

Outcome Analysis of USG Guided Musculoskeletal Interventions in the HIP Using MRI and USG Correlation

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Abstract: **Introduction:** Hip pain is a common condition reported by patients and will probably continue to grow in prevalence. There are many potential causes of musculoskeletal pain related to the hip. Structures from which this pain is generated include the hip joint itself, the surrounding musculotendinous structures, and numerous lumbar nerve branches innervating the hip region. Ultrasound is increasingly being used to guide diagnostic and therapeutic interventions around the hip joint. Ultrasound eliminates the necessity for radiation exposure and is already the method of choice for hip joint aspiration, an intervention that may be useful in guiding surgery. US-guided injections to manage hip pain have emerged as valuable tools for diagnostic and therapeutic applications. These injections can (a) help narrow the list of possible sources of pain, (b) serve as a primary method of managing pain, and/or (c) serve as a bridge to delayed surgery. **Aims and Objective:** 1. To identify the clinical manifestations and imaging findings of common hip conditions that may warrant US-guided intervention. 2. To assess the potential complications and expected outcomes associated with US-guided hip intervention. **Materials and Methods:** The study is carried out in department of Radiodiagnosis, GMCH, Guwahati. Patients with history of hip pain with osteoarthritis, rheumatoid arthritis, GTPS, bursitis, tendinopathy etc referred to the department of radiology. The ultrasound study was performed on Samsung RS80A with PRESTIGE machine using high frequency 3-12 MHz advanced piezoelectric crystal design linear array transducer. MRI evaluation was performed on 1.5 Tesla SIEMENS MAGNETOM AVANTO FIT machine. **Discussion:** Total of 40 patients who presented with clinical signs and symptoms of Osteoarthritis, GTPS, Septic arthritis and Iliopsoas bursitis were enrolled in the study and underwent high-resolution USG guided intervention both as diagnostic and therapeutic purpose (Out of 40 patients 20 patients are having osteoarthritis, 8 patients having septic arthritis, 7 patients having iliopsoas bursitis and 5 patients having GTPS). This was followed by pre and post treatment MRI of the affected hip and the findings were correlated. **Conclusion:** Ultrasonography is an effective imaging modality for diagnosing hip pathology after radiograph predominantly in detection of joint effusion and synovial thickening. Various ultrasound-guided diagnostic and therapeutic injections can be considered in patients with hip or groin pain. MRI is a more appropriate investigation and is therefore considered as the gold standard.

Keywords: USG, HIP, pain, Analysis, Ultrasonography

INTRODUCTION

Hip pain is a common condition reported by patients and will probably continue to grow in prevalence.

US-guided injections to manage hip pain have emerged as valuable tools for diagnostic and therapeutic applications.

These injections can:

- Help narrow the list of possible sources of pain,
- Serve as a primary method of managing pain, and/or
- Serve as a bridge to delayed surgery.

USG guided individual procedures that are used to treat pain in the anterior, lateral, and posterior regions of the hip, with an overview of the relevant anatomy, common diseases, and various injection techniques are mentioned.

The information can help radiologists introduce emerging therapeutic options to surgery in the management of hip pain to their patients quite

effectively. Ultrasound of the adult hip is a frequent procedure that can be used to look for both intraarticular and extraarticular pathologies. Joint fluid, bursitis, hematoma, and the development of a para labral cyst are all common findings. Ultrasound is increasingly being used to guide diagnostic and therapeutic interventions around the hip joint. Ultrasound eliminates the necessity for radiation exposure and is already the method of choice for hip joint aspiration (1), an intervention that may be useful in guiding surgery.

Ultrasound can also be used to access the hip for diagnostic or therapeutic injection (1). USG Guided injection of the greater trochanteric bursa or the iliopsoas tendon bursa may have enormous therapeutic benefits to the patient without the need for surgery or exposure to ionizing radiation. Some of the most common reasons for ultrasound intervention around the hip joint: intraarticular injection, aspiration of joint fluid for both therapeutic and diagnostic purposes, injection of

trochanteric or iliopsoas bursitis, and treatment of the symptomatic snapping hip. Here mentioned the techniques used at our institution for these ultrasound-guided interventions, along with tips to aid a successful procedure.

The hip and groin are also sites of multiple injuries and inflammatory conditions, including intra-articular and extra-articular pathology, giving rise to an extensive differential diagnosis for hip and groin pain (2). Often, patients with hip conditions have concomitant knee or spine conditions, which

may present difficult therapeutic and diagnostic dilemmas (3).

Given the complexity of hip and groin anatomy and clinical conditions, imaging-guided injections are useful both for the diagnostic workup and treatment (4)

The main advantages of ultrasound-guided injection are its safety, portability and lack of ionising radiation. Injections can include corticosteroid, local anaesthetic, platelet-rich plasma (PRP), viscosupplement and dextrose prolotherapy.

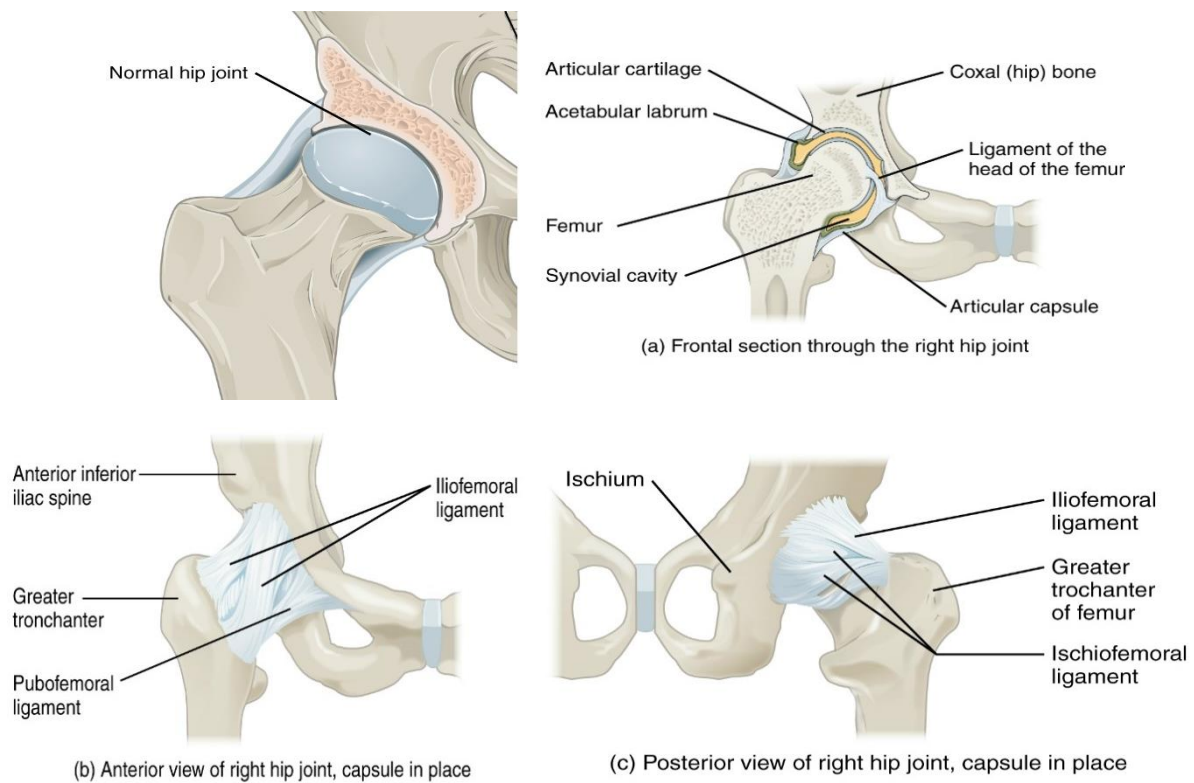


Figure 1: Anatomy of hip joint (a,b,c)

Table A: Potential Adverse Effects of Corticosteroids (5)	
Rare complications	Relatively common transient adverse effects
Septic arthritis	Corticosteroid flare
Tendon rupture	Facial flushing
Chondrotoxicity	Transient headache
Cutaneous atrophy and depigmentation	

Table B: Advantages and Disadvantages of Ultrasound-Guided Intra-Articular Injection.

Advantages	Disadvantages
➤ Convenient/cost-effective for patient	➤ User dependent
➤ Less painful than fluoroscopic guided	➤ Limited by body habitus
➤ Can avoid contrast in patients with allergies	➤ Upfront cost of ultrasound equipment and supplies
➤ Allows for immediate post injection reassessment/real-time information.	➤ Requires time of provider in clinic to perform procedure

➤ Can visualize effusion and aspirate if needed	
➤ No radiation exposure	
➤ More accurate than landmark injections	

AIMS AND OBJECTIVE

To identify the clinical manifestations and imaging findings of common hip conditions that may warrant US-guided intervention.

To describe the various indications for, contraindications to, and methods of performing US-guided hip interventions.

