Original Article

Comparison of surface microscopy coil and ankle joint special phased array coil magnetic resonance imaging in assessing preoperative osteochondral lesions of the talus

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Background: Lesion size is a major determinant of treatment strategies and predictor of clinical outcomes for osteochondral lesions of the talus (OLTs). Although magnetic resonance imaging (MRI) has been commonly used in the preoperative evaluation of OLTs, MRI has low reliability and usually overestimates or underestimates lesion size compared with intraoperative assessment. This study aims to determine whether the surface microscopy coil (SMC) can improve the accuracy of assessment of preoperative OLTs compared with conventional coil MRI, ankle joint special phased array coil (ASC).

Methods: A total of 43 patients diagnosed with OLTs undertook preoperative MRI examination with both SMC and ASC were included in this prospective study from 2019 to 2022. The diameter of the lesion was measured in sagittal plane and coronal plane at its widest point and then the lesion area was calculated. Then MRI measurements were compared with arthroscopy or open-surgery measurements.

Results: The mean lesion area measured with ASC was significantly greater than that measured intraoperatively (95.07±44.60 *vs.* 52.74±29.86 mm^2, P<0.001), while there was no significant difference between lesion area measured in SMC and intraoperatively (55.28±36.06 *vs.* 52.74±29.86 mm^2, P=0.576). Diameter measured in ASC was significantly greater than that measured intraoperatively in both coronal plane (8.95±2.48 *vs.* 6.67±1.81, P<0.001) and sagittal plane (13.12±3.76 *vs.* 9.58±3.98, P<0.001). No significant difference between lesion diameter measured in SMC and intraoperatively in both coronal plane (6.44±2.59 *vs.* 6.67±1.81, P=0.608) or sagittal plane (10.23±3.69 *vs.* 9.58±3.98, P=0.194). Compared with surgical assessment, 39 of 43 cases were consistent with SMC assessment while only 26 of 43 cases were consistent with ASC assessment (39/43 *vs.* 26/43, P=0.002).

Conclusions: Diameter measured with SMC was much more accurate than ASC MRI. Compared with ASC MRI, the SMC had a much higher concordance rate between preoperative assessment and surgical assessment.

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Keywords: Osteochondral lesions of the talus (OLTs); magnetic resonance imaging (MRI); surface microscopy coil (SMC); ankle joint special phased array coil (ASC); size assessment

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Introduction

Osteochondral lesions of the talus (OLTs) are defined as lesions simultaneously involving the hyaline cartilage of the talar as well as its underlying subchondral bone (1,2), which commonly occur in patients with acute ankle trauma and sprains (2,3). Patients with OLTs frequently display the symptoms of non-specific chronic ankle pain, ankle swelling, stiffness and weakness, especially after prolonged high impact activities or weight-bearing (2). Surgery will be considered if patients fail to relieve their symptoms by conservative therapy. Traditional surgical procedures for symptomatic OLTs include both reparative techniques such as bone marrow stimulation (BMS) and replacement procedures such as autologous osteochondral transplantation or autologous osteoperiosteal transplantation (AOPT) (4-6). Commonly, the decision of repairment or replacement is based on the lesion size primarily. Reparative techniques are generally indicated for OLTs <150 mm^2 in area or <15 mm in diameter, while replacement strategies are usually used for those with larger lesions or failed primary repair techniques (7,8). However, recent studies and international consensus suggest BMS for lesions <10 mm in diameter or <100 mm^2 in area (9,10). At the same time, whether a reparative or replacement procedure is performed has significant implications on patient outcomes (7,11). Consequently, precise preoperative measurement of the area of lesions is of great significance for making optimal treatment regimens for patients.

History, physical examination, imaging and arthroscopy are usually combined to diagnose OLTs. Magnetic resonance imaging (MRI) is usually used in diagnosing OLTs for its high sensitivity and specificity (12,13). Meanwhile, MRI is commonly used in preoperative evaluation and assessment of OLTs to help surgeon better understand the lesion characteristics and surgical decision making (14,15). However, to our knowledge, over the past years, a large number of studies have focused on comparing the diagnosis and clinical staging of OLTs between MRI and arthroscopy, the gold standard of diagnosis and estimation (12,13,16), while few studies have focused on the comparison of OLTs size measured preoperatively with MRI versus intraoperatively (17). One study demonstrated that in a majority of lesions, MRI overestimated OLTs diameter and area compared with arthroscopy, which may have significant effects on surgery decision making and patient outcomes (17). Consequently, it is of vital importance to improve the accuracy of preoperative lesion estimation of MRI.

