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Original article

Prosthetic joint infection: A pluridisciplinary multi-center audit bridging quality of care and outcome

Infection de prothèses articulaires : audit pluridisciplinaire multicentrique reliant qualité de prise en charge et pronostic

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Abstract

Background. – Care to patients with prosthetic joint infections (PJI) is provided after pluridisciplinary collaboration, in particular for complex presentations. Therefore, to carry out an audit in PJI justifies using pluridisciplinary criteria. We report an audit for hip or knee PJI, with emphasis on care homogeneity, length of hospital stay (LOS) and mortality.

Patients and methods. – Fifteen criteria were chosen for quality of care: 5 diagnostic tools, 5 therapeutic aspects, and 5 pluridisciplinary criteria. Among these, 6 were chosen: surgical bacterial samples, surgical strategy, pluridisciplinary discussion, antibiotic treatment, monitoring of antibiotic toxicity, and prevention of thrombosis. They were scored on a scale to 20 points. We included PJI diagnosed between 2010 and 2012 from 6 different hospitals. PJI were defined as complex in case of severe comorbid conditions or multi-drug resistant bacteria, or the need for more than 1 surgery.

Results. – Eighty-two PJI were included, 70 of which were complex (85%); the median score was 15, with a significant difference among hospitals: from 9 to 17.5 points, $P<0.001$. The median LOS was 17 days, and not related to the criterion score; 16% of the patients required intensive care and 13% died. The cure rate was 41%, lost to follow-up 33%, and therapeutic failure 13%. Cure was associated with a higher score than an unfavorable outcome in the univariate analysis (median [range]): 16 [9–18] vs 13 [4–18], $P=0.002$.

Conclusions. – Care to patients with PJI was heterogeneous, our quality criteria being correlated to the outcome.

Keywords: Prosthetic joint infection; Bone and joint infection

Résumé

Une collaboration pluridisciplinaire est requise pour la prise en charge des patients présentant une infection ostéo-articulaire (IOA), notamment dans leur forme complexe (C). Nous rapportons un audit portant sur la prise en charge des IOAC pour en mesurer l'hétérogénéité et établir une possible relation entre des critères qualité pluridisciplinaires et l'évolution clinique.

Méthodes. – Quinze critères étaient définis : 5 portant sur les moyens diagnostiques, 5 sur les aspects thérapeutiques et 5 pluridisciplinaires. Six critères étaient choisis pour leur vraisemblable impact sur l'évolution, donnant un score de 20 points : biopsies chirurgicales diagnostiques, discussion pluridisciplinaire de prise en charge, stratégie chirurgicale, antibiothérapie consensuelle, monitoring de la toxicité antibiotique et prévention des thromboses veineuses. Les IOA sur prothèse de hanche ou de genou de 2010–2012 de 6 établissements étaient inclues.

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Résultats. – Quatre-vingt-deux IOAC étaient analysées, dont 70 complexes (85 %). La médiane [extrêmes] du « score qualité » était de 15 [0–20], variant entre établissements de 9 to 17,5 points, $p < 0{,}001$. La durée d'hospitalisation était de 17 jours [6–104], sans relation avec le score, 16 % des patients nécessitant un transfert en réanimation et 13 % décédant en hospitalisation. Le taux de succès thérapeutique était de 41 %, de perdus de vue 33 % et d'échecs thérapeutiques de 13 %. En analyse univariée, le succès thérapeutique était associé à un score plus haut que les évolutions défavorables : 16 [9–18] *vs* 13 [4–18], $p = 0{,}002$.

Conclusion. – La prise en charge des IOAC est hétérogène, les critères qualité consensuels de prise en charge étant reliés à l'évolution.

Mots clés : Infection sur prothèse ; Infection ostéo-articulaire

An increasing number of patients undergo joint prosthesis implantation because of ageing, trauma, and improved surgical techniques [1,2]. Prosthetic joint infections (PJI) are a severe complication after surgical device implantation, for which recommendations were published in France in 2009 and in the United States of America in 2013 [3,4]. Both recommendations stress the need for a close collaboration among orthopedic surgeons, microbiologists, and infectious diseases specialist.

