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A short term functional outcome of bucket handle medial meniscus tears treated with arthroscopic repair: All-inside technique in a rural tertiary care hospital

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Abstract

Bucket-handle meniscal tears are defined as vertical longitudinal tears of the meniscus with displacement of the torn inner fragment toward the intercondylar notch region. It is most commonly encountered in medial meniscus. Management of bucket handle tears is important to preserve knee function & preserving the meniscus will limit future osteoarthritis. A series of 20 cases of bucket handle medial meniscus tears were treated by Arthroscopic repair: All-inside technique and were followed up regularly till 6 months and evaluated using Lysholm Knee Scoring Scale. Most patients had Excellent score at 6th month follow-up. Our study suggests Arthroscopic repair: All-inside technique is an effective management of medial meniscus bucket handle tears.

Keywords: Medial meniscus, bucket handle tear, arthroscopic repair: all inside technique, lysholm knee score

Introduction

Meniscus plays a crucial role in the function and biomechanics of the knee joint. The meniscus functions in load bearing, load transmission, shock absorption, joint stability, joint lubrication, joint nourishment and joint congruity ^[1].

Injuries are produced commonly by rotation as the flexed knee goes into extension and leads to variable levels of functional instability, activity limitations and participation restrictions. O'Connor classified tears into: (1) longitudinal tears; (2) horizontal tears; (3) oblique tears; (4) radial tears; and (5) variations, which include flap tears, complex tears, and degenerative meniscal tears. It is commonly seen in young adults ^[2].

Bucket-handle meniscal tears are defined as complete & vertical longitudinal tears of the meniscus with displacement of the torn inner fragment toward the intercondylar notch region ^[3]. It is most commonly encountered in medial meniscus & associated with anterior cruciate ligament injury ^[4]. Meniscal tears occur most commonly in athletes. The patient typically has episodes of locking in which the knee can be neither fully extended nor flexed. The fragment may displace and reduce with an audible and palpable clunk. There is associated pain and effusion.

The most common criteria for meniscal repair include (1) a vertical longitudinal tear more than 1 cm in length located within the vascular zone (2) a tear that is unstable and displaceable into the joint (3) patient who is active and younger than 40 years old, (4) a bucket-handle portion and remaining meniscal rim that are in good condition. Bucket-handle tears that cannot be repaired can be treated with partial meniscectomy.

The aim of this study was to evaluate the functional outcome of bucket handle medial meniscus tears treated with arthroscopic repair: all-inside technique.

Materials & Methods

The study was conducted on 20 patients under age of 45 years were enrolled after detailed clinical and appropriate radiological evaluation in Department of Orthopedics, Mahadevappa Rampure Medical College, Kalaburagi and other Private Hospitals in Kalaburagi.

It was conducted between June 2018 to March 2020. Lysholm Knee Scoring Scale was used to evaluate the functional outcome.

Surgical Technique

- After giving Spinal Anesthesia, patient was placed in supine position with side support & knee in 90 degree flexion.
- Lower Limb tourniquet of 300 mm Hg for 90 mins was applied and under aseptic precautions, parts painted and draped.
- Standard arthroscopy portals are created – Anterolateral portal (viewing portal) & Anteromedial portal (instrumentation portal).
- Diagnostic arthroscopy performed.
- Medial meniscus was evaluated in 20 degree of flexion and valgus stress. In some cases, pie-crusting of medial collateral ligament was done to open up medial joint.
- Probing of the entire tear was done to evaluate the extent of tear.
- Tear was reduced using a probe or grasping forceps.
- Edges were freshened with shaver and RF ablation.
- The tear was repaired using All-inside suture device.
- Other injuries such as ACL reconstruction was addressed in some cases.
- Incision was closed & pressure dressing applied.

Physiotherapy protocol included Knee isometric exercises and Quadriceps strengthening exercises and Knee ROM increasing gradually & non weight bearing for 2-4 weeks and partial & full weight bearing after 4-6 weeks with Long knee brace.

