Corynebacterium Propinquum Isolated From a Pus Collection in a Patient with an Osteosynthesis of the Elbow

Mabrouka Saïdani*, Skander Kammoun**, Ilhem Boutiba-Ben Boubaker *, Saïda Ben Redjeb*

*- Laboratoire de Microbiologie- Hôpital Charles Nicolle de Tunis
**- Service d'Orthopédie-Traumatologie- Hôpital Charles Nicolle de Tunis

M. Saïdani, S. Kammoun, I. Boutiba-Ben Boubaker , S. Ben Redjeb

Corynebacterium propinquum isolé d'une collection purulente chez un patient porteur d'une ostéosynthèse du coude

LA TUNISIE MEDICALE - 2010 ; Vol 88 (n°05) : 360 - 362

M. Saïdani, S. Kammoun, I. Boutiba-Ben Boubaker, S. Ben Redjeb

Corynebacterium propinquum isolated from a pus collection in a patient with an osteosynthesis of the elbow

LA TUNISIE MEDICALE - 2010 ; Vol 88 (n°05) : 360 - 362

RÉSUMÉ

Prérequis: Alors que les corynébactéries non diphtériques sont ubiquitaires dans la nature et commensales de la peau et des muqueuses de l'homme, elles ne sont que rarement impliquées dans des infections cliniques authentiques.
But: nous rapportons un cas d'infection à corynébactérie non diphtérique, Corynebacterium propinquum.
Observation: notre patient est un homme Tunisien, âgé de 67 ans, admis au service d'orthopédie-traumatologie de l'hôpital Charles Nicolle de Tunis pour traumatisme du coude gauche. Il a été traité par ostéosynthèse et reçu une antibiothérapie à base d'amoxicilline-acide clavulanique et gentamicine. Aucune complication post-opératoire n'a été notée. Ré- hospitalisé un mois plus tard pour démontage du matériel d'ostéosynthèse, l'examen clinique a trouvé une collection purulente du coude opéré. L'analyse bactériologique du prélèvement a montré des bacilles à Gram positif dont l'identification à conclut à un C.propinquum. Le germe n'était résistant qu'à la pénicilline G et au sulfaméthoxazole-triméthoprime. Le patient était traité par l'association ofloxacine (2g par jour pendant 8 jours) et gentamicine (160mg par jour pendant 5 jours) avec une bonne évolution clinique.
Conclusion: Selon la littérature, les infections dues à C.propinquum sont rares, survenant principalement chez des patients porteurs de biomatériaux ou immunodéprimés. Ainsi, ce pathogène pourrait être pris en considération dans de telles situations

SUMMARY

Background: Although non- diphtherial corynebacteria are ubiquitous in nature and commonly colonize the skin and mucous membranes of humans, they rarely account for clinical infections.
Aim: we report a case of infection due to non- diphtherial corynebacteria, Corynebacterium propinquum.
Case : A Tunisian male patient of 67 years old was admitted to orthopedic surgery and traumatology ward of Charles Nicolle university hospital of Tunis (Tunisia) for a left elbow trauma. He was treated by osteosynthesis and received an antibioprophylactic therapy with amoxicilline-clavulanate and gentamicin association. No postoperative incident was noted. When he was readmitted a month later for the osteosynthesis material removal, clinical examination found a pus collection in the operated elbow. Specimen analysis showed a Gram positive stained bacilli identified as C.propinquum. The organism was resistant only to penicillin G and sulfamethoxazole-trimethoprim association. The patient was treated with ofloxacin (2g per day for 8 days) and gentamicin (160mg per day for 5 days) with clinical improvement.
Conclusion: According to literature, infections due to C.propinquum are rare, occurring especially in patients with medical device or immunocompromised. Thus, this pathogen should be taken in consideration in such situations

Mots-clés
Corynebacteria, Corynebacterium propinquum, osteosynthèse, infection

Key-words
Corynebacteria, Corynebacterium propinquum, osteosynthesis infection

كرينيبكتريوم برؤينكيوم معزول من مجمع صديدي لمريض حامل لأداة تقويم عظمي بالمرفق

الباحثون : مبروكة السعيداني - اسكندر كمون - إلهام بوطيبة - إ .بن بوبكر - سعيد بن رجب .

