ОРИГИНАЛЬНАЯ СТАТЬЯ

DIAGNOSTICS OF SUPERIOR LABRUM ANTERIOR-POSTERIOR TEARS OF THE SHOULDER JOINT: AN ACCURACY AND VALIDITY STUDY USING NON-CONTRAST MR

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Superior labral anterior to posterior (SLAP) tears are a clinical subset of conditions associated with complex shoulder discomfort. MRI is a commonly used technique to distinguish SLAP tears.

Purpose. To assess the diagnostic validity of MRI in detecting shoulder ligament tears in a group of patients from Babylon City, Iraq.

Materials and methods. This prospective study included 32 cases of shoulder MRI between July 26, 2023, and May 29, 2024. Collected data included patient age, sex, occupation, dominant arm, affected arm, history of injury or trauma, trauma to the opposite side, history of frozen shoulder, comorbidities, history of sports activities, and overhead motion. Structural MRI findings were studied. MRI was performed using a 1.5-Tesla scanner (Achieva 1.5.0T TX; Netherlands). All images were analyzed by two consultant radiologists.

Results. The study enrolled 32 patients with shoulder complaints, with a mean age of 54.25 ± 13.97 years. Males were more frequent than females (71.9% vs. 28.1%). Right-dominant arms were more common than left (62.5% vs. 37.5%), and right arms were more affected than left (78.1% vs. 21.9%). Four patients (12.5%) reported a history of frozen shoulder. Labral tears were the most common finding, observed in 43.8% of patients, while full-thickness cuff tears were found in 13 patients (40.6%), the second most frequent finding. Nine patients (28.1%) had AC joint degeneration, and biceps tendon involvement was seen in 12 patients (37.5%). MRI demonstrated high sensitivity, specificity, and accuracy in detecting superior labral tears (93.33%, 94.74%, 94.12%), inferior labral tears (95.71%, 96.3%, 95%), and full-thickness cuff tears (92.86%, 95%, 94.22%), with statistically significant differences ($p = 0.04$, 0.004, and 0.025, respectively).

Discussion. In this study, the two most common structural MRI findings in shoulder joint lesions were superior labral tears and full-thickness cuff tears. Labral tears were also reported as follows: anterior (21.9%), inferior (18.8%), and posterior (18.8%). Partial articular cuff tears were observed in 12.5% of cases. One case showed degenerative changes in the humeral head, while 28.1% of patients presented with AC joint degeneration. Osteophyte formation was detected in three patients. Humeral head edema and joint effusion were observed in three cases each. Partial bursal cuff tears were recorded in two patients. Günay and Kavak reported MRI-positive SLAP lesions in 15 (29%) of 52 patients. A large cohort study of 409 patients by Rotem and colleagues found SLAP lesions in 44% of cases, with a higher prevalence in males (47%) compared to females (24.1%). Labral tears, adhesive capsulitis, rotator cuff injuries, glenohumeral ligament tears, and Hill-Sachs (Bankart) lesions were common structural MRI findings.

Conclusion. Right-dominant arms were more commonly affected by SLAP tears. Labral tears were the most frequent structural MRI finding, with superior labral tears and full-thickness cuff tears reported at high rates. MRI demonstrated high sensitivity and specificity in diagnosing superior and inferior labral tears, as well as full-thickness cuff tears.

Keywords: superior labral anterior to posterior, shoulder joint, full-thickness cuff tear, structural MRI, dominant arms.

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ДИАГНОСТИКА ПЕРЕДНЕ-ЗАДНИХ РАЗРЫВОВ ВЕРХНЕЙ ГУБЫ ПЛЕЧЕВОГО СУСТАВА: ИССЛЕДОВАНИЕ ТОЧНОСТИ И ДОСТОВЕРНОСТИ С ИСПОЛЬЗОВАНИЕМ МРТ БЕЗ КОНТРАСТНОГО УСИЛЕНИЯ

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Цель. Разрывы верхней губы, распространяющиеся кпереди назад (SLAP), представляют собой клиническую подгруппу заболеваний, связанных со сложными болями в плече. МРТ является распространенным методом диагностики разрывов SLAP.

Цель исследования. Оценить диагностическую достоверность МРТ при выявлении разрывов связок плеча у группы пациентов из города Вавилон, Ирак.

