Infections ostéo-articulaires et traitements ciblés des RIC

Dr P PHILIPPE 01/2023

Le risque infectieux dans la PR

- Le risque infectieux est augmenté dans les polyarthrites en dehors de toute biothérapie

Risque infectieux Polyarthrite versus non PR	RR* (IC 95%)
Bactériémie/ septicémie	4 (2-7,8)
Arthrite septique	2,2(0,4-12,5)
Tractus broncho-pulmonaire	**3,5 (2,3-5,4)**
Tractus urinaire	**2 (1,2-3,4)**
Infections cutanées	**1,9 (1,1-3)**

* Ajusté pour âge et sexe

- Facteurs de risque : corticoïdes RR = 2.2 (1.5 – 3.4); Tabagisme actif: RR 1.6 (1.0 – 2.5); Facteur Rhumatoïde positif: RR = 2.0 (1.3 – 3.0)

Franklin J. et al. Ann Rheum Dis 2007.

Table 6 Risk of serious infection (all sites combined) by risk score

Risk score	RR (95% CI)
0	1
1	1.6 (0.9 to 2.6)
2	3.5 (1.9 to 6.3)
3	7.4 (3.3 to 16.8)
Trend	1.9 (1.5 to 2.5)

Risque infectieux sous sDMARDs

- **Les infections les plus fréquentes dans la PR avant l'ère des biologiques**

Risque infectieux versus non PR	IRR (100 p-a)
Total	1,33 (1,26-1,41)
Bactériémie/ septicémie	1,5 (1,1-2,06)
Arthrite septique	14,89 (6,12-73,71)
Ostéomyélite	10,63 (3,39-126,8)
Pneumonie	**1,68 (1,46-1,95)**
Bronchopathie	**1,16 (1,06-1,27)**
Infections cutanées, parties molles	**1,93 (1,72-2,17)**

Doran MF. Arthritis Rheum. 2002;46:2287–93.

Etude de cohorte rétrospective
609 PR vs 609 Non PR
Diagnostic de RA 1955-1994
73% femmes 58 ans
Suivi 12,7 PR ans et 15 ans Non PR

31 cas d'arthrites chez les PR dont 11 (35%)
Sur prothèses articulaires

FACTEURS PREDICTIFS d'infections sous sDMARDs

Table 2. Medication use by patients in the rheumatoid arthritis incidence cohort

Medication*	No. (%) ever received	Days received, median (interquartile range)†
IM gold	137 (22.5)	456 (133–1,366)
Methotrexate	133 (21.8)	1,497 (585–2,338)
Oral gold	64 (10.5)	363 (159–1,344)
Sulfasalazine	44 (7.2)	509 (131–1,039)
Hydroxychloroquine	223 (36.6)	644 (237–1,871)
Azathioprine	30 (4.9)	676 (186–1,480)
D-penicillamine	50 (8.2)	298 (165–1,010)
Leflunomide	19 (3.1)	234 (103–297)
Cyclophosphamide	7 (1.1)	153 (87–743)
Cyclosporine	3 (0.5)	300 (290–394)
Etanercept (TNFR:Fc)	3 (0.5)	107 (30–239)
Corticosteroids (IV or IM)	292 (47.9)	798 (153–2,238)

* IM = intramuscular; TNFR = tumor necrosis factor receptor; IV = intravenous.
† Of patients who ever received the medication.

Table 5. Predictors of objectively confirmed infections in the RA incidence cohort, identified in the multivariate model*

Predictor	Hazard ratio	95% CI	*P*
Demographic variables			
Age, /10-year increment	1.30	1.16–1.46	<0.001
Male sex	1.18	0.90–1.55	0.22
Comorbidities			
Chronic lung disease	1.84	1.40–2.41	<0.001
Leukopenia	1.91	1.40–2.61	<0.001
Organic brain disease	1.88	1.22–2.89	0.004
Diabetes	1.60	1.12–2.30	0.011
Alcoholism	1.67	1.16–2.41	0.006
Disease-related variables			
Extraarticular RA	2.07	1.41–3.06	<0.001
Rheumatoid factor	1.36	1.06–1.75	0.015
Rheumatoid nodules	1.41	1.04–1.90	0.025
ESR	1.33	1.05–1.68	0.019
Functional capacity	1.27	1.04–1.56	0.018
Medications			
Corticosteroids	1.56	1.22–2.01	<0.001

* See Table 3 for definitions.

Doran MF et al Arthritis Rheum 2002;46 : 2294-2300

Arthritis & Rheumatism (Arthritis Care & Research)
Vol. 57, No. 7, October 15, 2007, pp 1151–1157
DOI 10.1002/art.23003

ORIGINAL ARTICLE

The Importance of the Disease Process and Disease-Modifying Antirheumatic Drug Treatment in the Development of Septic Arthritis in Patients With Rheumatoid Arthritis

CHRISTOPHER J. EDWARDS,[1] CYRUS COOPER,[1] DAVID FISHER,[2] MAX FIELD,[3] TJEERD P. VAN STAA,[4] AND NIGEL K. ARDEN[1]

Base de données médicale UK 1987-2002
136 977 sujets (34 250 RA vs 102 747 Non RA)
321 arthrites septiques (236 RA vs 85 Non RA)

Incidence Arthrite Septique PR sDMARDS ou prednisone 2,17 (IC 95% 1,68-2,80, p = 0,001) / pas de traitement

