

Shoulder Synovial Chondromatosis in an Adolescent Athlete: A Case Report

Neeraj Vij¹, Tram L Tran², Brian D Kelly³, Dane V Tassel^{1,4}, Heather M Menzer³, Jeffrey M Vaughn³

Learning Point of the Article:

Synovial chondromatosis, though rare, can be a cause of shoulder pain in an adolescent athlete. Arthroscopic removal is generally successful.

Abstract

Introduction: Synovial chondromatosis refers to a benign proliferative disease of the synovium. Reports in children are rare and reports involving the pediatric shoulder are even more rare. In this review of the literature and case report, we provide a summary of all published cases in children and a report of a case of shoulder synovial chondromatosis in an adolescent female athlete.

Case Presentation: A 15-year-old female cheerleader presented to the clinic with gradual onset right shoulder pain with a severity of 5/10. On physician examination, the patient had tenderness over the proximal humerus, limited abduction to 160°, limited forward flexion, and a total arc of motion of <180°. Radiograph of the shoulder demonstrated multiple calcific intra-articular loose bodies consistent with synovial chondromatosis. Arthroscopic removal resulted in resolution of symptoms at the 36-week follow-up.

Conclusions: Our literature search revealed only eight case reports on shoulder synovial chondromatosis in children. The location of the chondromatosis within the shoulder joint can be intra-articular, extra-articular, within the biceps sheath, or combined. In general, for chondromatosis confined to the glenohumeral joint space, open surgery is not required. Bony erosions can occur in the setting of chondromatosis though may not need to be addressed surgically. Although rare, this diagnosis should be considered when confronted with shoulder pain that is exacerbated during long athletic events with limited range of motion on physical examination in the adolescent athlete. Arthroscopic treatment in conjunction with physical therapy and early mobilization can lead to a successful outcome.

Keywords: Synovium resection, arthroscopy, shoulder, adolescent medicine, sports medicine.

Introduction

Synovial chondromatosis refers to a benign proliferative disease of the synovium [1]. The pathology was originally described in three distinct phases: Early, transitional, and late, with late being marked by the presence of several loose bodies [2]. It can broadly be classified by anatomic location [1], by the stage of disease [2], or by involvement: Extra-articular, intra-articular, bursal, or tenosynovial [1]. The disease has a male:female ratio of 2:1 and most commonly occurs in adults ages 30–50. The knee is the most common location overall. Within the upper extremity, the

elbow is the most common location [1].

Management is generally based on patient symptoms. Arthroscopic removal can be pursued in cases with progressive activity tolerance, mechanical symptoms, or excessive pain. In adults, age and concurrent osteoarthritis are important when considering surgery [3]. A recent case series demonstrated good clinical results for surgical removal in adults [3]. However, there are no studies exploring surgical removal in children.

Reports of shoulder involvement are sparse overall and even fewer in children [4, 5, 6, 7, 8, 9, 10, 11, 12]. Of these reports, only

Author's Photo Gallery



Dr. Neeraj Vij



Dr. Tram L Tran



Dr. Brian D Kelly



Dr. Dane V Tassel



Dr. Heather M. Menzer



Dr. Jeffrey M. Vaughn

Access this article online

Website:
www.jocr.co.in

DOI:
10.13107/jocr.2022.v12.i05.2836

¹Department of Orthopedic Surgery, University of Arizona College of Medicine- Phoenix 475 N. 5 th St | Phoenix AZ, 85012,

²University of Arizona- Phoenix, 1320 N 10 th St. Ste A, Phoenix, AZ 85006

³Department of Orthopedic Orthopedics, Main Building, Clinic B, 1919 E Thomas Rd, Phoenix, AZ 85016.

⁴Department of Radiology, Phoenix Children's Hospital, 1919 E Thomas Rd. Phoenix, AZ 85016.