Материалы и методы. Данное проспективное исследование включало 32 случая проведения МРТ плечевого сустава в период с 26 июля 2023 года по 29 мая 2024 года. Собранные данные включали возраст пациента, пол, профессию, доминирующую руку, пораженную руку, наличие травмы или повреждения в анамнезе, травмы противоположной стороны, наличие адгезивного капсулита («замороженного плеча»), сопутствующие заболевания, спортивную активность и выполнение движений над головой. Были изучены структурные находки по МРТ. МРТ проводилось на аппарате с напряженностью поля 1,5 Тесла (Achieva 1.5.0T TX, Нидерланды). Все изображения были проанализированы двумя врачами-рентгенологами.

Результаты. В исследование было включено 32 пациента с жалобами на плечо, средний возраст которых составил 54,25 ± 13,97 года. Мужчин было больше, чем женщин (71,9% против 28,1%). Преобладала правая доминирующая рука (62,5% против 37,5%), правая рука была поражена чаще, чем левая (78,1% против 21,9%). 4 пациента (12,5%) сообщили о наличии «замороженного плеча» в анамнезе. Разрывы губы были наиболее частой находкой, наблюдавшейся у 43,8% пациентов, тогда как полный разрыв манжеты был выявлен у 13 пациентов (40,6%), что было второй по частоте находкой. 9 пациентов (28,1%) имели дегенерацию акромиально-ключичного (АК) сустава, а поражение сухожилия бицепса наблюдалось у 12 пациентов (37,5%). МРТ показала высокую чувствительность, специфичность и точность в выявлении разрывов верхней губы (93,33%; 94,74%; 94,12%), нижней губы (95,71%; 96,3%; 95%) и полного разрыва манжеты (92,86%; 95%; 94,22%) со статистически значимыми различиями (p = 0,04, 0,004 и 0,025 соответственно).

Обсуждение. В данном исследовании наиболее распространенными структурными находками при МРТ плечевого сустава были разрывы верхней губы и полный разрыв манжеты. Также были выявлены разрывы губы: передние (21,9%), нижние (18,8%) и задние (18,8%). Частичные разрывы манжеты наблюдались в 12,5% случаев. Один случай показал дегенеративные изменения головки плечевой кости, а дегенерация АК-сустава была выявлена у 28,1% пациентов. Остеофиты были обнаружены у 3 пациентов. Отек костного мозга головки плечевой кости и выпот в суставе наблюдались у 3 пациентов в каждом случае. Частичный разрыв манжеты со стороны сумки был зарегистрирован у 2 пациентов. Günay and Kavak сообщили о положительных МРТ-находках SLAP у 15 (29%) из 52 пациентов. В крупном когортном исследовании, включавшем 409 пациентов, проведенном Rotem и соавторами, разрывы SLAP были выявлены у 44% пациентов, причем чаще у мужчин (47%) по сравнению с женщинами (24,1%). К частым структурным находкам по МРТ относились разрывы губы, адгезивный капсулит, повреждения вращательной манжеты, разрывы суставно-плечевых связок и поражение Хилла-Сакса (повреждение Банкарта).

Заключение. Правая доминирующая рука чаще всего поражалась SLAP-повреждениями (разрыв верхней части суставной капсулы плечевого сустава с передней на заднюю сторону).

Разрывы суставной губы были наиболее частой находкой по МРТ, а разрывы верхней губы и полный разрыв манжеты отмечались в большом проценте случаев. МРТ показала высокую чувствительность и специфичность в диагностике разрывов верхней и нижней губы, а также полного разрыва манжеты.

Ключевые слова: разрыв верхней губы спереди назад, плечевой сустав, полный разрыв манжеты, структурное МРТ, доминирующая рука.

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Lesions of the superior labral anterior to posterior (SLAP) are a recognized clinical subset of diseases associated with complicated shoulder discomfort. The term "SLAP lesion" was first used by Snyder in reference to the location and distinctive tear extension patterns of superior labral pathologies, which Andrews first documented in 1985 [1]. Since the initial descriptions of SLAP-type lesions, advances in modern diagnostic capabilities and arthroscopic management procedures have resulted in changing paradigms for care. As was initially stated, these injuries are not just found in juvenile throwers; SLAP tears are frequently observed in a variety of patient demographics, with differing degrees of true clinical significance. There's growing evidence that in asymptomatic overhead athletes, SLAP tears are often seen on MRI. Because of this, physicians need to be aware of the known clinical ambiguity that can arise when SLAP lesions are identified either alone or in conjunction with other shoulder pathologies [2]. The 20–29 and 40–49 decades had the highest rates of SLAP repairs, with 29.1 and 27.8 per 10,000 patients, respectively [3]. Other studies have shown rates between 6% and 26% at the time of arthroscopy [4].

