Potpourri - Recent and relevant literature in 2019

Potpourri is an attempt to provide precise summary of relevant literature published in last one year related to various aspect of Orthopaedics

Whats New in Arthroplasty -2019

Sanjay Londhe[1]

Knowledge keeps on expanding at rapid rate and it is important not to miss relevant articles. We have made a list of most relevant articles that will impact our practice in 2019

1. PAPER 1: Reduced Revision Risk for Dual-Mobility Cup in Total Hip Replacement Due to Hip Fracture

A Matched-Pair Analysis of 9,040 Cases from the Nordic Arthroplasty Register Association (NARA)

Conclusions: The use of a DMC as primary treatment for hip fracture was associated with a lower risk of revision in general and due to dislocation in particular. The total number of DMCs analyzed (4,520) likely exceeds any cohort of DMC-treated fractures published to date.

Editorial comment: The use of dual mobility THR systems is on the rise. The surgeons are preferring this system over conventional THR mainly when the risk of dislocation is very high like in acute fracture neck of femur settings and in revision hip replacement scenario. This paper clearly demonstrates the advantage of this system from revision and dislocation point of view.

2. PAPER 2: Risk Factors for Nerve Injury After Total Hip Arthroplasty: A Case-Control Study

Conclusion: This study demonstrates that nerve injury is a rare complication following THA at our institution. We found risk factors that are possibly modifiable factors such as lumbar spine disease, smoking, and time of surgical scheduling.

Editorial comment : The partial or complete sciatic nerve palsy following THR is a devastating complication. Majority of these palsies recover partially and they take long amount of time. This paper highlights certain at risk factors like young age<45, history of tobacco use, history of spinal surgery or disease, prolonged surgical time and late scheduling of the surgery on the operative list.

3. PAPER 3: The Use of Aspirin for Prophylaxis Against Venous Thromboembolism Decreases Mortality Following Primary Total Joint Arthroplasty.

Conclusions: The present study demonstrates that the use of aspirin as prophylaxis against VTE following TJA may reduce the risk of mortality. Given the numerous options available and permitted by the current guidelines, orthopaedic surgeons should be aware of the potential added benefits of aspirin when selecting a VTE-prophylactic agent.

Editorial comment : Significant number of THR and TKR patients develop symptomatic/ assymptomatic DVT. Recent guidelines and research has shown that oral aspirin is as effective as injectable enoxaparin or oral rivoraxoban. Aspirin is advantageous as it is very cheap and can be given orally. His paper shows even more advantages of giving oral aspirin as a DVT prophylaxis as it lowers the risk of death at 30 days and at 1 year.

4. PAPER 4: The Leukocyte Esterase Test for Periprosthetic Joint Infection Is Not Affected by Prior Antibiotic Administration.

Conclusions: This current study and previous studies have demonstrated that the administration of premature antibiotics can compromise the results of standard diagnostic tests for periprosthetic joint infection, causing significant increases in false-negative results. However, in this study, the leukocyte esterase strip test maintained its performance even in the setting of antibiotic administration. Antibiotic administration prior to diagnostic workups for periprosthetic joint infection stands to interfere with diagnosis. The leukocyte esterase strip test can be used as a reliable diagnostic marker for diagnosing periprosthetic joint infection even when prior antibiotics are administered.

Editorial comment : The diagnosis of post operative joint infection is often problematic , especially when patient has received prior antibiotics, which is usually the case. This paper shows the usefulness of Leukocyte Esterase Test in diagnosing PJI even when patient has taken prior antibiotics.

5. PAPER 5: Perioperative Antibiotic Prophylaxis in Total Joint Arthroplasty- A Single Dose Is as Effective as Multiple Doses

Conclusions: This study supports the notion that the administration of additional antibiotics following skin closure may not be required for primary TJA, regardless of the patient's preoperative risk of PJI. The findings of this large retrospective study highlight the need for a randomized, prospective study on which to base guidelines.

Editorial Comment: The standard norm of prophylactic antibiotics is one dose 2 hours before the procedure followed by two more doses at 6 and 12 hours post operatively. There is a paper in trauma surgery of only one dose of injectable Teicoplanin is equally effective as conventional regime. This is a first paper as far as Joint Replacement surgery is concerned about the efficacy of only one dose of intravenous antibiotic.

