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***Ruminococcus gnavus* infection of a metal-on-metal hip arthroplasty resembling a pseudo-tumour in a 72 year-old woman with no intestinal symptoms**



Infección por Ruminococcus gnavus de prótesis de cadera metal-metal asemejando un pseudotumor, en una mujer de 72 años sin síntomas intestinales

A 72-year-old woman was referred to the emergency department of a tertiary hospital under suspicion of left total hip infection and/or urinary infection. The patient complained of dysuria and left groin pain of several days duration, as well as temperature up to 39.5 °C, with no trauma. She had been implanted with a metal-on-metal big-head total hip arthroplasty five years ago. Physical exam revealed pain with groin palpation and with passive motion, and she had difficulty to walk. Blood analysis showed 18,980 g/l leukocytes, 87% neutrophils, C-reactive protein 180 mg/l and procalcitonin 4.12 ng/ml. Intravenous empiric antibiotic treatment was begun with cephazolin 1 g/8 h, gentamycin 240 mg/24 h and clindamycin 600 mg/8 h. After 3 days urine culture yielded >100,000 CFU of *Klebsiella pneumoniae* and treatment was changed to oral amoxicillin-clavulanate 875 mg for 10 days. The patient improved clinically and returned to walk without hip or groin pain. Along the following two months she suffered three episodes of left hip dislocation treated conservatively with closed reduction under general anaesthesia. The radiographic control after the last episode showed incomplete reduction (lack of full seating of head inside cup). The total hip was surgically revised to a conventional metal-on-polyethylene because of suspicion of pseudotumor interposition inside the joint.

One-stage uncemented exchange was performed, but only the acetabular cup and the femoral head were replaced. At the time of surgery, all biochemical parameters resulted normal. The removed periarticular tissue was examined histopathologically by microscopy to confirm the presence of a chronic inflammatory process with coagulation necrosis, hemosiderin and replacement of normal tissue with scar tissue. Five intraoperative specimens were obtained for microbiological purposes: three tissue samples of the periarticular and intraarticular granuloma/pseudotumour, the retired prosthetic components (big head and old acetabulum), and bone tissue from the remaining of acetabular bone.

Specimens were aseptically collected and sent for microbiological analysis and culture within 2 h. All samples were processed independently. Microscopic examination of the samples showed an absence of polymorphonuclear cells and/or microorganisms. Saline solution was added to the biopsies prior to homogenization. Ultrasonication of the removed prosthetic implants was performed. The resulting suspensions obtained were plated onto 5% sheep blood Columbia agar medium incubated at 36 °C under aerobic and anaerobic conditions; onto Chocolate agar incubated at 37 °C in a 5% CO₂ atmosphere; and onto Schaedler agar + 5% sheep blood, Phenile-

tanol blood agar and Schaedler Neomycin Vancomycin agar + 5% sheep blood incubated at 36 °C under anaerobic conditions (all media were from bioMérieux, Marcy l'Étoile, France). Additionally, 1 ml of the suspensions were injected into a pair of aerobic and anaerobic culture bottles BACTEC Plus Aerobic/F and Plus Anaerobic/F incubated for 7 days in a BACTEC 9240 Blood Culture System (Becton Dickinson Microbiology Systems, Sparks MD, USA).

Four samples yielded positive cultures after 3 days of direct incubation on anaerobic conditions: the three granuloma/pseudotumor samples and the sonicate from the prosthetic components. Microorganisms appeared as translucent small colonies and Gram staining showed short Gram-positive diplococci. Few colony forming units grew from the direct solid medium and positive cultures were also obtained from anaerobic bottles from the granuloma/pseudotumor samples and from the prosthesis sonicate; the same colonies appeared in the subcultured anaerobic plates after 48 h.

The microorganism was identified as *Ruminococcus gnavus* (score: 2.2) by matrix-assisted laser desorption/ionization time of flight mass spectrometry, Maldi-TOF MS (Maldi Biotyper 3.0 System, Bruker Daltonics GmbH, Leipzig, Germany). The test was confirmed twice with the same result. Susceptibility of *R. gnavus* to antimicrobial agents was performed using agar diffusion epsilometer testing (Oxoid, Basingstoke, UK) on 5% sheep blood Columbia agar medium at 37 °C in anaerobic atmosphere. Minimum inhibitory concentrations (MIC) were determined for penicillin (MIC = 0.064 α/4g/ml), tigecycline (MIC = 0.064 α/4g/ml), vancomycin (MIC = 0.19 α/4g/ml) and linezolid (MIC = 1.5 α/4g/ml). It was also tested against amoxicillin-clavulanic acid, meropenem, clindamycin and metronidazole but results could not be interpreted due to a contamination and the strain could not be recovered from the frozen vial. According to the European Committee on Antimicrobial Susceptibility Testing criteria, the isolate was found to be susceptible to penicillin and vancomycin.