Recommendations are needed because of the variety of clinical practices, depending on medical experience, and predefined hospital setup. Several options may be implemented from these recommendations, according to knowledge, technology resources, and the will to optimize surgical time. For example, some recommendations suggest collecting 5 tissue samples during surgical debridement and prolonging bacterial cultures for 14 days, allowing isolating a periprosthetic small variant colony [5]. Using 16S RNA sequencing is also suggested when cultures remain sterile [6]. The suggested surgical strategy is that acute infections associated with well-fixed prosthesis should be considered for debridement while chronic infections and/or unstable prosthetic devices should be replaced in 1 or 2 stages [3,4]. The main causative pathogen, *Staphylococcus* spp., is identified in only 50% of the cases, and polymicrobial infections are not rare events, suggesting multiple drug combinations for antibiotic therapy and a difficult evaluation [1–4].

We belong to a regional network devoted to infectious diseases in accordance with the French national antimicrobial stewardship program. We have tried to improve all aspects of medical practice, from clinical diagnosis to microbiological testing, therapeutic means, consensual processes of care, creation of cohort records, and audit [7,8]. We organized a regional pluridisciplinary meeting for the elaboration of a consensual antibiotic therapy close to French recommendations for PJI in April 2011, but divergent opinions emerged through discussions. Clinical practices were likely to be heterogeneous, leading us to implement an audit on care for PJI. Our aim was first to quantify the differences in clinical practice from one hospital to the next, and second to look for a relationship between this likely heterogeneous care and patient outcome.

1. Method

All volunteers specialists dealing with PJI care, in October 2012, were invited to participate in defining a "Quality set" of criteria that should be found in the patient's record, illustrating the quality of care. Fifteen criteria were defined (Table 1) with assigned points to determine a score out of 20. These 15 criteria were related to 3 steps of care: 5 concerned diagnostic tools, 5 evaluated therapeutic means, and 5 others were multidisciplinary.

A more important weight in points was given to the surgical strategy and to the consensual antibiotic treatment; out of 20 points, 6 concerned the surgical aspects and 6 antibiotic therapy (Table 1).

We considered as an adequate surgical strategy debridement and retention of the prosthesis for acute infection with a stable device, and 1 or 2-stage replacement in case of chronic infection. Other surgical strategies were not given any points. Furthermore, the total number of surgeries required for cure was reported.

Six of the 8 healthcare institutions in our network during the study period participated in the audit: the Infectious Diseases Department of the Nice University Hospital (a tertiary care center of 1600 beds); 4 general hospitals with similar capacities (320 beds) including 1 emergency department and 1 intensive care unit, but without any infectious diseases department, in Antibes, Cannes, Draguignan, and Grasse; and 1 private clinic near Toulon (250 beds).

All cases of PJI observed after hip arthroplasty (HA) or knee arthroplasty (KA), from 2008 to 2010, were included. Patients were identified through the administrative database as well as in the microbiology department database, considering that the diagnosis of PJI was made by the clinician who signed the final report of the patient's record.

Chronic bone infection was defined as lasting for more than 1 month.

The quality of targeted antibiotic therapy was defined by the prescription of agents chosen according to local or national guidelines [3], without considering the route of administration or dose.

Treatment success (cure) was defined as no clinical evidence of infection for at least 6 months after discontinuation of antibiotic therapy.

Treatment failure was defined as recurrence of infection with the initial bacteria or with different ones; and/or the development of a sinus tract; and/or presence of acute inflammation in the periprosthetic tissue on surgical examination at any time during or after the end of antibiotic therapy.

Table 1
Consensual parameters defining quality care for prosthetic joint infection. These 15 parameters were determined by pluridisciplinary discussions including surgeons, microbiologists, hygienists, and infectious diseases specialists. They concern 5 diagnostic components, 5 therapeutic means and 5 pluridisciplinary criteria. The assigned points are indicated to calculate a score out of 20. The criterion should be available in the patient's records for point attribution. The point distribution was related to the estimated weight of each parameter in the final outcome.
Critères pluridisciplinaires consensuels d'audit des pratiques cliniques des infections sur prothèses articulaires.