6. PAPER 6: Comparison of Gap Balancing vs Measured Resection

Technique in Patients Undergoing Simultaneous Bilateral Total Knee Arthroplasty: One Technique per Knee

Conclusions: At 2-year follow-up, there were no differences between the function and scores using the two techniques. Long-term follow-up will be necessary to evaluate any differences in long-term durability

Editorial Comment: A lot of debate exists about which method/ philosophy to follow while performing TKR. This paper demonstrates that both the techniques are equally good in skilled hands. Realistically modern-day TKR surgery is a combination of both gap balancing and measured resection technique.

7. PAPER 7: Conventional Versus Highly Cross-Linked Polyethylene in Primary Total Knee Replacement: A Comparison of Revision Rates Using Data from the National Joint Registry for England, Wales, and Northern Ireland.

Conclusions: Alternative bearings are marketed as having improved wear properties over traditional CoCr-CPE. This registry-based analysis demonstrated no overall survival benefit of HXLPE after a maximum duration of follow-up of 12 years. Because of their increased cost, the routine use of HXLPE bearings may not be justified. However, they may have a role in specific "higher demand" groups such as patients <60 years of age and/or those with a BMI of >35 kg/m.

Editorial Comment: The usefulness of HXPLE is well researched and documented for the longer survivorship in THR. This paper clearly shows that the costlier HXPLE is not superior to conventional polyethelene, though it might have an advantage in younger patients (<60years of age).

8. PAPER 8: The Effect of Surgeon Preference for Selective Patellar Resurfacing on Revision Risk in Total Knee Replacement

An Instrumental Variable Analysis of 136,116 Procedures from the Australian Orthopaedic Association National Joint Replacement Registry

Conclusions: Surgeons who preferred selective resurfacing of the patella had a higher risk of patellar revision than those who had preference for routine resurfacing of the patella. Overall, a greater preference for resurfacing resulted in a lower risk of patellar revision.

Editorial Comment: Review of literature shows a clear trans-Atlantic divide between patellar resurfacers(North American Surgeons) and non-resurfacers (European Surgeons). This paper shows that the risk of all-cause revision is 20 % higher in the selectively resurfaced group compared to the routinely resurfaced group.

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Orthopaedic Trauma : What has evolved in 2019

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Lower limb trauma

The choice of an appropriate internal fixation in treatment of distal tibial fractures remains controversial. There are always groups supporting either plating (medial / anterolateral) or nailing.
Open reduction and internal fixation (ORIF) provides anatomic reduction and allows early rehabilitation; however, it has shortcomings, including nonunion and wound infection due to extensive soft tissue injury(1)(3). Intramedullary nailing (IMN) is also a common method that avoids soft tissue stripping, allows preservation of the vascular supply, and permits dynamic fracture fixation.With improved IMN design and advanced adjunctive techniques such as angle-stable and multi-directional distal screws and block screws, reduction and fixation effects have become more effective(1)(4). Wound complications such as deep infection remain as a key factor affecting fracture healing and increasing medical costs. Plate fixation requires greater exposure and wider soft tissue dissection, possibly increasing the risk of infection[2]. Such problems can be avoided by using IMN, which is a minimally invasive method. The fixation of distal tibial fractures with intramedullary nails is associated with high union rates and offers a significant benefit in not disturbing the soft-tissue envelope at the fracture site [5]

A good reduction is the most difficult aspect and remains gold standard for nailing distal tibial metadiaphyseal fractures. Blocking screws can be used to check lateral displacement and angulation deformities.
1) Initial reduction of the fracture may often be achieved with gentle manipulation and traction by an assistant, with or without the use of percutaneously placed pointed reduction forceps.
2) Gravitational reduction, for example flexing the knee over a support such as stacked towels or a radiolucent foam wedge, may also be sufficient to maintain a satisfactory reduction.
3) Where the fracture extends to the tibial plafond , first lag screws should be placed.
4) Nail should be centered centrally.
5) Modern nail designs have more distal locking options within the distal 15 mm, for example the AO Expert Tibial nail has locking options at 5, 13, 22 and 37 mm from the tip of the nail.