Address of Correspondence:

Dr. Heather M Menzer,
Department of Orthopedic Surgery, Phoenix Children's Hospital, Phoenix, Arizona, United States.
E-mail: heathermenzermd@gmail.com

Submitted: 10/10/2021; Review: 15/01/2022; Accepted: April 2022; Published: May 2022

DOI:10.13107/jocr.2022.v12.i05.2836

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License <https://creativecommons.org/licenses/by-nc-sa/4.0/>, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms





Figure 1: AP, Grashey, and scapular Y views on initial presentation demonstrating multiple small rounded mineralized foci in the axillary and subcoracoid recesses.

one study reports a bony deformity [11], which was in the setting of a concurrent osteochondritis dissecans lesion. In this review of the literature and case report, we provide a summary of all published cases in children (Table 1) and a report of shoulder synovial chondromatosis in a 15-year-old female cheerleader with bony erosions.

Case Report

Clinical presentation

A 15-year-old female national POM cheer competitor with no known medical history presents to the clinic with a week of the right shoulder pain. The pain was described as a nagging ache over the anterolateral arm with the severity rated as 5/10. It was exacerbated by pressure, movement, and cheer events. The symptoms were partially alleviated by ibuprofen. The patient denied any recent injury, trauma, swelling, mechanical symptoms, or neuropathic symptoms.



Figure 3: Arthroscopic views demonstrating several small intra-articular loose bodies (first two images), removal through a large hip arthroscopy at the 7 o'clock position (third image), and several loose bodies measuring nearly 0.5 cm (fourth image).

On physician examination, the patient had point tenderness over the proximal humerus, limited abduction to 160°, and limited forward flexion to 120°.

Imaging studies

The patient's primary care physician had ordered X-rays of the shoulder which demonstrated multiple calcified loose bodies in the axillary recess (Fig. 1). Erosions were also seen posteriorly on the scapular Y-view (Fig. 1c). MRI demonstrated several loose bodies in the subcoracoid bursa (Fig. 2).

Treatment

On diagnostic arthroscopy, no labral, rotator cuff, or biceps

pathology were observed. Minor cartilage wear on the glenoid was noted. Several loose bodies were found intra-articularly (Fig. 3a, 3b). The loose bodies were removed through a large (hip arthroscopy) posteroinferior portal with a high inflow to act as a suction (Fig. 3c.) Extensive debridement around the rotator interval was performed to adequately remove all subcoracoid loose bodies. The same arthroscopic sequence was then repeated using both a 30° and 70° arthroscope. No loose bodies were found in the subacromial space. The specimens were sent for gross diagnosis to pathology and were described as multiple well-circumscribed gray-white portions of firm nodular tissue that was 3.5 cm in greatest dimension when aggregated (Fig. 3d).

Follow-Up

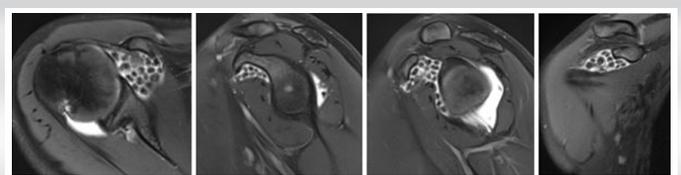


Figure 2: Axial, sagittal, and coronal slices from the T2 fat-saturated proton dense sequence demonstrating several loose bodies of relatively uniform size in the subcoracoid bursa, superior subscapular recess, and anterior to the glenoid.

At 2 weeks postoperatively, the patient reported 0 out of 10 pain controlled with the use of naproxen only. The patient proceeded to discontinue all pain medications by 6 weeks postoperatively. Although the patient did initially note some discomfort with terminal flexion and abduction, this had completely resolved by 12 weeks postoperatively.

At the 7-month follow-up, the patient described aching within the shoulder and difficulty raising the arm over her head. The ache was recently aggravated as she was approaching her competitive cheer season. On physical examination, she had full range of motion, full strength, and no signs of instability. At this time, a diagnostic and therapeutic intra-articular shoulder steroid injection under ultrasound guidance was pursued.

At 10 months postoperatively, the patient maintained 0 out of 10 pain at rest. The patient had returned to POM practices with no limitations. She did have some symptoms during prolonged POM practices with extended periods of overhead movement. She denied any symptoms of instability. On examination, the

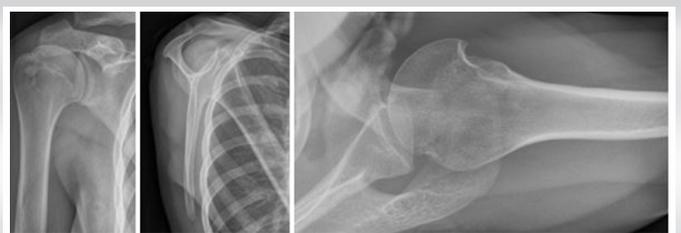


Figure 4: AP, scapular Y, and axillary lateral views demonstrating near complete resolution at 10 months postoperatively. An incidentally found large smooth scalloping lesion along the anterior aspect of the proximal humeral physis and a smaller lesion posteriorly can be seen.

