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Case report

# Chronic meningococcemia

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ABSTRACT

The spectrum of *Neisseria meningitidis*-associated clinical entities involves mild forms of disease, without neurological involvement or sepsis, and asymptomatic carrier states. Rarely, *N. meningitidis* bacteremia can be associated with a prolonged fever with or without arthritis, which we designate as chronic meningococcemia. Chronic meningococcemia is an uncommon entity, usually associated to serogroup B *N. meningitidis*. Diagnosis is frequently delayed as blood cultures collected outside febrile periods can be negative. We present a case of chronic meningococcemia in a 22-year-old woman with no relevant clinical background, presenting with fever, arthralgia and exanthem. Due to the potential for progression to more severe disease and the risk of *N. meningitidis* transmission and development of secondary cases, a high degree of clinical suspicion is required to ensure prompt recognition and adequate treatment. Our patient had a favorable outcome probably due to early recognition and adequate treatment, which is critical for the resolution of the disease without complications.



## Introduction

Infection by *Neisseria meningitidis* can produce a wide array of clinical manifestations, ranging from asymptomatic carrier status to a fulminant disease, in which death occurring a few hours after the first symptoms [1–4]. Along this spectrum, there are rare descriptions of mild meningococcal disease, without organ failure, which may present as bacteremia without sepsis (typically mimicking an upper respiratory tract infection or a self-limited viral exanthema), meningococcemia without meningitis (in which the patient presents with skin rash, malaise, weakness, headache, leucocytosis and, potentially, hypotension) and meningitis without meningococcemia [1].

Rarely, *N. meningitidis* can also cause persistent or relapsing bacteremia associated with low-grade fever, rash and arthralgia, with or without arthritis, a clinical situation known as chronic meningococcemia [4–9].

## Case report

A 22-year-old woman with no relevant medical background was admitted to the emergency room (ER) with a 7-day history of fever, anorexia and a papular non-pruritic rash that first appeared in both arms and gradually progressed involving all body surface, affecting palms and soles. The color of the lesions evolved from erythematous to purple over 6 days. Symmetric polyarthralgia affecting both knees and elbows was also present and the patient recalled odynophagia on the first day of fever, which resolved spontaneously. Travel history was noncontributory and unprotected sexual exposure was not reported for the previous 6 months.

In the ER, the patient was febrile (auricular temperature of 38.5 °C), with a blood pressure of 106/65 mmHg, heart rate of 100 bpm, respiratory rate of 12 and well-perfused extremities. The previously described rash was present and did not vanish with digital pressure (Fig. 1). She had an otherwise healthy appearance, oropharynx examination revealed no changes, cardiac and pulmonary auscultation was normal as well as abdominal examination. Painful knee and elbow were elicited bilaterally on passive and active movement but aside from pain, no joint inflammatory signs were present. Nuchal rigidity was absent and neurological examination showed no deficits. Blood tests in the ER revealed leucocytosis of 25,000/μL, C-reactive protein (CRP) of 205 mg/L and normal renal function (creatinine of 0,62 mg/dL and

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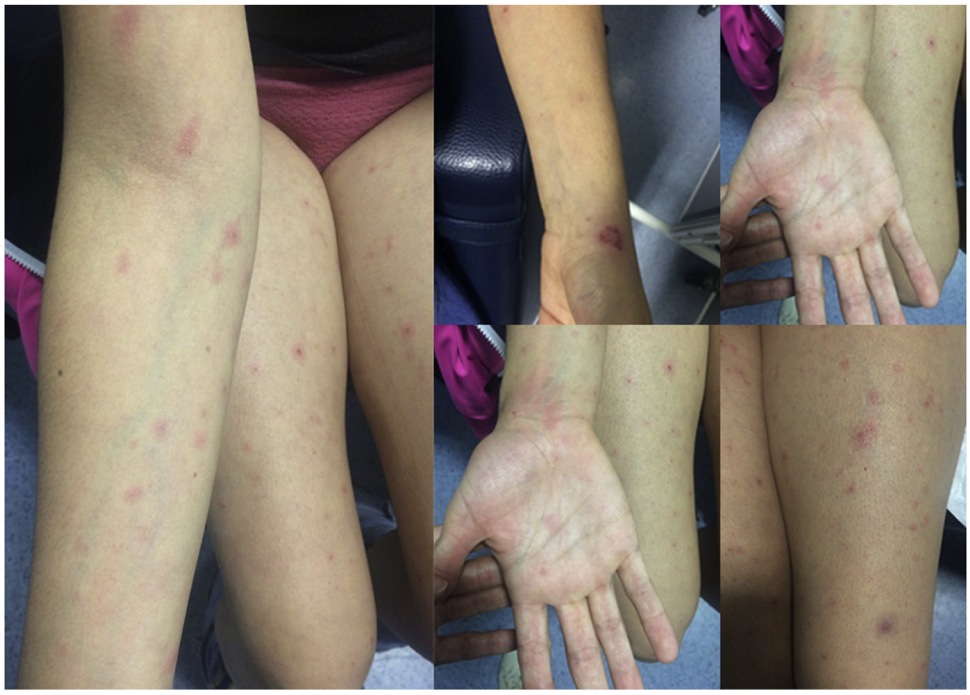