Polytrauma Golden treatment

New parameters are included-
1 LDH (LDH clearance)- Admission lactate has been used to predict sepsis, especially in the presence of substantial initial hemorrhage. A survival rate of 75% is observed after normalization of lactate levels between 24 and 48 h [6,7]. At the same time arterial and venous blood gas analysis, differentiation does matter and remains important.
2. Early platelet count -
Up to 35% of patients with severe injuries present with a trauma-induced coagulopathy on admission [9]. Abnormal coagulation tests are associated with higher mortality even in the moderately injured, suggesting that their importance may be underappreciated [7]. In general, certain principles appear to be relevant in managing coagulopathy: 1. The efficacy of plasma repletion appears to play out in the first few hours of resuscitation 2. Blood volume deficit may be a more sensitive marker of efficacy in some populations 3. Early plasma replacement appears to prevent some patients from going on to require massive transfusion [6,7,8]

New concepts introduced and older redefined

Early total care (ETC)
The simplified focus is attributed to fractures of long bones to ARDS and the aim is to decrease respiratory complications, as ARDS is the most important complication till now.

Damage control orthopaedics (DCO)

Certain aspects of initial injury types were observed to imply a special risk for secondary complications including SIRS, MOF, sepsis, or ARDS. With DCO treatment, the survival and the rate of complications was improved

Early appropriate care (EAC)

With more evidence and literature support, emphasis is shifted to elevated lactate levels with the similar background, i.e. to all stabilize fractures definitively, whenever lactate stabilizes. It is thus similar to ETC

Safe definitive surgery (SDS)

The overzealous application of external fixation as convenience is used with caution in this new concept (7) and this concept was developed to refine DCO. SDS uses easily available routine clinical parameters and reflects basis to understand clinical changes , severity of injuries and distribution of injuries as a basis to understand the dynamic clinical changes that may ensue within hours after injury along with that the continual reassessment of patients at risk is a crucial factor and is suggested to be performed multiple times, i.e. after completion of resuscitation, after completion of a major surgical step in planned staged management of fractures and prior to surgery in the ICU[9]

Prompt individualized safe management (PRISM)

The individualized approach includes patient age, gender, co-morbidities and special aspects that may cause management changes, such as pregnancy. In addition to the previous recommendations, it reflects upon local resources both in terms of manpower and hospital capacity(8). Moreover, this tactic overcomes previous dogma, (such as the "window of opportunity" for certain major fracture fixations) by not recommending setting time limits for initiation of surgery. It therefore respects recent advances in patient assessment using inflammatory mediators and allows one to perform intra-operative reassessments. It is described as representing a philosophy of "doing no further harm" in patients with multiple injuries in order to achieve the best possible outcome in a given patient, hospital, and trauma system environment.

In summary, various innovations have occurred since the turn of the millennium and they have helped evaluate the trauma patient with multiple injuries(7)(8). Among these, we have identified four major areas:
1) Emergency room management has moved towards a strategy of permissive hypovolemia and point of care testing;
2) The continual reassessment of the trauma patient after resuscitation has become more standardized and involves endpoints of coagulopathy and acid base changes;
3) The criteria to assess borderline patients and those at special risk have been refined;
4) Scoring systems and scales have been described that may help guide the management of patients that may benefit from damage control versus for safe definitive early surgery for major fractures.

