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Glenohumeral Chondrolysis After Shoulder Arthroscopy

- Chondrolysis of the shoulder, (rapid dissolution of the articular cartilage), is being diagnosed with increased frequency since the advent of shoulder arthroscopy.
- No definitive etiology has been identified, although strong associations have been made with the use of thermal devices and with the administration of intra-articular anesthetics.
- Management of glenohumeral chondrolysis is problematic as many of the patients are very young for treatment with conventional total shoulder arthroplasty.
- We have analyzed the existing literature along with a series of new cases in search of factors that may contribute to the development of chondrolysis.

Chondrolysis is a reported complication of shoulder arthroscopy. Up through 2008, a total of 51 patients, (55 shoulders), had been reported. Given the thousands of shoulder arthroscopies that are conducted on an annual basis, this number seems minute. It is likely that there are more cases that have escaped detection or were not reported. As such the incidence is not known.

To date, the development of chondrolysis has been associated with the use of Gentian violet dye to detect cuff tears, thermal treatment within the joint and intra-articular anesthetics. Other possible associations include bioabsorbable implants and absorbable suture as well as possibly infection, osteoarthritis and trauma.

No prospective analysis or randomized clinical trial has been done in humans, so the study of anecdotal cases along with bench and animal research efforts is the best information available. To study the problem, we obtained sixty-one patient records (67 shoulders) from other institutions of patients who developed post-arthroscopic glenohumeral chondrolysis, (PAGCL), and reviewed them in a systematic fashion along with the existing cases in the literature noted above. This allowed us to study all the available cases and more than double the information previously available. Ultimately we had data on 113 patients (122 shoulders) (Table 1).

A total of 122 shoulders in 113 patients with post-surgical glenohumeral chondrolysis were analyzed. The average patient age was 33 and 31 at the time of surgery for the case series and literature review respectfully (Range 14-64). The most common indications for surgery were instability and SLAP lesions. Pain pumps were utilized in 93 shoulders, 67 in case series and 26 in the literature review. Lidocaine (2%) was used in 14 patients in the case series, and bupivacaine (0.25-0.5%) in 31 patients in the case series and 17 patients in the literature review, with and without epinephrine. Radiofrequency capsulorrhaphy was performed in 24 shoulders with all patients in the case series having the addition of a pain pump.

Chondrolysis manifested clinically as progressive, severe and refractory pain and loss of motion. Radiographic documentation of chondrolysis was established at an average of 506 days (Range 42-1823) after the arthroscopic procedure, (Figure 1A & B). X-ray and MRI changes were consistent: joint space narrowing (97 patients), subchondral cysts of the glenoid (45 patients) and humeral head (45 patients), and minimal or no osteophytosis (10 patients and 23 patients).

Conclusion

Glenohumeral chondrolysis can be associated with the combination of arthroscopic surgery and post-arthroscopy infusion of local anesthetic. In contrast to previous reports, the arthroscopic operations associated with chondrolysis in this series were not limited to stabilization procedures and the infused anesthetic was not limited to bupivacaine.

It is of note that the 67 patients presented here were located based on their presentation of chondrolysis following the use of pain pumps. This did not allow for meaningful statistical

	Case Series	Literature Review
Number of shoulders	67	55
Number of patients	62	51
Number of males*	37	12
Number of females*	25	18
Mean Age in Years (SD, range)	33 (11, 15-57)	31 (14, 14-64)
Arthroscopic surgery	67	51
Open surgery	3 (arthroscopic converted to open)	4
Instability procedures	47	51
Bankart repairs for instability	17	23
Capsular plication for instability	30	28
SLAP repairs	27	6
Rotator cuff repairs	9	4 (open)
Rotator cuff debridements	2	4
Capsular releases	1	3
Cases using suture anchors	42	24
Cases using radiofrequency	28	24
RF Capsulorrhaphies	6	18
RF Only for releases or debridements	11	6
RF used in subacromial space only	11	0
Cases involving Thermal capsulorrhaphy and Pain Pumps	6	18
Cases involving radiofrequency and Pain Pumps	28	24
Laser Capsulorrhaphies	0	3
Cases using intraarticular dye	0	4
Cases with intraarticular pain pump	67	26
Cases with bupivacaine in infusate (concentration range)	31 (0.25-0.5%)	17 (0.25-0.5%)
Cases with lidocaine in infusate (concentration range)	14 (2%)	0
Cases with epinephrine in infusate (concentration range)	37 (1:100K-1:200K)	13 (unknown)
Flow rate range in cases where it was specified	2-5 ml/hr	4-4.16 ml/hr

Table 1: Summary of clinical findings. Data represent the number of shoulders with the finding. * 21 patients in the literature review did not have gender identified.

analysis or comparison to previously reported studies. Additionally, we are unable to ascertain the population at risk and therefore were unable to calculate the true incidence and prevalence of chondrolysis in this population. In spite of these limitations, this study demonstrated that chondrolysis can occur in patients in a broad age range, with many routine arthroscopic procedures, using bupivacaine or lidocaine with and without epinephrine. Moreover, there is often a substantial delay between the arthroscopic procedure and the diagnosis of chondrolysis.