**Fig. 1.** Maculopapular rash in upper limbs, lower limbs and palms.

BUN of 23 mg/dL). HIV testing was negative. Since the patient had a good general condition, good home support and she was not willing to be hospitalized, she was made aware of possible alarming signs and she was discharged after collecting blood for culture (2 samples) and for CMV, EBV and syphilis serologies, with a scheduled medical appointment in two days at our outpatient clinic. Symptomatic treatment was prescribed.

On reassessment, the patient maintained a good general appearance. She had been afebrile for 48 h, her polyarthralgia had resolved and the rash was regressing. However, rare petechial lesions had appeared in her lower limbs. Blood tests were repeated which showed an improvement in inflammatory markers, with a leucocytosis of 14,400/μL and CRP 140 mg/L. Blood cultures collected two days before in the ER were positive and serogroup B *N. meningitidis* was isolated in both samples. She was hospitalized for ceftriaxone treatment, which was changed to penicillin after antimicrobial susceptibility results were made available. She remained afebrile, asymptomatic and stable and she was discharged after a 7-day course of antimicrobial with normalized blood tests. Blood cultures collected both on hospital admission and at 24 h after treatment initiation were negative. On her follow-up appointment, 2 weeks after discharge, she was feeling well and remained asymptomatic.

## Discussion

We present an unusual case of meningococcemia without meningitis, that also fits in the definition of chronic meningococcemia as a syndrome affecting mostly healthy young adults and characterized by a clinical course lasting for at least a week [4,7]. Serogroup B *N. meningitidis*, as it is the case of our patient, has been associated the most often with this clinical manifestation [4].

Chronic meningococcemia is a rare condition [4–9], characterized by a clinical triad of rash, arthralgia and fever [5,6,8,10], that may be continuous, although in most cases is described as relapsing or recurrent with afebrile periods of variable duration (afebrile periods as long as 10 days have been described) [2–4]. The skin rash is typically maculopapular, but has also been described as nodular, petechial, polymorphous or even necrotic [2,11,12]. The arthralgia, that may present with or without arthritis, is generally more evident during febrile periods, may be migratory, and affects mostly larger joints, such as knees and ankles [2,4,11]. Other symptoms commonly described are headache, myalgia and intermittent chills [2,5,7,11]. Leucocytosis is generally present during febrile periods [13].

The diagnosis is confirmed by the presence of *N. meningitidis* in blood cultures [2–7,13], which is often difficult to obtain and may require multiple samples [2–4,6], since bacteremia is thought to be present only intermittently [2,3]. Due to this fact, and also because the clinical manifestations of the disease are difficult to distinguish from other more common and less serious diseases, the diagnosis may be challenging and frequently is delayed [2,8,12]. The duration of symptoms until diagnosis is reported to range from 1 to as long as 32 weeks [2,11,13].

In this case, the blood cultures were collected during a febrile and bacteremic period and the diagnosis was made promptly. Since the patient was already asymptomatic and with improving blood tests on reassessment, she would have probably been discharged had blood culture been negative. This fact highlights the need for a high clinical suspicion when evaluating patients with mild exanthematic fever. Although this disease may be self-limited and even though many patients seem to remain stable with mild to moderate disease and without complications for weeks, the potential of meningococcal disease to progress from milder stages to more serious or potentially fatal disease is well established [1]. Also, even after its resolution, the patient may persist as an asymptomatic carrier and, thus remain at risk for invasive disease or provide for the dissemination of the agent in the community [1], with secondary cases usually occurring within 10 days of the primary case [1,8]. All these factors argue in favor of antimicrobial treatment, even if the course seems self-limited, as it was our case. Indeed, on reassessment our patient was already recovering but it remains unknown if she would have cured without specific treatment or, on the contrary, if she was only at an afebrile stage that could then be followed by recurrent fever or even severe disease.

**Table 1**
Other cases reported from our institution in 2016 [15].

| | Case 1 | Case 2 |
|---|---|---|
| Patient age | 20 years-old | 24 years-old |
| Duration of symptoms before diagnosis | 2 days | 4 days |
| Rash characteristics | Macular, with palmar involvement | Maculopapular rash with palmar involvement, followed days later by petechial lesions in limbs and tongue |
| Other symptoms | Fever, fatigue, headache, | Fever and polyarthralgia (ankle, knee and wrist) |
| Organ dysfunction | Absent | Absent |
| Antibiotic therapy (duration) | Ceftriaxone (7 days) | Ceftriaxone (7 days) |
| Serotype | B | Unidentified |
| Outcome | Cure, without sequelae | Cure, without sequelae |

The prognosis with treatment is excellent and clinical response to antimicrobial treatment is generally swift, with most patients becoming asymptomatic within 48 h of treatment [2,12,14]. Recently, a report of two other similar cases from our hospital was published, both with a favorable outcome (Table 1) [15].

