Case report

Menigococcal endophthalmitis: A rare cause of endogenous endophthalmitis

Emilio Manuel Páez Guillán a,*, Cristina Macía-Rodríguez b, Alba García Villafranca b, María del Carmen Martínez Rey a, Ignacio Novo-Veleiro a

A R T I C L E   I N F O
Article history:
Received 16 August 2020
Received in revised form 19 October 2020
Accepted 20 October 2020

Keywords:
Endophthalmitis
Meningococcal
Endogenous Infection

A B S T R A C T
Neisseria meningitidis is a rare but severe cause of endogenous endophthalmitis. We report a case of a 46-year-old woman who presented an endophthalmitis secondary to an infection by Neisseria meningitidis that caused with meningitis. She was treated with corticosteroids and systemic and topical antimicrobials, but she presented loss of visual acuity as a consequence. We also review the cases reported in medical literature, and find out that 75.7 % of patients presented diverse complications. The prevalence of complications is higher in patients who received local treatment in combination with antibiotics. Patients who received corticosteroids as treatment presented a similar rate of complications than patients who did not.

© 2020 The Authors. Published by Elsevier Ltd. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/).

Introduction

Endophthalmitis secondary to meningococcal infection is a rare disease [1]. We report a clinical case, and carry out a systematic review of published cases.

Material and methods

We performed a bibliographical research on Pubmed, using the keywords “meningococcal endophthalmitis” and “neisseria endophthalmitis”. We obtained 47 results, 11 of which were discarded either for not reporting a meningococcal endophthalmitis or due to the unavailability of the original article. 36 articles were included, one of them containing two cases and the rest containing one case each.

CASE REPORT

We report the case of a 46-year-old woman with juvenile idiopathic arthritis without chronic treatment who was admitted to Emergency Room (ER) due to a severe sepsis caused by an acute meningococcal meningitis. After initiating treatment with Ceftriaxone and Dexamethasone, with good clinical progress, she showed blurred vision and ocular pain in the right eye, and a diffuse infiltration in her vitreous body with whitish condensations was observed. Suspecting endogenous meningococcal endophthalmitis, antimicrobial intravitreal treatment with Ceftazidime and Vancomycin was started, as well as topical treatment with eyedrops (ceftazidime and vancomycin as antimicrobials, and cycloplegic). Afterwards, a vitrectomy was required. Treatment with intravenous Ceftriaxone and Ceftazidime eyedrops was administered during 14 days, using prednisone in doses that were reduced with time. Good clinical evolution was observed but visual acuity was diminished as a consequence.