To assess the potential complications and expected outcomes associated with US-guided hip intervention.

MATERIALS AND METHODS

Hospital based Cross sectional study was done in total of 40 patients with due approval of the Institutional Ethical Committee, Gauhati Medical College. The study was done in department of Radiodiagnosis, Gauhati Medical College and Hospital, Guwahati From June, 2020 to May, 2021 in patient referred to the Department of Radiodiagnosis from orthopedics.

Inclusion Criteria

Patients with history of hip pain with osteoarthritis, septic arthritis, GTPS, bursitis,

tendinopathy etc referred to the department of radiology.

Patients having given written informed consent to participate in the study.

Patients of all age groups predominantly middle and old and both genders.

Exclusion Criteria

Patients having cardiac pacemakers, prosthetic heart valves.

Patient with allergic to steroid.

Patients having local site infection.

Patients falling in the above-mentioned inclusion criteria will be identified. Written informed consent will be taken from the patient/guardian and the case will be enrolled in the study.

Requirements

Samsung RS 480 USG Machine with Linear and curvilinear probe.

Syringing equipment's (cleaning agents, Local anaesthesia, medication (steroid, hyaluronic acid).



Figure 2: Injection Vial Showing Corticosteroid Injection and LA

Site of Puncture

Anterior hip, lateral hip and posterior hip depending on site of pathology.

Preparation

Sterilization of the site will be done followed by subcutaneous injection of 1% Lidocaine without adrenaline.

Study Tools

The ultrasound study was performed on Samsung RS80A with PRESTIGE machine using high

frequency 3-12 MHz advanced piezoelectric crystal design linear array transducer.

Magnetic resonance imaging (MRI) evaluation was performed on 1.5 and 3 Tesla SIEMENS MAGNETOM AVANTO FIT machine.

Efforts were made to do both the tests on the same day.

The index test (ultrasound) was interpreted independently of the reference standard (MRI) to minimize the bias.

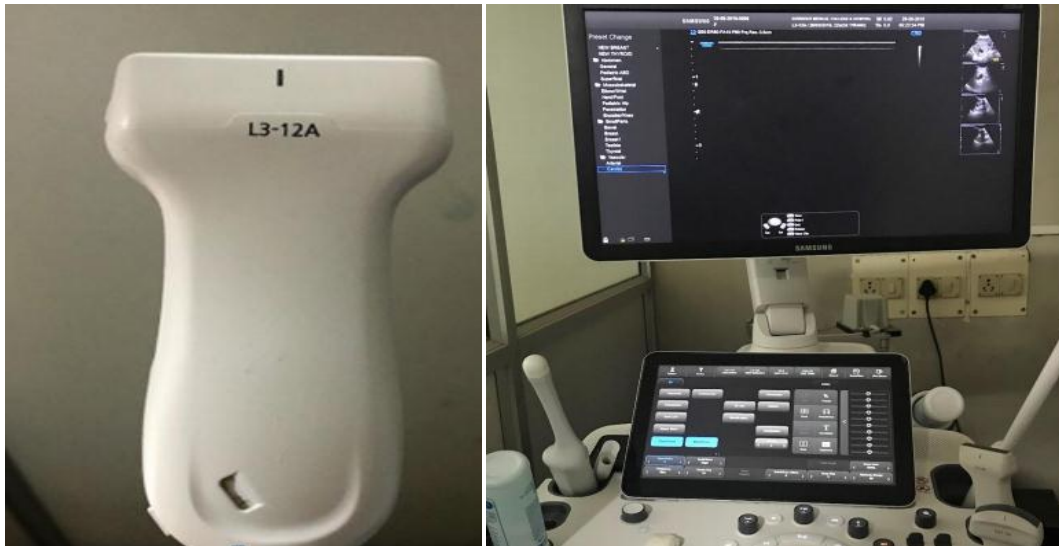


Figure 3: Linear Probe and SAMSUNG RS80A USG Machine



Figure 4: 1.5 Tesla MRI Machine

STATISTICAL ANALYSIS

MRI was considered as the gold standard of reference and the ultrasound findings were correlated with the gold standard.

Master chart was prepared in Microsoft Office Excel 2010 and statistical analysis was performed using SPSS 20.0 software.

Continuous variables were described using mean and SD and categorical values were described using frequency and percentage.

Sensitivity, specificity, positive predictive value (PPV), and negative predictive value (NPV) and diagnostic accuracy were obtained.

Flowchart Summarising Methodology

Patients coming to the Department of Radiology with hip pain having osteoarthritis, tendinopathy, bursitis etc are evaluated based on inclusion and exclusion criteria.

↓
Patients fulfilling the criteria will be included in the study.

↓
Written informed consent will be taken from the patient or guardian

↓
Patient will be enrolled in the study

↓
After sterilization and application of local anaesthesia, under US guidance the needle is advanced until it reaches the target location then infiltrates the agent. Real time knowledge of the needle tip location will prevent unintended consequences of neurovascular injury.

Immediate pain relief may occur owing to the administration of anaesthetic medication, and patients are instructed not to exert the affected limb for the remainder of the day. The injection site should be kept clean and dry and not be submerged in water for 24 hours.

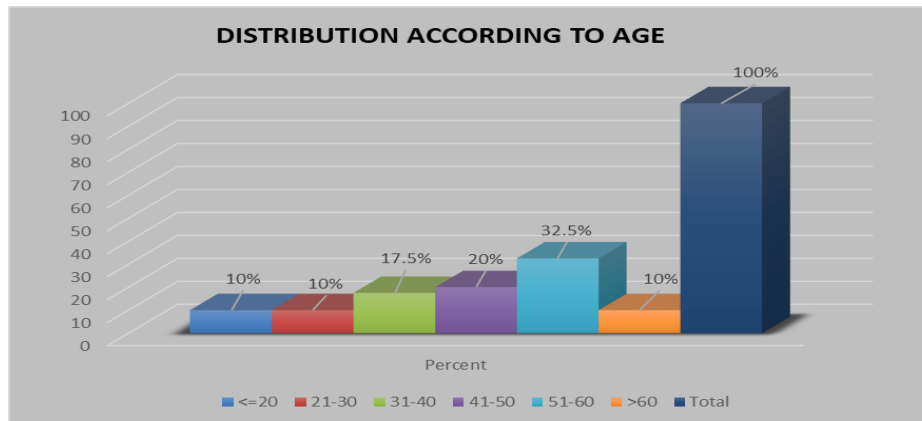
RESULTS AND OBSERVATIONS

In our study, total 40 patients who presented with clinical signs and symptoms of Osteoarthritis, GTPS, Septic arthritis and Iliopsoas bursitis were enrolled in the study and underwent high-

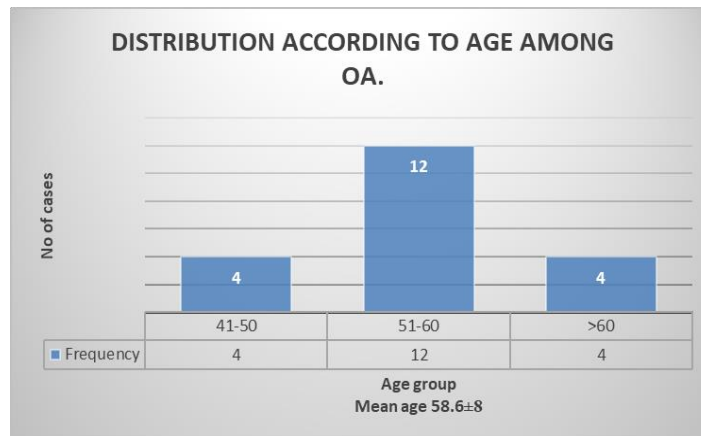
resolution ultrasound guided intervention both as diagnostic and therapeutic purpose. This was followed by pre and post treatment MRI of the affected hip and the findings were correlated.

Table 1: Overall Distribution According to Age.

