IAS newsletter 19, Feb 2023, Vol-3, Issue-2

FEB 2023 | VOL-3| ISSUE 2

IAS NEWSLETTER



Dr Sachin Tapasvi President, IAS





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Citation for this newsletter: IAS Newsletter-19 Feb 2023, Vol-3, Issue-2, https://indianarthroscopy.co.in/pdf/IAS_Newsletter_Feb 2023.pdf

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AVN humeral head with concomitant cuff injury (Pg 4-8)

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Venue: Down Town Hospital Auditorium, Building No-3, 7th Floor Guwahati, Assam

The Indian arthroscopy society as part of their outreach programme conducted the 5th IAS ONE CME in association with downtown hospital which was first of its kind in the North-east India. It was on Basics of ACLR & Meniscus repair which was held at downtown hospital, Guwahati on January 29,2023.



Dr Iran Bharali, the organizing secretary and his team organized an excellent interactive academic programme which consisted of didactic lectures, live surgery and a hands-on workshop. We held some excellent live talks on the basics of ACLR and meniscus repair by eminent national faculty like Dr Sachin Tapasvi (president, IAS), Dr S.R. Sundararajan(secretary, IAS), Dr Rajeev Raman, Dr Rufus Vasanth Raj, and Dr Sagar Kakatkar and few more Local faculty. There was an exciting panel discussion on a case of MLKI which was highly appreciated. We also held one live surgery on Hamstring single bundle ACL reconstruction by Dr S.R. Sundararajan followed by a hands-on workshop on Graft preparation and meniscus repair techniques. The programme was well received and was attended by about 65 registered delegates from all over the northeastern states. It was also streamed live on IAS YouTube channel and had more than 500 views so far.

Kudos to team downtown, Guwahati and IAS for the excellent academic programme!!

EXPERT TALK MY INDICATION AND ALGORITHM FOR CUFF REPAIR



Dr Sanjay desai Senior Consultant Mumbai

HIGHLIGHTS

• Indications for repair: Acutely Painful,

• Avoid cuff repairs:

Dysfunctional tears

Functional tear, no pain Goutallier stage 4 fatty degeneration Atrophied Gerber stage 3 Retracted type C

• Repairable cuff tears:

Technique:

Arthroscopic Double row cuff repair(two medial row anchors and one lateral row) Arthroscopic repair: Advantages:

A better appreciation of tear configuration/partial tears, easier to mobilise cuff, earlier return of function, higher patient acceptance and associated pathologies like SLAP tears can be addressed.

• Massive irreparable cuff tears:

Elderly(good function): LHB tenotomy, Partial repair, Balloon spacer Elderly(poor function): RSA/RSA+ LD transfer Young(Good function): Tissue patches, SCR, Muscle transfer(LD)

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AVASCULAR NECROSIS OF HUMERAL HEAD WITH CONCOMITANT CUFF INJURY



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Abstract:

Atraumatic avascular necrosis (AVN) of the humeral head is a less common pathology compared to the femoral head and is generally a part of polyarticular disease. A high index of suspicion is required in diagnosing the condition since symptomatology mimics other commoner pathologies in the shoulder like rotator cuff or biceps pathologies. Early diagnosis and treatment avoid the progression of the disease. Treatment options are generally based on the Cruess staging system and core decompression is a viable option in precollapse stages of disease. AVN can coexist with rotator cuff pathology and this association is rarely reported in the literature. In such cases, early diagnosis and addressing both AVN and cuff pathologies surgically can yield satisfactory outcomes and we report one such case managed successfully.