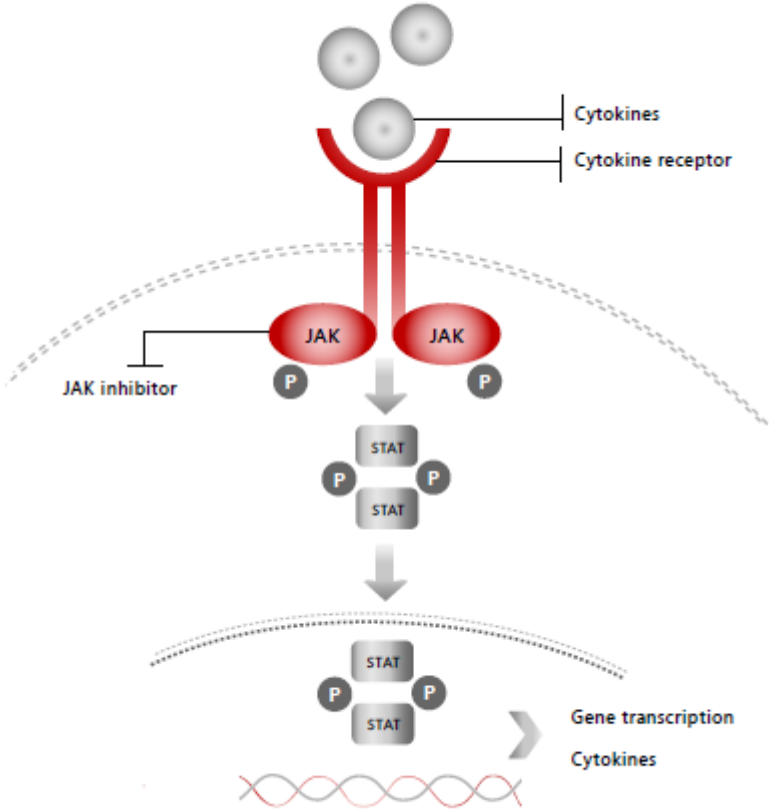
Table 3. IRRs for SA while on a particular disease-modifying antirheumatic drug (DMARD) compared with the incidence on no DMARD using Poisson regression, among RA cases only*

Therapy	IRR	*P*	95% CI	Observation time (person-years)	No. of SA events
Auranofin only	0.00	0.99	NA	432	0
Azathioprine only	1.99	0.34	(0.49–8.14)	1,130	2
Cyclophosphamide only	0.00	0.99	NA	29	0
Cyclosporin only	0.00	0.99	NA	95	0
Hydroxychloroquine only	0.59	0.60	(0.08–4.25)	2,094	1
Leflunomide only	0.00	0.99	NA	60	0
Methotrexate only	1.01	0.98	(0.44–2.34)	7,022	6
Penicillamine only	2.51	0.007	(1.29–4.89)	4,739	10
Sodium aurothiomalate (gold) only	0.00	0.99	NA	2,994	0
Sulfasalazine only	1.74	0.03	(1.04–2.91)	13,469	19
Prednisolone only	2.94	< 0.001	(1.93–4.46)	13,132	36
Any combination	2.50	< 0.001	(1.64–3.81)	15,038	33

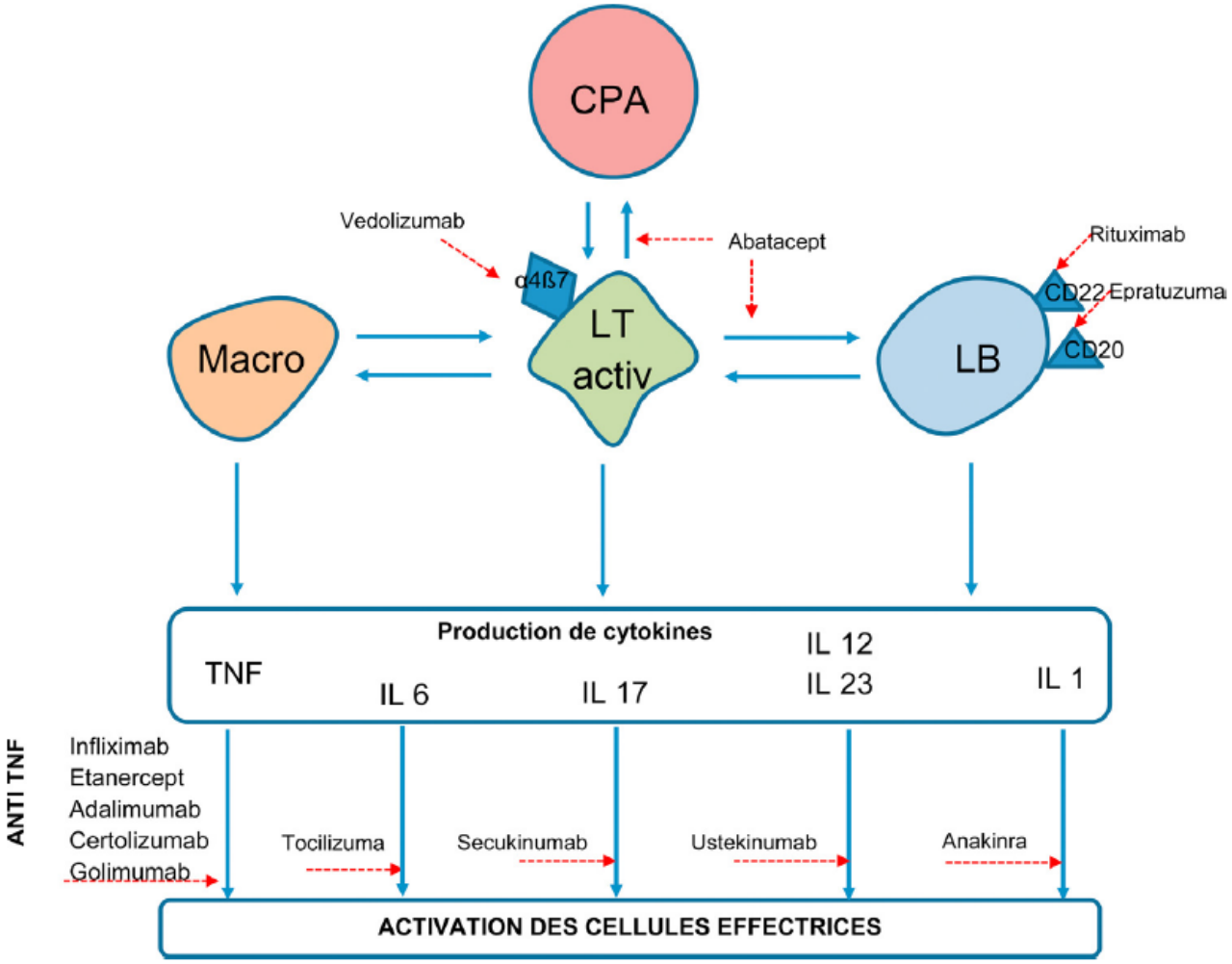
* Restricted to time patient spent with RA (before incidence of SA if it occurs). Adjusted for diabetes mellitus, hypertension, renal failure, heart failure, smoking status, and age category. Post-estimation Wald's test for the hypothesis that the effects of all the drugs are equivalent (excluding cyclophosphamide, cyclosporin, infliximab, and leflunomide, because they have very low observation times): χ^2 (8df) = 9.59, P = 0.30. NA = not applicable; see Table 2 for additional definitions.