Hip fractures

Hip fractures management is always based upon risk-benefit ratio. This ratio is difficult to quantify various treatment options evolved with time, and there is always debate which surgical treatment is superior, cost effective and gives best results(10). Most of these fractures are treated operatively with either a sliding hip screw or intramedullary hip screw, although arthroplasty is a rare option. Management options for hip fractures in superaged patients are always determined by the risk-benefit ratio. Intramedullary nailing can be used to in wide range of intertrochanteric fractures, including the more unstable fracture pattern such as reverse obliquity (10). Commonly proposed advantage of the intramedullary hip screw is its minimally invasive approach which reduces blood loss. Although there are is no data suggesting that an intramedullary hip screw is more effective than a sliding hip screw in treating stable fracture patterns, it is becoming more and more commonly used by young surgeons. The choice of implants is debatable in these fractures. Dynamic hip screw, whose advantage is interfragmental compression effect with a high union rate, and a minimally invasive technique, is used to reduce soft tissue stripping and blood loss at the same time the extramedullary fixation has a higher incidence of varus collapse, medialization of the distal fragment and cut out of the femoral head screw in the treatment of unstable intertrochanteric fractures(11)
Blood loss- In the study conducted by Hariharan et al the average blood loss for DHS and PFN groups was 202.5 ml and 198 ml, respectively. This result was similar to several studies in literature. Pajarinen et al. studied outcome of 108 operated cases of PFN and DHS (all AO type fractures) and found average blood loss was 320 ml and 357 ml respectively for the two groups and no statistical difference between the two groups .Recent meta-analysis by Zhang et al. in 2018 did meta-analysis which showed that there was no significant difference in the blood loss and requirement of blood transfusion between the two surgeries(12).
Surgical time- Giraud et al. studied 60 patients and found that the average operative time for PFN and DHS was 35 and 42 min, respectively, with no significant statistical difference. Meta-analysis by Huang et al. in 2013 showed that operative time depends upon the skill of the surgeon and his experience with using the specific implant. (10)
The functional outcome – At 1-year follow-up, functional recovery scores were similar in elderly patients treated with the DHS and PFN techniques.

To conclude, the study indicates that do not hesitate to choose a DHS implant for type 31-A1 fractures and believe that DHS fixation is the optimal choice for such a fracture. This is because cortical contact is present after reduction of type 31-A1 fractures, without a gap medially, posteriorly, or laterally. This contact can prevent fracture displacement secondary to the pull of the iliopsoas, gluteus medius, and short external rotator muscles on the proximal fragment; varus collapse; retroversion; future deformity; or nonunion when a force is transmitted to the fracture line. (11)(12)

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Recent and relevant literature for ACL injury in 2019

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Diagnosis of Partial Anterior Cruciate Ligament Injuries

Recently, a lot of fruitful work has been done for the accurate and timely diagnosis of partial anterior cruciate ligament injuries. The diagnostic validity of an isokinetic testing protocol to identify partial anterior cruciate ligament injury was studied by Scoz RD et al[1]. It was suggested that isokinetic data analysis through Fast Fourier transformation can be used to improve diagnostic accuracy of a difficult detection injury. Even thou present, a partial ACL injury can produce a stable knee during isokinetic testing and could be used to detect candidates for conservative treatment based on strengthening exercises, reducing surgery risks, and financial and social impact on patient's life.

Slope-changing osteotomy in ACL injury management

Increases in tibial slope lead to a linear increase in ACLR graft forces, and this effect is magnified in the setting of a posterior medial meniscus root tear. At slopes >12°, a slope-changing osteotomy could be considered in the setting of a revision ACLR with a concomitant medial meniscus root tear. This principle was substantiated in the study by Samuelsen et al [2].

Grafts used in ACL reconstruction.

Interest has recently grown in the techniques of identifying graft diameters preoperatively so as to select the best graft possible suiting the patient profile. Comparative analysis, in a single centre, of ACL reconstruction using bone patellar tendon bone allograft or a hamstring tendon autograft was done by Biz C et al[3]. At follow-up evaluation after ACL reconstruction, both BPTB allograft and GST autograft patient groups showed similar results at subjective, objective clinical evaluation and proprioceptive properties of the limb. In particular, the use of allogenic BPTB allowed the patients to return earlier to normal activities of daily-living and sport activity.

In the study by Rhatomy et al[4] on peroneus longus grafts, it was concluded that patients' anthropometric characteristics including gender, height, weight, and BMI in preoperative measurements can predict peroneus longus graft diameter intraoperatively. No particular formula, however, was derived for approximating graft diameter pre-operatively.

In the study by Hollnagel et al[5], it was found that imaging performed according to routine knee injury protocol can be used to preoperatively predict the size of hamstring autografts for ACL reconstructions. In clinical practice, this can assist orthopaedic surgeons in graft selection and surgical planning.

Combination of anterior cruciate ligament reconstruction with lateral extraarticular tenodesis.

