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Infection after Arthroscopic Cuff Tear Repair (Case Report)

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Abstract

Septic shoulder arthritis following arthroscopic surgery is a rare complication, according to the literature it arises from 0.006% to 2,1% of cases. We report on a case of 58 y.o. patient, admitted to our setting 10 days after arthroscopic intervention on the right shoulder joint in another hospital. Based on clinical, laboratory and instrumental assessment septic shoulder arthritis was diagnosed. Arthroscopic lavage and debridement surgery with bioabsorbable antibacterial agent implantation was performed. Long term follow-up in 6 months showed good results with full range of motion, absence of pain and elimination of infection.

Keywords: shoulder arthroscopy, rotator cuff, septic shoulder arthritis, infectious complications.

Background

Infectious complications in shoulder arthroscopic surgery are rare, according to the literature, they occur in 0.006% to 2.1% of cases [1–4]. It is believed that the patient's age and the rotator cuff suture are predisposing factors for an infectious process in the shoulder [5, 6]. The manifestation of the infectious process most often happens during the first three weeks after the operation and is revealed by pain, increased swelling, hyperemia, and also discharge from the wound [7, 8]. The most frequent contamination is due to the Propionibacterium acnes, Staphylococcus epidermidis and Staphylococcus aureus [7, 9].

We report on a case of infectious inflammation of the shoulder occurring 10 days after rotator cuff arthroscopic suture.

Clinical observation

Patient, 58 y.o., underwent an arthroscopic re-attachment of the subscapularis and supraspinatus tendons and a biceps tenotomy on one from Moscow clinics. The re-attachment of the rotator cuff tendon was performed using a single row suture technique with two titanium anchors via standard arthroscopic ports. Eight days after surgery, he was discharged with recommendations to continue immobilization of the right shoulder joint in a sling for up to 6 weeks postoperatively. The patient neglected the use of the sling and 2 days after discharge, he felt increased pain and swelling.

The patient admitted to our clinic. The right upper limb was not immobilized at the time of his initial visit and examination. Postoperative wounds were covered with

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aseptic dressings. Soft tissues were swollen. With palpation, there was a pain in the projection of postoperative wounds, and low-grade local hyperemia of the skin. The long head of the biceps was shifted distally, palpation was moderately painful. The range of motion in the right shoulder joint: abduction — 60°, flexion — 90°, external rotation — 10°, internal rotation — wrist at the hip level. Acute vascular and neurological disorders in the limb were not identified.

After the aseptic dressing and suture removal, about 25 ml of purulent discharge emerged from the lateral arthroscopic port when inserting a probe (Fig. 1).

X-rays show the status after the rotator cuff tendon re-attachment with two titanium anchors (Fig. 2). There were no signs of metal anchor migration.

Because we suspected the involvement of fixators and intra-articular structures in the infectious process, CT-fistulography (contrast agent — Omnipaque) was performed (Fig. 3).

Laboratory studies found an increase in C-reactive protein to 84.26 mg/l and ESR — 60 mm/h, which caught our attention.

Based on clinical, laboratory and instrumental data, the patient was diagnosed with postoperative septic arthritis of the right shoulder, the infection involving an installed anchor. The patient is recommended to undergo a surgical treatment — arthroscopic revision the right shoulder (Fig. 4). Arthroscopic revision was performed 10 days after the initial intervention and 2 days after the onset of symptoms. Findings of arthroscopic examination: cloudy, turbid synovial fluid; deposits of fibrin; signs of synovial membrane inflammation — hyperemia with petechial hemorrhages. An inconsistent ligature was found in the subacromial space. Metal fixators were consistent; no indications of instability were identified. Samples were taken from the subacromial space and from the cavity of the shoulder for microbiological seeding.