تعتبر الكورينبكتريات غير تلك المتسببة في مرض الخناق كثيرة التواجد في الطبيعة و أيضا عند الإنسان علي مستوي الجلدة و الأغشية المخاطية ورغم ذلك فهي نادرا ما تتسبب في تعفنات سريريه فعلية . نقدم هنا حالة لتعفن سببه كرينيبكتريوم برونكيوم لمريض تونسي الجنسية عمره 67 عاما ادخل الي قسم جراحة و تقويم الأعضاء بمستشفى شارل نيكول على اثر إصابة بمرفقه الأيسر أين تمت معالجته بواسطة أداة تقويم عظمي و بالمضادات الحيوية .عند عودته بعد شهر لإزالة أداة التقويم و أثناء الفحص السر يرى وجد مجمع صديدى بمكان العملية أظهر تحليله الجرثومي وجود عصيات ك.برونكيوم .تم علاج المريض بالأقلوكساسين و الجنتامسين أديا الي تحسن سريري ملحوظ .نستنتج من هذه الحالة أن جرثومة ك .برونكيوم تستطيع أن تتسبب في تعفنات عند المرضى الحاملين لمعدات بيوطبية مما يوجب أخذها بعين الاعتبار في هذه الحالات.

الكلمات الأساسية :كرينيبكتريوم برونكيوم ،تعفن ،أداة بيو طبية

الباحثون :م .سعيداني ،ا .كمون ،ا .بوطيبة بن بوبكر ،س .بن رجب

Corynebacteruim propinquum, former CDC coryneform group ANF-3, is a Gram positive stained bacilli belonging to Corynebacterium family. Since its description in 1993, few cases of C.propinquum in clinically significant infections have been reported. We describe a case of pus collection due to C.propinquum in a patient with an orthopedic device of the elbow.

CASE REPORT

A 67-years-old Tunisian male patient was admitted in November 2007 into orthopedic surgery and traumatology ward of Charles Nicolle university hospital of Tunis for a left elbow opened trauma resulting in intercondylar and supracondylar fractures of the humerus bone. As pathologic antecedents, the patient has been operated in 1997 for a fracture of his right leg in the same ward with a favourable outcome and in 2000 for a begnin prostata adenoma. In this episode, the patient was treated by osteosynthesis and received an antibioprophylactic therapy consisting in amoxicilline-clavulanate and gentamicin association. No immediate postoperative complication was noted. The patient was readmitted in December 2007 for the osteosynthesis material removal. The clinical examination was normal except an inflammatory aspect and a pus collection in the operated elbow which was aspirated and transported to the laboratory of Microbiology. The immediate post-operative antibiotic therapy administered was amoxicilline-clavulanate 3g per day for 48 hours. Direct examination of the specimen showed 100% polymorphonuclears and Gram positive coryneform-like bacilli. The Ziehl-Neelsen staining for acid-fast bacilli was negative. Culture was done on horse blood, chocolate, glucose-desoxycholate-lactose (GDL) and Chapman agar plates and on a thioglycholate broth used as enrichment medium. The blood agar plates were incubated for 24-48 hours aerobically and anaerobically, GDL and Chapman agar plates only aerobically for 24 hours and broth medium for 48 hours. A heavy pure growth of tiny colonies appeared on the blood-agar after 24 hours incubation. Grew colonies were approximatively one millimiter diameter, convex, whitish and non hemolytic. There was no growth on GDL, Chapman and the anaerobic agar plates. Microscopic examination showed Gram positive club shaped and arranged as coryneform bacteria. The organism was not acid fast. The isolate was catalase positive, reduced nitrate and did not hydrolyzed urea. Biochemical identification was performed using the commercial API-Coryne System (bioMérieux, Marcy l'Etoile, France) showing the presence of a pyrazinamidase activity and the absence of the pyrrolidonyl arylamidase, alkaline phosphatase, ß-glucuronidase, ß-galactosidase, ·-glucosidase, N-acetyl-ß-glucosaminidase. There was no gelatin liquefaction nor esculin hydrolysis and also no carbohydrate fermentation. All these characters assigned the bacteria as C.propinquum. Antibiotic susceptibility was perfomed by the disk diffusion and E-test methods on Mueller-Hinton agar supplemented with 5% of horse blood according to Clinical Laboratory Standard Institute guidelines (1). C.propinquum was susceptible to all antibiotics tested except to penicillin G and sulfamethoxazole-trimethoprim. The minimum inhibitory concentrations (MICs) are shown in table 1. Given the bacteriological results, the patient was treated by the association of ofloxacin 2g per day for 8 days and gentamicin 160mg per day for 5 days with clinical improvement. Seen 3 months later, the fracture has consolidated with a vicious position however.