MRI is a commonly used diagnostic tool for SLAP tears. An algorithm has been proposed to systematically define SLAP injuries of shoulder because of a complexity of anatomy of shoulder, normal variations observed in population, related trauma status, and low inter-observer reliability in classification of tears of SLAP [5]. Increased glenoid labrum signal, within or without extensions into biceps tendon and cleavage of superior glenoid labrum are two MRI indicators of a SLAP lesion [6, 7].

Nowadays, while diagnosing shoulder pain, a traditional magnetic resonance imaging (MRI) scan is frequently used [8]. Although the MRI scan with arthrogram is considered superior to a conventional MRI scan [9]. The traditional MRI scan is not linked to the transient side effects of arthrography and also permits the detection of any further coexisting disorders within the shoulder [10]. Previous researchers have discovered that the traditional MRI scan's diagnostic accuracy for SLAP lesion identification is adequate [11]. Nonetheless, some have argued that lesions of anterior origin can be identified more accurately than lesions of superior origin. The traditional magnetic resonance imaging scan was found to be more specific than sensitive in almost all instances with stated accuracy that was adequate. For imaging suspected labral anomalies, MRI imaging has also shown to be popular. Because of its noninvasive nature, lack of ionizing radiation, and ability to image in various planes, it is a very suitable tool for imaging not only the anterior and posterior labrum but also the superior and inferior ones. According to some writers, MR imaging's sensitivity for identifying labral tears can range from 44% (47%) to 95%. When glenoid labral tears are detected, MRA's arthrogram-like effect may be more effective than non-contrast MRI [12]. When deciding between MR arthrography and conventional MRI, there are a number of elements to take into account in addition to image quality. The patient's unwillingness to undergo an intrusive procedure is one of these factors, along with danger, time, expense, labor, and the scheduling and coordination of the MRI and fluoroscopy [13].

This study conducted to assess the diagnostic validity of MRI for detection of shoulder ligaments tears in a group of patients, Babylon city, Iraq.

Materials and Methods.

Study design and setting.

This is a prospective study of 32 patients with MRI of shoulder joint at Department of Ra-

Table №1. The sequences and parameters of MRI.

Sequences	Parameters			
	RF (ms)	TE (ms)	Layer thickness (mm)	FOV
T1WI	**450-650**	**8**	**3**	**160-180**
T2WI	**3000-5000**	**80**	**3**	**160-180**
Proton density (PD)	**2500-5000**	**8**	**3**	**160-180**
Fat saturation (STIR)	**2500-5000**	**60**	**3**	**160-180**

RF=radioferquency , TE=echo time , mm= milli meter, ms= milli second, FOV=field of view, T1=longitudinal relaxation time, T2=transverse relaxation time , WI=weighted imaging, STir = Short tau inversion recovery

diology in Al-Hilla General Hospital in a period between 26th July 2023 and 29th May 2024.

Data collection.

Data collected include age of patient, sex, jobs, Dominant arm (RT, LT or both), Effected arm (RT or LT), previous injury or trauma, Trauma to other side, History of frozen shoulder, Comorbid condition, History of sport and Overhead motion. Structural MRI lesions included SLAP, Partial bursal cuff tear, Partial articular cuff tear, Full-thickness cuff tear, Degenerative humeral head, Inferior labral tear, AC joint degeneration, Osteophyte formation, Humeral head edema, Biceps, joint effusion and Partial Bursal cuff tear.

Inclusion criteria.

1. Shoulder dysfunctions
2. Complete imaging
3. Aged ≥18 years

Exclusion criteria.

1. Tumors.
2. Contraindication for MRI.
3. Pregnancy.
4. Fractures
5. Cervical radiculopathy
6. Rheumatoid arthritis
7. Adhesive capsulitis

MRI.

MRI 1.5-Tesla (type Achieva 1.5.0T TX; Koninklijke Philips Electronics NV, Eindhoven, Holland, Netherlands) with shoulder Array coil (four-element coil). The sequences and parameters of MRI were listed in Table №1.

The joint was put in the dedicated-coil with arm in external-rotation and supine-hand (sand bag stabilized position). All images were analyzed by two consultant radiologists.

Ethical considerations.

Written informed consent was obtained from the cases for participating in this research. The study was approved by the Medical Ethical Committee of College of Medicine, Babylon University (5053 in 26-07-2023).

Statistical analysis.