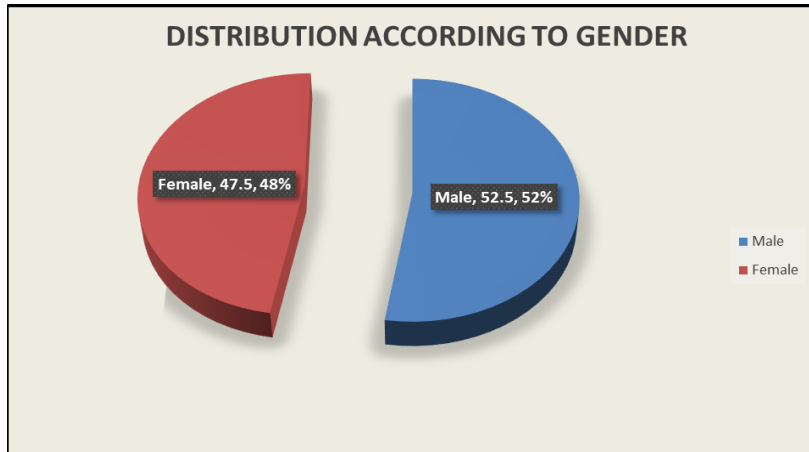
Age Group (In Years)	Frequency/Number Of Cases	Percentage (%)
<=20	4	10
21-30	4	10
31-40	7	17.5
41-50	8	20
51-60	13	32.5
>60	4	10
Total	40	100
MEAN ± SD	45.7±16.2	



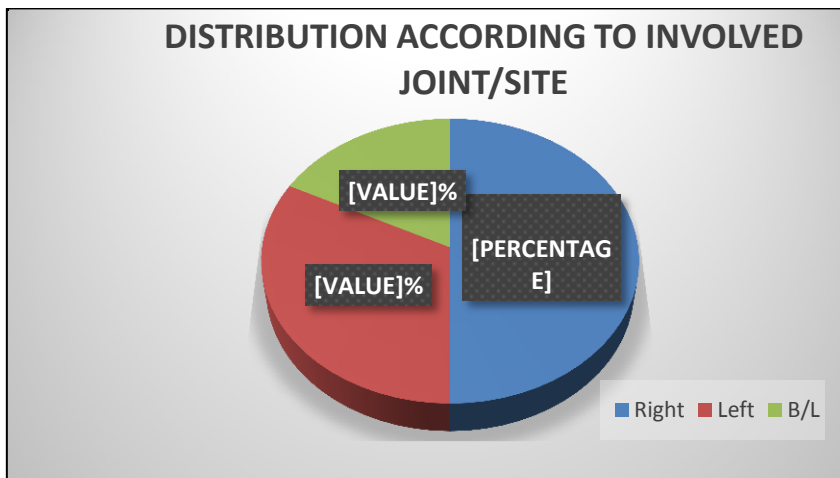
Graph 1: Column Diagram Showing the Distribution of Cases According to Age



Graph 2: Column Diagram Showing the Distribution of OA Cases According to Age



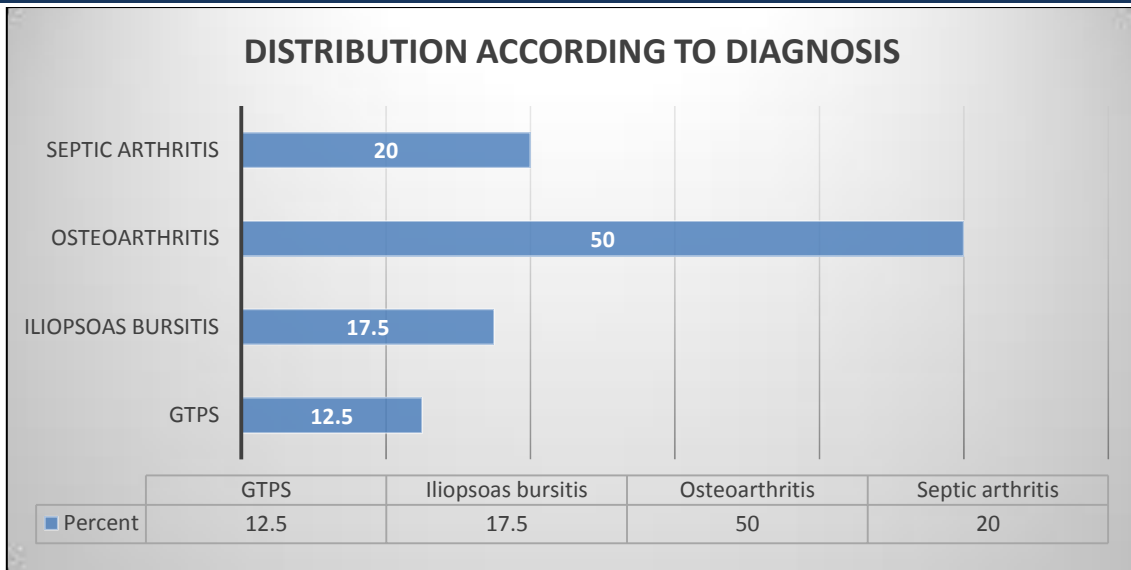
Graph 3: Pie Diagram Showing the Distribution of Cases According to Gender.



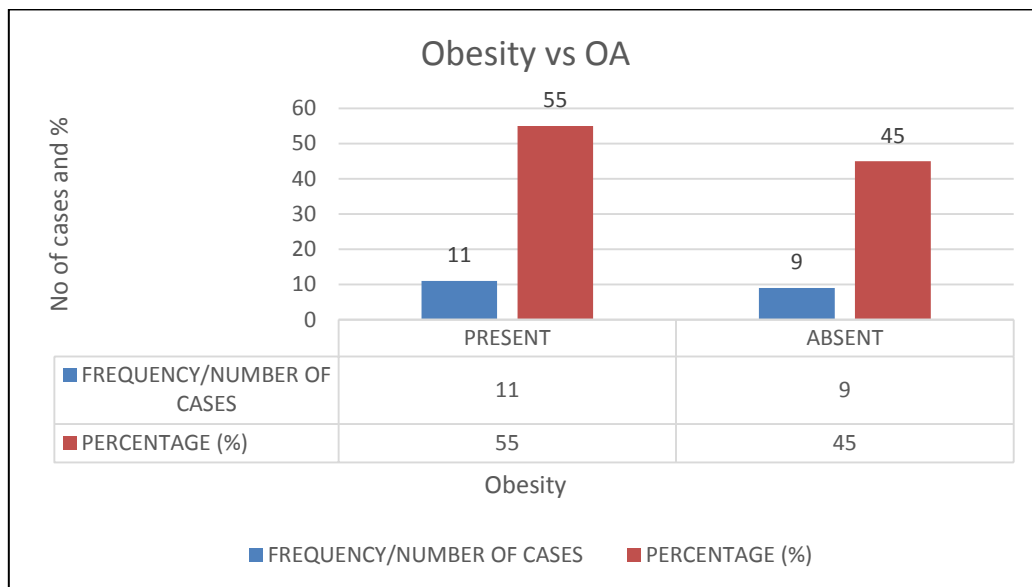
Graph 4: Pie Diagram Showing the Distribution of Cases According to Involved Joint/Site

Table 2: Distribution According to Diagnosis

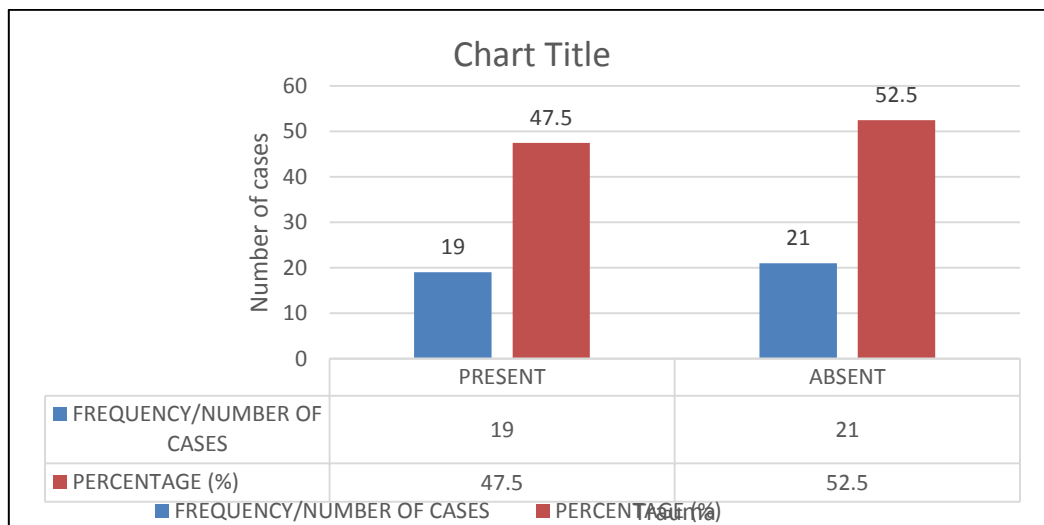
Diagnosis	Frequency/Number Of Cases	Percentage (%)
GTPS	5	12.5
Iliopsoas bursitis	7	17.5
Osteoarthritis	20	50
Septic arthritis	8	20
Total	40	100