TRAITEMENTS CIBLES

JAK inhibiteurs



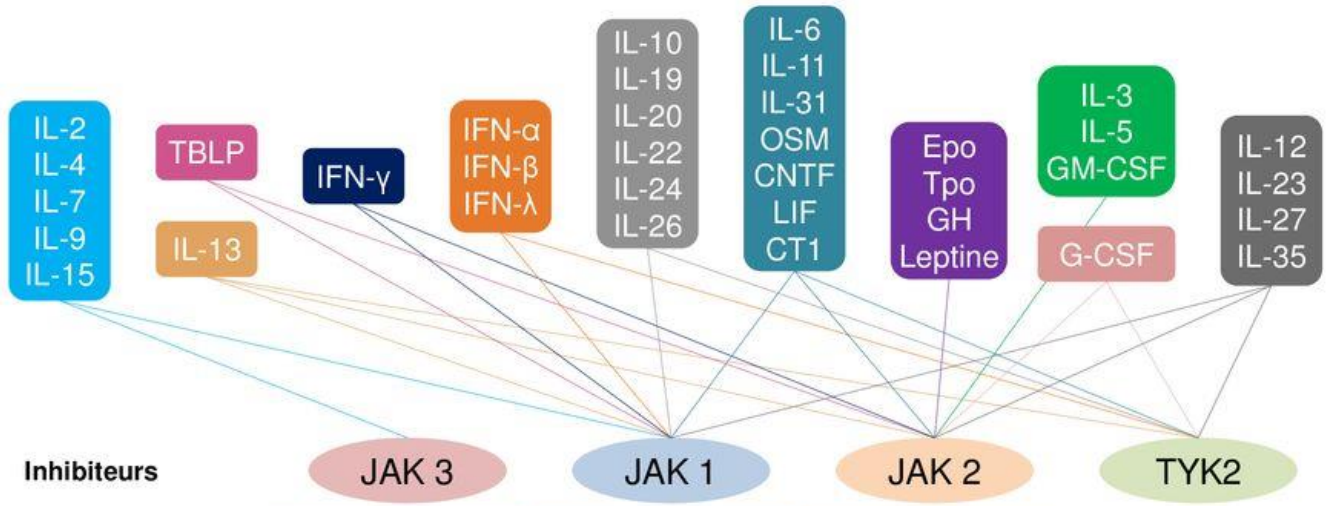
BIOTHERAPIES



Gooderham M STL vol 18 N 7 Dec 1,2013

Martinez T et al Anesth Reanim. 2019;5:274-284

Activité des différents anti-JAK/TYK

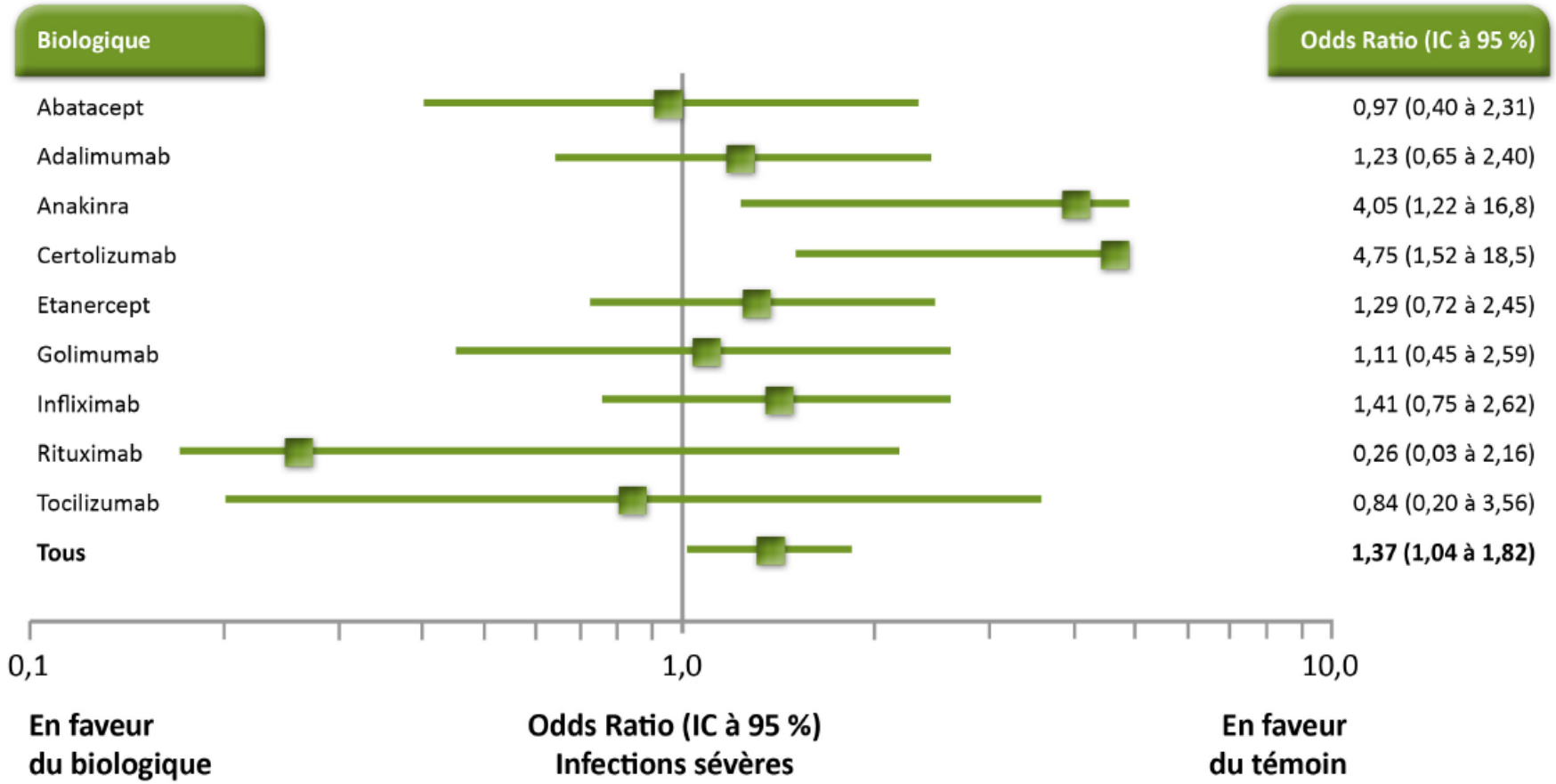


Inhibiteurs	JAK 3	JAK 1	JAK 2	TYK2
Tofacitinib	X	X	X	
Ruxolitinib		X	X	
Baricitinib		X	X	
Peficitinib	X	X	X	
Momelotinib			X	
Fedratinib			X	
Filgotinib		X		
Upacitinib		X		
Itacitinb		X		
PF-06651600	X			
BMS-986165				X
PF-06700841		X		X

AAD 2019 - D'après Armstrong A et al., abstr. S016, actualisé

Risque infectieux sous bDMARDs (études pivots)

- Risque d'infections sévères par biologique (toutes indications)



* Ajusté à la posologie

Singh JA *et al*. Cochrane Review 2011

Les sites infectieux sous biothérapie

Risk of Hospitalized Bacterial Infections Associated with Biologic Treatment Among U.S. Veterans with Rheumatoid Arthritis

J.R.Curtis,[1,2] S.Yang,[1,2] N. M.Patkar,[1,2] L. Chen,[1] J. A. Singh,[1,2] G. W. Cannon,[3] T.R. Mikuls,[4] E. Delzell,[5] K.G. Saag,[2] M.M. Safford,[1] S. DuVall,[3,6] K. Alexander,[7] P. Napalkov,[7] Kevin L Winthrop[8], M.J.Burton[9], A. Kamauu,[10] J.W. Baddley[1]

Infections	Cohort, n (%)
Pneumonia	61 (37)
Cellulitis/ soft tissue	37 (22)