Intravenous empiric antibiotic treatment was begun with cephazolin 1 g/8 h, gentamycin 240 mg/24 h and clindamycin 600 mg/8 h during the immediate post operative period. Seven days later, de-escalation was done and oral clindamycin 600 mg/8 h along 6 months was prescribed by treating orthopaedic surgeries according to the protocols established in the Hospital.¹ At last revision in out-patient clinic (10 months post-surgery), erythrocyte sedimentation rate (ESR) and C-reactive protein (CRP) resulted normal, the patient was absolutely asymptomatic, did not need any walking aid, climbed stairs and used public transportation, was able to walk up to 1 km without stopping, and showed no signs of left hip prosthesis dysfunction.

R. gnavus is a strictly anaerobic Gram-positive non-spore-forming coccus that may be motile or non motile. It belongs to the Clostridia class of the Firmicutes division. *R. gnavus* is found to be part of the intestinal flora in humans and in the rumen of animals such as sheep, cattle and goats.²

The only previously described human infections were two cases of bacteremia associated with diverticulitis in men,³ one case of total hip arthroplasty infection in a man with ulcerative colitis,⁴ and one case of septic arthritis⁵; all these infections were described in patients with gastrointestinal diseases. The patient

described in this case report had no intestinal history or symptoms at all, considering the case as a blood stream infection. The macroscopic perioperative findings were compatible with the presence of granuloma/pseudotumor tissue surrounding the prosthesis.

An increased rate of pseudotumor formation has been described with metal-on-metal hip prostheses. Pseudotumors can present variable granulomatous reactions. Pain is the strongest predictor for pseudotumor presence.⁶

Pseudotumors are often associated with subclinical infection, may destroy massively host bone and soft tissue, and usually require revision surgery for treatment.⁷

In the present case, the pseudotumor samples yielded positive for *R. gnavus*, the same microorganism as the prosthetic joint sample.

We conclude that the microorganism mentioned should be considered as a potential cause of joint prosthesis infection.

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Malaria in Europe: Follow-up of autochthonous malaria in Greece and new risks



Malaria en Europa: seguimiento de la malaria autóctona en Grecia y nuevos riesgos

Dear Editor:

Concerning the current Refugee crisis in Europe,¹ we consider this moment opportune to comment upon the situation of the autochthonous malaria in Greece, focusing our thoughts on this newly raising concern.

As we commented upon in our previous paper,² malaria remained a rare disease in the EU during the period 2009–2012 but few notorious cases of autochthonous malaria in Greece at that time, triggered an Action Plan for the Management of Malaria (2012–2015) which was introduced in Greece during the spring of 2012 and carried out by Greek Health Authorities (HCDCP) in collaboration with the WHO (World Health Organization) and the European Center for Disease Prevention and Control (ECDC). The aim was to avoid its reintroduction and subsequent expansion in Greece. Surveillance results were successful on 2014 with none cases³ reported and, apparently very rapidly, the WHO has recently declared Malaria-free Europe⁴ area. However, cases of local-acquired malaria by *Plasmodium vivax* have been reported in Greece on 2015 and 2016.

In the light of these local-acquired transmissions occurred by vector-borne (*Anopheles* mosquitoes) from other humans who have been previously infected from a malaria endemic or epidemic area, the more imported malaria cases (*Plasmodium vivax* relapse

cases with dormant hypnozoites), the more locally-acquired cases are to be expected when imported cases transit areas with confirmed or suspected circulation of the competent vector. Potential risks exist when migrants transit Greece within the current migration flow. Official number of current humanitarian crisis in Greece are 41,138 migrants arrived in 2014, 856,723 in 2015 and 157,396 in 2016 (by 15/6/2016).¹

Table 1 shows the number of cases per year 2009–2015 and the average rate of autochthonous malaria cases during the study period (2013–2016) compared with previous one (2009–2012). Autochthonous cases and prevalence have both decreased with an average of 13 autochthonous cases and 0.0256 cases per million in the past 4 years compared with 19.25 autochthonous cases and 0.0382 on the previous study period but, the tendency from none on 2014 has around-turned to 6 cases and 4 cases occurred in 2015 and 2016 respectively.

Measures³ of the Action Plan (2012–2015) included active malaria case detection in the general and the migrant populations, screening of immigrants for malaria, administration of antimalarial drugs to immigrants with positive serology from malaria endemic countries (one course of prophylactic antimalarial treatment for *P. vivax* infection (Chloroquine + Primaquine)), closely monitor areas where sporadic malaria cases without travel history to a malaria country have occurred and vector control activities, among others.

According to the Health Authorities the risk in 2016³ for malaria in Greece is very low so, as previously advised for travelers: chemoprophylaxis is not recommended for visitors to areas where locally-acquired malaria cases have been occurred until today nevertheless, personal protective measures against mosquitoes remain strongly encouraged.

In conclusion, it can be said that autochthonous malaria remains at lower risk after specific action plans related in 2012 by Health Authorities but, newly potential risks related to the numbers of