Introduction:

Avascular Necrosis (AVN) of humeral head is usually following trauma and atraumatic AVN is less common. Though AVN humeral head is the most common site after the femoral head, isolated atraumatic AVN is rare and generally part of multifocal AVN [1]. They are generally underdiagnosed and under-reported and therefore thorough examination and workup is required to diagnose the condition. Causes for atraumatic AVN humeral head include sickle cell anaemia, Gaucher Disease, systemic lupus erythematosus, Caisson disease, alcohol consumption, corticosteroids and also following shoulder surgeries either open or arthroscopic^[2]. Diagnosis is largely based on radiological findings since clinical findings

Citation for this article: Raghavendra Kembhavi, Girish Khodnapur, Nagesh Inginshetty. Avascular necrosis of humeral head with concomitant cuff injury.IAS Newsletter-19, 2023;3(2):4-8. https://doi.org/10.17613/0env-q897



Fig 1: Pre-operative imaging: A, B: Plain radiographs with wedge shaped sclerotic lesion suggesting AVN (black arrow) with glenoidal inferior osteophyte (white arrow), C,D,E: MRI (a- coronal b-sagittal c-axial) sections showing small supraspinatus tear with upper subscapularis tear with sclerotic lesion without subchondral collapse (Cruess stage 2 AVN).

mimic other commoner pathologies in the shoulder like rotator cuff tears, adhesive capsulitis or biceps tendinitis. Management of AVN humeral head depends on the stage of disease according to Cruess staging system where stage 1 and 2 can be managed with core decompression after conservative management fails and arthritic stages (stage 4 and 5) needs arthroplasty. Stage 3 can be opted between partial resurfacing or core decompression. However, there is no consensus on managing AVN humeral head with concomitant rotator cuff injury. Here, we report one such case wherein the patient had AVN humeral head with concomitant supraspinatus tear with upper subscapularis tear with adhesive capsulitis which was managed successfully with arthroscopic and medical management.

Case Report:

55 year old female patient presented with pain in right shoulder with difficulty in lifting since one year. Pain was insidious onset , gradually progressive , dull aching and disturbing sleep. There was no history of trauma. There were no comorbidities , however there was a history of bilateral hip core decompression done 8 years back and there was history of steroid intake prior to that for nearly six months. Presently she was asymptomatic for hip. On examination , all movements at shoulder were painful particularly forward flexion, abduction and external rotation. Whipple's test , O Brien's

test and Empty can test were positive and Belly Press, lift-off tests were negative but painful. There were no distal neurovascular deficits and the Constant shoulder score was 18. On radiography, there was wedge-shaped sclerotic lesion on the humeral head and a small osteophyte on the inferior glenoidal margin. Magnetic Resonance Imaging(MRI) showed a small tear in the supraspinatus with an upper one-third tear in the subscapularis with joint effusion (Fig 1). There was a clear wedgeshaped sclerotic lesion on the humeral head without subchondral collapse indicating AVN humeral head. Hence the diagnosis of humeral head AVN (Cruess system stage II) with supraspinatus tear with upper one-third subscapularis tear with adhesive capsulitis was made. She was planned arthroscopic assisted core decompression with capsular release with cuff repair. Intraoperatively we found severe capsulosynovitis with rotator interval tightness with small complete supraspinatus tear with upper subscapularis tear. Humeral head cartilage was intact with minimal flattening in the contour and glenoidal cartilage showed small defect of less than centimetre without exposing sub chondral bone (Fig 2). Initial thorough capsular release with rotator interval release with biceps tenotomy was done. Using anterior cruciate ligament (ACL) tibial drill guide, core decompression was done using 4 mm cannulated drill bit with entry from lateral side of humerus (Fig 2). After making 3 tracts under vision with arthroscope, subscapularis repair with no. 2 fibre wires and knotless one



Figure 2:Intraoperative images showing intact humeral head cartilage with minimal flattening in the contour and glenoidal cartilage showed small defect of less than centimetre without exposing sub chondral bone. C, D: Core decompression using ACL tibial drill guide with intraoperative fluoroscopic picture

5.5 PEEK anchor and supraspinatus repair with double loaded 4.5 mm titanium anchor was done. Postoperatively patient was put on sling for 6 weeks and rehabilitation protocol for rotator cuff repair was followed. She was also put on Tab. Alendronate 70 mg once a week for 6 months. At one year follow up, patient was doing house hold activities with near complete range of painless movements with Constant Shoulder Score increasing significantly to 71 (Fig 3). MRI at one year showed well healed rotator cuff with sclerotic AVN lesion marginally reduced size with areas of lucency around lesion suggesting revascularization (Fig 4).