Kidney/Urinary Tract	14 (9)
Bacteremia/sepsis	11 (7)
Device-associated	10 (6)
Gastroenteritis	10 (6)
Septic arthritis	7 (4)
Upper Respiratory Tract	8 (5)
Abdominal abscess	5 (3)
Osteomyelitis	2 (1)
Total	**165 (100%)**

Biologics	Events	Person Years	Infection Rate by Biologic per 100 patient-years (95% CI)
Abatacept	14	498.0	2.8 (1.7-4.7)
Rituximab	28	630.2	4.4 (3.1-6.4)
Anti-TNF agents	123	4147.0	3.0 (2.5-3.5)
Etanercept	25	1133.4	2.2 (1.5-3.3)
Infliximab	23	480.2	4.8 (3.2-7.2)
Adalimumab	75	2534.0	3.0 (2.4-3.7)

Arthritis Care & Research
DOI 10.1002/acr.22281

Données des registres : Biothérapies et risque d'arthrite septique

- Infections cutanées >infections VAS> Urinaires et infections ostéo-articulaires (AS)

- **Registre Espagnol BIOBADASER** (anti-TNFα)

  AS 3,76 cas /1000 PA ; infections cutanées 12,18 cas /1000 PA

  5,97cas /1000 PA pneumopathies

- **Registre ORA** (abatacept) 3 cas/100 PA 11,1% AS /infections pulmonaires 41%
- **Registre REGATE** (tocilizumab) 16% ostéoarticulaires 35% broncho-pulmonaires 32% cutanées

Etude Rétrospective
Evaluation de AS patients PR
2 Périodes 1979-2002 2003-2013

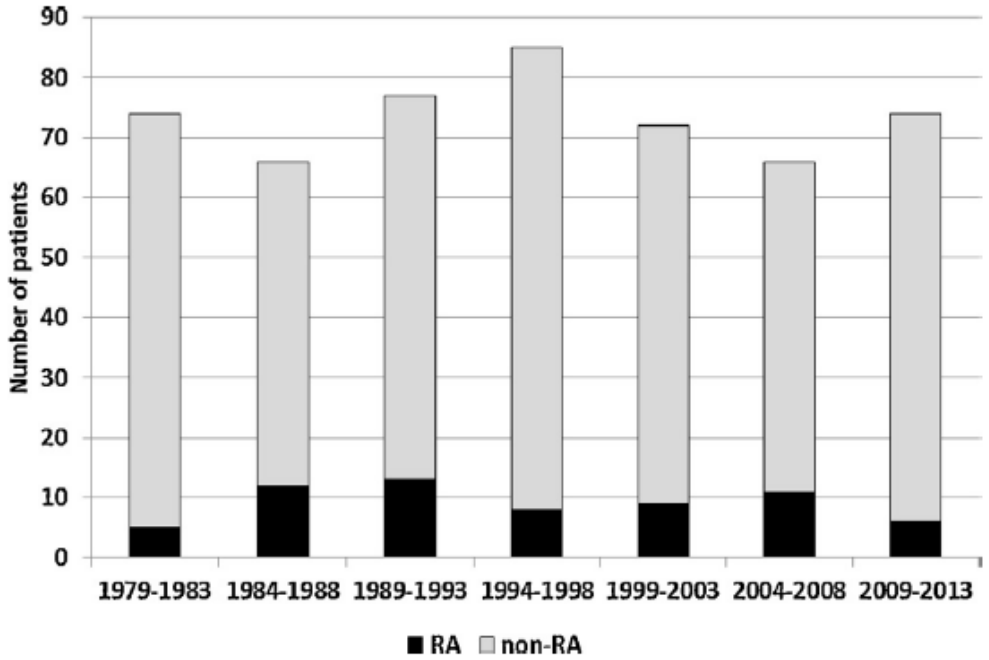


Fig. 1. Frequency of septic arthritis complicating rheumatoid arthritis between 1979 and 2013.