Anterolateral rotational instability may persist after anterior cruciate ligament (ACL) reconstruction for a variety of reasons including damage to lateral or posterolateral structures, injury to the meniscus, disruption of anterolateral soft tissue structures, or increased tibial slope. In the setting of revision or primary ACL reconstruction with persistent anterolateral laxity, despite repair or reconstruction of other injured structures or in the setting of increased tibial slope, Bernholt et al[6] concluded that a lateral extra-articular tenodesis procedure can be used to augment an ACL reconstruction to aid in restoring anterolateral rotational stability and to upload the ACL reconstruction graft.

Recent trends in rehabilitation after ACL reconstruction.

Buckthorpe M et al[7] have studied the use and benefits of aquatic therapy during rehabilitation after ACL reconstruction5. Aquatic rehabilitation practices, can be used to achieve six primary goals after ACL reconstruction : 1) assist in the reduction of pain and swelling; 2) support the

recovery of gait; 3) support the maintenance and/ or development of cardiovascular fitness; 4) help accelerate and optimize motor pattern retraining; 5) allow for earlier introduction of plyometrics and power training and 6) support the between session recovery and optimal load management, particularly in the later phases of rehabilitation.

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What's new in Hand Surgery! Updates from the year 2018-19.

Warid Altaf[1]

Scaphoid Fractures:

Nonunion of scaphoid fractures is still a big concern for all orthopedic surgeons. The common question in practice is the amount of cortical healing of a scaphoid fracture is needed to allow unrestricted activity. Guss et al. [1] did a cadaveric study to find out this and compared the load to failure of an intact scaphoid. The findings from the paper suggest that 50% cortical healing is sufficient to allow unrestricted activity after scaphoid open reduction and internal fixation with a compression screw.

The indications for a non vascularized bone graft, pedicled vascularized bone flap, or free bone flap remain debatable for the management of scaphoid non unions. Rancy et al. [2] challenged the traditional importance placed on the assessment of the proximal pole vascularity. In their study of scaphoid non unions treated with non vascularized bone-grafting and a headless compression screw, Rancy et al. showed that 33 of 35 fractures went on to union (defined by the authors as ≥50% bridging the cortical bone) demonstrated by computed tomography (CT), despite evidence of compromised proximal pole vascularity in 14 of 32 patients with histopathological data available. Although no data are available to examine the effectiveness of non vascularized bone-grafting relative to other techniques, the union rate in this series suggests that there may be a role for this treatment in the majority of scaphoid fractures. Additional series published in the past year using exclusively non vascularized grafting and screw fixation by Kim et al. (union in 22 of 24 patients with scaphoid non unions, all of which had magnetic resonance imaging [MRI]-demonstrated osteonecrosis in the proximal pole before the surgical procedure) [3] and Luchetti et al. (union in 18 of 20 proximal pole fractures) [4] corroborated the findings from Rancy et al. The reported success of non vascularized bone graft in the treatment of scaphoid non union and osteonecrosis demonstrates the need for prospective, comparative studies to determine the most appropriate surgical techniques.

Flexor Tendon Repair:

Research continues in the quest for optimal outcomes after flexor tendon repair. There are relatively few comparative studies of the

most popular postoperative therapy protocols, with prior Level-I evidence demonstrating superiority of place-and-hold over passive motion. However, Rigó et al. provided the first Level-I comparison of early active motion with passive motion [5]. In their prospective randomized trial, patients with flexor tendon repairs were randomized to early active motion (active flexion and extension) or a modified Kleinert passive motion protocol (active extension and passive flexion with a palmar rubber-band pulley). There were no differences in total active motion at the time of final follow-up (12 months), but better functional outcomes in the active motion group were seen at 1 month. This difference was not present at later assessments (at 2, 3, 6, and 12 months).

Giesen et al. called the tenets of A2/A4 pulley preservation and epitendinous suture into question, as they reported a series of 27 flexor tendon repairs treated with a 6-strand repair technique without an epitendinous suture, with liberal division of the A2 and A4 pulleys, and with early active motion [6] Twenty-four of the 27 fingers had good to excellent outcomes using the Strickland criteria, with no ruptures. Similarly promising results have been reported using a comparable protocol for thumb flexor tendon repairs by Pan et al [7], suggesting that a paradigm shift may be underway in the treatment of flexor tendon injuries.