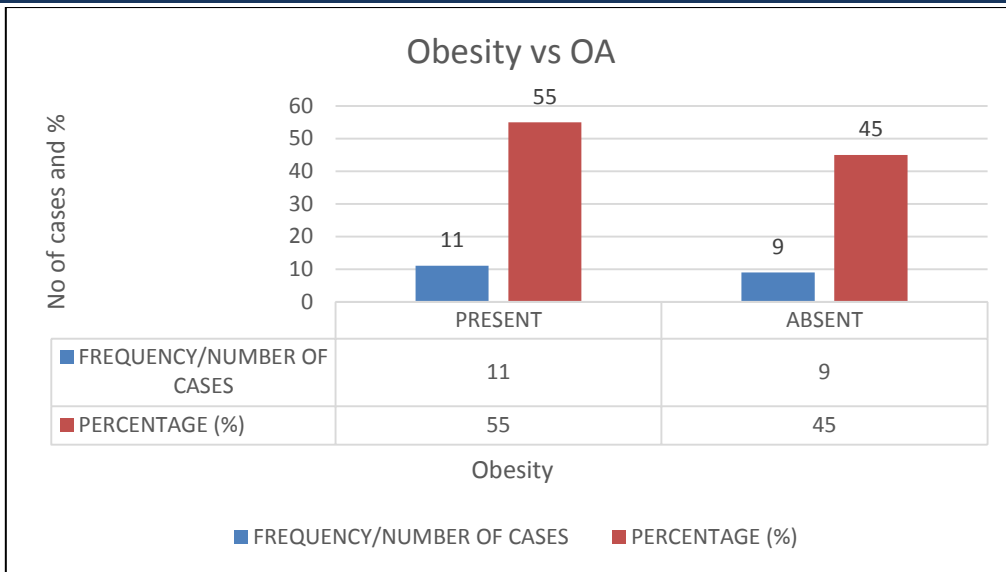
Graph 5: Bar Diagram Showing the Distribution of Cases According to Diagnosis



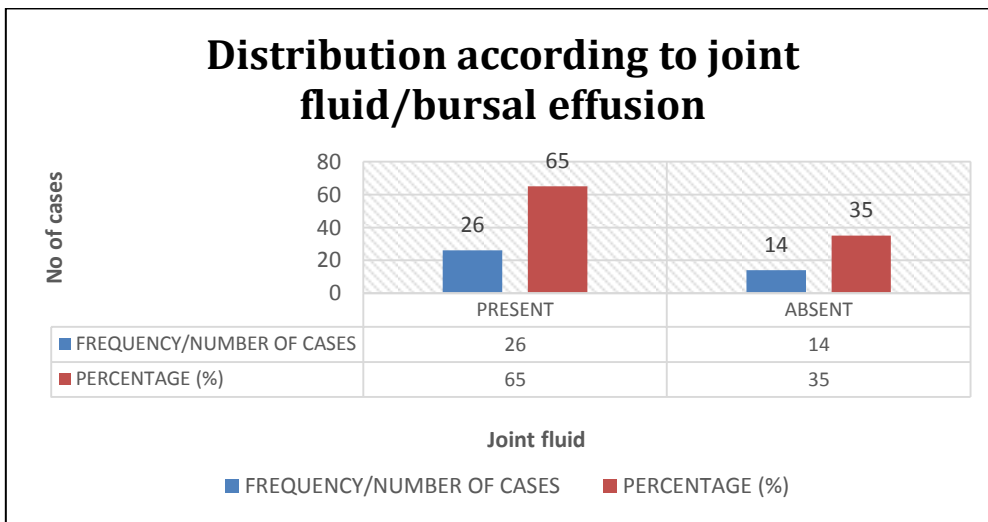
Graph 6: Column Diagram Showing the Distribution of OA Cases According to Obesity



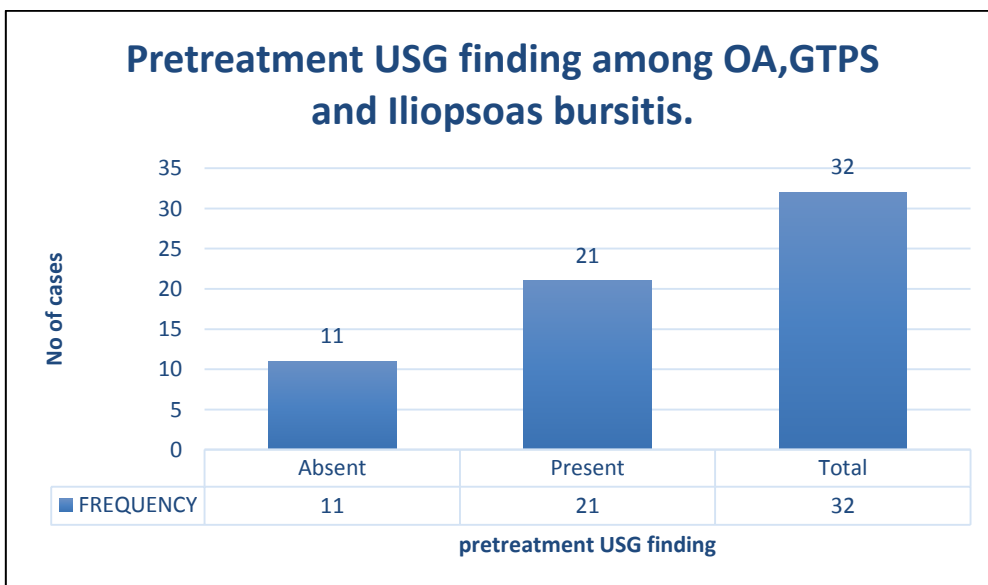
Graph 7: Column Diagram Showing the Distribution of Cases According to Trauma



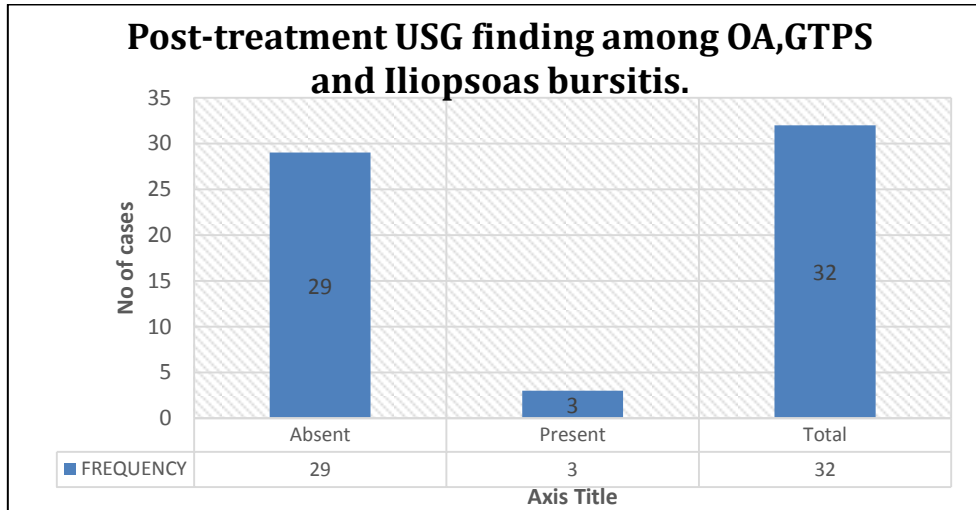
Graph 8: Column Diagram Showing the Distribution of OA Cases According to Obesity.



Graph 9: Column Diagram Showing the Distribution of Cases According to Joint Fluid/Bursal Effusion



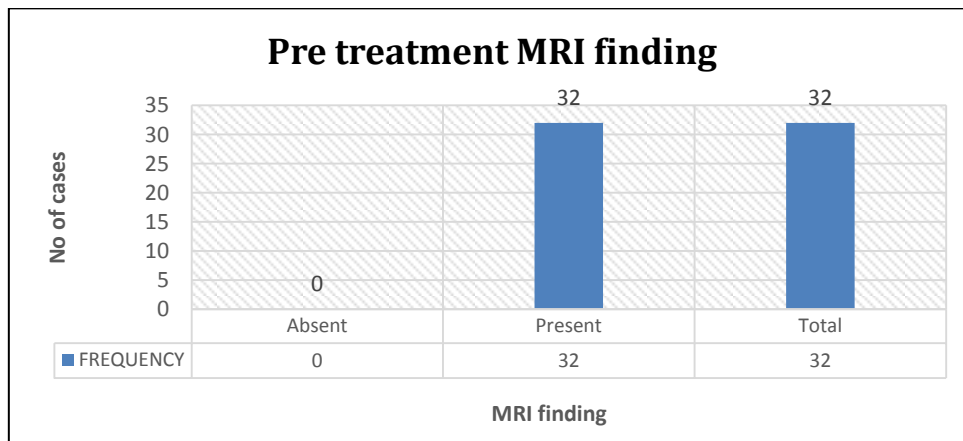
Graph 10: Column Diagram Showing the Distribution of Pre-Treatment USG Finding Among OA, GTPS and Iliopsoas Bursitis.