Table 1 : Minimum inhibitory concentrations of the antibiotic tested

Antibiotics	MICs* (µg/ml)
penicillin G	1,5
ampicillin	0,5
cefaclor	0,5
cefuroxime	0,75
cefotaxime	0,125
imipenem	0,094
gentamicin	0,094
ciprofloxacin	0,064
ofloxacin	0,064
tetracycline	0,25
teicoplanin	4
vancomycin	2
rifampin	0,38
erythromycin	2
clindamycin	1,5
chloramphenicol	0,75
trimethoprim-sulfamethoxazole	> 32

** MICs: minimum inhibitory concentrations*

DISCUSSION

The family of coryneform bacteria includes organisms from the genius Corynebacterium and Propionibacterium and other genera less commonly cultivated. They were named Diphteroids because of their morphological similarities to C.diphteriae and defined as a group of Gram positive pleomorphic rods in the coryneform family (2). Although non diphterial corynebacteria are ubiquitous in nature and commonly colonise the skin and mucous membranes of humans, they rarely account for clinical infections (3). Indeed, except C.jeikeium and C.urealyticum which are now well-established humain pathogens (4) the other species have occasionally been involved in human infections. Moreover, new species have recently been described as the cause of serious systemic infections especially in immunocompromised patients and those having prosthesis (5, 6).The clinical significance of C.propinquum in our patient was based on positive direct Gram stain with leukocyte reaction and heavy pure isolation from a pus collection. C.propinquum was originally called CDC coryneform ANF-3 (absolute nonfermenter), the name of C.propinquum was proposed by Riegel et al in 1993 (7). C.propinquum has been mostly recovered from lower respiratory tract infections (8,3), but also from variety of infections such as bacteremia (6,9,10), native valve or prosthetic endocarditis (11), pleural effusion (2), material-

related infections (12), surgical and other skin wounds and abscesses (13), and osteitis cases (3,14). According to these cases, medical devices and or immunodeficiency may favour infections with this species.

Phenotype identification of Corynebacterium species remains routinely problematic due to the rapid taxonomic changes (6). Their recognition is highly dependent on the ability and attentiveness of the technician to identify these species (10). The existence of several differential characters of these organisms mainly with rapidely growing Mycobacterium, Rhodococcus spp and Nocardia spp emphasizes the necessity of an accurate identification of bacterial isolates. In our case, the bacteriologic identification was made by a combination of morphological characteristics of Gram stain, negative acid-fast of the isolate and biochemical characters given by the API Coryne System. This latter seems to be a reliable system for the identification of most Gram positive rods (5)

Due to the lack of established standards for coryneform bacteria and a referral strain for antimicrobial susceptibility testing, it is recommended to report MIC results without interpretative criteria (1). According to previous reports, antibiotic susceptibility rates were variable. The strain isolated was susceptible to all antibiotics tested including ß-lactams, fluoroquinolones, aminoglycosides, and glycopeptides. In a Brazilian report (13), the antimicrobial resistance rates of 28 strains were high for the antibiotics tested (Pencillin 78%, ampicillin 45%, cefotaxime 33%, trimethoprim-sulfamethoxazole 78%, gentamicin 45%, tetracycline 65% and pefloxacin 33%). In all previous studies, isolates were constantly susceptible to vancomycin except one resistant case reported by Babay et al (10) with a MIC of 64mg/l. The authors didn't found any predisposing factors, such as previous hospitalization or treatment with broad-spectrum antibiotics or with vancomycin.