Data was collated in Microsoft Excel 2010, and statistical package for social science (SPSS version 26.0, NY, IBM Inc.) was used. Data were described as number and percentage for qualitative data, and mean with SD for quantitative data. Liner progression analysis was used to detect the relationship between variables of the study of structural MRI finding. Diagnostic accuracy was evaluated with ROC curve analysis. The area under curve (AUC) for the diagnostic test was used. The accuracy, sensitivity, and specificity were calculated. A one-sided P-value of less than 0.05 was considered significant.

Results.

Results according to patient's baseline characters.

In this study, 32 patients with shoulder complaints were enrolled. The mean age of patients was 54.25±13.97 yrs ranged from 20 yrs to 74 yrs (median=55 yrs). Most of patients in included in age group (>60 yrs) as 13 cases (40.6%). Frequently, males were more than females (71.9% vs. 28.1%). Right dominant arms were more prevalent than left arms (62.5% vs. 37.5%). Right arms were more effected than left (78.1% vs. 21.9%). History of previous trauma or injury was recorded in 5 cases (15.6%) whereas those without history were 27 cases. No cases suffered from other side trauma. History of frozen shoulder was reported in four (12.5%) cases. 17 of 32 cases (53.1%) suffered from comorbidity (hypertension, diabetes, …ect.) while 15(46.9%) were healthy. Patients were sport players or had sport history in six (18.8%) in number. Patients whom complained of overhead motion were 17(53.1%) while those not complained were 15(46.9%) (Table №2).

Results according to structural MRI findings.

Table 3 listed structural MRI findings of shoulder joint lesions. Labral tears reported as followed: 43.8% superior (first commonest finding), 21.9% anterior, 18.8% inferior and 18.8% posterior. Partial articular cuff tear was noticed in four (12.5%) cases only. The full-thickness cuff tear was documented in 13 cases (40.6%).

Table №2. Patients baseline characters (n=32).

Characters		No. of patient	%
Age (years)	20-30	2	6.2
	31-40	4	12.5
	41-50	6	18.8
	51-60	7	21.9
	>60	13	40.6
Gender	Male	23	71.9
	Female	9	28.1
Dominant arm	Right	20	62.5
	Left	12	37.5
Effected arm	Right	25	78.1
	Left	7	21.9
Previous injury	Yes	5	15.6
	No	27	84.4
Trauma to other side	Yes	-	-
	No	32	100.0
History of frozen shoulder	Yes	4	12.5
	No	28	87.5
Comorbid conditions	Yes	17	53.1
	No	15	46.9
History of sport	Yes	6	18.8
	No	26	81.3
Overhead motion	Yes	17	53.1
	No	15	46.9

Table №3. The structural MRI findings (n=32).

Structural findings		No. of patient	%
Superior labral tear	No	18	56.3
	Yes	14	43.8
Anterior labral tear	No	25	78.1
	Yes	7	21.9
Inferior labral tear	No	26	81.3
	Yes	6	18.8
Posterior labral tear	No	26	81.3
	Yes	6	18.8
Partial articular cuff tear	No	28	87.5
	Yes	4	12.5
Full-thickness cuff tear	No	19	59.4
	Yes	13	40.6
Degenerative humeral head	No	31	96.9
	Yes	1	3.1
AC joint degeneration	No	23	71.9
	Yes	9	28.1
Osteophyte formation	No	29	90.6
	Yes	3	9.4
Biceps	No	20	62.5
	Yes	12	37.5
Humeral head edema	No	29	90.6
	Yes	3	9.4
Joint effusion	No	29	90.6
	Yes	3	9.4
Partial Bursal cuff tear	No	30	93.8
	Yes	2	6.3

One case showed the degenerative humeral head. Nine cases (28.1%) were presented with AC joint degeneration. Osteophyte formation was detected in three patients. Biceps was seen in 12 patients (37.5%). Humeral head edema and joint effusion were visualized in three cases for each. Lastly, partial bursal cuff tear was recorded in two patients (Fig. 1-4).

Results according diagnostic accuracy.

MRI showed greater sensitivity, specificity and accuracy among detection of superior labral tear, (93.33%; 94.74%; 94.12%), inferior labral tear, (95.71%; 96.3%; 95%) and full-thickness cuff tear, (92.86%; 95%; 94.22%), with a statistical significant difference (p=0.04, 0.004, and 0.025), respectively (Fig. 6). However, MRI sensitivity, specificity and accuracy for other findings recorded in different percentage without any

Fig. 1 a (Рис. 1 а)

Fig. 1 b (Рис. 1 б)

Fig. 1 c (Рис. 1 в)

Fig. 1 d (Рис. 1 г)

Fig. 1. MRI of right shoulder joint.

a – T2-WI coronal plane (posterior labral tear – yellow circle); b – Fat Saturation coronal plane (high SI) at the greater tuberosity (partial articular cuff tear – yellow circle); c – T2-WI axial plane (high SI) at the post labrum (tear – yellow circle); d – T2-WI sagittal plane (posterior labral tear – yellow circle).