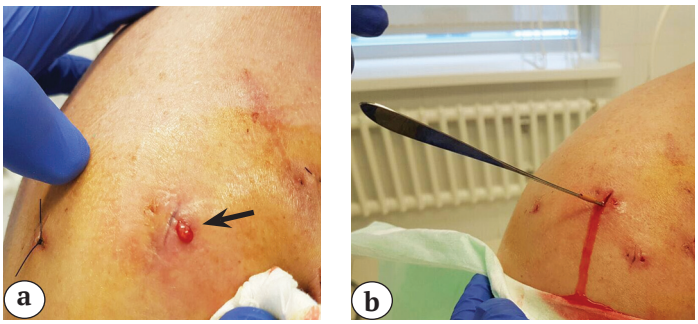

Fig. 1. General appearance of the right shoulder of patient K.:
a — discharge from the postoperative wound (arrow);
b — instrumental examination of the wound with a probe proof stick

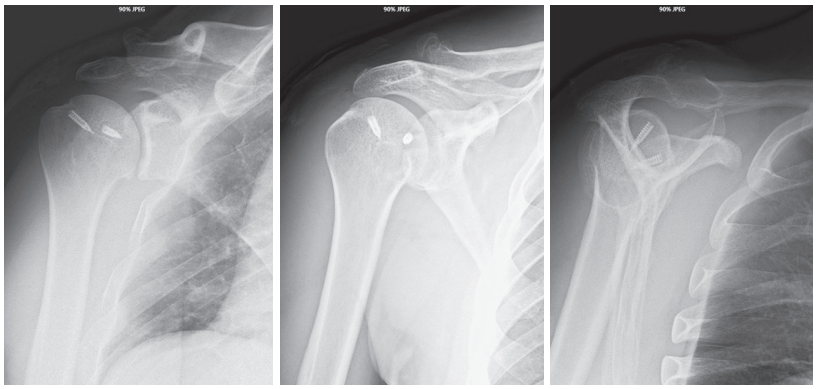

Fig. 2. X-rays of the right shoulder joint, standard view: state after the rotator cuff tendon re-attachment with two titanium anchors.
There are no signs of metal anchor migration

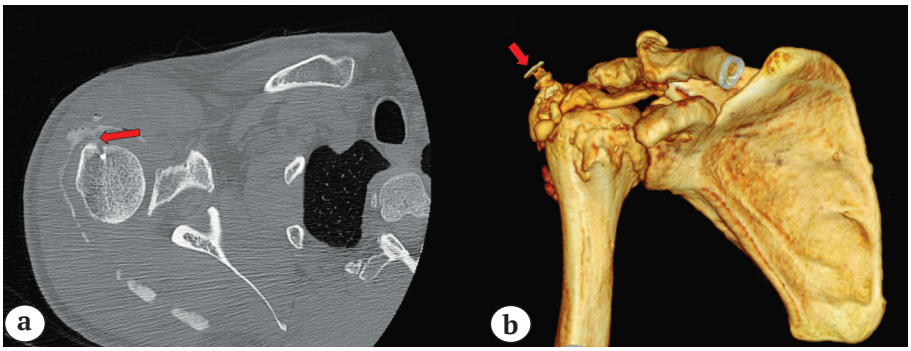

Fig. 3. Results of CT-fistulography:
a — axial section, diffusion of a contrast agent to the lateral anchor (red arrow);
b — 3D reconstruction: diffusion of a contrast agent (the red arrow indicates the place where the contrast was introduced — lateral arthroscopic port)

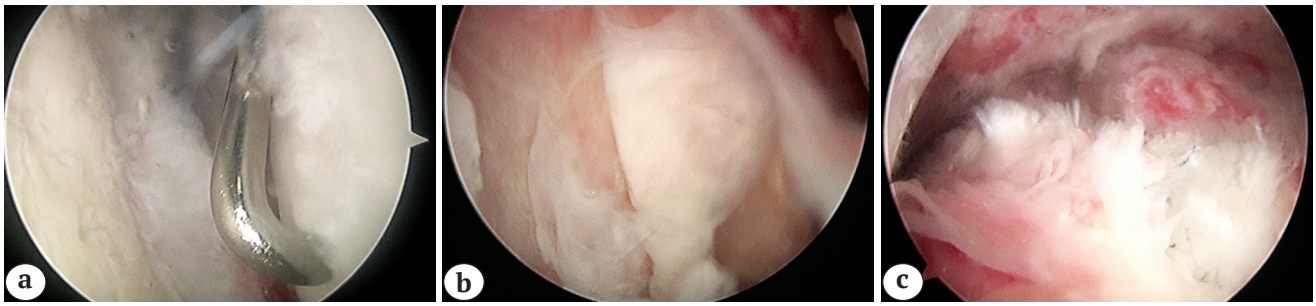

Fig. 4. Intraoperative images:
a – the status of the humeral head cartilage cover and the scapula articular surface;
b – adhesions in the subacromial space;
c – supraspinatus and infraspinatus tendon