Table 2
Comparison of hospitalizations for septic arthritis in RA patients in the period 1979–2002 versus 2003–2013.

	1979–2002 $n=43$	2003-2013 $n=21$	*P*-value
Age, median [IQR]	61 [54–70]	68 [65–73]	0.02
Gender – males, *n* (%)	17 (39.5)	11 (52.4)	0.33
Time since onset of RA, median [IQR] (/61)	16 [8–25]	18 [8–29]	0.93
Rheumatoid factor, *n* (%)	34 (87.2)	18 (94.7)	0.65
Corticosteroids, *n* (%)	35 (81.4)	19 (90.5)	0.48
Corticosteroid dose, mean (SD)	10.0 (4.8)	10.1 (8.1)	0.34
DMARD, *n* (%)	27 (62.8)	15 (71.4)	0.50
Methotrexate	12 (27.9)	3 (14.3)	0.22
Biotherapy[a], *n* (%)	0 (0.0)	5 (23.8)	0.003
Multifocal joint site, *n* (%)	16 (37.2)	2 (9.5)	0.02
Prosthetic joint, *n* (%)	12 (27.9)	4 (19.1)	0.44
Microorganisms			
Staphylococcus, *n* (%)	37 (86.1)	15 (71.4)	0.16
S. aureus, *n* (%)	32/37 (86.5)	13/15 (86.7)	1.00
Multiresistant *S. aureus*	2/32 (6.2)	4/13 (30.8)	0.049
Streptococcus and *enterococcus*, *n* (%)	2 (4.7)	2 (9.5)	0.59
Gram-negative bacilli, *n* (%)	2 (4.7)	4 (19.1)	*0.08*
Other microorganisms[b], *n* (%)	2 (4.7)	1 (4.8)	1.00
Synovial fluid culture, *n* (%)	41 (93.4)	21 (100.0)	1.00
Blood culture, *n* (%)	20 (46.5)	6 (28.6)	0.17
Iatrogenic, *n* (%)	4 (9.3)	0 (0.0)	0.29
Diabetes, *n* (%)	3 (7.0)	3 (14.3)	0.39
Death, *n* (%)	4 (9.3)	1 (4.8)	1.00

[a] Etanercept $n=2$, adalimumab $n=1$, rituximab $n=1$, tocilizumab $n=1$.
[b] *Mycobacterium xenopi*, *Candida albicans*, *Clostridium*.

Dubost J-J et al Joint Bone Spine 2017:84:47-50

Risk of septic arthritis in patients with rheumatoid arthritis and the effect of anti-TNF therapy: results from the British Society for Rheumatology Biologics Register

J B Galloway,[1] K L Hyrich,[1] L K Mercer,[1] W G Dixon,[1] A P Ustianowski,[2] M Helbert,[3] K D Watson,[1] M Lunt,[1] D P M Symmons[1]; on behalf of the BSR Biologics Register

Table 2 Risk of septic arthritis in patients with rheumatoid arthritis

	nbDMARD	All anti-TNF	Etanercept	Infliximab	Adalimumab
Exposure time (years)	11 426	42 671	18 554	10 827	13 289
Events (n)	20	179	86	41	52
Incident rate/1000 pyrs (95% CI)	1.8 (1.1 to 2.7)	4.2 (3.6 to 4.8)	4.6 (3.7 to 5.7)	3.8 (2.7 to 5.1)	3.9 (2.9 to 5.1)
Unadjusted HR (95% CI)	Ref	2.5 (1.6 to 4.0)	3.0 (1.8 to 4.8)	2.2 (1.3 to 3.8)	2.3 (1.4 to 3.8)
Adjusted HR (95% CI)	Ref	2.3 (1.2 to 4.4)	2.5 (1.3 to 4.9)	2.4 (1.0 to 5.8)	1.9 (0.9 to 4.0)

Anti-TNF, anti-tumour necrosis factor; nbDMARD, non-biological disease-modifying antirheumatic drug; pyrs, patient years.

Etude prospective observationnelle

Evaluation du risque AS chez 11 881 patients anti-TNF / 3673 csDMARDs

Registre Britannique BSRBR

Facteurs de risques indépendants/TT Age une plus longue durée d'évolution RIC un HAQ élevé Das28 plus élevé

Exposition aux corticoïdes à la base line **chirurgie orthopédique** antérieure diabète

Infections ostéoarticulaires sur prothèse

- csDMARDS **MTX** LEFLU
- Pas d'arrêt avant une chirurgie

- **Etude de cohorte prospective**
- Complication précoce (dans l'année qui suit la chirurgie)
- Plus de poussées dans le groupe arrêt du MTX (8%)

Grennan DM et al Rheum Dis 2001;60:214-7

Methotrexate and postoperative complications

Table 6 Logistic regression analysis of all patients studied

Intercurrent disease	*p Value*	*Odds ratio*	*95% Confidence interval*
Diabetes	0.005	4.34	1.57 to 11.97
Hypertension	0.03	3.04	1.14 to 8.10
Osteoporosis	0.0001	9.51	3.01 to 30.06
Bronchiectasis/psoriasis/diverticulitis	<0.0001	11.12	3.39 to 36.57
Asthma	0.02	3.20	1.20 to 8.57
Heart condition	0.004	6.97	1.87 to 25.95
Treatment			
Penicillamine	0.05	2.64	1.00 to 6.94
Gold	0.56	1.46	0.41 to 5.17
Azathioprine	0.6	1.28	0.51 to 3.24
Indometacin	0.05	2.64	1.00 to 6.94
Cyclosporin	<0.0001	33.78	6.54 to 17.44
Hydroxychloroquine	0.02	4.61	1.35 to 15.77
Chloroquine	0.003	30.88	3.13 to 305.08
Sulfasalazine	0.17	2.04	0.73 to 5.69
Diclofenac	0.3	1.64	0.64 to 4.20
Prednisolone*	<0.0001	21.13	5.00 to 89.22
Leg surgery	0.05	0.489	0.24 to 1.00
Arm surgery	<0.0001	0.15	0.06 to 0.37
Methotrexate	0.35	1.12	0.34 to 1.40
Flare up	0.1	0.18	0.02 to 1.37
Articular index	0.22	0.98	0.94 to 1.01
HAQ†	0.15	1.58	0.84 to 2.99

*Range of daily dose of prednisolone from 1 mg to 27 mg (mean dose 5.9 mg).
†HAQ = Health Assessment Quuestionnaire.