Posterior labral tear and Partial articular cuff tear. 64-years-old man, right dominant arm.

Рис. 1. МРТ правого плечевого сустава.

а – Т2-ВИ, корональная плоскость (разрыв задней губы – желтая окружность); б – Корональная плоскость с подавлением сигнала от жировой ткани (повышенный сигнал) в области большого бугорка (частичный разрыв манжеты – желтая окружность); в – Т2-ВИ, аксиальная плоскость (повышенный сигнал) в области задней губы (разрыв – желтая окружность); г – Т2-ВИ, сагиттальная плоскость (разрыв задней губы – желтая окружность).

Разрыв задней губы и частичный разрыв манжеты. Мужчина, 64 года, правая доминирующая рука.

Fig. 2 a (Рис. 2 а)

Fig. 2 b (Рис. 2 б)

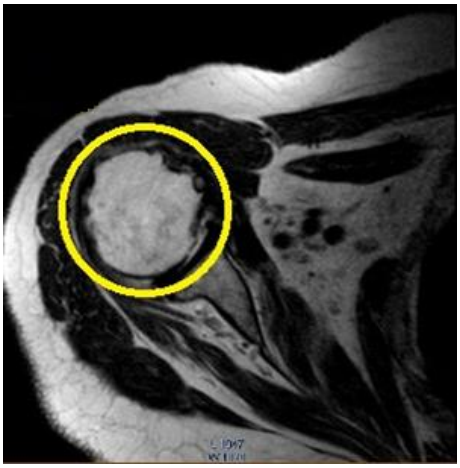

Fig. 2 c (Рис. 2 в)

Fig. 2 d (Рис. 2 г)

Fig. 2. MRI of right shoulder joint.

a – T2-WI coronal plane (high SI) at muscle insertion (full-thickness cuff tear – yellow circle);

b – Fat Saturation coronal plane: ACJ, (high SI) superior labrum + inferior labrum -yellow circle and degenerative changes – yellow arrow;

c – T2-WI axial plane: humeral head degenerative changes – yellow circle;

d – T2-WI sagittal plane (anterior labral tear – yellow circle).

Anterior labral tear, full-thickness cuff tear, AC joint degeneration, Degenerative humeral head and Inferior labral tear. 74-years-old woman, right dominant arm. History of injury in history and overhead motion difficulty.

Рис. 2. МРТ правого плечевого сустава.

a – Т2-ВИ, корональная плоскость (повышенный сигнал в месте прикрепления мышцы - полный разрыв манжеты – желтая окружность);

b – Корональная плоскость с подавлением сигнала от жировой ткани: АКС (повышенный сигнал), верхняя и нижняя губа – желтая окружность, дегенеративные изменения – желтая стрелка;

c – Т2-ВИ, аксиальная плоскость: дегенеративные изменения головки плечевой кости – желтая окружность;

d – Т2-ВИ, сагиттальная плоскость (разрыв передней губы – желтая окружность).

Разрыв передней губы, полный разрыв манжеты, дегенерация АК-сустава, дегенеративные изменения головки плечевой кости и разрыв нижней губы. Женщина, 74 года, правая доминирующая рука. В анамнезе травма и ограничение при выполнении движений над головой.

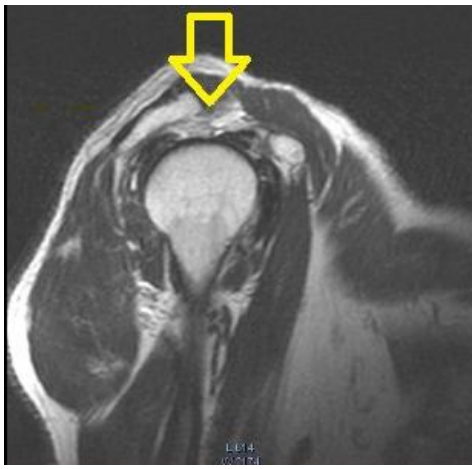

Fig. 3 a (Рис. 3 а)

Fig. 3 b (Рис. 3 б)

Fig. 3 c (Рис. 3 в)

Fig. 3 d (Рис. 3 г)

Fig. 3. MRI of right shoulder joint.

a – T2-WI sagittal plane (ACJ degeneration – yellow arrow);

b – Fat Saturation coronal plane ACJ degenerative changes – yellow circle;

c – T2-WI coronal plane, ACJ degenerative changes – yellow circle;

d – T2-WI axial plane: Osteophyte – yellow arrow.

