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Original article

Chronic bacterial prostatitis. Clinical and microbiological study of 332 cases[☆]

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ABSTRACT

Background and objective: Chronic bacterial prostatitis (CBP) is characterized by long-lasting symptoms, frequently associated with psychosomatic disorders. The objective of the study was to study PCB in our environment clinically and microbiologically.

Methods: Between January 2013 and December 2014 761 patients with suspected CBP were studied. Of these patients 332 (43.6%) underwent a complete microbiological study and the major clinical signs and symptoms were collected.

Results: Eighteen point four percent of patients were diagnosed microbiologically with CBP, *Enterococcus faecalis* being the main aetiologic agent (37.7%), followed by *Escherichia coli* (22.2%). Ninety-six point seven percent of the CBP had positive semen cultures, while only 22.9% had positive urine post-semen cultures. Data of sensitivity, specificity, positive predictive value and negative predictive value of semen were 96.7%, 95.9%, 84.3% and 99.3%, respectively and urine post-semen 22.9%, 99.3%, 87.5% and 85.1%, respectively. Testicular perineum pain (44.3%), ejaculatory discomfort (27.9%) and haemospermia (26.2%) were highlighted as the patients' main clinical manifestations.

Conclusions: Fractionated culture for the microbiological diagnosis of CBP could be simplified by the culture of urine pre-semen and semen, without the need for the culture of urine post-semen. The main aetiologic agent of CBP in our media was *E. faecalis*, followed by *E. coli*.

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Prostatitis crónica bacteriana. Estudio clínico y microbiológico de 332 casos

RESUMEN

Fundamento y objetivos: La prostatitis crónica bacteriana (PCB) se caracteriza por una clínica de larga duración, frecuentemente asociada a trastornos psicósomáticos. El objetivo del estudio fue estudiar clínica y microbiológicamente la PCB en nuestro medio.

Métodos: Entre enero de 2013 y diciembre de 2014 se estudiaron 761 pacientes con sospecha de PCB. De ellos, 332 (43,6%) fueron sometidos a un estudio microbiológico completo y se recogieron los principales signos y síntomas clínicos.

Resultados: Un 18,4% de los pacientes fueron diagnosticados microbiológicamente de PCB, siendo *Enterococcus faecalis* el principal agente etiológico (37,7%), seguido de *Escherichia coli* (22,2%). El 96,7% de las PCB presentaron cultivos de semen positivos, mientras que tan solo un 22,95% tuvieron cultivos de orina postsemen positivos. Los datos de sensibilidad, especificidad, valor predictivo positivo y valor predictivo negativo del cultivo de semen fueron 96,7; 95,9; 84,3 y 99,3% respectivamente; y del cultivo de la orina postsemen 22,9; 99,3; 87,5 y 85,1% respectivamente. Destacaron el dolor perineotesticular (44,3%) de los pacientes, molestias eyaculatorias (27,9%) y la hemospermia (26,2%) como principales manifestaciones clínicas de los pacientes con estudio microbiológico significativo.

Palabras clave:

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Conclusiones: El cultivo fraccionado para el diagnóstico microbiológico de PCB podría simplificarse mediante el cultivo de la orina presemén y del semen, sin necesidad del cultivo de la orina postsemén. El principal agente etiológico de PCB en nuestro medio fue *Enterococcus faecalis*, seguido de *Escherichia coli*.
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Introduction

Chronic bacterial prostatitis (CBP) is the most common urological disease in men under 50 years of age and the third most frequent after benign prostatic hyperplasia and prostate cancer in men over 50 years of age.¹ It is responsible for 5–10% of non-acute prostatic syndromes.^{2,3} It is characterized by its long duration, clinical course with frequent recurrences and high morbidity. Psychosomatic disorders are often associated with it as a result of the persistence of symptoms, along with nonspecific clinical manifestations, with significant alteration of the quality of life. Along with antibiotic and anti-inflammatory treatment,⁴ psychotherapy has also been offered to help these patients, which also supports the clinical significance of this process.

Most authors agree that the most common causative agent is *Escherichia coli* (*E. coli*), accounting for 65–80% of these diseases.^{2,5} Other gram-negative bacilli involved are *Pseudomonas aeruginosa*, *Serratia* spp., *Klebsiella* spp. and *Enterobacter* spp. Except *Enterococcus* spp., which is considered a potential etiologic agent, the pathogenic role of the other gram-positive cocci described is uncertain. There is generally much controversy over the participation of *Chlamydia trachomatis* (*C. trachomatis*), *Ureaplasma* spp., *Mycoplasma* spp. and *Corynebacterium* spp. The role of anaerobic bacteria is still unknown.⁵ Establishing the microbiological cause of CBP is a complex and difficult process, still, the gold standard continues to be the Mears and Stamey test.^{5–9} The value of sperm culture in the diagnosis of this disease is difficult to establish because its sensitivity varies widely in the literature.⁷ Because there are few published studies on the etiology of CBPs in the Spanish population,^{10,11} we propose in this paper a clinical-microbiological study in our healthcare environment on the population with suspected CBP.

