

## Defensive Antibacterial Coating (DAC) with gentamycin and vancomycin for therapy of postoperative infection after Achilles tendon suture. Results in 8 cases.

**Aim:** The risk of infection after suturing the Achilles tendon is 0.2-3.6%. In cases of infection and skin defect, regional or free flaps are proposed, but it is associated with problems at the site of the flap collection. We present technique and results of using DAC (Defensive Antibacterial Coating) hyaluronic acid hydrogel with antibiotics in the treatment of infections after suturing the Achilles tendon in combination with revision surgery. Effective use as a coating on implants of DAC hydrogel with antibiotics in reducing septic complications and revision due to infection has been described, but their use in postoperative Achilles tendon infections has not been published. DAC is characterized by high biocompatibility and a short absorption time. Gentamicin, vancomycin, daptomycin, meropenem, rifampicin and ciprofloxacin can be added to the DAC.



Example of debridement of infected and healed Achilles tendon + application of DAC gel.

**Methods:** controlled cohort study, performed in 2019-2022. **Material:** 8 patients after Achilles tendon repair with a non-absorbable suture: 7 open and 1 closed. In one case infection occurred after Achilles tendon reconstruction with reverse flap from triceps sure muscle. Infection with fistulas appeared early after surgery. Treatment with antibiotics, removal of stitches through fistulas was ineffective. **Technique:** the revision surgeries were performed from the approach above the Achilles tendon, without dissecting the tendon on the sides. Longitudinal incision was made and "opened like a book", the sutures, suture-anchors and biofilm from the suture channels were removed. Preparation of the DAC was performed according to the manufacturer's recommendations. To 300 mg of sterile DAC powder were added 4 ml of gentamicin solution (160 mg) and 1 ml of vancomycin solution (50 mg). Small amounts of DAC hydrogel with gentamicin and vancomycin were applied over the tendon and injected into surrounding tissues. In one patient, the tissues around the tendon were injected and the gel was injected into the tendon sheath under ultrasound guidance as attempt to avoid open revision. One patient required negative pressure wound therapy due to delayed wound healing.

Patient; gender; age; risk factors	Course of treatment;	Pathogen	Post OP ATB-cs	NRIH	FU	CoINF	FAAM ( max 84 points); Pre-versus postoperative function (%)
1. F; 26 years	AT traumatic rupture; open suture; rupture of suture, 2nd suture. Infection; injection of DAC into AT sheet; revision with DAC	E. coli	Ciprofloxacin + TMP-SMX 4 weeks	1	14	Yes	FAAM score 87/84; 80%;
2. M; 57 years, Psoriasis	AT traumatic rupture; open suture, infection; revision with DAC;	Staph. aureus MSSA	Ciprofloxacin + TMP-SMX 4 weeks	1	10	Yes	FAAM score 80/80; 95%;
3. F; 29 years, SLE	AT traumatic rupture; percutaneous suture, infection; revision with DAC;	Staph. aureus MSSA	Cefuroxime + Ciprofloxacin 2 weeks	1	9	Yes	FAAM score 81/84; 98%;
4. F; 19 years	AT traumatic rupture; open suture, infection; revision with DAC	Pseudomonas aeruginosa	Ciprofloxacin + clindamycin 2 weeks	1	8	Yes	FAAM score 77/84; 70%;
5. M; 57 years	Nontraumatic AT rupture; 1 week after steroid injection; open suture; infection; HBO; revision with DAC	Staph. aureus MSSA	Cefuroxime 10 days	1	7	Yes	FAAM score 83/84; 100%;
6. M; 41 years	AT traumatic rupture; reconstruction with Fibervire suture + transfer of central part of triceps sure; infection; revision with DAC, VAC	Klebsiella oxytoca; Serratia marcescens	Ciprofloxacin 2 weeks	1	6	Yes	FAAM score 80/84; 80%;
7. M; 62 years	AT traumatic rupture; open suture, revision due to suture insufficiency; infection; revision with DAC	Enterococcus faecalis; Finegoldia magna	Cloxacillin + metronidazole 7 days	1	30	Yes	FAAM score 81/84; 95%;
8. M; 31 years	AT traumatic rupture; open suture with anchor; infection, revision with DAC	Staph. aureus MSSA	Clindamycin, cefuroxime + RMPC 4 weeks	1	43	Yes	FAAM score 84/84; 95%;

**Table 1.** Demographic data and characteristics of patients treated with Defensive Antibacterial Coating (DAC) with gentamycin and vancomycin for Achilles Tendon Infection after Surgical Repair. **Table legend:** M: male; F: female; AT-Achilles tendon; ATB-cs: antibiotics; TMP-SMX – Trimethoprim – sulfamethoxazole; Post OP ATB-cs: Postoperative Antibiotics; NRIH: Number of Revisions until Infection Healed; HBO – Hyperbaric Oxygen Therapy; VAC – Vacuum Assisted Closure dressing; CoINF: Cure of Infection; FU – Follow Up (in months); FAAM – Foot and Ankle Ability Measures.

**Results:** FU 5 to 43 months; in 7 patients who received the DAC hydrogel during surgery, the infection resolved after one revision, the rehabilitation and strength training could be continued and the efficiency of the operated limb improved. Simply injecting DAC hydrogel around the Achilles tendon without revision resulted in a temporary improvement. The assessment of the function of the operated limb in FAAM score showed the score range from 77/84 points to 84/84 points (average 81/84)

**Conclusions:** The use of 5 ml of DAC antibacterial hydrogel with gentamicin (160 mg), vancomycin (50 mg) in infection after Achilles tendon surgery according to the above-described technique proved to be safe and effective.