	Points
Diagnostic components	
1. bacterial diagnosis based on at least 2 intraoperative samples, or preoperative aspiration sample, or positive blood culture	3
2. all bacterial species identified and antibiograms available	–
3. in case of vancomycin use, minimal inhibitory concentrations measured	–
4. intraoperative histopathological examination available	–
5. when PJI is suspected, leukocyte scan should not be performed before 6 months after surgery	–
Therapeutic components	
6. antibiotic prophylaxis administered	–
7. therapeutic strategy defined after multidisciplinary discussion	3
8.1. patients diagnosed with early PJI (< 1 month) -> debridement and retention of the prosthesis or 8.2. patients diagnosed with late PJI (≥ 1 month) -> 1 or 2 stage-replacement of prosthetic material	6
9. antibiotic therapy chosen according to local or national guidelines	3
10. antibiotic toxicity monitored by biological data	3
Multidisciplinary criteria	
11. pain taken into consideration and adequate treatment prescribed	–
12. prophylaxis for preventing venous thromboembolism prescribed	2
13. advice for rehabilitation obtained	–
14. clinical follow-up for at least 6 months after completion of antibiotic treatment	–
15. patient warned of potential late relapse	–

PJI were defined as complex in case of severe comorbidities, or multi-drug resistant bacteria, or when requiring more than 1 surgery.

The record analysis was made by 2 investigators, independent of the audited healthcare institution. All the patient data was extracted from their records, including: clinical diagnosis, microbiological results, antibiotic therapy, length of hospital stay (LOS) related to PJI, and outcome. Comorbidities were defined according to the specific treatment received before hospital care, or if the diagnosis was made during the hospital stay. Investigators had a "medicolegal perspective", leading to consider unavailable data in the patient's record as clearly absent for quality criteria, according to recommendations from our medical and surgical societies. In other terms, criteria had to be proven by a specific notification in the record. Accordingly, collaboration between medical and surgical specialists had to be mentioned in the patient's record.

We calculated the number of microbial samples, discriminating among those that were from arthrocentesis, and/or synovial fluid, and/or blood culture, or from superficial wound, and/or postoperative samples.

1.1. Statistical analysis

The analysis was performed with the StatView® F-4.5 software. The relationships between variables were evaluated with the χ^2-test for categorical variables; Fisher's exact test was used when the expected frequency was < 5, and Mann–Whitney's *U* test for non-parametric comparisons.

2. Results

All patients presenting with PJI were included from 5 general hospitals: 68 patients (from 9 to 22 patients per hospital). The Infectious Diseases Department had managed 85 patients presenting with PJI, from 2008 to 2010; to make adequate comparisons, a random sample of 14 patients was analyzed. Seventy (85%) of the 82 cases of PJI were classified as complex: 44 because of severe comorbid conditions, 20 requiring more than 1 surgery, and 6 because of a multi-drug resistant bacterium. Thirteen patients had more than one criterion for complex PJI.

2.1. Heterogeneity of care for PJI

The definition of PJI was made by the clinician in charge of the final report, nevertheless all patients had a diagnosis of PJI, including micro-organisms isolated from the patients' periprosthetic tissue and purulence at the implant site, and/or macroscopic acute inflammation of the periprosthetic tissue.

The main characteristics of the study population are listed in Table 2: mean age [std deviation] 76 ± 12, sex-ratio (M/F): 0.90, HA infection (64/82, 78%), and acute infections (45/82, 55%). There was no difference in patients' characteristics among healthcare institutions except that the Infectious Diseases Department recruited more cases of chronic PJI, acute infections accounting for 58% of PJI in the Orthopedic Department.

A total of 442 samples related to PJI were collected during the hospitalization period, ranging from 0 to 27 per patient (Table 2). Three of the 82 patients did not benefit from bacterial sampling (3.6%) despite obvious prosthetic infection criteria, and 69 of the 79 patients had intraoperative microbial samples (87.3%), with a median of 3 samples per patient (IQ = 2 [1–14]).

There was a high rate of *Enterobacteriae* and polymicrobial infections; 41%, PJI were staphylococcal infections, and half of the strains were methicillin-resistant.

Two of the 82 patients did not undergo surgery. The surgical strategy was debridement and retention in 39/45 cases of acute infections (86.6%), and removal of the prosthesis in 27/37 cases of chronic infections (72.9%). A single surgery was required for 56 of the 80 patients (70%), 2 surgeries for 20 of the 80 patients, and 4 patients underwent > 2 surgeries.