Discussion:

AVN humeral head is more commonly seen in men than women and is generally seen between 20 to 50 years of age [3]. Though symptomatology's are non-specific they are characterized by deep seated shoulder pain aggravating during night times, poorly localized and often radiating to elbow. There may be clicking or locking sensations due to loose cartilage flaps coming in between articular surfaces. On examination, there will be deep tenderness with a range of movements particularly painful with more than 90 ^o abduction /forward flexion due to glenohumeral loading [4].

Anchor induced AVN is not new entity and have been described previously in the literature [2]. In fact, AVN humeral head have been seen following shoulder surgeries either open or arthroscopic. Kind of surgeries causing AVN are rotator cuff surgeries with or without anchors, acromioplasty and biceps tenodesis or tenotomy. When anchors are used, more number of anchors are likely to cause AVN[5]. Close relation to ascending branch of anterior humeral circumflex artery (AHCA) in the bicipital groove is responsible for disruption of vascular supply during biceps related procedures. However Keough et.al showed AVN could be multifactorial which can be due to either damage to anterolateral branch of ACA, anchor induced damages to intraosseous branches at greater tubercle or both concurrently [2].



Figure 3: Pre-operative range of movement(A) & (B) and post operative improved range of movement(C), (D) & (E).

When core decompression is feasible in stage I with lesion more than 15% of humeral head or in stage II or in selected cases of stage III according to Cruess system, decompression methods are several. They can be either open conventional technique, percutaneous technique or arthroscopic assisted methods. In open core decompression method, single trephine of size 6-10 mm is passed just lateral to bicipital groove using deltopectotal approach confirming location of lesion using fluoroscopy. In percutaneous, multiple (two or three) perforations are made using 3.2 steinman pin or 2.7 drill bit into the lesion under fluoroscopic guidance [6]. However entry is same as open technique wherein it is kept lateral to bicipital groove to prevent

damage to ascendingbranch of AHCA. In arthroscopic assisted technique, first described by Chapman et.al, use of arthroscopy helps in addressing other articular issues like synovial/cuff and /or chondral pathologies at the same time [7]. It also helps in avoiding iatrogenic chondral damages while making drill holes. Advent usage of ACL tibial drill guide while performing arthroscopic assisted core decompression helps in proper triangulation of humeral head lesion and avoids unnecsessary drilling [8]. Coexistent pathologies of rotator cuff and AVN are less known in the literature and have been described only few times as case reports[9]. There is no proper consensus on the treatment algorithm in combined pathologies.



Fig 4: Follow-up MRI(1 year): Well-healed rotator cuff repair(a) with sclerotic AVN lesion marginally reduced size with areas of lucency around lesion suggesting revascularization (yellow arrow)(b) &(c)

Hereby we report one such rare case wherein both pathologies (rotator cuff) and AVN humeral head were addressed surgically along with medical management involving tab. Alendronate post operatively with successful outcome.

Conclusion:

AVN is rare and generally part of polyarticular disease. High degree of suspicion is required for proper diagnosis of condition . It can be coexisting with rotator cuff pathology and early diagnosis and addressing both AVN and cuff pathologies surgically can yield satisfactory outcome.

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Citation for this article: Raghavendra Kembhavi, Girish Khodnapur, Nagesh Inginshetty. Avascular necrosis of humeral head with concomitant cuff injury.IAS Newsletter-19, 2023;3(2):4-8. https://doi.org/10.17613/0envq897

SINGLE STAGE ACL RECONSTRUCTION, MEDIAL MENISCUS ROOT REPAIR AND MOSAICPLASTY IN YOUNG PATIENT WITH NONCONTACT ACL INJURY



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Introduction:

ACL tear is common in sport activities and accidents. High percentages of these injuries are associated with meniscal, ligament, or chondral injuries(1). Articular cartilage injury in the knee may be found alone, but it is mostly accompanied with injuries to the ligaments and menisci(2). Articular cartilage does not usually regenerate after injury or disease leading to loss of tissue and formation of a defect(3). Repair of meniscal root injuries is the treatment of choice with the aim of restoring joint kinematics, contact pressures, and delaying the development of osteoarthritis

The volume of literature focused on treatment of chondral defects in conjunction with ACL reconstruction is significantly inferior. We did not find any case report of single stage treatment of medial meniscus root tear and chondral lesion in conjunction with ACL tear in literature.