In conclusion, it is crucial to recognize these clinical entities, to document them, and mostly, to timely approach them, providing effective treatment to the patient in convalescence and prophylactic treatment for contacts at risk.

## Conflict of interest

None.

## CRediT authorship contribution statement

**Beatriz Prista-Leão**: Conceptualization, Methodology, Investigation, Writing - original draft, Writing - review & editing. **Francisco Almeida**: Conceptualization, Methodology, Investigation, Writing - original draft, Writing - review & editing. **Ana Cláudia Carvalho**: Writing - review & editing. **Susana Silva**: Writing - review & editing. **António Sarmento**: Writing - review & editing, Supervision.

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## References

[1] Apicella MA. Neisseria meningitidis. In: Gerald L, Mandell John E, Bennet RD, editors. Mandell, Douglas and Bennett's Principles and practice of infectious diseases. 7th ed. Philadelphia: Churchill Livingstone; 2010. p. 2737–52.
[2] Benoit FL. Chronic meningococcemia. A case report and review of the literature. Am J Med 1963;35(July)103–12. . [Internet], Available from: http://www.ncbi.nlm.nih.gov/pubmed/14045996.
[3] Ploysangam T, Sheth AP. Chronic meningococcemia in childhood: case report and review of the literature. Pediatr Dermatol 1996;13(6):483–8.
[4] Kernéis S, Mahé E, Heym B, Sivadon-Tardy V, Bourgeois F, et al. Chronic meningococcemia in a 16-year-old boy: a case report. Cases J 2009;2(1)7103. . [Internet], Available from: http://www.casesjournal.com/content/2/1/7103%5Cnhttp://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=19829911%5Cnhttp://www.ncbi.nlm.nih.gov/pmc/articles/PMC2740133/pdf/1757-1626-0002-0000007103.pdf.
[5] Grob H, Frei R, Tyndall A, Itin PH. Chronic meningococcemia–a rare, but characteristic disease picture. Schweiz Med Wochenschr 1998;128(December (50))1988–93. . [Internet], Available from: http://www.ncbi.nlm.nih.gov/pubmed/9888170.
[6] Carré D, Dompmartin A, Sannier K, Verneuil L, Bravard P, Leroy D. Chronic meningococcemia. Ann Dermatol Venereol 2005;132(April (4))355–8. . [Internet], Available from: http://www.ncbi.nlm.nih.gov/pubmed/15886564.
[7] Martínez JV, Verbanaz SC, Jordán R, Enríquez N, Efrón ED. Chronic meningococcemia. Medicina (B Aires) 2008;68(4)298–300. . [Internet], Available from: http://www.ncbi.nlm.nih.gov/pubmed/18786886.
[8] Rosenstein NE, Perkins BA, Stephens DS, Popovic T, Hughes JM. Meningococcal disease. N Engl J Med 2001;344(May (18))1378–88. . [Internet], Available from: http://www.ncbi.nlm.nih.gov/pubmed/11333996.
[9] Carpenter R, Petersdorf R. The clinical spectrum of bacterial meningitis. . p. 262–75.
[10] Roux M, Sire S, Lalande V, Le Coustumier A, Tiev KP, et al. Fièvre prolongée associée à une éruption cutanée diffuse révélant une méningococcémie chronique. Rev Med Interne 2010;31(6):445–8.
[11] Bonville CA, Suryadevara M, Ajagbe O, Domachowske JB. Chronic meningococcemia presenting as a recurrent painful rash without fever in a teenage girl. Pediatr Infect Dis J 2015;34(6)670–2. . [Internet], Available from: http://content.wkhealth.com/linkback/openurl?sid=WKPTLP:landingpage&an=00006454-201506000-00027.
[12] Apicella Michael M. Clinical manifestations of meningococcal infection. UpToDate 2013;1–11.
[13] Rasmussen LH, Andersen PL. Chronic meningococcemia. A review and a report of 4 cases]. Ugeskr Laeger 1991;153(December (51))3613–4. . [Internet], Available from: http://www.ncbi.nlm.nih.gov/pubmed/1776205.
[14] op de Coul ME, Kardos G. An unusual cause of fever: chronic meningococcemia. Ned Tijdschr Geneeskd 1996;140(April (14))785–7. . [Internet], Available from: http://www.ncbi.nlm.nih.gov/pubmed/8668266.
[15] Ferraz RV, Ceia F, Duro R, Carvalho AC, Andrade P, Silva S, et al. Chronic meningococcemia. Adv Infect Dis 2016;6(3)97–101. . [Internet], Available from: http://www.scirp.org/journal/doi.aspx?DOI=10.4236/aid.2016.63012.