Collaboration between medical and surgical specialists was documented in 52/82 patient records (63.4%), and antibiotic therapy using recommended antimicrobial agents in 41/82 cases (50%). Monitoring the potential toxicity of antimicrobial therapy was mentioned in the patient's records in 50% of the cases.

Table 2
Main characteristics of the study population according to healthcare institutions. It should be noted that 3 out of 82 patients did not have microbial sample. Institution F recorded more chronic infections than others, $P < 0.001$. The lowest and the highest percentages are presented to show the contrasted results of the processes of care on the outcome.
Principales caractéristiques des patients inclus selon le site hospitalier.

	A	B	C	D	E	F
	$n=9$	$n=22$	$n=15$	$n=9$	$n=13$	$n=14$
Age (mean ± std deviation)	79 ± 9	78 ± 8	78 ± 10	71 ± 21	73 ± 13	72 ± 12
Male/female	2/7	14/8	10/5	4/5	4/9	5/9
Hip/knee	8/1	16/6	13/2	9/0	10/3	8/6
Acute/chronic infection	5/4	15/7	12/3	7/2	6/7	0/14
Comorbid conditions						
None	2 (22)	4 (18)	2 (13)	2 (22)	3 (23)	5 (36)
Cardiovascular	5 (44)	12 (45)	6 (40)	4 (56)	6 (54)	7 (50)
Diabetes	0	4 (18)	3 (20)	1 (11)	2 (15)	2 (14)
Neurological/psychiatric	2 (22)	7 (32)	6 (40)	1 (11)	4 (31)	2 (14)
Pulmonary	1 (11)	1 (4)	2 (13)	0	0	2 (14)
Cancers/ID	0	0	1 (7)	1 (11)	1 (8)	0
Liver diseases/alcohol	0	2 (9)	4 (27)	2 (22)	1 (8)	3 (21)
Chronic renal failure	0	1 (4)	2 (13)	0	1 (8)	0
Microbial samples[a]	10 ± 7	4 ± 1	2 ± 2	11 ± 7	3 ± 2	7 ± 6
Pathogens[b]						
Staphylococcus spp.	5 (56)	12 (55)	4 (29)	1 (11)	4 (33)	6 (46)
Enterobacteriae	3 (33)	6 (27.5)	4 (29)	1 (11)	5 (42)	2 (14)
Polymicrobial infection	1 (11)	2 (9)	5 (36)	4 (44)	0	2 (14)
Others	0	2 (9)	1 (7)	3 (33)	3 (25)	3 (21)
Outcome						
Treatment success (cure)	2 (22)	11 (50)	4	3	3	7
Lost to follow-up	5	6	7 (47)	2 (22)	5	5
Treatment failure	0 (0)	3	1	3 (33)	3	1
Death	2 (22)	2	3	1	2	1 (7)

[a] Mean ± std deviation.
[b] In C, E, and F for 1 patient, no microbial sampling was performed.

The length of follow-up was 13 ± 12 months; 42/82 patients were followed for 6 months (51.2%).

Fig. 1A shows the rate of each criterion documented in the patient's records, in each health institution, highlighting the heterogeneous care delivered, the global rate per criterion ranging from 3.6% (MIC for vancomycin for *Staphylococcus* infection) to 87.6% (proof of antalgics). Several records were found for the same patient in some hospitals, because various departments had provided care to patients with PJI, leading to the unavailability of some information such as antibioprophylaxis. The variability of the "Quality score" within and among health care facilities is illustrated by Fig. 1B.

2.2. Relationship between "Quality score" and outcome

Concerning the main markers of morbidity and mortality, the mean PJI related LOS was 25 ± 19 days, 16% of the patients required intensive care and 13% died. The mean LOS in intensive care was 7.5 ± 9.5 days (range 1 to 34). Retrospectively, 10 out of 11 unfavorable outcomes were related to comorbid conditions: 5 cases of cardiac failures, 2 of hemorrhagic shocks, 2 or more of fatal comorbid conditions, and 1 of treatment cessation. Fig. 2 illustrates the relationship between the "Quality score" and the 3 main markers of outcome: LOS, requiring intensive care, and outcome. When there was no relationship between the score and LOS, patients who did not require intensive care had a higher "Quality score". Table 3 illustrates the relationship between the quality criteria and the outcome, indicating that the "Quality score" and the pluridisciplinary discussion to define the therapeutic strategy were associated with a favorable outcome. PJI classified as complex were not associated with a worse outcome.