Surface microscopy coil (SMC), a special coil of MRI, has been used to evaluate skin melanoma or basal cell carcinoma, triangular fibrocartilage complex injuries and orbital anatomy for its better accuracy compared with conventional MRI (18-23). However, to our knowledge, there is no report of application of SMC in preoperative assessment of OLTs. In this study, we aim to compare the accuracy of assessment of lesions of OLTs between SMC and the conventional coil MRI, ankle joint special phased array coil (ASC). We present this article in accordance with the STROBE reporting checklist (available at https://qims.amegroups.com/article/view/10.21037/qims-22-1202/rc).

Methods

Study design

This prospective study was conducted in Sun Yat-sen Memorial Hospital, Sun Yat-sen University from 2019 to 2022. Patients clinically suspected of OLTs by the combination of symptoms (ankle pain, swelling), clinical history (sporting activities, trauma), physical examination (alignment, motion, swelling, tenderness) and imaging (X-ray, CT, etc.) (24) would take the MRI examination with both SMC and ASC. Patients diagnosed with OLTs by MRI were enrolled in this study. Then all patients received surgery therapy with BMS or AOPT according to the lesions of OLTs. All patients received follow-up at 3, 6, 12 months after surgery. Visual Analogue Scale (pain VAS) and AOFAS AHS (The American Orthopaedic Foot & Ankle Society Ankle Hindfoot Scale) were used to assess the pain and function scale of ankles in our study. The flow diagram of the study design is showed in *Figure 1*.

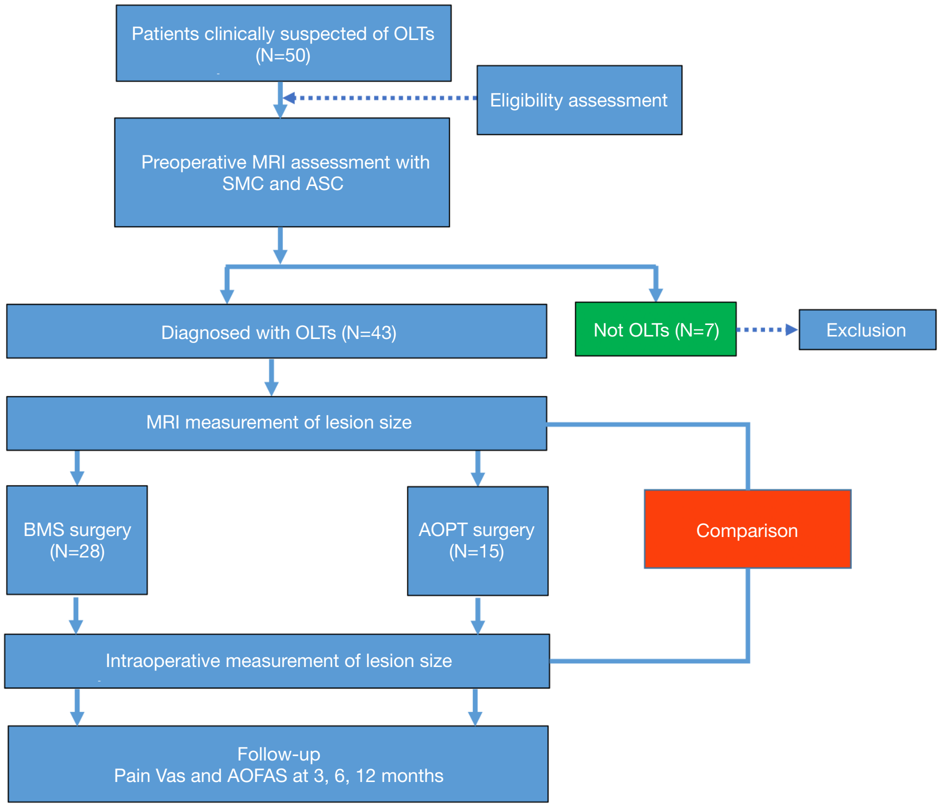

Figure 1 Flow diagram of the progress through the study. OLTs, osteochondral lesions of the talus; MRI, magnetic resonance imaging; SMC, surface microscopy coil; ASC, ankle joint special phased array coil; BMS, bone marrow stimulation; AOPT, autologous osteoperiosteal transplantation; AOFAS, American Orthopaedic Foot & Ankle Society.