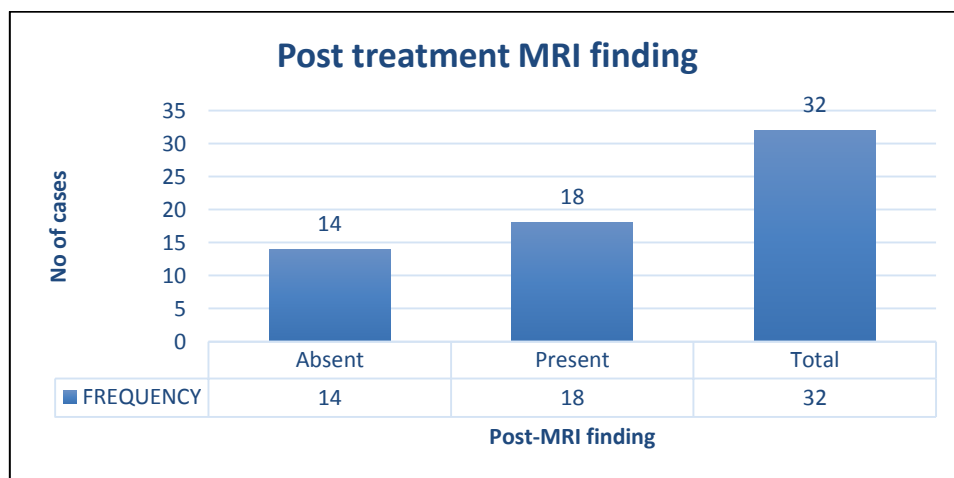
Graph 11: Column Diagram Showing the Distribution of Post-Treatment USG Finding Among OA, GTPS and Iliopsoas Bursitis.

Table 3: Pre-Treatment MRI Finding in Osteoarthritis, Gtps and Iliopsoas Bursitis.

Pre-Treatment Mri Finding	Frequency	Percentage (%)
Absent	0	0
Present	32	100
Total	32	100



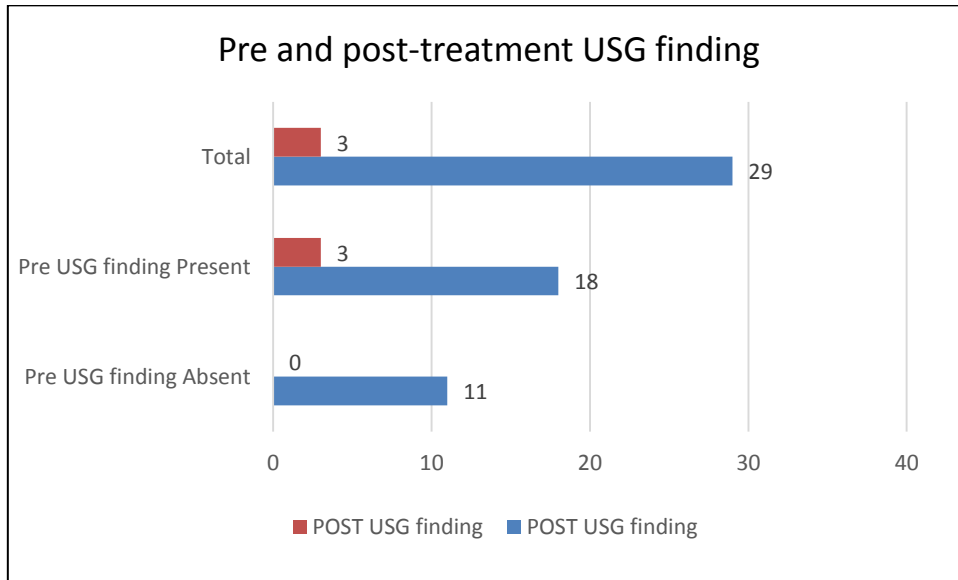
Graph 12: Column Diagram Showing Pre-Treatment MRI Finding Among OA, GTPS And Iliopsoas Bursitis



Graph 13: Column Diagram Showing Post-Treatment MRI Finding Among OA, GTPS and Iliopsoas Bursitis

Table 4: Distribution According To Pre and Post Treatment USG Finding.

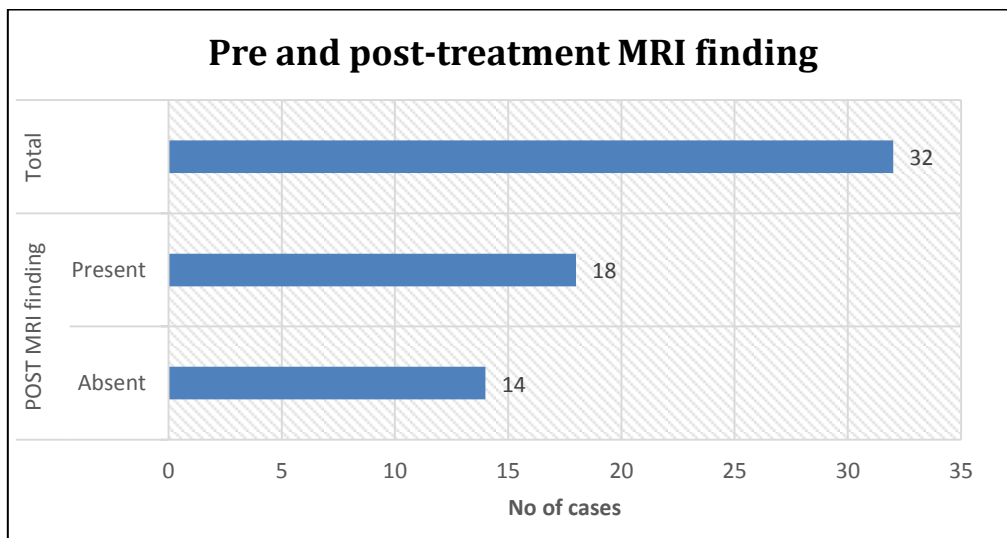
PRE USG finding	Post USG finding		Total
	Absent	Present	
Absent	11	0	11
Present	18	3	21
Total	29	3	32
P value	0.188	Not significant	



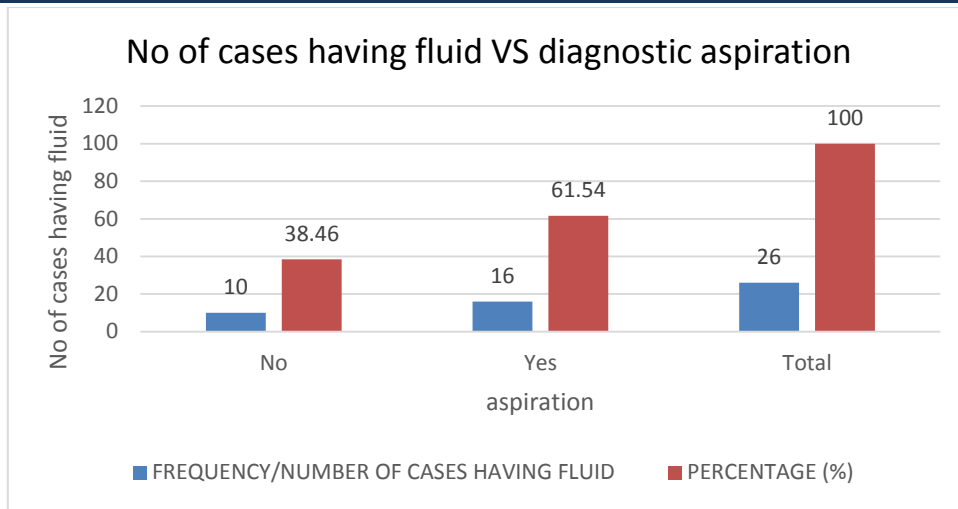
Graph 14: Clustered bar diagram showing pre- and post-treatment USG finding

Table 5: Distribution According To Pre and Post Treatment Mri Finding

PRE MRI finding	Post MRI Finding		Total
	Absent	Present	
Present	14	18	32
Total	14	18	32



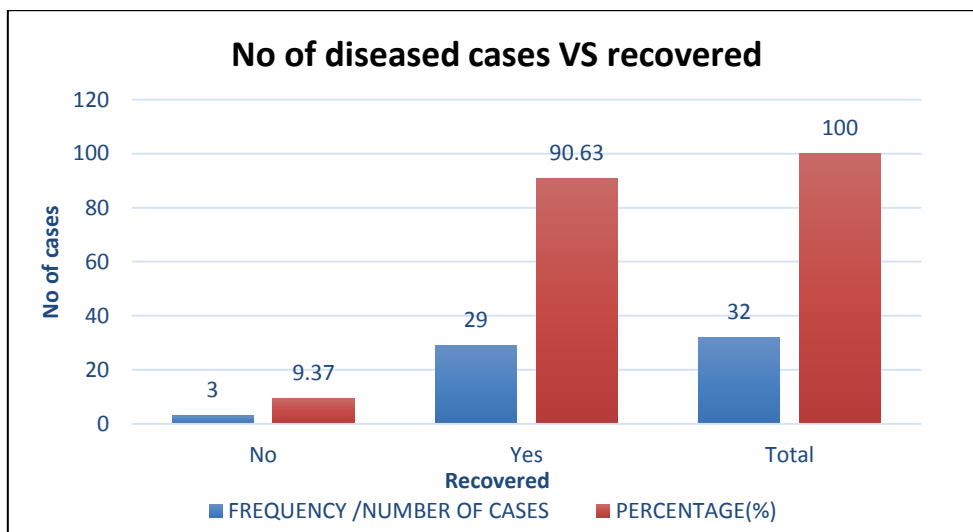
Graph 15: Bar Diagram Showing Pre and Post-Treatment USG Finding



Graph 16: Clustered Column Diagram Showing No of Cases Having Fluid VS Diagnostic Aspiration.

