



## Case report

# Menigococcal endophthalmitis: A rare cause of endogenous endophthalmitis



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## ABSTRACT

*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.

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## 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 cephalosporines or penicillins. In case of allergy to betalactamics, 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

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**Table 1**  
Table of previously published cases.

AUTHOR	SEX	AGE (years)	AFFECTATION	ASSOCIATED MENINGITIS	OTHER CLINIC	SEROGROUP	SYSTEMIC ANTIMICROBIALS (length)	LOCAL ANTIMICROBIALS	STERIODS (way of administration)	SEQUELS	DETACHMENT
Kallinich	Female	4	L	No		C	Vancomycin (17 days) + Cefazidime (9 days)	Aciclovir + Vancomycin (ITV)	Yes (S)	Enucleation	No
Yusuf [5]	Male	15 months	R	Yes		B	Ceftriaxone + Gentamicin (N)	Gentamicin + Cefuroxime (ITV) Cefuroxime (T) Aminosalicylate (T)	Yes (T)	Loss of visual acuity	No
Arlet [2]	Male	58	R	Yes	Articular pain	C	Cefotaxime followed by levofloxacin (21 days)	Cefazidime (ITV y SBC)	Yes (S and T)	No	No
Balaskas [1]	N	20	L	Yes		B	Ceftriaxone (7 dias)	Cefazidime (ITV)	Yes (S)	Loss of visual acuity	No
Agrawal [3]	Female	29	L	Yes		N	Cefuroxime (5 days)	Vancomycin + cefazidime (ITV)	Yes (T)	Retinal detachment.	Yes
Chhabra	Female	15	L	Yes		N	Cefotaxime + Vancomycin (N)	Vancomycin (ITV)	Yes (T)	Loss of visual acuity	No
Quintyn	Male	20	R	No	Articular pain	C	Cefotaxime (N)	Ciprofloxacin (T)	N	Retinal detachment	Yes
Chacko	Male	27	B	No	Atroalgias Rash	C	Bencilpenicillin + Cefotaxime (N)	Cefazidime + Vancomycin (ITV)	Yes (T)	Loss of visual acuity	No
Zacks	Male	16	N	No	Articular pain	N	N	Cefazidime + vancomycin (ITV)	NC	Retinal detachment	Yes
Frelch	Female	13	B	Yes	Articular pain	C	Vancomycin + Cefazidime (N)	Cefazidime + Vancomycin (ITV) Gentamicin(SBC)	Yes (T and SBC)	Loss of visual acuity	No
Kerckhoff Cheng	Male Female	17 54	R L	No Yes	Articular pain Arthritis	C N	Penicillin (14 days) Ceftriaxon + Cloxacillin + Metronidazole (N)	N Amikacin + Vancomycin (ITV) Gentamicin + Cefazolin (T)	No No	Iris retraction Loss of visual acuity	No No
Yeung Jain	Male Female	14 months 14	B L	Yes Yes		N N	Cefotaxime (14 days) Cefazidime + Vancomycin (N)	Cefazidime (ITV) Ofloxacin (T) Vancomycin + Cefazidime (ITV)	No Yes (ITV)	No Retinal detachment Severe loss of visual acuity	No Yes
Garraganis	Female	3 months	B	Yes		N	Ceftriaxone + Chloramphenicol + Rifampicin (19 days)	Chloramphenicol + Ampicillin (T)	Yes (S)	No	No
Malhotra	Male	16	L	No		N	Ceftriaxone (7 days)	Vancomycin + Cefazidime + Amphoterin B (ITV) Vancomycin + Amikacin (T)	Yes (ITV)	Loss of visual acuity	No
Shappell	Female	26 months	B	No	Rash, CID	N	Cefotaxime (NC)	N	No	Loss of visual acuity	Yes
Wong	Female	28	R	Yes		N	Ceftriaxone (7 days) + penicillin (14 days)	Cefazoline + Gentamicin (ITV and T)	No	Loss of visual acuity Retinal detachment Subcapsular cataract SynchiaeOcular hypotony Loss of visual acuity	No
González	Female	8	L	Yes	Rash	N	Ampicillin (14 ays)	Vancomycin + Cefazidime (ITV) Cefazolin (T)	Yes (T and SBC)	Synechiae	No
Sleep	Male	17	R	No	Articular pain	N	Penicillin + Rifampicin (N)	Vancomycin + Cefazidime (ITV) Cefazolin (T)	Yes (T)	Loss of visual acuity Afferent pupillary defect	No
Marcovich	Female	22	R	Yes		N	Cefotaxime + Gentamicin + Vancomycin (N)	Cefazidime + Amphoterin (ITV) Cefuroxime + Gentamicin (T and SBC)	Yes (S)	Prosis	No
Abousaasha	Male	19	L	No	Myalgia Rash	C	Cefotaxime (N)	Cefotaxime (SBC), Cefotaxime + Chloramphenicol + Bencilpenicillin, Gentamicin (T)	Yes (S)	Loss of visual acuity	No
Kearns	Male	23	L	Yes		C	Ampicillin + Ciprofloxacin (7dias)	Gentamicin (ITV) Cefuroxime + Gentamicin (SBC) Gentamicin (T)	No	Loss of visual acuity	No
Beynon	Female	58	L	No	Pericarditis	C	Bencilpenicillin (14 days)	No	Yes (T)	Loss of visual acuity	Yes
Auerbach	Male	13 months	L	Yes	Rash	C	Cefazidime + Vancomycin + Chloramphenicol (10 days)	Chloramphenicol (ITV)	Yes (ITV)	Retinal detachment Loss of visual acuity	No
Hull	Female	13 months	B	Yes		C	Penicillin G (N)	Penicillin G (SBC)	Yes (S)	Synechiae	No
Stephani	Female	14	R	No	Articular pain Pericarditis	C	Penicillin + Chloramphenicol (59 days)	Chloramphenicol, atropine (T)	Yes (S)	No	NO
Brimser	Female	15	R	No		B	Penicillin + Gentamicin (N)	Gentamicin (ITV) Penicillin (SBC), Sulfacetamide and Chloramphenicol (T)	Yes (S)	Loss of visual acuity	No