3. Discussion

Our study results show that care to patients presenting a PJI varied significantly among hospitals. Even if this was expected, to the best of our knowledge this was the first study quantifying such differences among hospitals for PJI management. Using a set of criteria to quantify the quality of care to patients presenting with PJI, allowed demonstrating that care heterogeneity was associated with a variable outcome. It was important that quality criteria were defined by a pluridisciplinary consensus determined before the audit.

The clinical and/or bacterial criteria for PJI were present in every patient's records, even if microbial investigations were not performed in 3 out of 82 cases; accordingly 69/80 had positive intraoperative bacterial samples.

The American consensus stresses the difficulty to write recommendations for PJI care with a high confidence index, notably because almost no information was available on potential differences in outcome associated with various practices

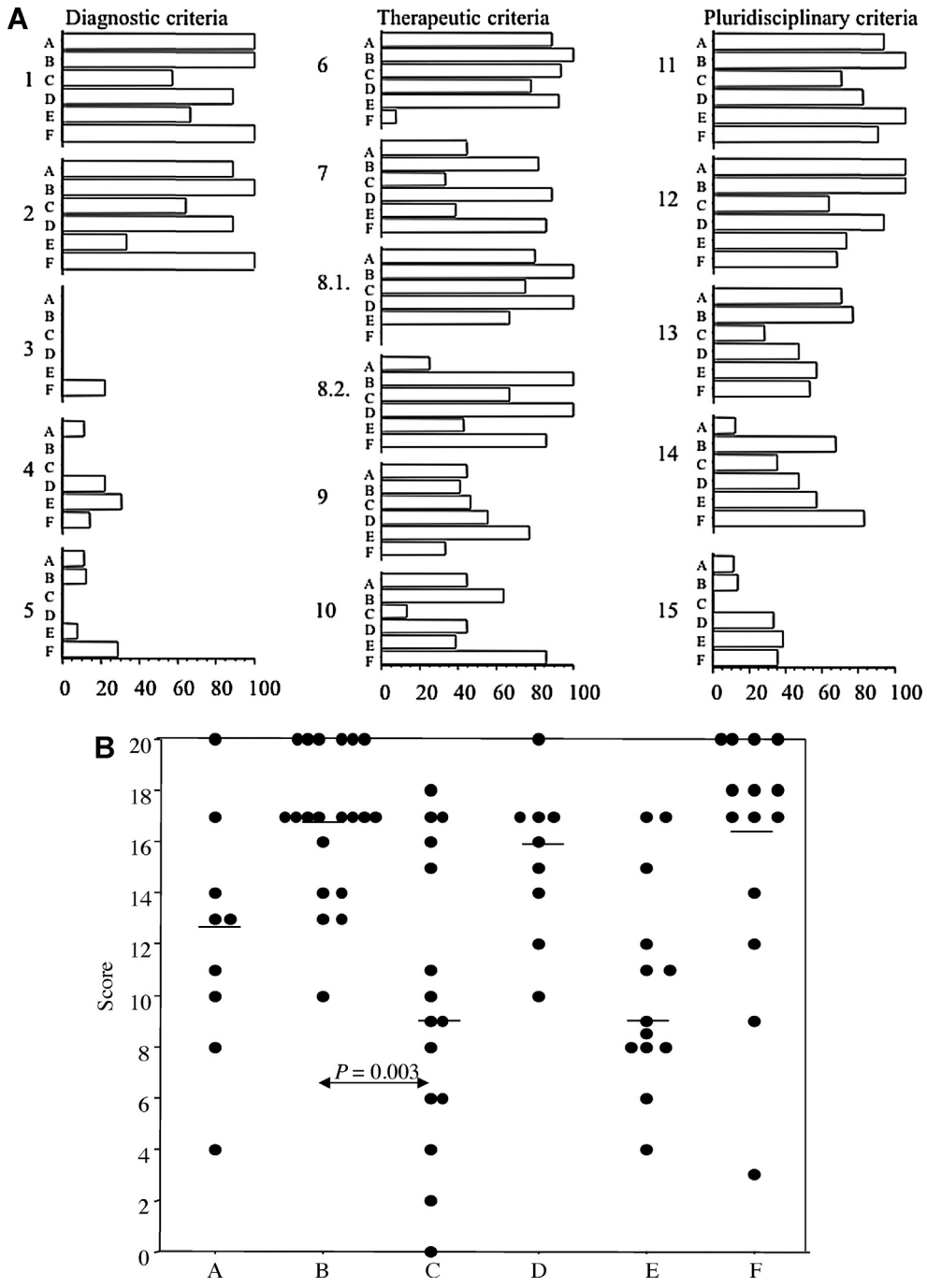

Fig. 1. A. Rate of quality criteria available in the patients' records in each healthcare institution, from A to F. Each histogram represents the rate of the considered criterion, from 1 to 15, in a single institution, the global rate per criterion is also indicated. B. Score per patient in each healthcare institution, from A to F. A significant difference was observed between the "best" and the "worst" hospital, proving the heterogeneity of care for PJI.
A. Présence des critères qualité dans les dossiers médicaux des patients selon les institutions participantes, de A à F. B. Score par patient dans chaque institution participante, de A à F.

[4]. The French ministry of health recently issued a guide for optimal care to patients presenting with a PJI, in which the main recommendation was to transfer the most complicated cases ("complex PJI") to specialized care centers [9].

There are few publications dealing with audits on prosthetic surgery in orthopedics, and/or PJI, or infectious arthritis management. The few available studies were always performed in the context of a single specialty, e.g. orthopedics or rheumatology [10–13]. The authors of an audit performed in orthopedics reported a significant difference in terms of readmission rate or major wound complications among 3 institutions: 1 referral center and 2 smaller healthcare institutions [10]. Another author reported inadequate care for bacterial arthritis: 30% of the patients had undergone joint fluid aspiration before initiation of antibiotics [12]. There are more published studies on