AC joint degeneration and osteophyte formation. 66-years-old man, left dominant arm (right shoulder effected).

Рис. 3. МРТ правого плечевого сустава.

a – Т2-ВИ, сагиттальная плоскость (дегенеративные изменения АКС – желтая стрелка);

b – Корональная плоскость с подавлением сигнала от жировой ткани: дегенеративные изменения АКС – желтый круг;

c – Т2-ВИ, корональная плоскость: дегенеративные изменения АКС – желтый круг;

d – Т2-ВИ, аксиальная плоскость: остеофит – желтая стрелка.

Дегенеративные изменения АК-сустава и образование остеофитов. Мужчина, 66 лет, левая доминирующая рука (поражено правое плечо).

Fig. 4 a (Рис. 4 а)

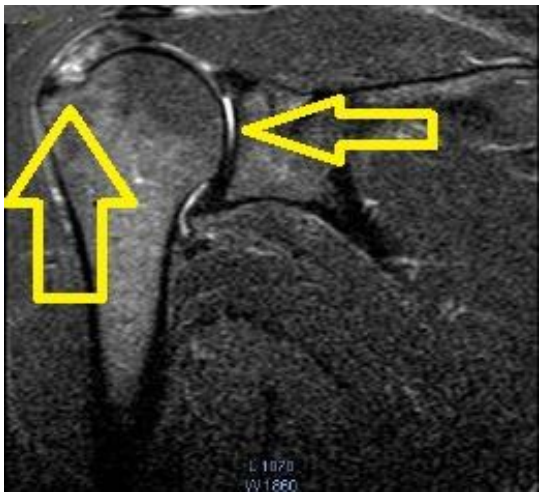

Fig. 4 b (Рис. 4 б)

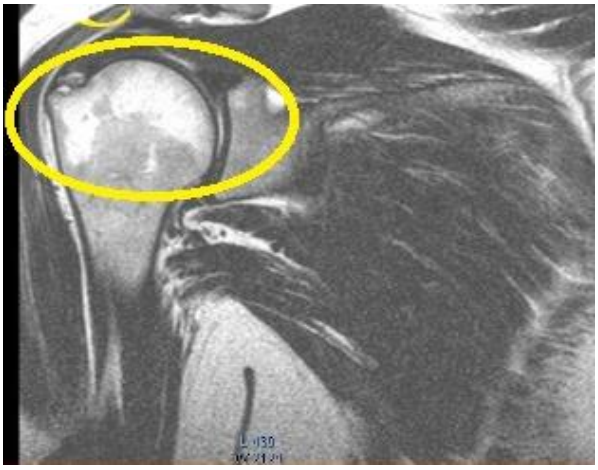

Fig. 4 c (Рис. 4 в)

Fig. 4 d (Рис. 4 г)

Fig. 4. MRI of left shoulder joint.

a – T2-WI axial plane (Superior labral tear and fatty transformation of the bone marrow – yellow circle);

b – Fat Saturation coronal plane: high SI at supra spainatous tendon and superior labrum – yellow arrows;

c – T2-WI coronal plane: fatty transformation of the bone marrow – yellow circle;

d – T2-WI axial plane: fatty transformation of the bone marrow – yellow circle. 49-years-old woman, left dominant arm. History of overhead motion difficulty. Superior labral tear, and full-thickness cuff tear.

Рис. 4. МРТ левого плечевого сустава.

а – Т2-ВИ, аксиальная плоскость (разрыв верхней губы и жировая трансформация костного мозга – желтая окружность);

b – Корональная плоскость с подавлением сигнала от жировой ткани: повышенный сигнал в сухожилии надостной мышцы и верхней губе – желтые стрелки;

с – Т2-ВИ, корональная плоскость: жировая трансформация костного мозга – желтая окружность;

d – Т2-ВИ, аксиальная плоскость: жировая трансформация костного мозга – желтая окружность.

Женщина, 49 лет, левая доминирующая рука. В анамнезе трудности при выполнении движений над головой. Разрыв верхней губы и полный разрыв манжеты.