The adhesions and fragments of inflamed synovial membranes were resected and the inconsistent ligature was removed from the subacromial space. The lavage of the shoulder cavity was performed with 35 liters of saline and of the subacromial space with 35 liters of saline. Two bioabsorbable antibacterial implants (Collatamp® EG, Roberts Healthcare, Germany), 5×20 cm in size, were placed into the joint cavity and subacromial space. Postoperative wounds were treated with antiseptic solutions and sutured tightly. Aseptic dressings were applied. The right shoulder joint was immobilized using a sling. A day later, patient was discharged from our clinic for outpatient observation.

Linezolid as an antimicrobial drug was administered (500 mg 1 tab once day for 21 days after surgery). The shoulder was immobilized for 3 weeks postoperatively. Suture material was removed 2 weeks after surgery. The dynamics of laboratory tests are shown in Figure 5.

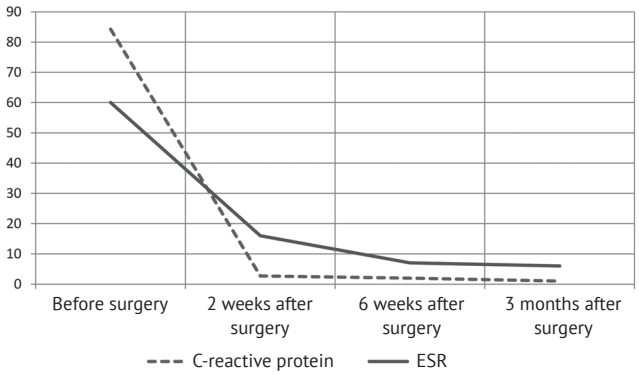

Fig. 5. The dynamics of laboratory tests of the patient

The bacterial culture test made it possible to identify the causative agent — Staphylococcus epidermidis 10^5 CFU, resistant to penicillin-type anti-bacterial agents and macrolides.

During the follow-up examinations, 1.5, 3 and 6 months after the operation, a positive trend, the absence of inflammations and an increase in the range of motion were observed. Six months after the operation, the full range of motion in the shoulder was achieved, the muscle strength of the rotator cuff was not reduced and the load was painless.

MRI six months after surgery shows: rotator cuff tendons are fully visible; the position of the anchors is correct; moderate synovitis (Fig. 6).

Discussion

Infectious complications after arthroscopic rotator cuff repair are rare, much less often than with open surgery [10]. Parnes *et al*. detected infectious complications in 2.1% (in 2 of 94 patients) [4].

Athwal *et al*. followed up 4886 patients who underwent rotator cuff arthroscopic repair. Infectious complications were detected in 0.43% (21 of 4886) cases [7].

Data were published comparing the different rates of infectious complications depending on the type of operation. In the study, Yeranosian et al. analyzed more than 150,000 arthroscopic operations on the shoulder joint. The frequency of infectious complications was higher in patients after rotator cuff repair — 0.29%. The lowest frequency of these complications was after capsulorhaphy — 0.16% [5].

A deep shoulder infection after rotator cuff repair significantly slows the rehabilitation (physiotherapy, restoration of motion, etc.) and the patient's ability to return to his usual activity [11]. In our clinical case, the shoulder was immobilized after sanition, which also increased the total period of immobilization and delayed the beginning of the recovery period.

There is conflicting evidence about the need of implant removal during arthroscopic debridement. Jennsen et al. rarely remove implants [12], and Pauzenberger et al., on the contrary, favor a removal of all implants [6]. In our opinion, the retention of previously installed implants is essential in the further postoperative recovery period.