Wrist Arthroplasty:

The utilization of total wrist arthroplasty has been limited by concerns for complications such as distal implant loosening. Kennedy et al. provided a mean 7-year follow-up following the implantation of the Universal 2 total wrist arthroplasty (Integra Life Sciences) (48 wrists in 46 patients), noting improvements in patient-reported outcomes, satisfaction, and range of motion [8]. However, half of the patients had radiographically detectable loosening in the wrist; 6 of these cases were noted as having symptomatic loosening. Seven wrists underwent revision arthroplasty or arthrodesis and 4 were diagnosed with carpal tunnel syndrome (2 had carpal tunnel release). Despite the promising clinical outcomes, the complication risk should be noted when counselling patients about their treatment options.

In an effort to address the shortcomings of total wrist arthroplasty, a hemiarthroplasty that replaces the proximal carpal row and preserves the midcarpal joint has been introduced. Among the 20 patients who had a mean follow-up of 4 years, Anneberg et al. demonstrated improvements in wrist flexion and extension, radial and ulnar deviation, grip strength, and patient-reported outcomes [9]. Three patients underwent a manipulation under anaesthesia for stiffness, 1 patient underwent a conversion to total wrist arthroplasty due to component loosening, and 1 patient had a wrist arthrodesis to treat ulnar-sided wrist pain. Although these results are promising, long-term results and reproducibility by other centres are needed before recommending widespread use.

Distal radius fractures:

Over the past many years the focus has been on intermediate column of the distal radius fractures. Bingshan Yan et al in 2019 published a study on influence of distal radius fractures involving the intermediate column on forearm rotation [10].

102 patients with distal end radius were taken into the study. The results of this study prove that fractures of the intermediate column play an important role in determining restricted forearm rotation after distal radius fractures treated conservatively. The data also did suggest that patients with distal radius fractures involving the intermediate column have lower DASH scores. Based on these findings, they think fractures involving the intermediate column of the distal end deserve more attentions from the surgeon.

Fragment specific fixation of the distal radius fractures is a very useful concept in treating distal end radius fractures. Hozack et al in 2019 studied the anatomy of the distal end radius in detail and further explained the fixation strategies in such cases. [11]. What they concluded from the study is that Fragment-specific fixation can be utilized in cases in which stabilization of specific articular segments is required. Radial styloid, volar rim, dorsal wall, dorsal–ulnar corner, and impacted intra articular fragments may be secured with implants designed specifically for each individual fragment. Although these techniques can be technically demanding, they can be used independently or in combination with other fixation techniques to obtain accurate reductions and favourable functional outcomes

Carpal Tunnel Syndrome:

The role of electrodiagnostic studies in the diagnosis and management of carpal tunnel syndrome continues to evolve. Although the American Academy of Orthopaedic Surgeons (AAOS) has declared in its clinical practice guidelines that electrodiagnostic studies are not necessary to establish a diagnosis of carpal tunnel syndrome, many surgeons continue to use electrodiagnostic studies as a predictor of response to carpal tunnel release. In their prospective study, Rivlin et al. demonstrated improvement in functional and patient-reported outcomes at 3 months after carpal tunnel release in patients with electrodiagnostic studies graded as mild, moderate, and severe carpal tunnel syndrome [12]. There was no difference in the magnitude of improvement among the 3 groups, suggesting that electrodiagnostic studies may not be a useful prognostic indicator for patient-reported recovery after carpal tunnel release. Neurologic outcomes such as muscle strength and sensation were not evaluated.

Triangular Fibrocartilage Complex:

Our collective understanding of the anatomy and pathophysiology of the triangular fibrocartilage complex continues to grow. Recent studies have examined some of the fundamental beliefs in the assessment of ulnar-sided wrist pain. Park et al. evaluated the reliability of wrist arthroscopy to diagnosis triangular fibrocartilage complex injuries, demonstrating modest agreement among 3 observers as to whether a triangular fibrocartilage complex tear was present, whether a trampoline test was considered positive, and the location of a tear [13]. The results of this study suggest that wrist arthroscopy may not be an appropriate reference standard for the diagnosis of triangular fibrocartilage complex tears. In a cadaver model, Trehan et al. also demonstrated suboptimal performance of the trampoline test among 3 reviewers, with the arthroscopic hook test being a more

reliable and highly sensitive and specific marker for isolated triangular fibrocartilage complex foveal detachment [14].

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