Patient selection

Participants that met all the following criteria were included in our study: (I) diagnosed with OLTs; (II) failed to resolve symptoms with conservative therapy; (III) would take open or arthroscopic surgery; (IV) written informed consent. By contrast, patients with the following conditions were excluded: (I) a history of ipsilateral ankle surgery or fracture; (II) diagnosed with diabetes; (III) with autoimmune diseases or active infection; (IV) cartilage damage on both talus and tibial surface.

MRI assessment

Preoperative MRI with both SMC and ASC were taken for all patients on the same day. MRI sequences of SMC and ASC are showed in *Table 1*. Two reviewers (Dr. Li and Dr. Wang) who were not involved in patient recruitment or surgery procedure and were blinded to the result of the surgical evaluation assessed the MRI and measured the lesions independently. The diameter of the lesions was measured in both coronal (*Figure 2A,2B*) and sagittal planes (*Figure 2C,2D*) at the largest point and then the area was calculated (area = $ab\pi$ = coronal diameter × sagittal diameter × $\pi/4$) (4). The lesion measurement was defined as something taken from the base of the lesion to the rim of the surrounding cartilage layer. If there was a discrepancy of 0.2 mm or more that occurred between measurement taken by these two reviewers, the third reviewer (Dr. Shen), who was also blinded to the surgical measurement assessed the image, and then the mean of the two closest recorded measurements was taken.

Surgical assessment

Surgical assessment included arthroscopy assessment and open surgery assessment. For patients that underwent arthroscopy surgery, they were performed with debridement and curettage of all loose or fibrillated cartilage until there

Table 1 MRI sequence of SMC and ASC

MRI	Sequence	TR (ms)	TE (ms)	ST (mm)	SG (mm)	Matrix	TA
SMC sequence	T1W_TSE_SAG	743	9	3	0.3	252×248	1 min, 37 s
	T2W_mDIXON_COR	2600	90	3	0.3	252×248	4 min, 4 s
	T2W_mDIXON_TRA	2500	80	3	0.3	200×194	4 min, 25 s
	PDW_TSE_SPAIR_COR	2500	30	5	0	376×360	3 min, 5 s
	PDW_TSE_SPAIR_SAG	2500	30	5	0	376×360	3 min, 5 s
	T2W_FFE_SAG	22.7	11	1.2	0	284×456	8 min, 38 s
ACS sequence	T1W_TSE_SAG	509	20	3	0.3	356×276	2 min, 47 s
	T2W_mDIXON_COR	2600	85	3	0.3	276×180	2 min, 20 s
	T2W_mDIXON_TRA	3000	80	3.5	0.35	276×182	2 min, 30 s
	PDW_TSE_SPAIR_SAG	2500	30	3	0.3	320×264	2 min, 55 s
	PDW_TSE_SPAIR_COR	2500	30	3	0.3	320×264	2 min, 55 s

MRI, magnetic resonance imaging; SMC, surface microscopy coil; ASC, ankle joint special phased array coil; TR, Time of Repetition; TE, Time of Echo; ST, Slice Thickness; SG, slice gap; TA, time of acquisition.