Table 6: Distribution According To Number Of Cases Recovered.

Recovered	Frequency /Number of Cases	Percentage (%)
No	3	9.37
Yes	29	90.63
Total	32	100



Graph 17: Clustered Column Diagram Showing No of Cases VS Recovered

Table 7: Distribution According to Number of Cases Having Minor Side Effect

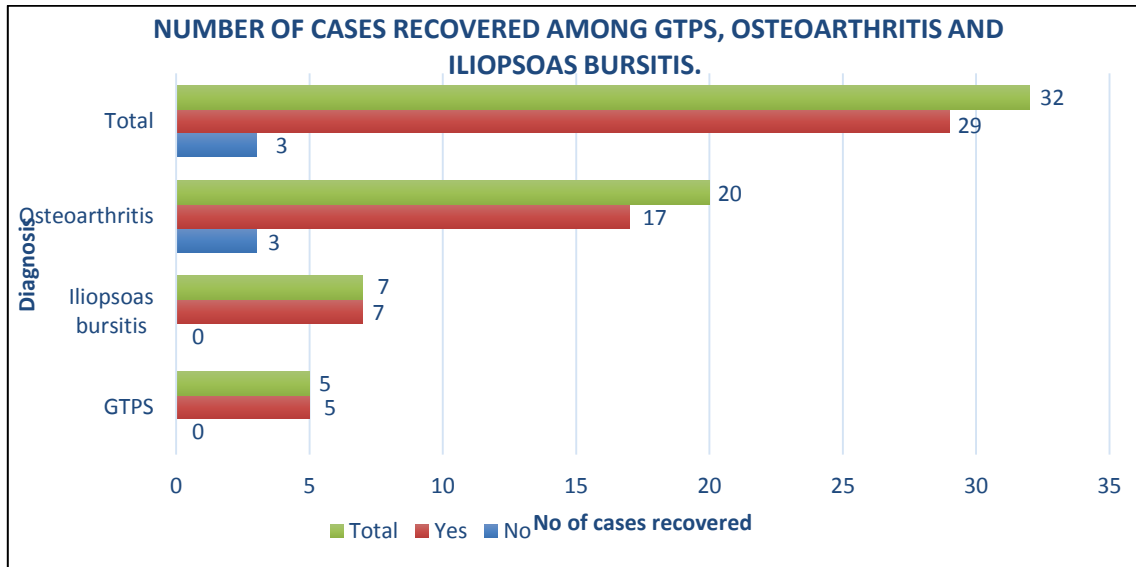
Minor Side Effect	Frequency/Number of Cases	Percentage (%)
No	37	92.5
Yes	3	7.5
Total	40	100

Table 8: Distribution According To Number of Injection and Recovered

Recovered	Number of injections		Total
	1	2	
No	0	3	3
Yes	23	6	29
Total	23	9	32
P value	0.004	Highly significant	

Table 9: Distribution According to Number of Cases Recovered Among GTPS, Osteoarthritis and Iliopsoas Bursitis

Recovered	Diagnosis			Total
	GTPS	Iliopsoas bursitis	Osteoarthritis	
No	0	0	3	3
Yes	5	7	17	29
Total	5	7	20	32
P value	0.37	Not significant		



Graph 18: Clustered bar diagram showing diagnosis wise no of cases Vs recovered

DISCUSSION

In our study, total 40 patients who presented with clinical signs and symptoms of Osteoarthritis, GTPS, Septic arthritis and Iliopsoas bursitis were enrolled in the study and underwent high-resolution ultrasound guided intervention both as diagnostic and therapeutic purpose (Out of 40 patients 20 patients are having osteoarthritis, 8 patients having septic arthritis, 7 patients having iliopsoas bursitis and 5 patients having GTPS). This was followed by pre and post treatment MRI of the affected hip and the findings were correlated.

Out of 40 patients 32 patients undergone USG guided steroid injectable treatment and 8 patients (septic arthritis) undergone diagnostic fluid aspiration.

Out of 32 patients, undergone USG guided steroid injection. 29 (90.6%) patients are recovered following one or two setting of injection and 3 (9.3%) patients are failed to recover even after multiple session of injection later which undergone hip arthroplasty.

Patient Demographics

Age Group

The age group of patients in our study ranged from a minimum age of 13 years to a maximum age of 85 years with a mean age of 45.7 years.

We divided the patients into 6 age groups in the form of a) less than 20 years, b) 21 to 30 years, c) 31 to 40 years, d) 41 to 50 years, e) 51 to 60 years and f) More than 60 years.

The maximum number of patients were in the age group of 51 to 60 years (32.5%) followed by 41 to 50 years (20%). The least number of patients were in the age group of less than 20 years (8.3%). Among osteoarthritis most of the patients (60%) were in the age group of 51 to 60 years.

Thus, in our study, we found that *hip pathology with age correlation*.

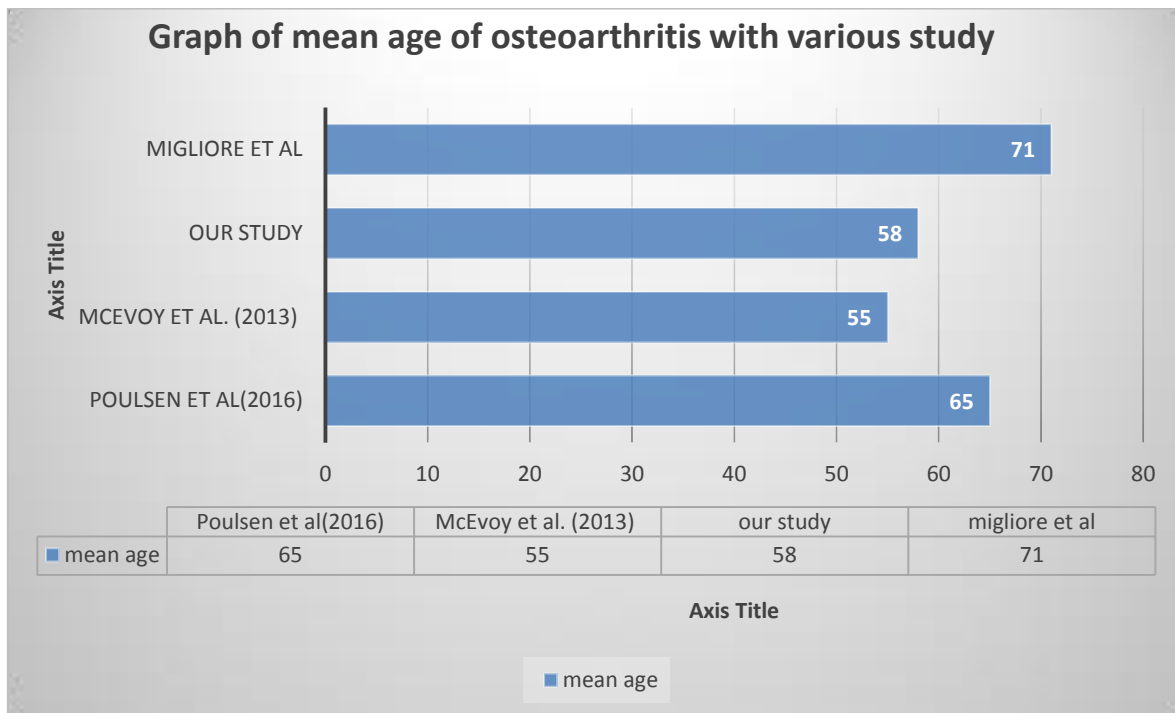
These Findings are in Concordance with the Following Studies

The overall mean age in our study is 45.7 years and among osteoarthritis mean age is 58.6±8.8 years which is concurred with the study done by *migliore, et al., (2005)* they have found mean age 71.64 ±10.92 years with osteoarthritis.

Poulsen, et al., (2016) they have found mean age 65 years.

McEvoy, et al., (2013) found mean age 55 years.

Anderson and loeser, reported a higher prevalence of symptomatic hip OA in their population of 5.9% in the 45–54 age group increasing to 17% in the 75+ age group.



Graph 19: Clustered Bar Chart Showing Mean Age of Our Study with other Study

The advancing age causes degeneration of tendons, cartilage occurring most commonly in patients after the 5th to 6th decade and increases linearly thereafter. Osteoarthritis is characterized by an active progressive alteration of the whole synovial joint, due to a combination of mechanical, inflammatory and metabolic factors. This arises from an imbalance between the destruction and repair of the affected tissues. So, its risk increases with age.