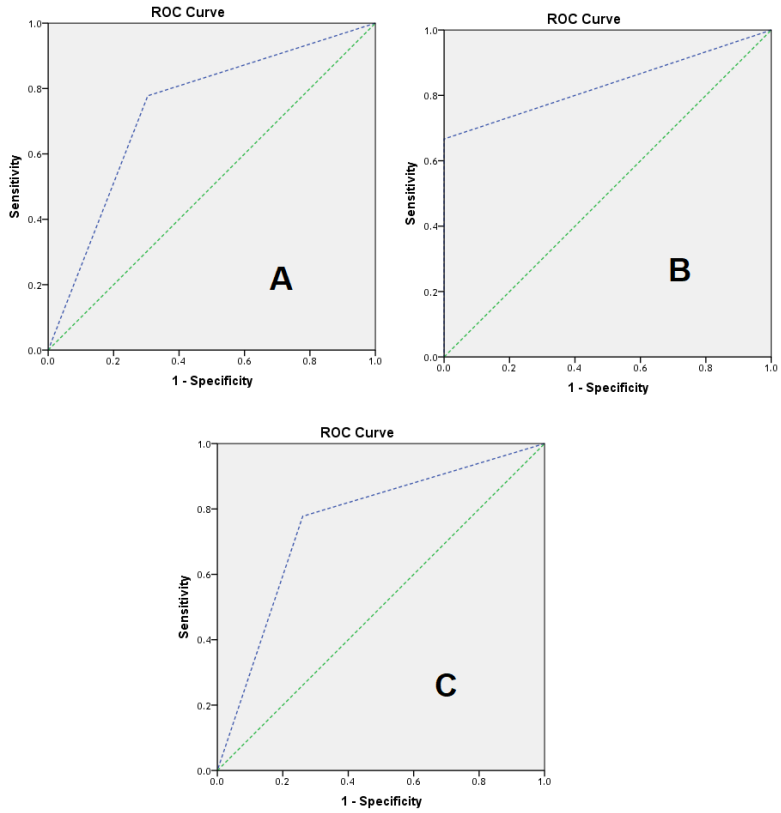

Fig. 6 (Рис. 6)

Fig. 6. ROC-curves of labral tears by structural MRI.

a – Superior labral tear, b – Inferior labral tear, c – full-thickness cuff tear.

Рис. 6. ROC-кривые разрывов губы по данным структурной МРТ.

a – разрыв верхней губы, b – разрыв нижней губы, c – полный разрыв манжеты.

Table №4. Accuracy rates and AUC in the study.

Parameters	Sensitivity	Specificity	PPV	NPV	Accuracy	AUC	P- value
	%						
Superior labral tear	93.33	94.74	90.66	39.75	94.12	0.737	0.04
Anterior labral tear	87.5	96.15	91.12	60	89.2	0.502	0.983
Inferior labral tear	95.71	96.3	94.55	56.6	95	0.833	0.004
Posterior labral tear	85.71	86.3	85	80	88.51	0.447	0.645
Partial articular cuff tear	80	86.55	79.1	73.25	79.99	0.49	0.933
Full-thickness cuff tear	92.86	95	93.3	75	94.22	0.758	0.025
Degenerative humeral head	50	86.88	56.9	85.55	75.5	0.556	0.63
AC joint degeneration	80	85.83	80	75.3	82.15	0.459	0.722
Osteophyte formation	75	86.55	61.9	69	77.7	0.435	0.572
Biceps	82.31	85.24	80.34	77.2	80.25	0.471	0.801
Humeral head edema	75	76.77	66.9	56.9	69.7	0.435	0.572
Joint effusion	75.88	86.67	44.9	76.8	74.35	0.667	0.148
Partial Bursal cuff tear	66.67	76.79	69.2	55.2	50	0.534	0.769

MRI, magnetic resonance image; PPV, positive predictive value; NPV, negative predictive value; AUC, are under curve

significant (Table №4).

Discussion.

In the present study, 32 patients with shoulder complaints were studied. The mean age of patients was 54.25±13.97 yrs. Right dominant arms were more prevalent than left arms (62.5% vs. 37.5%). Right arms were more effected than left (78.1% vs. 21.9%). History of previous trauma or injury was recorded in (5, 15.6%). History of frozen shoulder was reported in four cases (12.5%). 17 of 32 cases (53.1%) suffered from comorbidity. Patients were sport players or had sport history six (18.8%) in number. Patients whom complained of overhead motion were 17 (53.1%). Günay and Kavak [14], studied 52 patients with complaints (32 females and 20 males), aged between 19-74 yrs. The right shoulder was affected in 65% and the left shoulder in 35%. They found 34 cases with rotator cuff syndrome, seven cases with impingement syndrome, two cases with frozen shoulder and nine cases with Bankart lesion. Phillips et al., enrolled 77 cases with shoulder problems (53 females and 24 males), mean age was 45.3 yrs [15]. The right shoulder was affected in 58 cases and the left shoulder in 19 cases. Right dominant arms were more prevalent than left arms (68 vs. 3). History of previous injury was recorded in 19 cases. Patients whom complained of overhead athlete were 29. Mardani-Kivi et al., studied 35 cases with shoulder pathology, 25 males and 10 females. Right dominant arms were more prevalent than left arms (25 vs. 10) [16].