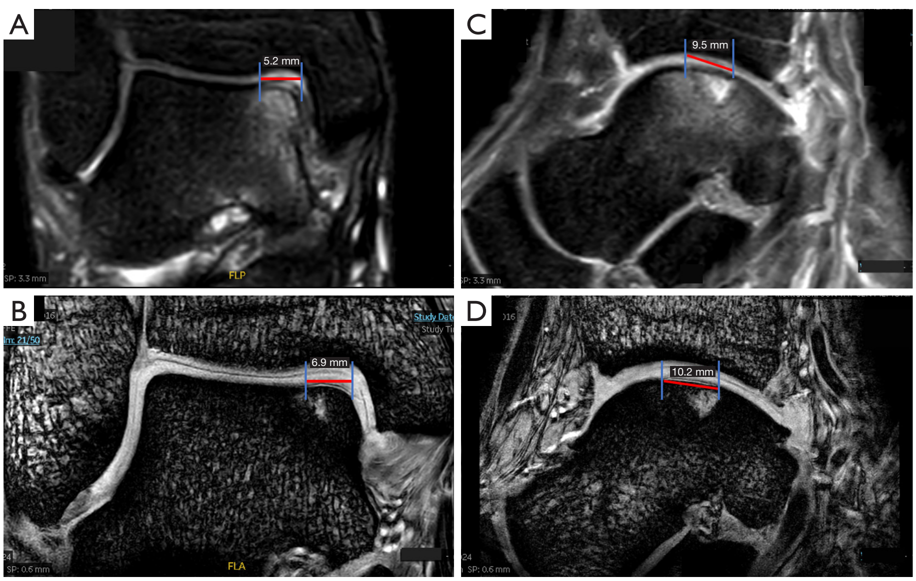

Figure 2 Preoperative MRI measurement of OLTs. (A) Coronal measurement of ASC. (B) Coronal measurement of SMC. (C) Sagittal measurement of ASC. (D) Sagittal measurement of SMC. MRI, magnetic resonance imaging; OLTs, osteochondral lesions of the talus; SMC, surface microscopy coil; ASC, ankle joint special phased array coil.

is a stable rim of articular cartilage. Then an awl or drill was utilized for BMS. A custom-made graduated probe, with every 1.0 mm graduation, was used to measure the lesion in coronal and sagittal planes at its widest point under direct arthroscopic visualization (*Figure 3A,3B*). For patients underwent open surgery, after debriding the lesions thoroughly, osteoperiosteal grafts were harvested from the ipsilateral anterior superior iliac spine. Then an aseptic ruler with every 1.0 mm graduations was used to measure the lesion in two planes at its widest point under direct visualization (area = abπ = coronal diameter × sagittal diameter × π /4) (4) (*Figure 3C,3D*). All measurements were

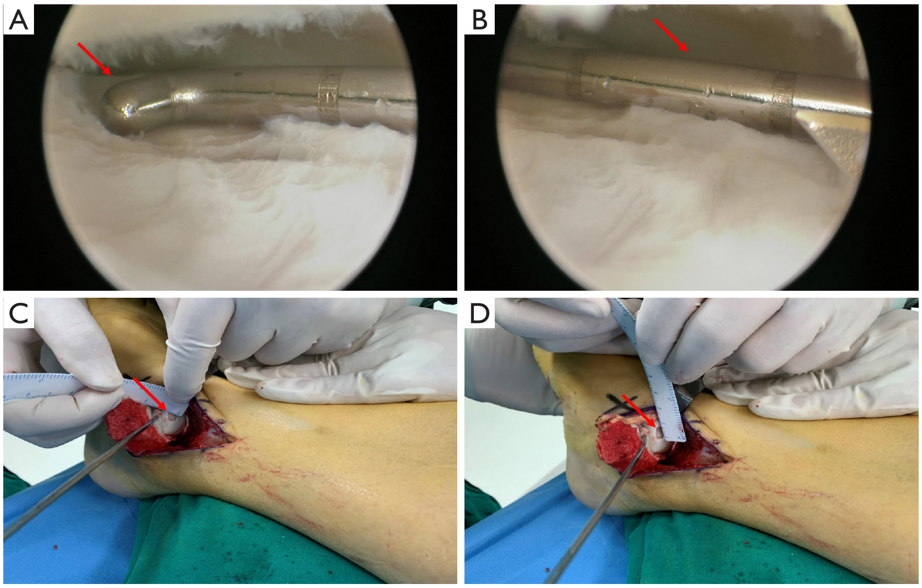

Figure 3 Intraoperative measurement of OLTs. The red arrows indicate the lesion of OLTs. (A) Coronal measurement under arthroscopic view. (B) Sagittal measurement under arthroscopic view. (C) Coronal measurement under open surgical view. (D) Sagittal measurement under open surgical view. OLTs, osteochondral lesions of the talus.

taken independently by two surgeons (Dr. Zeng and Dr. Chen), and if discrepancy of 0.5 mm or more was noted, measurement was taken by the third one (Dr. Song), and then the mean of the two closest results was taken.