Gender

Our study included a total of 21 (52.5%) male patients and 19 (47.5%) female patients with a male predominance (Male: Female ratio 1.1: 1). So, in our study overall **males had a higher chance of hip pathology than females.**

These Findings are in Concordance with the Following Studies

Poulsen, et al., (2016) found male predominance with a male: female ratio of 1.4:1.

However, among osteoarthritis female has more predominance than male. This finding is concordance with Murphy, et al., (2010) study they had find female predominance among osteoarthritis.

Site of Involvement

In our study out of 40 patients 20(50%) patients are having pathology on right site, 13 (32.5%) patients on left and 7(17.5%) patients on bilateral site.

Theodore, et al., (2018) they have found in their study that dominant hip involvement is common than non-dominant hip among osteoarthritis due to early articular cartilage destruction.

Trauma, TB, Obesity and Diabetes Mellitus

In our study, 19 (47.5%) patients gave a history of trauma to the affected site. Thus, **trauma was identified as one of the major etiological factors for hip pathology.**

These Findings are in Concordance with the Following Studies

Kolber, et al., (2017) also reported that trauma, obesity and diabetes mellites are risk factor for hip pathology (osteoarthritis, septic arthritis,GTPS and iliopsoas bursitis).

In our study out of 40 patients 11 (27.5%) patients are having obesity,9(22.5%) patients are having history of diabetes mellites and 5(12.5%) patients are having history of TB.

Out of 40 patients we have found 20(50%) patients are having osteoarthritis, 8(20%) patients are having septic arthritis, 7(17.5%) patients are having iliopsoas bursitis and 5(12.5%) patients are having GTPS.

Joint Fluid

In our study out of 40 patients 26(65%) patients are having joint fluid/bursal fluid and among 26 patient's majority patients are having osteoarthritis and septic arthritis. Among 26 patients 16(61%) patients are undergone diagnostic aspiration of which 8 patients are case of septic arthritis.

So joint fluid is common finding and increasingly associated with septic arthritis (30%) and osteoarthritis (46%).

This finding is concordance with *Karthikeyan and Sridevi, (2019)* study they had found in their study that joint effusion is commonest finding in septic arthritis.

Correlation of Pre-Intervention USG and Pre-Intervention MRI Finding of Synovial Thickening

USG detect synovial thickening in 17(85%) patients out of 20 patients having pretreatment synovial thickening. However MRI detect synovial thickening in 20(100%) patients out of 20 patients. So MRI is gold standard for detection of finding in hip pathology.

Pre and Post Treatment USG Finding Analysis

Out of 32 patients 21(65.5%) patients had pre-treatment USG finding and 11(34.3%) patients had no USG finding but having disease. On post-treatment USG there is only 3(9.37%) patients had post-treatment USG finding and 29(90.6%) patients had no USG finding.

Pre and Post Treatment MRI Finding Analysis

Out of 32 patients 32 (100%) patients had pre-treatment MRI finding. On post-treatment MRI there is 18 (56.2%) patients had post-treatment MRI finding and 14 (43.7%) patients had no MRI finding. Following treatment out of 32 patients 29 patients are recovered irrespective of USG or MRI finding.

USG has 100% sensitivity and 90.6% positive predictive values for detecting hip pathology. This study concordance with the following study.

Annabel, *et al.*, (2018) demonstrated reasonable sensitivity (90.92%) and positive predictive values (91.96%) in their study.

Correlation of Pre-Intervention USG Finding and Pre- Intervention MRI Finding of HIP Pathology

USG detects pretreatment positive finding in 21(65%) patients and no finding in 11(34.3%) out of 32 patients. However MRI detect positive finding in 32(100%) patients out of 32 patients. So MRI is gold standard for detection of finding in hip pathology.

Strength of Agreement for Pre-Treatment MRI and USG Finding

USG had a sensitivity of 100%, with 95% confidence interval= 83.9 to 100% PPV 65 % Accuracy 65%.

Correlation of Post-Intervention USG Finding and Post- Intervention MRI Finding of Hip Pathology

USG detects post treatment positive finding in 3(9.3%) patients and no finding in 29(90.7%) out of 32 patients. However MRI detect positive finding in 18(56.2%) patients out of 32 patients undergoing intervention irrespective of recovery of symptoms. So MRI is gold standard for detection of finding in hip pathology.

Strength of Agreement for Post-Treatment MRI and USG Finding

USG had a specificity of 100%, sensitivity of 16.7%, with 95% confidence interval 29.24 to 100% PPV 100%, NPP 48%, Accuracy 53.12%. These finding are concordance with following study.

Kleiner, *et al.*, (1991) reported a sensitivity and specificity of 87% and 100% respectively in a series of 18 patients undergoing diagnostic intra-articular hip injections to differentiate between intra-articular causes of hip pain from neurological ones.

Number of Injection and Percentage Recovered

Out of 32(100%) patients undergone USG guided therapeutic intervention 29(90.7%) patients had recovered in which 23 patients had taken single injection and 6 patients had taken double injection and 3(9.3%) patients failed to recover despite multiple attempts of injection so overall efficacy rate in our study is 90.7% and failure rate is 9.3%. Single injection recovery percentage is 79.3 and double injection recovery rate is 20.6 in our study.

These finding are concordance with following study.

Long and Fitzpatrick, (2021) concluded their study with efficacy of 71.3% in patient with hip osteoarthritis.

Park, *et al.*, (2016) conducted their study of ultrasound-guided injections with successful outcomes of 80.3%.

Minor Side Effect

Out of total 40 patients undergone both therapeutic and diagnostic intervention only 3(7.5%) patients had developed minor side effect (pain).

This is concordance with the study Long and Fitzpatrick, (2021) In their study 5(6%) patients had developed minor side effect.

Diagnosis Wise Recovery

Out of 32 patients undergone therapeutic treatment 5 patients were GTPS, 7 iliopsoas bursitis and 20 patients were osteoarthritis. Among those there is 100% recovery of GTPS and iliopsoas bursitis and 85% recovery of Osteoarthritis, 3(15%) patients of osteoarthritis had failed to recover despite of multiple corticosteroid injection probably due to

associated comorbidity and increased age. Which later undergone hip replacement.

This study is concordance with the following studies.

KanthaWang, *et al.*, (2021) did their study on osteoarthritis patients Of which 361 injections, 79.8% showed an immediate pain response and 32.7% had subjective long-term pain relief (> 2 months).

Robinson, *et al.*, (2007) did their among osteoarthritis study with efficacy of 95%.

Brinks, *et al.*, (2011) did their study of USG guided corticosteroid injection in GTPS with success rate of 85%.

Lustenberger, *et al.*, (2011) concluded their study in trochanteric bursitis with subjective improvement and achieving a return to the patient's baseline activity level ranged from 49% to 98%.

Table 31: Recovery Rate of our Study in Comparison with Various Other Study

Recovery Rate of our Study in Comparison with Various Other Study.		
Studies	year	Recovery rate (%)
<i>Robinson, et al</i>	2007	95
<i>Kantha Wang, et al</i>	2021	79.8
<i>Brinks, et al</i>	2011	85
<i>Lustenberger, et al</i>	2011	49 to 98
<i>Our study</i>	2021	(90.7%) 85 to 100

Recovery/efficacy rate of our study lies between Brinks, *et al.*, (2011) and Robinson, *et al.*, (2007).

SUMMARY

This is an observational study aimed to evaluate the outcome analysis of USG guided musculoskeletal intervention in the hip joint using USG and MRI correlation in the Department of Radiodiagnosis, Gauhati Medical College and Hospital, Assam.

The study was conducted on a total of 40 patients suspected to have hip pathology (osteoarthritis, septic arthritis, GTPS and iliopsoas bursitis) based on history and clinical examination after getting the consent from the patient party and approval by the ethical committee.

Both pre-treatment USG and MRI of the affected hip (osteoarthritis, GTPS and iliopsoas bursitis) was done and reported independently. These findings were correlated with post treatment USG & MRI. MRI was considered as the gold standard. In case of septic arthritis and above mentioned other hip pathology USG guided diagnostic

aspiration was also done. Out of 26 patients having joint fluid/bursal fluid USG guided diagnostic aspiration was done in 16 cases (61%).

The literature has been reviewed. The results have been tabulated and statistical analysis has been done.

The Study Can Be Summarised Under the Following Points

The most common age group for hip pathology was between 51-60 years in our study. The prevalence of hip pathology predominantly osteoarthritis increases progressively with age.

Overall there is a male to female predominance noted in hip pathology. However, among osteoarthritis female predominance noted.

Trauma, TB and diabetes are important etiological factors for hip pathology.

Septic arthritis is having increase association with history of pulmonary, abdominal/spine tuberculosis.

GTPS and iliopsoas bursitis is having increase association with trauma.

Obesity is also important risk factor among Osteoarthritis.

Intraarticular corticosteroid injection improve pain and range of motion of the affected joint in patients with hip OA.