The pathology of chondrolysis is characteristic and remarkable in terms of the involvement of essentially all of the joint's articular cartilage, (Figure 2A & B). Once the process begins, there is no evidence that it can be arrested. Arthroscopic surgeons may wish to consider avoiding factors associated

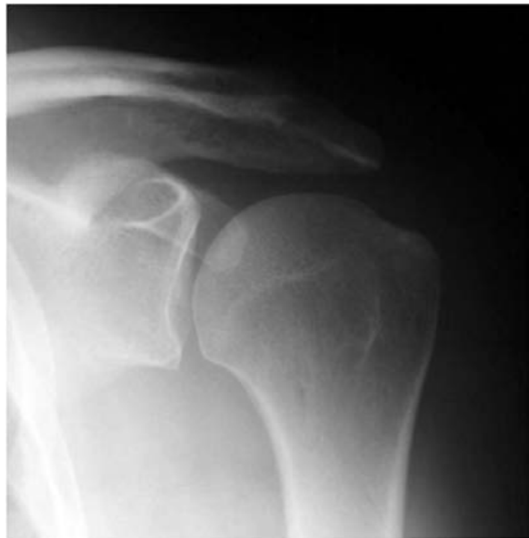
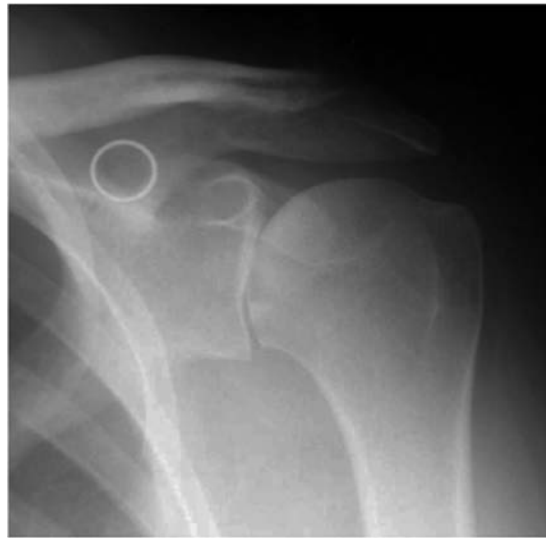

Figure 1A & B: Characteristic radiograph of pre-operative normal apparent joint space, (a) and 18 months after arthroscopic surgery with a post-operative intra-articular pain pump (b).

with chondrolysis, such as the post-operative infusion of local anesthetics and thermal energy, if these factors are not essential to the success of the procedure.

Future Developments in Optimizing Patient Care

In that we are seeing an increasing number of individuals with post-arthroscopic chondrolysis, we are striving to optimize the treatment of each of them. Some patients with early chondrolysis may be effectively managed with an arthroscopic approach of debridement and capsular release. More advanced cases may require a humeral hemiarthroplasty with non-prosthetic glenoid arthroplasty (the "Ream and Run" procedure) (www.orthop.washington.edu/reamandrun).

Recommended Reading

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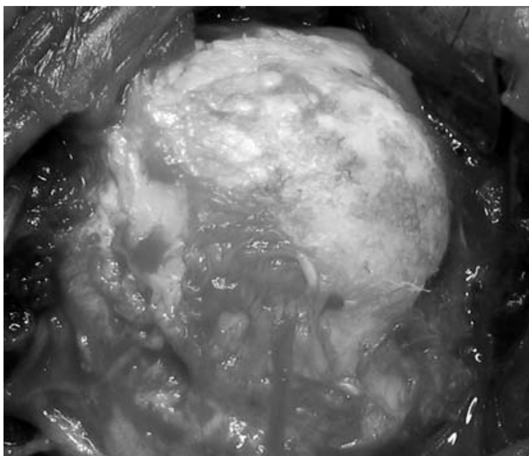
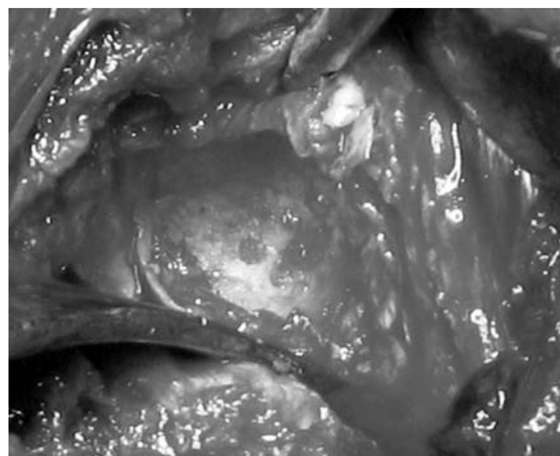

Figure 2A & B: Routine findings at arthroplasty surgery with complete loss of the (a) humeral head and (b) glenoid articular cartilage without proliferative osteophytes. Bone cysts were commonly seen.