Case presentation:

We present a case of 37-year male patient presented with pain and instability of left knee since last 3 month following twisting injury of knee while slipping off stairs . On examination patient had positive medial joint line tenderness, positive Lachman, anterior drawer test grade II, positive pivot shift &full range of motion of knee which was terminally painful.

His MRI left knee revealed a complete ACL tear from femoral site with medial meniscus root tear with infolding of meniscus lying in meniscotibial recess and grade 4 chondral defect at medial femoral condyle of size 1.5 x 1.5 cm(Fig 1).

Under spinal anesthesia standard anterolateral and anteromedial portals were made. Medial meniscus which was lying meniscotibial recess was liberated with labral elevator following which the torn root was repaired using transtibial suture pullout technique. ACL reconstruction was done with quadrupled Semitendinosus graft by transportal technique. Anterolateral portal incision extended by 1cm and from lateral femoral condyle two 6mm osteochondral plugs were harvested and

Citation for this article: Amit Kumar Jha. Single Stage ACL Reconstruction, Medial Meniscus Root Repair and Mosaicplasty in Young Patient with Noncontact ACL Injury. IAS Newsletter-19,2023;3(2):9-13. doi:https://doi.org/10.17613/13ga-pj38



Fig 1: A: Femoral sided ACL tear, B&C: Meniscus root tear with torn meniscus in the meniscotibial recess, D: Grade IV ICRS cartilage lesion-medial femoral condyle

implanted at the recipient site over the medial femoral condyle through an extended AM portal incision. (Fig 2).

Knee ROM was started after 3 weeks postop and full weight-bearing walking was allowed after 2months.No squatting and crossed leg sitting was allowed for 6 months. At 6months his VAS score was 0 and IKDC score 86.2 (Fig 3).At 1 year follow up we did MRI of knee and found good incorporation of ACL graft with meniscus root healing and cartilage restoration with MOCART score 90/100(Fig 4).

Discussion:

The diversity of meniscal tear patterns encountered in the ACL-deficient knee adds complexity to the treatment decisionmaking process, and questions still exist regarding the optimal strategies for maximizing outcomes. Approximately 50% of primary anterior cruciate ligament (ACL) failed ruptures and over 90% of reconstructions will have coexisting cartilage and/or meniscal pathology (4). In terms of location, 95% and 77% of medial and lateral menisci, respectively, involve the posterior horn. Association of posterolateral meniscus root in conjunction with ACL tears is approximately 8% to 14%. Conversely, posteromedial meniscal root avulsions are uncommonly observed with isolated ACL although they have increased injury, association with Multiligament injuries (5,6).

The effects of peripheral longitudinal posterior horn medial meniscal tears (mean 28 mm length tear) in the setting of ACL deficiency were evaluated by Ahn et al (7) and findings included significant increases in anterior translation with simulated Lachman maneuvers at flexion angles up to 60 (P, 0.05) but no differences with pivot shift. Furthermore, peripheral tears resulted in the same degree of instability as a total medial meniscectomy. After meniscal repair, however, stability was restored to the isolated ACL-deficient state. High-level clinical evidence on the effect of meniscal integrity on postoperative stability is also lacking. One level III review of 482 patients at mean 7.6 years postoperatively found significantly higher KT-1000 side-to side differences in patients with any medial meniscal resection compared with intact medial menisci (2.6 6 1.7 versus 2.0 6 1.5 mm; P = 0.0065), but no differences in graft failures were reported (8).