Infections ostéoarticulaires sur prothèse

- **TT biologiques**
- Recommandation d'arrêt avant chirurgie (ACR SFR CRI)
- PR > arthrose complications et infections post-opératoires en cas de prothèse
- 1 Sur-risque infectieux semble exister sous biologiques (anti-tnf) x2 et >cs DMARDs
- la Réduction de ce sur-risque par l'interruption pré-opératoire n'est pas clairement établie
- Quid du risque de poussées et de l'augmentation de la corticothérapie en péri-opératoire

Study or Subgroup	Anti-TNF Events	Anti-TNF Total	Controls Events	Controls Total	Weight	Risk Ratio IV, Random, 95% CI
Berthold 2013	20	513	43	1040	16.7%	0.94 [0.56, 1.59]
Bibbo 2004	1	72	1	69	1.3%	0.96 [0.06, 15.02]
Bongartz et al. 2008	3	50	20	412	6.0%	1.24 [0.38, 4.01]
Den Broeder 2007	14	196	41	1023	14.9%	1.78 [0.99, 3.21]
Giles 2006	7	35	3	56	5.2%	3.73 [1.03, 13.49]
Hirano 2010	1	39	0	74	1.0%	5.63 [0.23, 134.93]
Johnson 2013	4	92	3	143	4.1%	2.07 [0.47, 9.05]
Kawakami 2010	8	64	1	64	2.3%	8.00 [1.03, 62.13]
Kubota 2012	3	276	1	278	1.9%	3.02 [0.32, 28.87]
Momohara 2011	10	48	23	385	12.8%	3.49 [1.77, 6.88]
Scherrer 2013	7	122	28	1207	10.4%	2.47 [1.10, 5.54]
Suzuki 2011	46	3468	567	56339	23.4%	1.32 [0.98, 1.78]
Total (95% CI)		**4975**		**61090**	**100.0%**	**1.81 [1.31, 2.50]**
Total events	124		731			

Heterogeneity: $Tau^2 = 0.09$; $Chi^2 = 17.25$, df = 11 (P = 0.10); $I^2 = 36\%$
Test for overall effect: Z = 3.58 (P = 0.0003)

Risk Ratio IV, Random, 95% CI — 0.01 0.1 1 10 100

Fig. 2. Meta-analysis comparing the number of post-operative infections observed in patients treated with anti-TNFα compared to patients treated with csDMARDS.

Study or Subgroup	Anti-TNF withdrawal Events	Anti-TNF withdrawal Total	Anti-TNF continuation Events	Anti-TNF continuation Total	Weight	Risk Ratio IV, Fixed, 95% CI
Berthold 2013	11	270	9	243	42.9%	1.10 [0.46, 2.61]
Bongartz et al. 2008	0	12	3	38	3.8%	0.43 [0.02, 7.76]
Den Broeder 2007	6	104	8	92	30.7%	0.66 [0.24, 1.84]
Ruyssen 2007	2	36	10	55	15.0%	0.31 [0.07, 1.31]
Scherrer 2013	1	49	7	122	7.5%	0.36 [0.04, 2.82]
Talwalker 2005	0	12	0	4		Not estimable
Wendling 2005	0	18	0	32		Not estimable
Total (95% CI)		**501**		**586**	**100.0%**	**0.69 [0.39, 1.21]**
Total events	20		37			

Heterogeneity: $Chi^2 = 2.82$, df = 4 (P = 0.59); $I^2 = 0\%$
Test for overall effect: Z = 1.29 (P = 0.20)

Risk Ratio IV, Fixed, 95% CI — 0.01 0.1 1 10 100

Fig. 3. Meta-analysis comparing the number of post-operative infection in patients treated with anti-TNFα who continued or discontinued treatment before surgery.

Mabille et al Joint Bone Spine 84(2017)441-445

Arthritis Care & Research
Vol. 65, No. 12, December 2013, pp 2032–2040
DOI 10.1002/acr.22077

ORIGINAL ARTICLE

Infection Risk After Orthopedic Surgery in Patients With Inflammatory Rheumatic Diseases Treated With Immunosuppressive Drugs

CATRINA B. SCHERRER,[1] ANNE F. MANNION,[1] DIEGO KYBURZ,[2] MARKUS VOGT,[3] AND INÈS A. KRAMERS-DE QUERVAIN[1]