In this study, the structural MRI findings of shoulder joint lesions, the two commonest lesion are superior labral tears and full-thickness cuff tear. Other findings as labral tears reported as followed: 21.9% anterior, 18.8% inferior and 18.8% posterior. Partial articular cuff tear was noticed in four (12.5%) cases only. One case showed the degenerative humeral head. Nine cases (28.1%) were presented with AC joint degeneration. Osteophyte formation was detected in three patients. Biceps was seen in 12 patients (37.5%). Humeral head edema and joint effusion were visualized in three cases for each. Lastly, partial bursal cuff tear was recorded in two patients. Günay and Kavak [14], showed positive MRI SLAP lesion in 15 cases (29%) only from 52 patients.

A large cohort included 409 patients (54 females and 355 males) retrospectively studied by Rotem and co-authors, the SLAP lesions was found in 44% of the patients [17]. However, slap was twice as common in males comparison to females (47% vs. 24.1%). No pathology was as common as SLAP in females (24.1%) compared to (13%) in males. The structural MRI lesion are labrum tear, adhesive capsulitis, rotator cuff, glenohumeral ligament tears and Hill Sachs (Bankart lesion).

In the current study, MRI showed greater sensitivity and specificity among diagnosis of superior labral tear (93.33% and 94.74%), inferior labral tear (95.71%; 96.3%; 95%), and full-thickness cuff tear (92.86%; 95%; 94.22%), with a statistical significant difference (p=0.04, 0.004, and 0.025), respectively. However, MRI sensitivity, specificity and accuracy for other findings recorded in different percentage without any significant. A lower rates reported by Phillips et al., for MRI SLAP lesion–only diagnosis sensitivity (86%), specificity (13%) and accuracy (66.2%) [15]. The reason behind this, they used arthroscopy as a standard tool for calculated MRI accuracy. Mardani-Kivi et al. reported that the sensitivity, specificity, and accuracy of MRI in detecting labral tears were 77.77%, 75.00%, and 77.14%, respectively, which lowest than we reported [16].

Fallahi et al., Phillips et al. and Mardani-Kivi et al. found results higher to ours, with higher sensitivity and accuracy of I-MRA than MRI, and also for D-MRA were higher than those of MRI [16-18]. Previous studies comparing the diag-nostic values of these radiology modalities for SLAP lesions determined that I-MRA has higher diagnostic value than MRI [17].

Rotem et al., concluded that MRA is a usable diagnostic radiology modality for intra-articular lesion like SLAP [17].

In clinical examination, there are many tests used to diagnosed SLAP lesions as The Biceps load test, O'Brien active-compression test, Kim test, Yergason and Speed tests and Crank test [19]. These tests suggesting the presence of SLAP pathologies, and there is no single test which show the high diagnostic accuracy and might cause a misleading or wrong diagnosis with other shoulder joint pathologies [15].

Several researches assessed the MRI accuracy for the detection of SLAP lesions as, which recorded specificity (69% to 99%) and sensitivity (75% to 98%) [20-22].

The radiologist's interpretations are an important factor in providing an accurate MRI diagnosis for SLAP lesion. Also, the appropriate clinical examination and providing detailed clinical data to the radiologists, could improving the MRI accuracy in the detection of shoulder pathologies [15].

Schwartzberg et al., studied 72 cases (27 females and 45 males), age ranged between 45-60 yrs [23]. The superior labral tears were common lesion. They found superior labral tears with high prevalence diagnosed by MRI in the asymptomatic shoulders. These data suggested that superior labral tears noted by MRI may not be the cause of shoulder pain.

Günay and Kavak, concluded that the detection of SLAP lesions requires details of history and complete clinical examination, in addition to MRI and gold standard arthroscopy [14].

Conclusions.

Right dominant arms are more prevalent than left arms in patients with SLAP tears. Labral tears are the most common structural findings on MRI. Superior labral tears and full-thickness cuff tears are reported at a high percentage. MRI shows greater accuracy, sensitivity, and specificity in detecting superior labral tears, inferior labral tears, and full-thickness cuff tears.

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