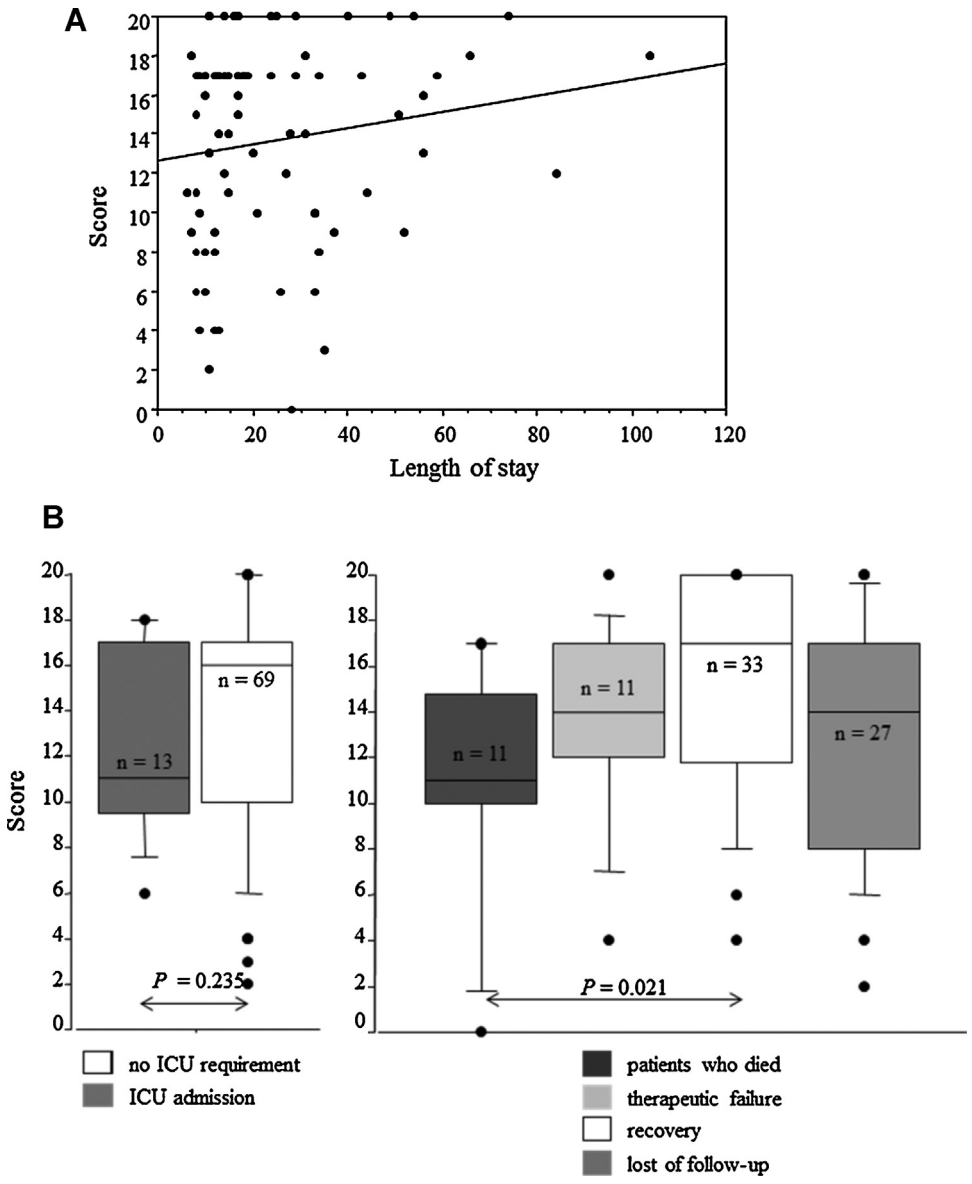

Fig. 2. Relationship between the quality score and outcome in prosthetic joint infection. A. Absence of correlation between the score and the length of hospital stay related to PJI. B. Left panel: patients requiring intensive care presented with the same score as others. Right panel: there was a significant relationship between the outcome and the quality score, it was higher in case of recovery, compared to those lost to follow-up or those who died.
Relation entre le score de qualité et le pronostic des patients présentant une infection sur prothèse articulaire.

antibioprophylaxis in the operating room, indicating inadequate management for more than 25% of the patients [14]. This proves the heterogeneity in clinical practice and variable outcomes are to be expected.

Audit and feedback information is certainly an adequate solution to reduce heterogeneous care. The French Society for Infectious Diseases (Spilf) had also suggested tools for audits on PJI in 2009. However, numerous criteria were proposed, with as a consequence their improbable use. Conversely, our study was based on a limited number of criteria chosen in a pluridisciplinary context. This was of utmost importance for the process of care in which each step is crucial. For example, the authors of an international survey detailing the use of low molecular weight heparin for venous thromboembolism prophylaxis following hip arthroplasty reported poor clinical practice, despite evidence-based guidelines and potential medicolegal implications [15].