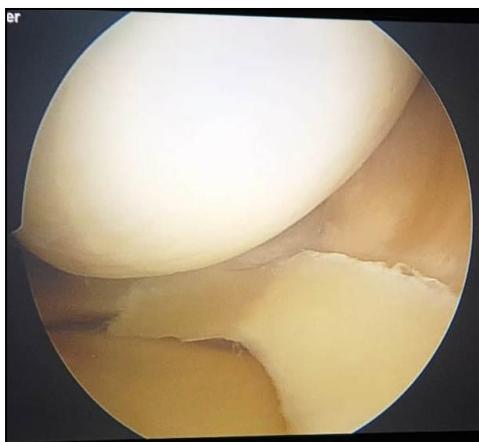


Fig 1: Medial Meniscus Bucket Handle Tear

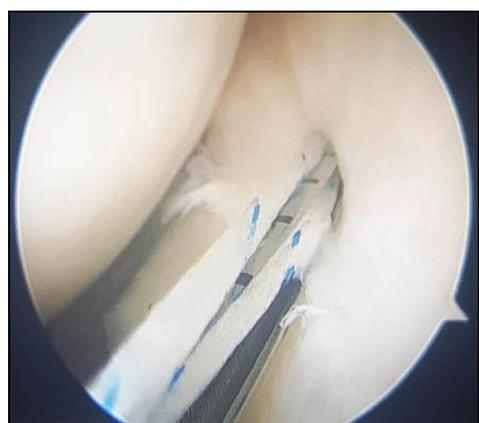


Fig 2: All inside suture device passing suture into the torn meniscus

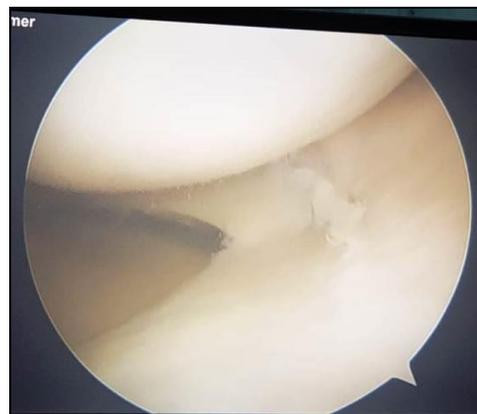


Fig 3: Repaired Tear

Results

In our study of 20 patients who were followed up to 6 months, majority of the patients were males between age group of 25-40 years (Mean age of 28.2 years). Right knee was more involved with sports related injuries was the common mode of injury. 16 cases were associated with Anterior Cruciate Ligament injury.

Table 1.

Parameter	Total number of cases (20)	
	Number	Percentage
Age Distribution (years)		
16-25	4	20%
26-35	10	50%
36-45	6	30%
Sex distribution		
Male	18	90%
Female	2	10%
Side Distribution		
Right	16	80%
Left	4	20%
Mode of Injury		
Sports related	10	50%
Road Traffic Accidents	8	40%
Others	2	10%

According to Lysholm Knee Scoring System, out of 20 patients, 15 had excellent results, 4 had good results and 1 had fair result.

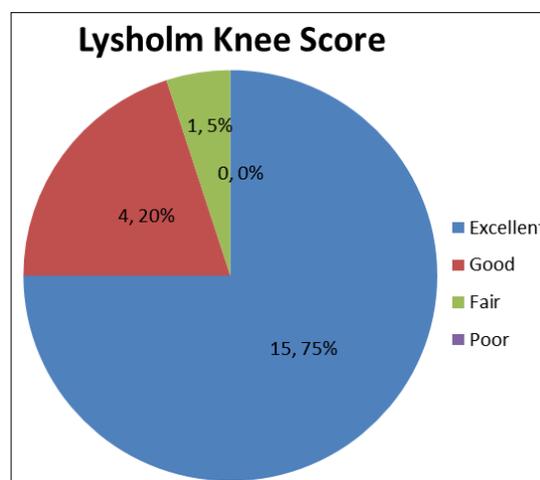


Fig 3.

In our series, 1 patient developed knee stiffness and 1 patient who underwent subsequent ACL reconstruction had graft

donor site superficial wound infection which was treated with antibiotics.

Discussion

Treatment of meniscal injuries have evolved over time from conservative to open/arthroscopic meniscectomy to arthroscopic repair.

Our study was done on 20 patients who had bucket handle meniscal tears who underwent Arthroscopic All-Inside Repair. Mintzer *et al.* [5] reported on 29 adolescents who underwent meniscal repair but did not include any bucket handle meniscal tears repair.

Krych *et al.* [6] reported on 45 isolated meniscal repairs in adolescents with a mean age of 16 years, which included 29 bucket handle repairs. The authors reported clinical success in 68% of displaced bucket handle tears at a mean follow-up of 5.8 years. In our study, meniscus repair of bucket handle tears were done in young population with mean age of 28 years with follow up to 6 months.

Physical examination and MRI may be used for the diagnosis of bucket-handle tears. Snapping and locking is present in 80% of cases. MRI gives valuable information in bucket-handle tears but its sensitivity ranges between 45% and 98%. Arthroscopy is still the golden standard for diagnosis and deciding the treatment choice between suturing or partial resection [7].

A recent systematic review of 19 (mostly adult) studies [8] compared the effectiveness and complications of inside-out repair versus all-inside repair for isolated meniscal tears, which included BHMTs. The authors found similar failure rates (17%-19%) and subjective outcomes for both techniques. More nerve symptoms were associated with inside-out repair, and more implant-related complications were identified with the all inside technique.

Concurrent ACL surgery was associated with a lower meniscus-related reoperation rate in our series, which is similar to findings from many other studies [9].

Meniscectomy, however, has been shown to have potentially devastating consequences in younger patients. Long-term data indicate that partial meniscectomy may accelerate the incidence of osteoarthritis, which could adversely affect not only the athletic participation but also the basic activity level and daily ambulatory function of this younger age group [10].

Conclusion

On the basis of this study, we concluded that bucket handle medial meniscus repairs treated with Arthroscopic All-inside technique is a safe and effective method & gave excellent results with minimal incidence of complications. In our study, we found significant relief of pain, function, range of motion and overall satisfaction of the patient. We also concluded that it is a technically demanding procedure and requires a long learning curve.

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