All patients received surgery within one week after MRI examination. All reviewers and surgeons were trained adequately before research to avoid large discrepancy happens.

Outcome measurement

The purpose of this study was to compare the accuracy of preoperative size evaluation between these two MRI coils, SMC and ASC, with the absolute gold standard, intraoperative measurement. The concordance rate between MRI-based decision and surgery-based decision was the main outcome measure. In this study, we decided the surgical procedures according to the latest international consensus (10). Lesion areas under and over 100 mm^2 were subjected to BMS and AOPT procedures respectively.

Statistical analysis

All the statistical analysis were performed with GraphPad Prism version 8.0 for Windows (GraphPad Software Inc., San Diego, California, USA) and IBM SPSS Statistics for Windows, version 27 (IBMCorp., Armonk, NY, USA). Summary statistics for quantitative variables with normally distribution were expressed as means as well as standard deviations. Unordered categorical variables were summarized with percentages or ratios. Differences in means of continuous variables were compared with Student's *t*-test (two independent groups) and Paired-Samples *t*-test procedure was used to compare the means of two variables of before and after measures for a single group. Differences in proportions were tested by Chi-Square test. Statistical significance was set at the level P=0.05 (two-side test).

Ethical statement

This study followed the principles of Declaration of Helsinki (as revised in 2013) and was approved by the medical ethics committee of Sun Yat-sen Memorial Hospital, Sun Yat-sen University (No. 2020-KY-156). At the same time this study was registered on Chinese Clinical Trial Registry (ChiCTR2000035159) and all patients signed written informed consent for enrollment and anonymous data publication.

Results

Baseline and demographic data

43 patients (35 males and 8 females) diagnosed with OLT

Table 2 Demographics of the total patient population (N=43)

Demographics	N	%
Age (years)		
<30	18	41.9
30–45	18	41.9
>45	7	16.3
Gender		
Male	35	81.4
Female	8	18.6
BMI (kg/m^2)		
<18	0	0
18–24	19	44.2
>24	24	55.8
Side		
Left	19	44.2
Right	24	55.8
History of trauma		
Yes	36	83.7
No	7	16.3
Duration of symptoms		
<6 months	11	25.6
6–12 months	4	9.3
>12 months	28	65.1
Smoking		
Yes	6	14.0
No	37	86.0
Location		
Medial	33	76.7
Lateral	10	23.3
Surgery procedure		
BMS	28	65.1
AOPT	15	34.9

BMI, body mass index; BMS, bone marrow stimulation; AOPT, autologous osteoperiosteal transplantation.

Table 3 Laboratory examination and follow-up data of patients

Variable	Result	P value
FBG	4.86±0.64	
ESR	10.32±12.1	
Pain VAS		
Before surgery	3.54±1.58	–
3 months	2.19±1.23	0.003
6 months	1.50±0.93	0.002
12 months	1.08±1.32	<0.001
AOFAS AHS		
Before surgery	81.71±8.10	–
3 months	89.00±5.56	0.004
6 months	89.00±5.66	0.005
12 months	93.75±5.22	<0.001

Data are presented as mean ± standard deviation. Paired-Samples *t*-test was used to compare the means of pain VAS and AOFAS AHS before and after surgery. FBG, fasting blood glucose (mmol/L); ESR, erythrocyte sedimentation rate (mm/h); VAS, Visual Analogue Scale; AOFAS AHS, The American Orthopaedic Foot & Ankle Society Ankle Hindfoot Scale.

were included in this study. The mean age of patients at the time of surgery was 32.3±11.2 years (range, 14–58 years), and the mean BMI was 24.9±3.4 kg/m^2 (range, 18.6–31.4 kg/m^2). Most of the patients had a history of trauma (36/43) and most lesions were on the medial side of the talus (33/43). For all patients, 28 cases underwent surgery of BMS and 15 cases underwent procedure of AOPT. Patient demographics and laboratory data are summarized in *Table 2* and *Table 3*. There is no missing data in this study.