No hospital had all criteria available in patient records (see Fig. 1). Thus, at the time of feedback information, each hospital team obtained valuable information to improve their clinical practice. Furthermore, it was proposed at the regional network level that our set of quality criteria should be present in a specific form in the records of patients presenting with PJI. Our next goal will be to search for a link between such tools, the quality of care, and the outcome.

Improving clinical practice is of the utmost importance because of the high morbidity and mortality reported in PJI: the mean PJI related LOS was > 3 weeks in our study, and the mortality rate was 13%. Acknowledging the causes of these deaths is a reminder to carefully assess comorbid conditions before surgical

Table 3
Risk factors for a favorable outcome of prosthetic joint infection. Patients who were lost to follow-up were grouped with those presenting with therapeutic failure defined as the clinical and/or microbiological relapse after cessation of antibiotic treatment. The follow up of patients with a favorable outcome was (mean±std deviation [range] = 15 ± 9 months [6–36]). Accordingly, the item "clinical follow-up for at least 6 months" was not pertinent in the univariate analysis. Patients who died during hospitalization (n = 13) were not included.
Facteurs associés à une évolution favorable d'une infection ostéo-articulaire sur prothèse. Les patients perdus de vue étaient regroupés avec ceux présentant un échec clinique et/ou microbiologique après l'arrêt de l'antibiothérapie. Le suivi des patients présentant une évolution favorable était d'au moins 6 mois (moyenne ± déviation standard [extrêmes] = 15±9 mois [6–36]). Le critère pluridisciplinaire n'apparaît donc pas utilisable dans l'analyse. De même, les patients décédant durant leur hospitalisation étaient exclus.