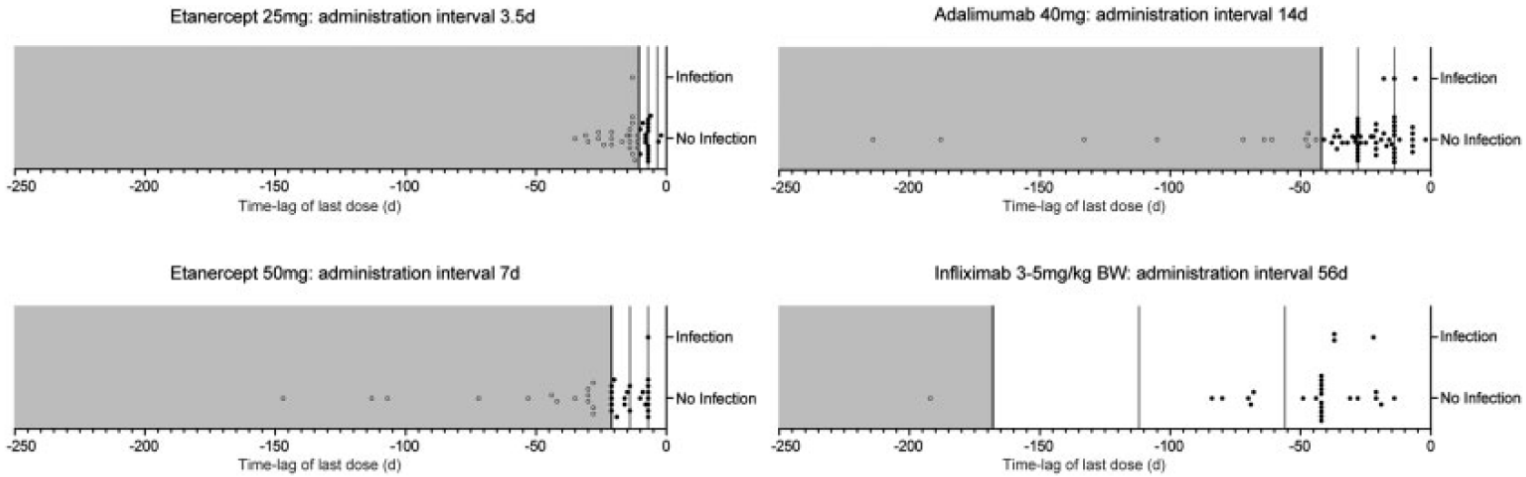


Figure 1. Distribution of time intervals for the last dose of tumor necrosis factor α (TNFα) inhibitor taken before surgery in relation to postoperative infection. Includes surgery cases with (Infection) or without (No Infection) postoperative infection in those with the last known dose of TNFα inhibitor taken prior to surgery (n = 171). Surgery was performed at day 0. Time at which the last dose of the TNFα inhibitor was taken is indicated in days before surgery (time-lag of last dose). The vertical lines indicate 1, 2, and 3 administration intervals for each medication. Open circles in the shaded areas represent surgery cases where the last dose of the drug was administered >3 administration intervals before surgery ("ex-users"). BW = body weight.

Impact important du délai d'interruption dans la période péri-opératoire

Chirurgie Avant 3 ½ vie patients plus à risque d'infection

Arrêt < 1 ½ vie risque infectieux x 10 versus Arrêt > 1 ½ vie

Scherrer CB et al Arthritis Care Res 2013;65(12):2032-40

Arrêt anti-TNF VS Poursuite = moins d'infections post-op

RR =0,62 IC95% (0,39-1,21). Méta-analyse

Clay M et al Joint Bone Spine 2016;83:701-5

Tableau II

Délai d'arrêt des anti-TNF alpha en pré-opératoire d'une chirurgie programmée selon le CRI

Principe actif	Nom commercial	Délai recommandé	½ vie (données Vidal®)
Adalimumab	HUMIRA®	4 semaines	2 semaines
Etanercept	ENBREL, BENEPALI®	2 semaines	3 jours
Certolizumab	CIMZIA®	4 semaines	2 semaines
Golimumab	SIMPONI®	4 semaines	12 à 14 jours
Infliximab	REMICADE® INFLECTRA® REMZIMA®	4 semaines	8 à 9,5 jours

Tableau III

Délai d'arrêt des autres biothérapies en pré-opératoire d'une chirurgie programmée selon le CRI

Principe actif	Nom commercial	Délai recommandé	½ vie (données Vidal®)
Ustekinumab	STELARA®	15 semaines	3 semaines
Rituximab	MABTHERA®	26 semaines	3 à 5 semaines
Tocilizumab	ROACTEMRA®	10 semaines	1 à 2 semaines
Abatacept[1]	ORENCIA®	4 semaines IV 2 semaines SC	8 à 25 jours IV 13 jours SC
Sécukinumab	COSENTYX®	Risque faible : 5 semaines Risque élevé : 8 semaines	4 semaines

CRI : Club Rhumatisme et Inflammation ; IV : intraveineux ; SC : sous-cutané.
[1]Le risque infectieux sous abatacept est jugé plus faible que pour les autres BT, ce qui justifie les délais d'interruption plus courts.

Facteurs autres que les biothérapies influençant la survenue d'infections du site opératoire (ISO)

RIC
Son ancienneté
Corticothérapie (le risque croit avec la dose)
OR 1,32 <5mg OR 1,94 6-10mg **OR 2,98 > 10mg**
Sexe masculin
Obésité
Diabète
Goutte
Le type d'articulation opérée cheville pied …..
Révision de prothèse
ATCD d'infection de prothèse

Comparisons	No. of studies	No. of Participants†	No. of cases	RR (95% CI)
Diabetes versus no diabetes	29	210,087	3,503	1.74 (1.45, 2.09)
Rheumatoid arthritis versus no rheumatoid arthritis	13	177,618	2004	1.70 (1.37, 2.11)
History of steroid administration versus no history	10	10,882	925	1.68 (1.26, 2.25)
Osteoarthritis versus no osteoarthritis	7	95,229	724	0.75 (0.51, 1.10)
Cardiovascular disease versus no cardiovascular disease	7	45,028	1575	1.07 (1.03, 1.12)
Revision arthroplasty versus primary arthroplasty	5	20,395	235	2.26 (1.30, 3.92)
Previous joint surgery versus no previous joint surgery	5	3,127	563	2.98 (1.49, 5.93)
Hypertension versus no hypertension	4	42,416	1469	1.07 (0.87, 1.33)
Cancer versus no cancer	4	42,556	1984	1.52 (0.98, 2.34)
Intra-articular steroid injection versus no intra-articular steroid injection	3	956	9	4.03 (0.75, 21.80)
Post-traumatic arthritis versus no post-traumatic arthritis	3	86,837	585	1.42 (0.49, 4.16)
Depression versus no depression	2	41506	1459	1.48 (1.13, 1.95)
Osteonecrosis versus no osteonecrosis	2	86,707	559	2.03 (0.75, 5.49)