In conclusion, non diphtherial Corynebacteria can act as real infectious pathogen mainly in immunocompromised patients and in related device infections.

Thus, they can be taken in consideration when isolated from any specimen after a confrontation with clinical symptoms. A complete identification of these isolates, especially when they appear on original plate as pure or predominant, should be performed. It can easily be achieved by API Coryne System. Finally, because of their unpredictable susceptibility to antibiotics, susceptibility testing should be performed for usual antibiotics in order to obtain the best therapeutic results.

Références

1. Clinical and Laboratory and Standards Institute , Wayne, Pennsylvania, ISBN 1-56238-556-9, January, 2005 USA
2. Coyle MB, Hollis DG, Groman NB. Corynebacterium ssp and other coryneform organisms. In: Lenette EH, Balows A, Houster WJ, Shadomy HJ, eds. Manual of clinical microbiology. 4th ed. Washington DC: American Society for Microbiology, 1985: 193-204
3. Young VM, Meyers WF, Moody MR, Schimpff SC. The emergence of coryneform bacteria as a cause of nosocomial infections in compromised hosts, Am J Med 1981, 70:646-50
4. K. Lagrou, J. Verhaegen, M. Janssens, G. Wauters, L. Verbist. Prospective Study of Catalase-positive Coryneform Organisms in Clinical Specimens: Identification, Clinical Relevance, and Antibiotic Susceptibility. Diagn Micobiol infect Dis 1998; 30:7-15
5. Babay.H: Pleural Effusion due to Corynebacterium propinquum in a patient with squamous cell carcinoma. Ann.Saudi.Med 2001;21: 337- 339
6. Motomura K, Masaki H, Terada M, Onizuka T, Shimogama S, Furumoto A, Asoh N, Watanabe K, Oishi K, Nagatake T.Three adult cases with Corynebacterium propinquum respiratory infections in a community hospital. Kansenshogaku Zasshi. 2004; 78: 277-282
7. P. Riegel, D. de Briel, G. Prévost, F. Jehl, H. Monteil Proposal of Corynebacterium propinquum sp. nov. for Corynebacterium group ANF-3 strains FEMS Microbiol Lett 1993; 113: 229–234
8. Lipsky.BA, Goldberger AC, Tomkins.LC: Infections caused by nondiphtheria corynebacteria. Rev Infect Dis 1982;4: 1220-1235
9. Balci I, Ekfli F, Bayram A. Coryneform bacteria isolated from blood cultures and their antibiotic susceptibilities. J Int Med Res. 2002; 30:422-427.
10. Babay HA, Kambal AM Isolation of coryneform bacteria from blood cultures of patients at a University Hospital in Saudi Arabia. Ann. Saudi Med J. 2004; 25:1073-9.
11. Petit. PL, Bok. JW, Thompson. J, Buiting. AG, Coyle. MB. Native valve endocarditis due to CDC Coryneform group ANF-3: report of a case and review of corynebacterial endocarditis. Clin Infec Dis, 1994; 19 :897-901
12. Chudnicka A, Koziol-Montewka M. Characteristics of opportunistic species of the Corynebacterium and related coryneforms isolated from different clinical materials. Ann univ Mariae Curie Sklodowska, 2003; 58:385-391
13. Camello TCF, Mattos-Guaraldi AL, Duarte Formiga LC, Andrade Marques E. Nondiphtherial Corynebacterium species isolated from clinical specimens of patients in a university hospital, Rio De Janeiro, Brazil. Braz. J. Microbiol 2003; 34:39-44
14. Roux. V, Drancourt. M, Stein. A, Riegel.P, Raoult. D, La Scola. B, Corynebacterium Species Isolated from Bone and Joint Infections Identified by 16S rRNA Gene Sequence Analysis. J. Clin Microbiol. 2004; 42:2231-2233