Review

The characteristics of 37 cases of endophthalmitis secondary to meningococcaemia are shown in Table 1. More than half of them are pediatric, while young people predominate in the rest. 13 patients did not present meningitis, and 18 presented other complications such as arthritis or pericarditis. Treatment was given in the majority of cases using third generation cefalosporines or penicillins. In case of allergy to beta lactamics, chloramphenicol or quinolones were used. Despite the adequate treatment, 75 % of patients presented diverse complications such as loss of visual acuity or retinal detachment. Systemic corticosteroids were employed in 11 patients, without finding a clear reduction of
| AUTHOR | SEX (years) | AGE (months) | ARFECTATION | LOCAL ANTIMICROBIALS | SYSTEMIC ANTIMICROBIALS | STEROIDS (way of administration) | SEQUELAE | DETACHMENT | LOSS OF VISUAL ACUITY | RETINAL DETACHMENT | SYNECHIAE | OCULAR HYPOTONY | LOSS OF VISUAL ACUITY | Afferent Pupillary Defect | BRACHYACOPEIA | OROMAMMAL FISTULA |
|--------|-------------|--------------|-------------|----------------------|--------------------------|---------------------------------|----------|------------|----------------------|-------------------|----------|----------------|----------------------|------------------------|--------------|------------------|
| Kallinich | Female | 4 | Yes | Artral pain | Vancomycin (17 days) + Ceftazidime (9 days) | Gentamicin (ITV) | Yes (T) | Retinal detachment | Loss of visual acuity | No | Yes | No | No | No | No |
| Yusuf | Male | 15 months | Yes | Rash | Ceftriaxone + Gentamicin (17 days) | Cefuroxime (17 days) | No | Loss of visual acuity | No | No | Yes | No | Yes | No |
| Arlet | Male | 58 | Yes | Artral pain | Ceftriaxone (14 days) | Aminoside (17 days) | Yes (S and T) | Retinal detachment | No | Yes | No | No | No | No |
| Balaskas | N | 20 | Yes | Rash | Ceftriaxone (17 days) | Ceftazidime (ITV y SBC) | Yes (S) | Loss of visual acuity | No | Yes | No | No | Yes | No |
| Agrawal | Female | 29 | Yes | Rash | Cefuroxime (17 days) | Vancomycin + Ceftazidime (17 days) | Yes (T) | Loss of visual acuity | Yes | Yes | No | No | Yes | No |
| Chhabra | Female | 15 L | Yes | Rash | Cefotaxime + Vancomycin (17 days) | Ciprofloxacine (17 days) | No | Loss of visual acuity | Yes | Yes | No | No | Yes | No |
| Quintyn | Male | 20 | No | Rash | Cefotaxime (17 days) | N | N | Retinal detachment | Yes | Yes | No | No | Yes | No |
| Chacko | Male | 27 | Yes | Rash | Bencilpenicillin + Cefotaxime (17 days) | Cefazolin + Vancomycin (17 days) | Yes (T) | Loss of visual acuity | No | Yes | No | No | Yes | No |
| Zacks | Male | 56 | Yes | Rash | Cefotaxime + Vancomycin (17 days) | Ciprofloxacine (17 days) | Yes (T) | Loss of visual acuity | No | Yes | No | No | Yes | No |
| Frelich | Female | 13 | Yes | Rash | Ampicillin (17 days) | Vancomycin + Ceftazidime (17 days) | Yes (T) | Loss of visual acuity | No | Yes | No | No | Yes | No |
| Kerkhoff | Male | 17 | No | Rash | Penicillin (17 days) | N | No | Loss of visual acuity | No | Yes | No | No | Yes | No |
| Cheng | Female | 54 | Yes | Rash | Ceftriaxone + Cloxacillin + Metronidazole (17 days) | Amikacin + Vancomycin (17 days) | No | Loss of visual acuity | No | Yes | No | No | Yes | No |
| Yeung | Male | 14 months | Yes | Rash | Cefotaxime (17 days) | Ceftazidime (17 days) | No | Loss of visual acuity | No | Yes | No | No | Yes | No |
| Jain | Female | 14 | Yes | Rash | Ceftazidime + Vancomycin (17 days) | Vancomycin + Cefazolin (17 days) | Yes (ITV) | Retinal detachment | Yes | Yes | No | No | Yes | No |
| Gartaganis | Female | 3 months | Yes | Rash | Ceftriaxone + Chloramphenicol + Rifampicin (17 days) | Chloramphenicol + Ampicillin (17 days) | Yes (S) | Loss of visual acuity | No | Yes | No | No | Yes | No |
| Malhotra | Male | 16 | No | Rash | Ceftriaxone (17 days) | Vancomycin + Amphotericin B (17 days) | Yes (ITV) | Loss of visual acuity | No | Yes | No | No | Yes | No |
| Shappell | Female | 26 months | Yes | Rash | Cefotaxime (17 days) | N | No | Retinal detachment | Subcapsular cataract | Yes | No | No | Yes | No | No |
| Wong | Female | 28 | Yes | Rash | Ceftriaxone (17 days) + penicillin (17 days) | Cefazoline + Gentamicin (17 days) | No | Synchiae | Ocular hypotony | Loss of visual acuity | No | Yes | No | No | No | No |
| González | Female | 8 | Yes | Rash | Ampicillin (17 days) | Vancomycin + Ceftazidime (17 days) | Yes (SBC) | Loss of visual acuity | No | Yes | No | No | Yes | No |
| Sleep | Male | 17 | No | Rash | Penicillin + Rifampicin (17 days) | Vancomycin + Cefazolin + Amphotericin (17 days) | Yes (T) | Loss of visual acuity | No | Yes | No | No | Yes | No |
| Marcovich | Female | 22 | No | Rash | Ceftriaxone + Gentamicin (17 days) | Cefazolin + Gentamicin (17 days) | Yes (SBC) | Loss of visual acuity | No | Yes | No | No | Yes | No |
| Abousaia | Female | 19 | Yes | Rash | Ceftriaxone (17 days) | Cefazolin (17 days) | Yes (ITV) | Loss of visual acuity | No | Yes | No | No | Yes | No |
| Karras | Male | 23 | No | Rash | Bencilpenicillin (17 days) | Ampcencilin + Cefazolin (17 days) | Yes (T) | Loss of visual acuity | No | Yes | No | No | Yes | No |
| Beynon | Female | 58 | Yes | Rash | Ceftriaxone (17 days) + vancomycin (17 days) | Penicillin (17 days) | Yes (S) | Loss of visual acuity | No | Yes | No | No | Yes | No |
| Auerbach | Male | 19 | No | Rash | Ceftriaxone (17 days) + vancomycin (17 days) | Penicillin (17 days) | Yes (S) | Loss of visual acuity | No | Yes | No | No | Yes | No |
| Hall | Female | 18 | Yes | Rash | Ceftriaxone (17 days) | N | No | Loss of visual acuity | No | Yes | No | No | Yes | No |
| Stephani | Male | 15 | No | Rash | Ceftriaxone (17 days) | N | No | Loss of visual acuity | No | Yes | No | No | Yes | No |
| Bannister | Female | 15 | Yes | Rash | Ceftriaxone (17 days) | N | No | Loss of visual acuity | No | Yes | No | No | Yes | No |
complications. According to our review, local antimicrobials (intravitreous and subconjunctival) have been correlated with a higher prevalence of complications (94.1% and 100% respectively, versus 75.7% in the general group).