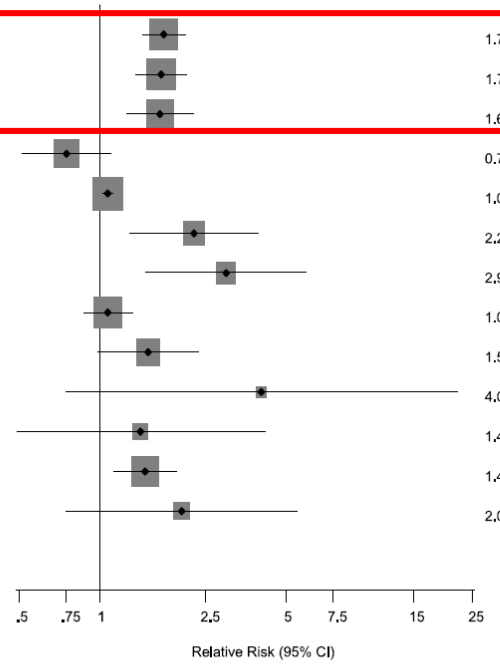
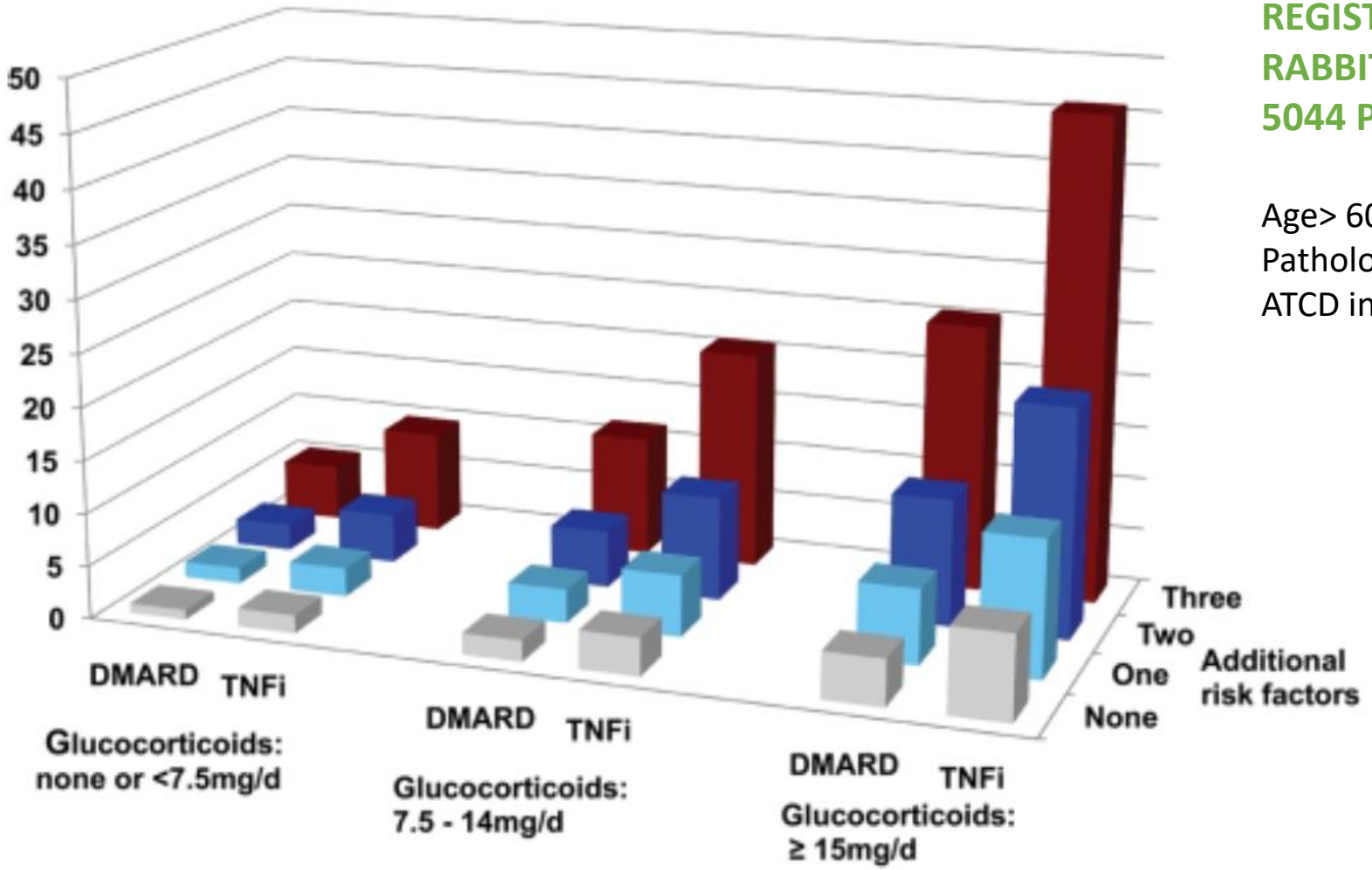


Fig 6. Medical and surgical history comparisons and risk of periprosthetic joint infection. CI, confidence interval (bars); RR, relative risk; †, are number of participants or arthroplasties.

doi:10.1371/journal.pone.0150866.g006

Kunutsor SK et al PLoS One 2016;11(3):1-18

Evaluation du risque infectieux sous traitements



REGISTRE ALLEMAND
RABBIT
5044 PR

Age> 60 ans
Pathologie pulmonaire ou rénale chronique
ATCD infections sévères

Strangfeld A et al. Ann Rheum Dis 2011 *[3]*

Retard de cicatrisation et Biothérapies (BT)

- Pas de lien entre BT et retard de cicatrisation

- Par contre la durée de la maladie inflammatoire (PR) le type et le site de la chirurgie (notamment la prothèse de genou) sont des facteurs de risque de retard de cicatrisation chez les patients atteints de PR

- La corticothérapie va altérer la qualité de la cicatrisation

Kadota Y et al Mod Rheumatol 2016;26 (1):68-74