Pain VAS and AOFAS AHS of follow-up data

Pain Visual Analogue Scale (pain VAS) was 3.54±1.58 before surgery. Compared with pain VAS before surgery, VAS at 3 months (2.19±1.23, P=0.003), 6 months (1.50±0.93, P=0.002) and 12 months (1.08±1.32, P<0.001) after surgery was significantly lower. For AOFAS AHS (The American Orthopaedic Foot & Ankle Society Ankle Hindfoot Scale), AOFAS AHS was significantly higher at 3 months (89.00±5.56, P=0.004), 6 months (89.00±5.66, P=0.005) and 12 months (93.75±5.22, P<0.001) after surgery compared with preoperative AOFAS AHS (81.71±8.10). The follow-up data is shown in *Table 3*.

Lesion size measurement of OLTs

The mean lesion area measured on conventional MRI coil (ASC) was significantly greater than that measured

Table 4 Osteochondral lesion measurements on MRI *vs.* during surgery

Lesion measurement	Intraoperative	ASC		SMC	
		MRI	P value	MRI	P value
Lesion area (mm^2)	52.74±29.86	95.07±44.60	<0.001	55.28±36.06	0.58
Coronal plane (mm)	6.67±1.81	8.95±2.48	<0.001	6.44±2.59	0.61
Sagittal plane (mm)	9.58±3.98	13.12±3.76	<0.001	10.23±3.69	0.19

Data are presented as mean ± standard deviation. Paired-Samples *t*-test was used to compare the means of area and length of lesions between MRI measurement and surgical measurement. MRI, magnetic resonance imaging; SMC, surface microscopy coil; ASC, ankle joint special phased array coil.

Table 5 Comparison of surgical measurement and preoperative MRI assessment of lesion area

MRI assessment	Surgical measurement		P value
	<100 mm^2	>100 mm^2	
ASC			0.56
<100 mm^2	24	1	
>100 mm^2	16	2	
SMC			0.003
<100 mm^2	36	0	
>100 mm^2	4	3	

Chi-Square test was used to compare preoperative MRI measurement and surgical measurement. MRI, magnetic resonance imaging; ASC, ankle joint special phased array coil; SMC, surface microscopy coil.

Table 6 Comparison of the concordance rate between preoperative MRI assessment and surgical assessment

MRI assessment	Surgical assessment		P value
	Consistent	Inconsistent	
ASC assessment	26	17	0.002
SMC assessment	39	4	

Chi-Square test was used to compare the concordance rate between two MRI assessment and surgical assessment. MRI, magnetic resonance imaging; ASC, ankle joint special phased array coil; SMC, surface microscopy coil.

intraoperatively (95.07±44.60 *vs.* 52.74±29.86 mm^2, P<0.001). By contrast, there was no significant difference between the lesion area measured in SMC and intraoperatively (55.28±36.06 *vs.* 52.74±29.86 mm^2, P=0.58).

When lesion diameter measurements were compared, the mean diameter measured in ASC was significantly greater than that measured intraoperatively in both coronal plane (8.95±2.48 *vs.* 6.67±1.81, P<0.001) and sagittal plane (13.12±3.76 *vs.* 9.58±3.98, P<0.001). However, there was no significant difference between the lesion diameter measured in SMC and intraoperatively in both coronal plane (6.44±2.59 *vs.* 6.67±1.81, P=0.61) or sagittal plane (10.23±3.69 *vs.* 9.58±3.98, P=0.19). Lesion size data is summarized in *Table 4*.

Concordance rate between MRI assessment and surgery assessment

In this study, we set the lesion area cutoff value of BMS and AOPT as 100 mm^2. For surgical measurement, the lesion area was smaller than 100 mm^2 in 40 cases. For ASC measurement, the lesion area was smaller than 100 mm^2 in only 25 cases. While in SMC measurement, the lesion area was smaller than 100 mm^2 in 36 cases. The lesion areas of surgical and preoperative MRI measurement is shown in *Table 5*. Compared with surgery assessment, 91% cases were consistent with SMC assessment while only 60% cases were consistent with ASC assessment (39/43 *vs.* 26/43, P=0.002). The comparison data is shown in *Table 6*.

