

Infection complicating 794 primary and revision arthroscopies. Accuracy of actual prophylactic procedures against infection and results from a single orthopedic centre in Poland.

Introduction: Septic arthritis after arthroscopy (SAAA) is a devastating complication which reported frequency varies about **0,04% - 5,7%**. The aim of the study is to analyze frequency of SAAA at one orthopedic center, risk factors and accuracy of actual prophylactic measures.

Methods: A retrospective study includes 794 (665 primary and 129 revision) "clean" arthroscopies performed in the years 2017-2018 with confirmed joint infection during 30 days after operation without the use of non-resorbable implants and up to 1 year after procedures with non-resorbable implants. Demographic and medical data about potential risk factors of SAAA were analyzed: patients age, sex, operated joint, type of procedure, primary or revision procedure, the use of drains, usage of non-absorbable implant, time of surgery, BMI, time lapse from index operation to diagnosis of SAAA, length of hospital stay, causative microorganisms.

Details: All operations were performed by eight different but experienced surgeons, in operation theatre with vertical laminar flow with the capacity of 50 air exchanges per hour. All patients were prepared to the operation according the same protocol. Prior to the surgery they took a shower with the use of the antimicrobial soap with octenidine dihydrochloride. Hair removal with a clipper was performed only if absolutely necessary. We used alcohol-based antiseptic solutions for surgical site skin preparation in the operation theatre. The antibiotic prophylaxis was administrated to every patient according to the internal protocol of perioperative prophylaxis based on national and international recommendations. The patients received Biofazolium 1 g intravenous (or 2g if their weight was over 80 kg or they have another indications to elevate the dose) in 30 minutes prior to clamping the Esmarch band (if used) and skin incision. In case of the use of non-absorbable implant during the operation (55,8% of patients), the antibiotic prophylaxis was prolonged to 24 hours. These patients got two additional doses of Biofazolium 1 g in 8 and 16 hours after the first dose.

Table 1. Demographic characteristics of 794 elective arthroscopies analyzed for postoperative infection.

Table 1.	Total	Knee	Shoulder	Hip	Ankle	Wrist	MTP joint	Elbow
Number of analyzed cases	794	644	65	52	22	6	3	2
Age (mean, SD, range)	37,19±15,8 (7-79)	36,51±15,9 (7-79)	42,63±16,91 (15-78)	36,81±10,7 (14-65)	43,77±14,9 (23-78)	27,33±14,4 (13-52)	46,67±10,4 (37-61)	16,5±11,5 (15-38)
Sex	F274:M520	F226:M418	F16:M49	F16:M49	F6:M16	F4:M2	F1:M2	F0:M2
Primary	83,8% (665 vs. 129)	81,5% (525 vs. 119)	100% (65 vs.0)	100% (52vs.0)	63,63% (14vs.8)	100% (6vs.0)	100% (3vs.0)	100% (2vs.0)
Revision								
The use of nonabsorbable implant (%)	55,8% (443vs.351)	54,66%(352vs.292)	72,31%(47vs.18)	72,31%(47vs.18)	0%(0vs.22)	0%(0vs.6)	0%(0vs.3)	0%(0vs.2)
The use of drains (%)	85,26% (677 vs. 117)	99,38% (640vs.4)	21,54% (14vs.51)	21,54% (14vs.51)	95,45% (21vs.1)	0% (0vs.6)	0% (0vs.3)	0%(0vs.2)
Time of surgery (mean, SD, range)	1:25±0:00:48 (00:15-5:35)	1:20±0:00:49 (00:15-5:35)	1:25±0:00:47 (00:30-3:20)	1:58±0:00:30 (01:15-3:20)	1:43±0:00:39 (00:45-3:20)	1:14±0:00:13 (00:55-01:30)	00:52±0:00:09 (00:40-01:00)	1:00±0:00:20 (01:20)
BMI (mean, SD, range)	25,34±4,48 (14-45,44)	25,15±4,33 (14-45,44)	26,56±5,4 (17,4-39,8)	25,21±4,34 (17,2-38,06)	27,12±5,14 (19,7-40,6)	23,77±2,37 (21,4-28,3)	22,05±4,51 (18,38-28,4)	24,47±5,37 (19,1-29,83)
Length of stay in the hospital (mean, SD, range)	2,12±0,94 (1-8)	2,15±0,93 (1-7)	2±1,13 (1-8)	1,87±0,7 (1-3)	2,41±0,83 (1-4)	1,54±0,5 (1-2)	2,33±0,47 (2-3)	2±0 (2)

Table 3. Age, BMI, time of surgery and hospital stay in cases with and without infection.