	Favorable outcome	Unfavorable outcome	*P*
	n = 33	n = 38	
Age (years, mean ± std deviation)	73 ± 13	76 ± 11	0.344
Sex-ratio (M/F)	0.94	0.9	0.925
Comorbid conditions			
Cardiovascular	20 (60.6)	17 (44.7)	0.182
Neurological and/or psychiatric	6 (18.2)	12 (31.6)	0.196
Diabetes	5 (15.2)	5 (13.2)	0.809
Pulmonary	2 (6.01)	4 (10.5)	0.499
Liver diseases	6 (18.2)	4 (12.0)	0.355
Chronic renal failure	2 (6.1)	2 (5.3)	0.884
Cancers/immunodepression	1 (3.0)	2 (5.3)	0.641
Infection's characteristics			
Hip/knee	7/26	9/29	0.804
Acute/chronic infection	19/14	19/19	0.523
Quality criteria[a]			
Diagnostic components			
Leukocyte scan not performed	3 (9.1)	4 (10.5)	0.804
Bacterial diagnosis	32 (97.0)	35 (92.1)	0.375
Bacterial identification and antibiograms	30 (91)	32 (84.2)	0.781
MIC vancomycin	1 (3.6)	1 (3.4)	0.979
Histopathological examination	3 (9.1)	5 (13.2)	0.589
Therapeutic components			
Antibiotic prophylaxis	26 (81.2)	28 (73.7)	0.452
Multidisciplinary discussion	24 (72.7)	17 (44.7)	0.017
Optimal surgery	30 (90.9)	33 (86.8)	0.588
Antibiotic therapy using guidelines	17 (51.5)	20 (52.6)	0.925
Monitoring antibiotic toxicity	23 (69.7)	13 (34.2)	0.003
Multidisciplinary criteria			
Treatment for pain	31 (93.9)	34 (89.5)	0.499
Thromboembolytic prophylaxis	29 (87.9)	28 (73.7)	0.134
Advice for rehabilitation	26 (78.8)	17 (44.7)	0.003
Patient warned of potential late relapse	9 (27.3)	8 (21.0)	0.54
Total score (mean ± std deviation, range)			
Complex PJI	15 ± 3 [9–19]	12 ± 3 [4–18]	0.002
	25 (75.7)	26 (68.4)	0.493

[a] For complete definition of quality criteria, see Table 1 and Section 1.

re-intervention. The authors of previous studies did not determine precisely the prognosis of PJI since the management was highly variable from one hospital to the next. The high frequency of required intensive care we report correlates with our previous study showing that bone infections were frequently bacteremic [16]. It should be noted that the effectiveness of 1 or 2-stage revision in preventing re-infection is not evidence-based medicine [17]. The authors of another study reported that *Staphylococcus aureus* infection was the only clinical variable associated with treatment failure [18]. It is important to note that some items of our quality set were clearly not directly related to the outcome, so point assignment was restricted to the microbiological diagnosis and therapeutic means. The association between this "Quality set" and outcome validates our proposing a check-list to fill for all patients presenting with PJI.

Our study has some limitations. First, the number of PJI cases per institution was rather low. Second, we did not include all cases managed by the Infectious Diseases Department because the recruitment was clearly different from surgical departments, as suggested by Table 2. Third, the high number of patients lost to follow-up altered our capacity to identify risk factors associated with a favorable outcome. Finally, the definition of treatment success or cure was established on a short period of follow-up (at least 6 months) without relapse, because there was a lack of follow-up after antibiotic treatment.

In conclusion, our study results indicate that a heterogeneous clinical practice leads to substandard results in the management of PJI, and clinical practice at a regional level might be improved by using a standardized set of quality criteria included in every patient's record.

Disclosure of interest

The authors declare that they have no conflicts of interest concerning this article.

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