Discussion

To the best of our knowledge, this study is the first one to use SMC MRI in diagnosing and assessing OLTs. Diameter measured with SMC was much closer to that measured during surgery than conventional MRI coil. At the same time, compared with the conventional MRI coil, the SMC had a higher concordance rate between preoperative assessment-based decision making and surgical assessment-based decision making.

Radiography, CT and MRI are common imaging techniques in diagnosing OLTs. In fact, up to 50% of OLTs are not visualized on standard radiograph alone for its moderate sensitivity in detection of ankle cartilage lesions (25). Consequently, the majority of clinicians utilize the more accurate CT and MRI for further diagnosis and assessment. A previous study prospectively comparing different imaging with arthroscopic found no statistically significant difference between MRI and helical CT (13). Another recent study demonstrated that both CT and MRI were deemed to be valid and reliable in evaluating the subchondral cysts size of OLTs, and that these two classifications were well-correlated (12). Compared with CT, MRI has the advantage of observing the cartilaginous portion of the lesions and concomitant soft tissue pathology. However, MRI has potential misinterpretation of lesions because of bone marrow edema. Previous literature indicates that the lesion size measured by surgery is often different from that of MRI (4). A study included 17 juvenile patients with ankle cartilage lesions showed that MRI assessment and arthroscopy assessment only correlated in 65% of the cases (26). MRI seems to commonly underestimate the size of knee articular cartilage defects when compared with final post debridement area measured during arthroscopic surgery (27,28). By contrast, MRI usually tends to overestimate the lesion size in OLTs (17). The obvious reason for discrepancy between MRI measurements and surgical measurements is that surgery often measures the cartilage component of the lesion while MRI measures the bony component. Hence, the reliability of lesion size measurement using MRI should be cautioned.

Lesion size is the most important factor for deciding the surgical procedures and predicting outcomes (7,11). However, in the past, few studies have compared OLTs size measured preoperatively with MRI versus intraoperatively via arthroscopy or open surgery (24). The only one previous study demonstrated that lesion size measured via MRI did not reflect arthroscopic measurement accurately (17). The mean MRI diameter and area measurement were significantly greater than the arthroscopic measurement. Compared with the arthroscopic measurement, MRI overestimated 53.3% ankles and underestimated 24.4% cases (17). However, this was a retrospective study and the authors had not defined the meaning of "overestimated" and "underestimated". Therefore, we designed this prospective study to further improve the accuracy of preoperative MRI assessment. In our study, we found that preoperative MRI assessment could not match the intraoperative assessment exactly, which is consistent with previous study (17). Nonetheless, our study indicated that the diameter measured with SMC was much more similar to that measured during surgery than conventional MRI coil. Also, the SMC had a higher concordance rate between preoperative assessment-based decision making and surgical assessment-based decision making than the conventional MRI coil, ASC MRI (90% *vs.* 60%). Thus, we strongly recommend the clinical application of surface microscopic coil for OLTs before surgery to achieve more accurate assessment.

Imaging techniques such as MRI scanning continue to evolve rapidly. SMC (also called microscopy surface coil), a special coil of MRI, has been used to diagnose and assess the superficial lesions such as skin melanoma or skin basal cell carcinoma (19,20,23). SMC has proven to be with higher resolution and better image quality in the evaluation of more superficial structures. At the same time, SMC has been applied to orthopaedic diseases (29,30). Compared with conventional surface coil, MRI with a microscopy coil was more useful in the assessment of small soft tissue tumors of the hand and foot preoperatively (31). High-resolution MRI with microscopy coils has proved superior to those using a conventional coil quantitatively and qualitatively in diagnosing triangular fibrocartilage complex lesions (22,32). Another study aiming to evaluate the feasibility of high-resolution MRI with microscopy coils in diagnosing of rotator cuff tears indicated that high-resolution SMC had higher sensitivity than the conventional MRI and had values comparable to MRI arthrography (33). In our study, we utilized SMC to diagnosis and assess lesion size of OLTs, which is the first study to explore the application of SMC in OLTs. In recent studies, three-dimensional (3D) models MRI analysed simultaneously through statistical shape modelling were used to assesses bone morphology and were confirmed that can contribute to improve diagnosis of clubfoot (34,35), which may be helpful to improve the diagnosis and assessment of OLTs in future research. On the other hand, several references have addressed small field-of-view imaging and High-resolution MRI in talar dome osteochondral lesions imaging, which showed that the imaging is safe, technically feasible and help comprehension of symptomatology and enhance clinical decision-making (36-38).