	Without infection (n = 790)		Infected (n = 4)		t	p	95% CI		
	M	SD	M	SD			LL	UL	d Cohena
Age	37,15	15,81	45,25	15,48	-1,02	0,307	-23,65	7,46	0,51
BMI	25,30	4,49	26,15	3,36	-0,38	0,706	-5,26	3,56	0,19
Time of surgery	84,85	47,88	118,75	55,13	-1,41	0,158	-81,04	13,24	0,71
Length of stay in the hospital	2,11	0,92	4,50	2,52	-1,90	0,154	-6,39	1,62	2,57

Table 2. Demographic data, details of surgery, risk factors for SAAA in infected cases.

	JK	MB	EW	HG
Area of the body, procedure	knee, arthrolysis	knee, arthrolysis	knee, ACL reconstruction	shoulder, rotator cuff reconstruction
Age	42	50	26	63
Sex	M	M	F	F
Primary/revision	revision	revision	revision	primary
Using of nonabsorbable implant	no	no	yes	yes
Using of drains	yes	yes	yes	no
Time of surgery	01:45	01:30	01:20	03:20
BMI	26,6	26	21,9	30
Length of stay in the hospital	4	4	2	8
Onset of infection from index operation	7 days	13 days	47 days	5 month 2 weeks
Pathogen	Enterobacter cloacae	Staphylococcus lugdunensis	Propionibacterium acnes	unknown

Table 4. Knee-only arthroscopies - with and without infection.

Table 4.	Without infection (n = 641)		Infected (n = 3)		t	p	95% CI		
	M	SD	M	SD			LL	UL	d Cohena
Age	36,52	15,93	39,33	12,22	-0,31	0,760	-20,90	15,27	0,18
BMI	25,16	4,24	24,83	2,56	0,13	0,898	-4,61	5,25	0,07
Time of surgery	80,64	49,02	91,67	12,58	-0,39	0,697	-66,65	44,60	0,23
Length of stay in the hospital	2,15	0,94	3,33	1,15	-2,19	0,029	-2,25	-0,12	1,26

Table 5. Comparison of 129 revision and 665 non-revision cases with regard to patients age, BMI, time of surgery and hospital stay.

Table 5.	Primary (n = 665)		Revision (n = 129)		t	p	95% CI		
	M	SD	M	SD			LL	UL	d Cohena
Age	38,14	16,31	32,29	11,81	4,80	<0,001	3,45	8,24	0,37
BMI	25,41	4,50	24,75	4,39	1,52	0,130	-0,19	1,50	0,15
Time of surgery	82,51	45,11	97,95	59,00	-2,82	0,005	-26,26	-4,61	0,32
Length of stay in the hospital	2,08	0,92	2,35	1,04	-2,72	0,007	-0,46	-0,07	0,29

Results: From 794 cases 4 have been infected: 2 after knee arthrolysis, one after ACL reconstruction and one after rotator cuff repair. There were 2 early, with manifestation within 30 days, and 2 late-onset SAAA. Infections occurred in **0,5% of all arthroscopies** and in 0,47% of knee arthroscopies alone. Patients age and time of surgery have not been found significantly different in infected and non-infected cases, whereas age and time of surgery have been significantly different in revision and non-revision cases.

Conclusions: Primarily aseptic arthroscopic procedures performed with respect to actual perioperative preventive measures have a low risk of postoperative septic arthritis. The risk increases with patients age and time of operation, but not significantly.