USG guided corticosteroid injection is operator dependent and among osteoarthritis, GTPS and iliopsoas bursitis it improves the symptoms as well as range of motion of affected limb.

USG guided diagnostic as well as therapeutic aspiration is also helpful in case of septic arthritis.

Common finding in hip pathology include marrow oedema, enhancing synovial thickening, joint effusion, subchondral cyst, myofascial oedema. However, USG can detect only joint effusion, synovial thickening and myofascial oedema if present.

Statistically, we found a good correlation between pre-treatment and post treatments USG findings and MRI findings in the detection of hip pathology. However, the strength of agreement between USG and MRI and accuracy of MRI was superior in diagnosing hip pathology. However, for intervention purpose USG is superior than MRI.

Limitations of Our Study

Smaller sample size of our study.

Patients attending a single hospital with a heterogeneous study population.

Operator dependency and inter-observer variations in USG.

Despite being the gold standard for diagnosing hip pathology, arthrography was not included as it is

invasive and MRI has been taken as the gold-standard.

The final accurate diagnosis of hip pathology (osteoarthritis, septic arthritis, GTPS and iliopsoas bursitis) can only be given after both USG and MRI correlation but follow-up was not done in our study.

CONCLUSION

From Our Study, the Following Conclusion Can Be Drawn

Ultrasonography is an effective imaging modality for diagnosing hip pathology after radiograph predominantly in detection of joint effusion and synovial thickening. Given the advantages of portability, lack of ionising radiation, and visualisation of soft tissue and neurovascular structures, ultrasound-guidance is a highly practical and recommended technique when performing injections in the hip and groin region.

A wide availability, low cost, faster procedure, and better tolerability of ultrasonography makes it to be the ideal first-line imaging modality of choice for evaluation of hip pathology. The important aspect when selecting an imaging modality for hip pathology evaluation is the ability to properly detect and differentiate joint effusion, synovial thickening and myofascial oedema properly. In this context, MRI is a more appropriate investigation and is therefore considered as the gold standard. However, for therapeutic intervention USG is the modality of choice for hip pathology.

Thus, from our study, we can conclude that a well-performed USG can effectively serve as a primary diagnostic as well as therapeutic method, and screening of all suspected cases of hip pathology and MRI can be reserved for patients with indeterminate USG results and further post treatment residual finding characterization where surgical correction is needed.

Few Representative Image



Image 1: USG of Hip Showing Synovial Fluid Aspiration

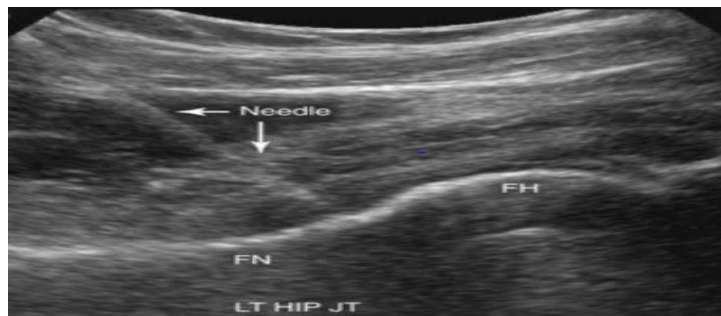


Image 2: USG of Hip Showing USG Guided Injection

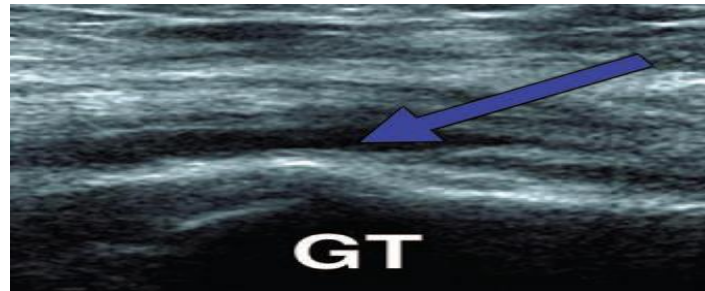


Image 3: USG Shows Trochanteric Bursa (*Blue Arrow*) is Thickened in this Axial Image

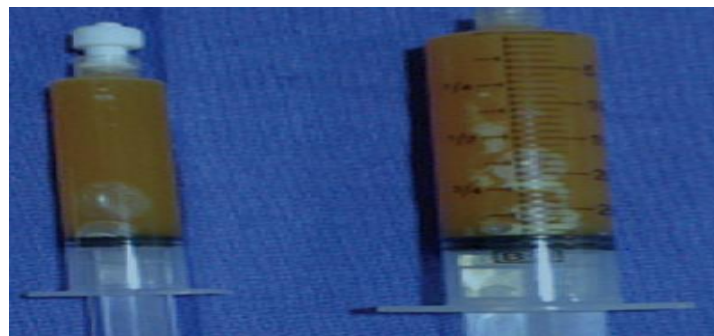


Image 4: Image Shows that Aspirated Synovial Fluid from Hip Joint in a 25 Years Patient with Septic Arthritis.

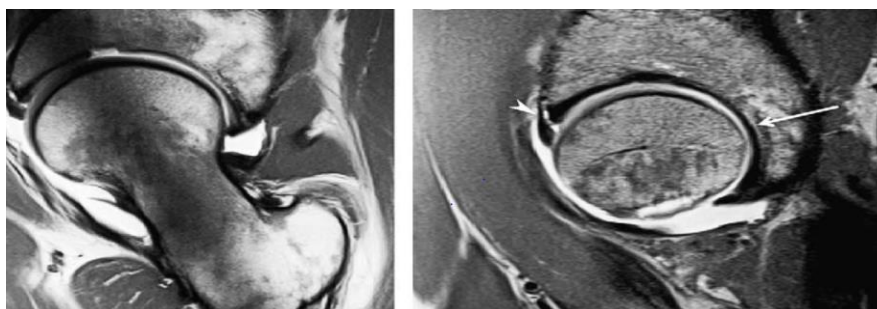


Image 5: Pre-Treatment Sagittal T2 and PDFS Image Shows Joint Fluid, Synovial Thickening and Articular Margin Irregularities (Osteoarthritis)

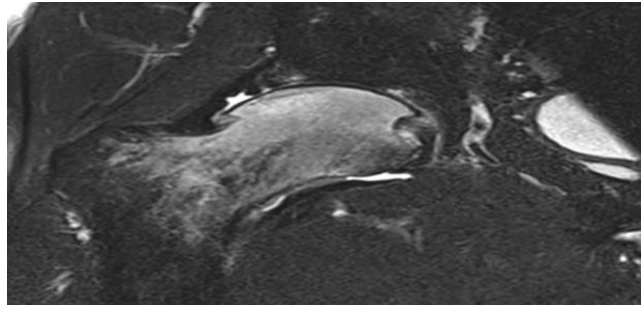


Image 6: Post-Treatment Coronal PDFS Image Shows Persistent Altered Signal Intensity and Focal Articular Margin Irregularities in Femoral Head with Symptoms Recovery

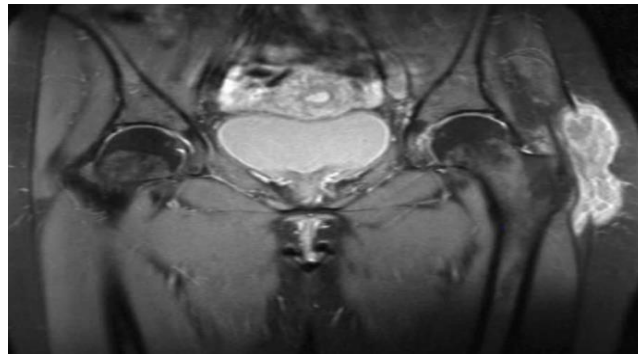


Image 7: Coronal T2FS Image Shows Fluid in Left Trochanteric Bursa with Altered Signal Intensity in Tendon. (Trochanteric Bursitis)

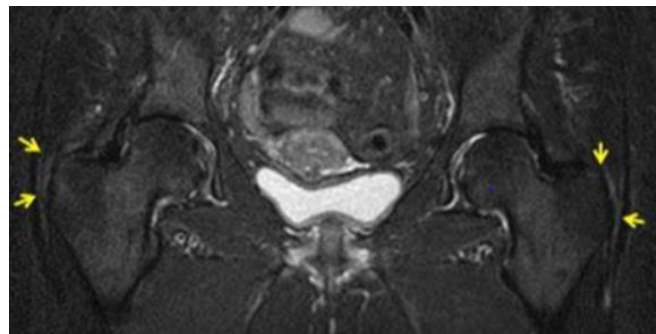


Image 8: 4 Weeks after Post Treatment Coronal PDFS Image Shows Resolving of Altered Signal Intensity and Fluid in Bursa in Case of Trochanteric Bursitis.

PURPOSE OF THE STUDY

To evaluate the outcome analysis of USG guided musculoskeletal intervention in the hip joint using USG and MRI correlation.

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