Historical research has recommended BMS procedure for lesions smaller than 15 mm in diameter and 150 mm^2 in area (7,8). However, recent evidence and latest international consensus of American Orthopaedic Foot & Ankle Society (AOFAS) have different viewpoints (9,10). A systematic review of 25 studies with 1,868 ankles revealed that lesion sizes greater than 10.2 mm in diameter and 107.4 mm^2

in area were correlated with poorer clinical outcomes significantly and suggested that BMS may best be reserved for these smaller lesions (4). In a laboratory biomechanical study, 8 fresh-frozen cadaveric ankle specimens were used to assess the effects of OLTs defect size on rim stress, stress concentration and location of peak stress. They determined that the peak stress location in the ankle joint became closer to the rim of the defect in OLTs at a threshold of 10 mm or greater in diameter and suggested a threshold defect size for surgical decision making in symptomatic lesions (39). Another cohort study with 173 cases reflected that lesions between 100 to 149 mm^2 were associated with increasing likelihood of clinical failure and worse AOFAS score compared to lesions <100 mm^2 after BMS (9). In the latest international consensus of AOFAS, 94% of the experts agreed the optimal size guidelines for use of BMS were lesions <10 mm in diameter and <100 mm^2 in area (strong consensus and high grade of evidence) (10). Consequently, we decided 100 mm^2 as the threshold defect size for surgical decision making in our study. Further research, however, is essential to determine a precise cut-off value for surgical decision making in the future.

Autologous osteochondral transplantation from the ipsilateral knee is considered an effective and reliable technique to treat large cystic OLTs. However, there are many complications such as pain and joint motion difficulty after surgery. Recently, autologous osteoperiosteal transplantation (AOPT) has been confirmed to have comparable clinical and radiologic outcomes compared with autologous osteochondral transplantation and fewer complications (5,6,40). Consequently, we took AOPT transplantation for our patients with large lesion sizes in our study and all patients have good prognosis.

There is also some limitation in our study. Firstly, the sample size of our study was not large enough. Secondly, patients were followed up for only 12 months after surgery in this study. Since the sequences of these two MRI coils were partially different, and this may have influence on the imaging results. At the same time, only the size of lesion is discussed and other features such lesion morphology, cartilage fracture and osteochondral separation were no evaluated in our study. Consequently, further studies with larger sample sizes and longer follow-ups will be required in the future.

Conclusions

In conclusion, diameter measured with SMC was much more accurate than conventional coil MRI. Compared with the ASC MRI, the SMC had a much higher concordance rate between preoperative assessment and surgical assessment. Consequently, SMC can be applied in evaluating preoperative lesions of OLTs in the future.

Acknowledgments

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Footnote

Reporting Checklist: The authors have completed the STROBE reporting checklist. Available at https://qims.amegroups.com/article/view/10.21037/qims-22-1202/rc

Conflicts of Interest: All authors have completed the ICMJE uniform disclosure form (available at https://qims.amegroups.com/article/view/10.21037/qims-22-1202/coif). The authors have no conflicts of interest to declare.

Ethical Statement: The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. This study followed the principles of Declaration of Helsinki (as revised in 2013) and was approved by the medical ethics committee of Sun Yat-sen Memorial Hospital, Sun Yat-sen University (No. 2020-KY-156). At the same time this study was registered on Chinese Clinical Trial Registry (ChiCTR2000035159) and all patients signed written informed consent for enrollment and anonymous data publication.

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