CLINICAL FEATURES AND PROGNOSIS OF PROSTHETIC JOINT INFECTION CAUSED BY STAPHYLOCOCCUS LUGDUNENSIS A MULTI-CENTER RETROSPECTIVE STUDY

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BACKGROUND

Prosthetic joint infections due to *Staphylococcus lugdunensis* are rare. Only 33 cases of prosthetic joint infections involved S. lugdunensis are published in the literature. Its clinical features and prognosis have not been clearly known to date..

MATERIAL/METHODS

We report a multicenter retrospective study of prosthetic joint infection cases caused by S. lugdunensis managed in 9 hospital centers and 3 private clinics in the South and Southern France from 1995 to 2014.

RESULTS

A total of 66 cases of prosthetic joint infection due to S. lugdunensis were included. The mean age was 66 years (range 24 to 89 years), yielding a male/female sex ratio of 1.4. Sixty-four percent of cases had risk factors. Thirty-nine (59%) cases were localized in the knee and 27 (41%) cases in the hip. Fourteen percent of cases occurred within the first month of implantation. Local signs were frequently observed included pain in 84%, purulent discharge in 53%, and fever in 29%. Bacteremia was identified in one case, severe sepsis in 3 cases and endocarditis in one case. Thirty-five percent of cases were polymicrobial infections. Eight cases were treated by antibiotic treatment without surgery, and 58 cases were treated by antibiotics and surgical treatment. Thirty-eight cases were treated with surgical lavage and debridement with prosthesis retention, two cases with prosthesis removal without re-implantation, nine cases with one-stage prosthesis exchange, and eleven cases with two-stage prosthesis exchange. Of the 66 patients, 59 patients were followed-up until they had no further relapses, 7 patients were lost to follow-up. One patient was dead due to infection. Forty-two cases (64%) were in remission, and 16 cases (24%) relapsed. No risk factor or comorbidity has been associated with relapse. Polymicrobial infections was not significantly associated with clinical outcome. No statistical significant of prosthesis removal compared to antibiotic treatment regime without surgery or surgical lavage and debridement.

Table 1. Clinical and microbiological characteristics of 66 cases of prosthetic joint infection involved *S. lugdunensis*.

	Number de cases (%)
Median age	66 years (24-89 years)
Sex	
Male	39 (59%)
Female	27 (41%)
Co-morbidities & risk factors	
Tobacco use	22 (33%)
Diabetes mellitus	13 (20%)
Obesity	9 (14%)
Alcoholism	8 (12%)
Immunodeficiency	7 (11%)
Solid cancer	2 (3%)
Corticosteroid treatment	2 (3%)
Chemotherapy	1 (2%)
Immunosuppressive treatment	1 (2%)
Transplant	1 (2%)
Inflammatory rheumatism	6 (9%)
Open fracture	3 (5%)
Cirrhosis	1 (2%)
Peripheral neuropathy	1 (2%)
Infection delays	
Early infection (≤ 30 days of implantation)	9 (14%)
Chronic infection (>30 days of implantation)	57 (86%)
Localization of infections	
Knee arthroplasty	37 (56%)
Hip arthroplasty	29 (44%)
Clinical and biological presentations	
Pain	56 (84%)
Erysipelas	37 (56%)
Purulent discharge inside the wound	35 (53%)
Fever	19 (29%)
Bacteremia	1 (2%)
Severe sepsis	3 (5%)
Endocarditis	1 (2%)
Protein reactive C rate ≥ 40 mg/ml	19 (29%)
Mixed infection	23 (35%)
Antibiotic resistance	
Methicillin resistant	4 (6%)
Rifampin resistant	1 (2%)
Fosfomycin resistant	5 (8%)

REFERENCES

Kragsbjerg et al. 2000; Sampathkumar et al.,2000; Sanzén et al.2003; Szabados et al. 2011; Shah et al. 2010

Table 2. First-line therapy

	Number of case (%)
ANTIBIOTIC TREATEMENT WITHOUT SURGERY	**8 (12%)**
SURGERY	**58 (88%)**
Debridement, antibiotics and implant retention (DAIR)	35 (53%)
Prosthesis removal	
Prosthesis removal without re-implantation	2 (3%)
One-stage exchange prosthesis	9 (14%)
Two-stage exchange prosthesis	11 (21%)
Amputation	**1 (1%)**
HYPERBARIC OXYGEN THERAPY	**2 (3%)**
ANTIBIOTIC TREATMENT	
Oral antibiotic treatment (ONLY)	42 (64%)
Oral antibiotic treatment after short intravenous course	20 (30%)
Combination of oral and intravenous antibiotic treatment	4 (6%)

Table 3. Number of surgery needed over the 59 cases with complete follow.

	Number of case	Number of surgery =1	Number of surgery ≥ 2
Surgery	51	38 (75%)	13 (25%)
Debridement, antibiotics and implant retention (DAIR)*	33	19	6
Prosthesis removal*	18	6	7
Prosthesis removal without re-implantation	3	1	2
One-stage exchange prosthesis	8	2	3
Two-stage exchange prosthesis	7	3	4
Amputation	1	1	0

**not statistically significant*

Table 3. Clinical outcome of the 59 cases with complete follow.

	Remission	Failure of first-line treatment + Relapse	*p*=
Antibiotic treatment without surgery	3	4	0,795
Surgery	26	26	1
Debridement, antibiotics and implant retention (DAIR)	19	14	0,08
Prosthesis removal	6	12	0,15
Prosthesis removal without re-implantation	1	2	0,352
One-stage exchange prosthesis	2	6	0,171
Two-stage exchange prosthesis	3	4	0,795

DISCUSSION & CONCLUSION

- The comorbidities usually reported : Diabetes mellitus (12% in literature vs. 20% in this study; Corticosteroid treatment (18% in literature vs. 3% in this study); and urogenital infection (32% in literature, absent in this study).
- Localization in the knee arthroplasty were frequent (85% in literature vs. 56% in this study)
- Early infection were recorded in 14% in this study (not yet reported in literature)
- Only monomicrobial infection cases have been reported in literature, (35% of ours cases were mixed infection). Polymicrobial infection was not significantly associated with relapse.
- Proportion of *S. lugdunensis* isolates resistant to antistaphylococcal agents was low. Methicillin resistant: 11 cases in literature vs. 4 cases in this study; Rifampin resistant: 1 case in literature vs. 1 case this study; Quinolone resistant: 1 case in literature and absent in this study; Fosfomycin resistant: no report in literature vs. 5 cases in this study.
- Relapse rate was high: 21% in the study of Shah *et al.* vs. 30% in this study + 25% first-line treatment failure that required more than one surgery to control infection. the relapse SL isolates were usually susceptible to antistaphylococcal agents.
- *S. lugdunensis* appears to be an unusually virulent CoNS with ability to form biofilms. However, we did not observed a statistical significant of prosthesis removal compared to debridement, antibiotics and implant retention (DAIR) (or to antibiotic treatment regime without surgery): remission rate and number of surgery required.
- Prosthetic joint infections due to *S. lugdunensis* is underreported, and the rate of recurrence is high which was not related to any risk factor or polymicrobial infection or the surgical treatment strategy. Prolonged antibiotic treatment at least 6 months might be a potential treatment of relapse cases