Antibacterial therapy plays an important role in the prevention and treatment of postoperative infectious complications [2, 6]. Randelli *et al.* showed a strong negative correlation between antibacterial prophylaxis and the occurrence of infectious complications (p<0.01) [2].

Arthroscopic sanitation and debridement are widely used in postoperative infectious and inflammatory processes in the shoulder and show good long-term results [4, 9, 13, 14].

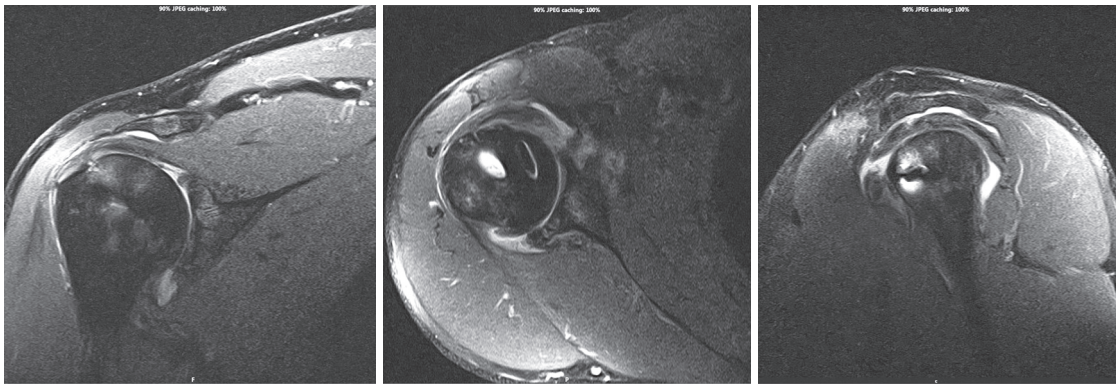

Fig. 6. MRI of the right shoulder joint; coronary, axial and sagittal sections in six months after surgery: rotator cuff tendons are fully visible; the position of the anchors is correct; moderate synovitis

In the Russian literature, we managed to find only one mention of infectious complications after arthroscopic shoulder surgery. Dokolin *et al.* described a two-stage treatment of an infectious complication. In the first stage, arthroscopic revision, debridement, and fixator removal, as well as replacement of a defect in the humeral head with an antibacterial spacer were performed. In the second stage, the revision suture of rotator cuff tendon was performed. The authors also emphasize the lack of caution among doctors regarding infectious complications in the shoulder joint [15].

Our case report shows the possibility of single-stage treatment of patients with the described complication. Intra-articular and subacromial placement of bioabsorbable antibacterial implants reduces the risk of recurrence of the infectious process. Despite the fact that arthroscopic rotator cuff repair has a generally low risk of complications in the early postoperative period compared with open surgery, the infectious process ranks first among the possible complications (superficial infections — 0.19% of cases, deep infections — 0.11%) [16]. The most common symptom of the inflammatory process in the shoulder after arthroscopic surgery is a diffuse pain [6]. Therefore, with the occurrence of severe pain in the postoperative period and during the beginning of rehabilitation, it is necessary to consider it as a sign of a possible infectious complication.

Despite the low risk of infectious complications after arthroscopic interventions on the shoulder joint, the doctor must remain cautious in this regard and carefully monitor the patient in the postoperative period.

Arthroscopic sanitation, lavage of the joint cavity with a large amount of saline, and the selection of the appropriate antibacterial therapy will preserve the implanted fixators and eliminate the focus of infection.

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Competing interests: the authors declare that they have no competing interests.

