. Br J Surg. 1999;86:1528–31.
9. Zhiying Q, Jianxiong T. Value of ultrasonography before and after tension-free inguinal hernioplasty. Chinese Journal of General Surgery. 2011;26(2):91–3.
10. Zhiying Q, Yue C, Cai C, et al. Comparison of ultrasonic volume auto-scan and regular ultrasonography for the diagnostic classification of the hernia. Chinese. J Ultrasound Med. 2012;28(5):446–52. Hua T, Lei Z, Hongyan Z, et al. The application of color Doppler ultrasonography in diagnosis for the complication of tension-free inguinal hernia repair. Chin J Med Ultrasound (Electronic Edition). 2010;7(9):1483–9.
11. Joachim Conze, Anterior open repair of inguinal hernia in adults.Management of Abdominal Hernias. A.N. Kingsnorth and K.A. LeBlanc (eds.). chapter14.
12. ZibM GJ. Inguinal hernia repair : where to next. ANZ J Surg. 2002;72(8):573.

ISSN (O): 2687-5365; ISSN (P): 2753-6556

13. Licheng Z, Junzhong S, Huijun S. Causes and strategies of chronic pain following tension-free herniorrhaphy. Chinese. journal of general practice. 2008;6(8):829–30.
14. Cunningham J, Temple WJ, Mitchell P, et al. Cooperative hernia study: pain in the postrepair patient. Ann Surg. 1996;224:598–602.
15. Butler JD, Hershman MJ, Leach A. Painful ejaculation after inguinal hernia repair. J R Soc Med. 1998;91:432–3.
16. Wantz GE. The Canadian repair of inguinal hernia.//Nghus LM, Condon RE. Hernia. 3rd ed. Philadelphia: JB Lippincott Co,1989:236–252.
17. Wijsmuller AR, Lange JFM, Kleinrensink GJ, et al. Nerve-identifying inguinal hernia repair: a surgical anatomical study. World J Surg. 2007;31(2):414–20.
18. Caliskan K, et al. A method for the reduction of chronic pain after tension free repair of inguinal hernia: iliohypogastric neurectomy and subcutaneous transposition of the spermatic cord. Hernia. 2010;14(1):51–5.
19. Wijsmuller AR, van Veen RN, Bosch JL, et al. Nerve management during open hernia repair. Br J Surg. 2007;94:17–22.
20. Bower S, Moore BB, Weiss SM. Neuralgia after inguinal hernia repair. Am Surg. 1996;62:664–7.
21. Condon RE. Groin pain after hernia repair. Ann Surg. 2001;233(1):8.
22. Kingsnorth A, LeBlanc K. Hernias: inguinal and incisional. Lancet 2003;362:1561-71
23. Devlin HB. Trends in hernia surgery in the land of Astley Cooper. In: Soper NJ, ed. Problems in general surgery . Vol 12. Philadelphia, PA: Lippincott-Raven, 1995:85-92.
24. Chow A, Purkayastha S, Athanasiou T, Tekkis P, Darzi A. Inguinal hernia. BMJ Clin Evid 2007;4:1-20.
25. Fonseca EKUN, Peixoto MR, Cavalcante Júnior FA, Rahal Júnior A, Francisco Neto MJ, Funari MBG. Ultrasound evaluation of inguinoscrotal pain: an imaging-based review for the ultrasonographer. Radiol Bras. 2018 May-Jun;51(3):193-199. doi: 10.1590/0100-3984.2016.0175. PMID: 29991842; PMCID: PMC6034721.
26. Qiu ZY, Chen Y, Tang JX, Chen L. Ultrasonography in diagnosis and analysis of chronic pain following anterior open inguinal herniorrhaphy. BMC surgery. 2018 Dec 1;18(1):28.

ISSN (O): 2687-5365; ISSN (P): 2753-6556