In a recent level III study with median follow-up 26 months, 118 patients were evaluated after anatomic single bundle hamstring tendon autograft ACL reconstruction. The investigators found that medial and lateral meniscal deficiency were the highest risk factors for graft failure (medial: hazard ratio, 15.1; CI, 4.7 to 48.5; P, 0.001, lateral: hazard ratio, 9.9, CI, 3 to 33; P, 0.001) (9). A large level II cohort of 4,691

patients with 2-year follow-up found that only medial meniscal repairs had significantly worse Knee injury and Osteoarthritis Outcome Score (KOOS) subscales compared with isolated ACL reconstructions (Symptoms: b = 22.5; CI, 24.6 to 20.5; P = 0.023, Quality of Life: b = 23.8; CI, 26.8 to 21; P = 0.009) (10). However, all other treatments had no effect, including any lateral meniscal intervention. Røtterud et al (11) in nationwide cohort study from Norway and Sweden of 8476 patients with 2year follow-up found no stastically significant difference in outcome with patient with medial meniscus tear. Two level I prospective investigations (12,13), both reporting on data from the same pool of patients with 6-year follow-up

found, compared with uninjured menisci, worse patient-reported outcomes with medial meniscal repairs and improved outcomes with nontreatment of lateral meniscal tears.

Articular cartilage injury associated with ACL reconstruction possibly has the greatest single effect on long term subjective outcomes. In a large, level-III review of 2,770 patients, 4.5% were found to have an isolated high-grade chondral defect (treated with benign neglect, mean size 1.7 cm2) in the absence of meniscal pathology. Compared with a cohort without meniscal or chondral pathology, at mean follow-up 8.7 years, IKDC scores were statistically lower but differences were



Fig 2: Intraoperative images: A: ICRS gradeIV lesion medial femoralcondyle(1.5cmx1.5cm) B: Post mosaicplasty,C: Medial meniscus root tear with themeniscus in the meniscotibial recess,D: Medial meniscus root repair, E: Femoralsided ACL tear, F: Completed ACLreconstruction

DIAGNOSTIC

POST REPAIR



likely not clinically significant (medial: 1.2; P = 0.0451, lateral: 3.1; P = 0.0047) (14). Contradictory to it a level-III review with longer mean follow-up of 8.6 years found that both meniscal resections and chondral defects were associated with worse subjective outcomes (8). High-level studies evaluating ACL reconstruction with concurrent cartilage repair are lacking. Techniques described include chondroplasty, microfracture, autologous chondrocyte implantation, and osteochondral autograft/allograft transplantation.

A prospective, randomized level II (nonblinded) study comparing osteochondral autograft transplantation, microfracture, and debridement of high-grade defects (mean, 2.6 cm2) in conjunction with ACL reconstruction found at mean 36-month follow-up superior results with osteochondral autograft transplantation compared with microfracture (15).



Fig 4: Post operative MRI. A: Well healed ACL, B&C: Well incorporated cartilage plugs & healed medial meniscus root

Conclusion:

- Optimizing long-term outcomes in treating ACL tears with associated chondral and meniscal pathology requires an understanding of both the natural history of specific pathology and the results of various treatment modalities.
- Meniscal tears and previous partial meniscectomies have higher associations with corresponding compartmental chondral defects in both primary and revision ACL reconstructions.

- Benign neglect of stable meniscal tears in association with ACL reconstruction leads to generally acceptable outcomes; however, medial meniscal tears left in situ are associated with higher revision surgery rates than lateral tears.
- The presence of chondral defects consistently results in lower intermediate-to-long-term patient-reported outcomes.
- Despite these observations, further study is needed to elucidate the complex factors involved in optimizing patient outcomes in the setting of ACL insufficiency with concomitant meniscal or chondral injury.

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Citation for this article: Amit Kumar Jha. Single Stage ACL Reconstruction, Medial Meniscus Root Repair and Mosaicplasty in Young Patient with Noncontact ACL Injury. IAS Newsletter-19,2023;3(2):9-13. doi:https://doi.org/10.17613/13ga-pj38

Rest in Peace



Dr Saurabh Mathur

23rd Feb, 2023

Indian Arthroscopy society is saddened by the sudden demise of our dynamic member Dr Saurabh Mathur from Jaipur. He was a academician and a great human being . May his soul rest in peace.