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References

1. Saltzman M.D., Marecek G.S., Edwards S.L., Kalainov D.M. Infection after shoulder surgery. *J Am Acad Orthop Surg*. 2011;19(4):208-218.
2. Randelli P., Castagna A., Cabitza F., Cabitza P., Arrigoni P., Denti M. Infectious and thromboembolic complications of arthroscopic shoulder surgery. *J Shoulder Elbow Surg*. 2010;19(1):97-101. DOI:10.1016/j.jse.2009.04.009.
3. Randelli P., Spennacchio P., Ragone V., Arrigoni P., Casella A., Cabitza P. Complications associated with arthroscopic rotator cuff repair: a literature review. *Musculoskelet Surg*. 2012;96(1):9-16. DOI: 10.1007/s12306-011-0175-y.
4. Parnes N., DeFranco M., Wells J.H., Higgins L.D., Warner J.J. Complications after arthroscopic revision rotator cuff repair. *Arthroscopy*. 2013;29(9):1479-1486. DOI: 10.1016/j.arthro.2013.06.015.
5. Yeranosian M.G., Arshi A., Terrell R.D., Wang J.C., McAllister D.R., Petrigliano F.A. Incidence of acute postoperative infections requiring reoperation after arthroscopic shoulder surgery. *Am J Sports Med*. 2014;42(2):437-441. DOI: 10.1177/0363546513510686.
6. Pauzenberger L., Grieb A., Hexel M., Laky B., Anderl W., Heuberer P. Infections following arthroscopic rotator cuff repair: incidence, risk factors, and prophylaxis. *Knee Surg Sports Traumatol Arthrosc*. 2017;25(2):595-601. DOI: 10.1007/s00167-016-4202-2.
7. Athwal G.S., Sperling J.W., Rispoli D.M., Cofield R.H. Deep infection after rotator cuff repair. *J Shoulder Elbow Surg*. 2007;16(3):306-311. DOI: 10.1016/j.jse.2006.05.013.
8. Moen T.C., Rudolph G.H., Caswell K., Espinoza C., Burkhead Jr. W.Z., Krishnan S.G. Complications of shoulder arthroscopy. *J Am Acad Orthop Surg*. 2014;22(7):410-419. DOI: 10.5435/JAAOS-22-07-410.
9. Settecerri J.J., Pitner M.A., Rock M.G., Hanssen A.D., Cofield R.H. Infection after rotator cuff repair. *J Shoulder Elbow Surg*. 1999;8(1):1-5.
10. Hughes J.D., Hughes J.L., Bartley J.H., Hamilton W.P., Brennan K.L. Infection rates in arthroscopic versus open rotator cuff repair. *Orthop J Sports Med*. 2017;5(7):2325967117715416. DOI: 10.1177/2325967117715416.
11. Atesok K., MacDonald P., Leiter J., McRae S., Singh M., Stranges G., Old J. The effect of deep shoulder infections on patient outcomes after arthroscopic rotator cuff repair: a retrospective comparative study. *Muscles Ligaments Tendons J*. 2017;7(4):590-597. DOI: 10.11138/mltj/2017.7.4.590.
12. Jenssen K.K., Lundgreen K., Madsen J.E., Dimmen S. Targeted intervention of acute postoperative infection after rotator cuff repair results in good functional outcomes. *Knee Surg Sports Traumatol Arthrosc*. 2018;26(1):285-291. DOI: 10.1007/s00167-017-4743-z.
13. Sperling J.W., Cofield R.H., Torchia M.E., Hanssen A.D. Infection after shoulder instability surgery. *Clin Orthop Relat Res*. 2003;(414):61-64. DOI: 10.1097/01.blo.0000084401.53464.4b.

14. George M.S., Khazzam M. Current concepts review: revision rotator cuff repair. *J Shoulder Elbow Surg.* 2012;21(4):431-440. DOI: 10.1016/j.jse.2011.11.029.
15. Dokolin S.Yu., Artyukh V.A., Kuzmina V.I., Liventsov V.N. [Clinical case of infection treatment after arthroscopic repair of rotator cuff]. *Travmatologia i ortopedia Rossii* [Traumatology and Orthopedics of Russia]. 2016;22(3):110-116 (In Russ.). DOI: 10.21823/2311-2905-2016-22-3-110-116.
16. Schairer W.W., Nwachukwu B.U., Fu M.C., Warren R.F. Risk factors for short-term complications after rotator cuff repair in the United States. *Arthroscopy.* 2018;34(4): 1158-1163. DOI: 10.1016/j.arthro.2017.10.040.

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