Table 1: A summary of all published case reports on synovial chondromatosis of the shoulder in the pediatric population											
Author	Year	Age	Gender	Sport	Location	Other	Surgical treatment	Resolution of symptoms	Instability	Complications	Duration of follow-up
Sinikumpu [7]	2020	14	M	None	Within the glenohumeral joint, biceps tendon sheath, and subcoracoid bursa	N/A	Y-Open deltopectoral approach	Y	N	N	1 year
Ucpinar [10]	2020	17	M	None	Multiple well-defined osseous intra- and extra-articular loose bodies	N/A	Y-arthrotomy with concomitant synovectomy	Not available	Not available	Not available	Not available
Gill [11]	2017	14	M	Competitive Golfer	Within the glenohumeral joint	A concurrent concave defect in the center of the humeral head.	Y	Y	N	N	1 year
Dwidmutha [12]	2014	8	M	None	Anteromedial aspect of humerus	N/A	Y	Y	N	N	3 weeks
Kirchhoff [5]	2008	14	M	None	Within the tendon sheath of the LHB	N/A	Y-Open synovectomy and open biceps exploration deltopectoral	Y	N	N	9 months
Chillemi [4]	2005	18	M	None	Multiple calcific nodules in the right glenohumeral joint, the subcoracoid recess, and anterior to the humeral head	Mild degenerative changes in the glenohumeral joint were noted.	Y	Y	N	N	24 months
Miranda [9]	2004	10	F	None	Around the glenohumeral joint and within the biceps sheath	N/A	Y-deltopectoral approach for biceps sheath	Y	N	N	12 months
Nashi [8]	1998	14	M	None	Densities around the glenohumeral articulation	N/A.	N	Not available	Not available	Not available	Not available

patient had full range of motion of forward flexion to 180°, abduction to 180°, external rotation to 80°, and internal rotation to L1. Five out of five strength in abduction, internal rotation, and external rotation were noted. Follow-up X-rays demonstrated resolution of the chondromatosis; however, bony erosions along the anterior and posterior humeral head were seen (Fig. 4).

At the 49-month follow-up, the patient maintained complete resolution of symptoms. The patient did not report any pain or subjective instability. The patient maintained forward flexion to 180°, abduction to 180°, external rotation to 80°, and internal rotation to L1. Special testing did not reveal any signs of instability. Repeat radiographs demonstrated resolution of the synovial chondromatosis, yet the priorly seen bony erosions were again noticed (Fig. 5).

Discussion

Shoulder synovial chondromatosis is rare and is especially rare in children. In this review of the literature and case report, we review all published cases of shoulder synovial chondromatosis in children and provide a unique case. Our literature review revealed only eight case reports on shoulder synovial chondromatosis in children (Table 1). One can note that only one of these eight cases was in self-reported athletes [11]. One can also note that seven of these eight cases were treated surgically, of which four involved open surgery due to the extent of the chondromatosis. There is a wide spectrum regarding the

location of the chondromatosis in the pediatric population (Table 1). In our case, the chondromatosis was limited to the gleno humeral joint space (Fig. 1, 2, 3), and thus, an open surgical approach was not required.

Our case presents the unique features of concurrent bony erosions (Fig. 4) in the setting of shoulder synovial chondromatosis. However, our patient did not report any symptoms of instability nor was any instability noted on physical examination. Gill et al. 2017, presented the case of shoulder chondromatosis in a competitive golfer in the setting of a concave defect in the center of the humeral head [11]. On arthroscopy, this was diagnosed as concomitant osteochondritis dissecans. These two cases may highlight the fact that chondromatosis may alter the pressure environment within the shoulder and thus lead to bony erosions. To the best of our knowledge, there are no reports of other bony deformities in the setting of shoulder synovial chondromatosis in children.