Rosenberg	Female	21 months	B	Yes	Arthritis Rash	C	Penicillin G (N)	No	Chloramphenicol (T)	Yes (T)	No	No
Mason	Male	2	R	No	Arthritis Rash	C	Ampicillin + Gentamicin (14 days)	Chloramphenicol (T)	No	No	Secondary glaucoma	No
MacBeath	Male	7	L	Yes	Articular pain	N	Penicillin (N)	No	Penicillin G (SBC)	Yes (SBC)	Loss of visual acuity	No
Jay	Female	15	R	Yes	Articular pain	N	Penicillin G (N)	Penicillin G (SBC)	Penicillin G (SBC)	Yes (T)	Loss of visual acuity	No
Jensen	Female	7	B	Yes		N	Penicillin G + Chloramphenicol (14 days)	Chloramphenicol (T)	Chloramphenicol (T)	Yes (S)	Loss of visual acuity	NO
Haider	Female	18	R	Yes		C	Penicillin G +, Sulfadiazine (14 dias)	Penicillin (T)	Penicillin (T)	No	Synechia	No
Williams	Female	18	L	Yes	Arthritis, Pericarditis	N	Bencilpenicillin (N)	Chloramphenicol (T)	Chloramphenicol (T)	Yes (T)	Residual uveitis	No
Hedges1	Female	2	B	Yes		N	Penicillin + Probenecid(14 days)	No	No	Yes (S)	No	No
Hedges2	Male	16 months	R	Yes		N	Streptomycin + Dihydrostreptomycin + Aqueous penicillin + Probenecid	Atropine + Chloramphenicol (T)	Chloramphenicol (T)	Si (T)	No	No

R: right, L: left, B: bilateral, N: not known, S: systemic, T: topical, ITV: intravitreal, SBC: subconjunctival.

complications. According to our review, local antimicrobials (intravitreal 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 topic 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 induce serious complications. Clinical suspicion is necessary to make a diagnosis and administer early antimicrobial treatment to reduce complications.

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### 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

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