Discussion
Infectious endophthalmitis is a potentially severe disease that consists on the infection of the inside of the eyeball, which can be due to diverse etiologies. Neisseria meningitidis is not a frequent cause of infectious endophthalmitis. It can appear in the presence of meningitis, but it appears isolated in one fourth of the cases [2]. It must be suspected in any patient presenting an uveitis that does not respond to topical treatment, which would make the use of systemic antibiotics mandatory.

After reviewing the published cases, over a half have been found to be pediatric cases. The rest involve healthy young people mainly (the average age is 25 years old). This fact contradicts the previous studies in which this disease was linked to immunodepression and comorbidity like diabetes mellitus [1].

Regarding treatment, the majority of cases were treated with third generation cefalosporins [3]. In case of allergy to penicilins, quinolons were used [2]. Vitrectomy or local antimicrobial treatment (topical, intravitreal or subconjunctival) was added in many cases. However, their use was correlated with a larger number of complications. This result could be due to a larger severity of the disease in those cases, calling for added topical treatment. More studies have to be performed to confirm this result.

Steroid treatment is controversial. Although Pappuru et al. have observed a better outcome in patients who received corticosteroids [4], the 11 patients in our review that were treated with corticosteroids did not present a lower rate of complications. Moreover, local administration of corticosteroids could be harmful as it could delay the diagnostic [5] and interfere with local antimicrobials in case of intravitreal administration, and it could also make the patient more vulnerable to fungal infection [6].

It is remarkable that, although Neisseria meningitidis type B is the most common type in meningococcal infection [5], type C is present in the majority of reviewed cases.

We must take into account that endogenous endophthalmitis is a severe but rare complication arising from meningococcal meningitis, and in some cases can cause serious complications. Clinical suspicion is necessary to make a diagnosis and administer early antimicrobial treatment to reduce complications.

Funding source
The study has not received any kind of funding.

Ethical approval
We have read and complied with the journal policy on ethical issues. We have followed the Helsinki treaty.

Author statement
The authors of this study declare that all of them have contributed to it in the same way, in terms of research, data analysis, writing and reviewing.

Declaration of Competing Interest
We do not have any conflict of interest.
Acknowledgements

We would like to acknowledge Daniel García Fernández for his revision of the text of the manuscript.

References

[1] Balaskas K, Potamitou D. Endogenous endophthalmitis secondary to bacterial meningitis from Neisseria meningitidis: a case report and review of the literature. Cases J 2009;2:149, doi:http://dx.doi.org/10.1186/1757-1626-2-149.

[2] Arlet J-B, de Lajudie E, Despujol C, Ranque B, Pouchot J. Meningitis and loss of visual acuity. Presse Med 2010;39:617–9, doi:http://dx.doi.org/10.1016/j.lpm.2010.02.033.

[3] Agrawal P, Yellachich D, Kirkpatrick N. Retinal detachment following meningococcal endophthalmitis. Eye (Lond) 2007;21:450–1, doi:http://dx.doi.org/10.1038/sj.eye.6702628.

[4] Pappuru RR, Dave VP, Pathengay A, Gangakhedkar S, Sharma S, Narayanan R, et al. Endophthalmitis progressing to panophthalmitis: clinical features, demographic profile, and factors predicting outcome. Semin Ophthalmol 2018;33:671–4, doi:http://dx.doi.org/10.1080/08820538.2017.1416441.

[5] Yusuf IH, Sipkova Z, Patel S, Benjamin L. Neisseria meningitidis endogenous endophthalmitis with meningitis in an immunocompetent child. Ocul Immunol Inflamm 2014;22:398–402, doi:http://dx.doi.org/10.1080/09273948.2013.854392.

[6] Wen Ching, Ho D, Agarwal A, Lee CS, Chhablani J, Gupta V, et al. A review of the role of intravitreal corticosteroids as an adjuvant to antibiotics in infectious endophthalmitis. Ocul Immunol Inflamm 2018;26:461–8, doi:http://dx.doi.org/10.1080/09273948.2016.1245758.

[7] A.M. Kearns. M.S.Sprott. Endophthalmitis caused by Neisseria meningitidis. J Infect22;.