There are limited studies regarding arthroscopic synovectomy and loose body removal. A recent case series in adults demonstrated good clinical results (five out of five patients) with radiographic recurrence in two out of five patients [3]. The results of our review (Table 1) of the eight published cases in children demonstrate six out of eight cases reporting complete resolution of symptoms at last follow-up (two of eight cases did not have follow-up information.) Our case demonstrated good clinical results at 36 months, with a complete resolution of symptoms at rest, yet some symptoms during long POM practices were maintained.

Conclusion

Our case highlights the presentation of shoulder synovial chondromatosis in the adolescent athlete. Although rare, this diagnosis should be considered when confronted with shoulder pain that is exacerbated during long athletic events. Adolescent



Figure 5: Radiographs 48 months postoperatively demonstrating resolution of the chondromatosis. The bony erosions seen priorly are most notable on the axillary lateral view.



athletes with this condition may have full return to sport after arthroscopic treatment.

Clinical Message

Arthroscopic removal and physical therapy may be the appropriate treatment for refractory shoulder synovial chondromatosis in adolescent athletes.

Declaration of patient consent: The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given the consent for his/ her images and other clinical information to be reported in the journal. The patient understands that his/ her names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Conflict of interest: Nil **Source of support:** None

References

1. Ho YY, Choueka J. Synovial chondromatosis of the upper extremity. *J Hand Surg Am* 2013;38:804-10.
2. Milgram JW. Synovial osteochondromatosis: A histopathological study of thirty cases. *J Bone Joint Surg Am* 1977;59:792-801.
3. Urbach D, McGuigan FX, John M, Neumann W, Ender SA. Long-term results after arthroscopic treatment of synovial chondromatosis of the shoulder. *Arthroscopy* 2008;24:318-23.
4. Chillemi C, Marinelli M, De Cupis V. Primary synovial chondromatosis of the shoulder: Clinical, arthroscopic and histopathological aspects. *Knee Surg Sports Traumatol Arthrosc* 2005;13:483-8.
5. Kirchhoff C, Buhmann S, Braunstein V, Weiler V, Mutschler W, Biberthaler P. Synovial chondromatosis of the long biceps tendon sheath in a child: A case report and review of the literature. *J Shoulder Elbow Surg* 2008;17:e6-10.
6. Sprengers ME, Van Rijn RR. Diagnostic image (280). A female dancer with a painful shoulder. *Ned Tijdschr Geneesk* 2006;150:1454.
7. Sinikumpu JJ, Sinikumpu SP, Sirniö K, Näpänkangas J, Sequeiros RB. Pediatric primary synovial chondromatosis of the shoulder, biceps tendon sheath and subcoracoid bursa. *J Clin Orthop Trauma* 2020;11:317-20.
8. Nashi M, Manjunath B, Banerjee B, Muddu BN. Synovial chondromatosis in a child: An unusual cause of shoulder pain case report. *J Shoulder Elbow Surg* 1998;7:642-3.
9. Miranda JJ, Hooker S, Baechler MF, Burkhalter W. Synovial chondromatosis of the shoulder and biceps tendon sheath in a 10-year-old child. *Orthopedics* 2004;27:321-3.
10. Ucpinar BA, Sahin C. Primary intra-articular and extra-articular synovial chondromatosis in a child: A rare cause of shoulder pain in children. *J Coll Physicians Surg Pak* 2020;30:1345-7.
11. Gill J, Tytherleigh-Strong G. Osteochondritis dissecans with associated secondary chondromatosis in an adolescent shoulder. *Shoulder Elbow* 2019;11:275-81.
12. Dwidmuthe SC, Nemade AS, Agrawal S, Pathak A. Rare case of extra-articular synovial chondromatosis of biceps tendon sheath in 8 years male child. *J Orthop Case Reports* 2014;4:33-6.

Conflict of Interest: Nil

Source of Support: Nil

Consent: The authors confirm that informed consent was obtained from the patient for publication of this case report

How to Cite this Article

Vij N, Tran TL, Kelly BD, Tassel DV, Menzer HM, Vaughn JM. Shoulder Synovial Chondromatosis in an Adolescent Athlete: A Case Report. *Journal of Orthopaedic Case Reports* 2022 May;12(5): 101-104.