Materials and methods

761 patients who presented with pain at the level of the pelvic region for at least 3 months, with or without sexual or urinary manifestations, compatible with CBP, were studied in the Urology Services of the University Hospital of Granada (Hospital Virgen de las Nieves) between January 2013 and December 2014.¹² This hospital is a reference center in Andalusia, serving a population of 440,000 inhabitants. A complete microbiological study was conducted in 332 (43.6%) patients by means of fractionated sample cultures. This consisted of a modification of fractionated culture of Mears and Stamey,¹⁰ which included the collection and processing, sequentially, of samples of clean catch urine, semen and post-semen urine, under strict aseptic conditions. The clean catch urine sample was processed by the previously described procedure.⁶ The post-semen urine sample was inoculated in the same chromogenic medium and a Columbia blood agar was added (Becton Dickinson, USA) incubated in CO₂. In the case of semen samples, the inoculation in Martin-Lewis agar (Becton Dickinson, USA) medium was added to the previous procedure) incubated in CO₂ to recover *Neisseria gonorrhoeae*. The cultures were quantified using 10 µl calibrated loop samples and 48 h incubation at 37 °C. The genital mycoplasmas study was performed by inoculation in the Mycoplasma IST 2 equipment (bioMérieux, Marcy l'Etoile, France), which allows the identification, counting and determination of

sensitivity to different antibiotics, and in the A7 Mycoplasma agar (bioMérieux, Marcy-l'Etoile, France).

The fractionated culture was considered indicative of CBP, as gold standard, in any of the following situations: (1) presence of one or more microorganisms only in semen or post-semen urine with a count >1000 CFU/ml; or (2) presence of a bacterial microorganism count, in semen or post-semen urine, at least 10 times higher than in clean catch urine. The presence of urinary pathogens with significant count (>10⁵ CFU/ml) in the pre-ejaculatory urine culture was considered indicative of urinary tract infection, and ruled out the presence of CBP. In the case of gram-positive microorganisms, it was necessary to obtain more than one positive fractionated culture by the same microorganism, defined by antibiotype (MicroScan, Barcelona, Beckman Coulter, MicroScan, Beckman Coulter, Brea, California, United States), to consider their involvement in CBP. Genital mycoplasmas were assessed with a count >10⁴ CFU/ml and absence of any other possible pathogen of rapid growth.¹⁰ Finally, the main urological signs and symptoms of patients with suspected CBP were also collected. The presence of *C. trachomatis* was not studied as there were no epidemiological and clinical data to justify it.

Statistical analysis

Data were analyzed with the SPSS statistical software package by MS Windows, version 17.0 (Chicago, IL, USA). Quantitative variables are described as the distribution frequency of each of the categories. Sensitivity, specificity, positive predictive value and negative predictive value were calculated separately for semen and post-semen urine analysis, with a confidence interval of 95%.

Ethical considerations

The study protocol was carried out in accordance with the Declaration of Helsinki and the "Comisión de Ética e Investigación Sanitaria de los Centros Hospitalarios y Distritos de Atención Sanitaria" (Ethics and Health Research Committee of Hospital Centers and Healthcare Districts). This was a non-interventional study, with no additional research to routine procedures. The biological material was used only for the standard diagnosis of urinary tract infections, following the prescriptions of doctors. No additional sampling or routine protocol modification was made. Data analyses were done using an anonymous database. Therefore, approval was considered unnecessary according to our country's regulations. The entity which granted permission to access and use the data was the "Clinical Management Unit of Infectious Diseases and Clinical Microbiology, University Hospital of Granada, Spain."

Results

Of the 332 patients studied with clinical suspicion of CBPs, 271 (81.6%) did not meet the microbiological criteria for CBP. The remaining 61 patients (18.4%) with a mean age of 48 years and a range of 23–66 years, showed a positive microbiological study of fractionated samples. The isolation in monomicrobial culture of *Enterococcus faecalis* (*E. faecalis*) (Table 1) in 23 patients (37.7%) is worth mentioning, followed by *E. coli*, in 16 (22.2%). *Enterobacter* spp., *Klebsiella* spp., *Streptococcus agalactiae* and *Ureaplasma urealyticum* were isolated in 3 cases each (4.9%), *Morganella morganii*

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