

We are IntechOpen, the world's leading publisher of Open Access books Built by scientists, for scientists

6,900

Open access books available

185,000

International authors and editors

200M

Downloads

Our authors are among the

154

Countries delivered to

TOP 1%

most cited scientists

12.2%

Contributors from top 500 universities



WEB OF SCIENCE™

Selection of our books indexed in the Book Citation Index
in Web of Science™ Core Collection (BKCI)

Interested in publishing with us?
Contact book.department@intechopen.com

Numbers displayed above are based on latest data collected.
For more information visit www.intechopen.com



Ocular Manifestations of Endocarditis

Cheima Wathek and Riadh Rannen

Additional information is available at the end of the chapter

<http://dx.doi.org/10.5772/65313>

Abstract

Endocarditis is an inflammation of the inside lining of the heart chambers and heart valves. Ocular manifestations are nonspecific and could reveal the disease, justifying routine ocular examination. *Staphylococcus aureus* is the most incriminated in ocular complications. Endophthalmitis, retinal arterial occlusion, Roth dots, or vitreal and retinal infiltrations could be seen with endocarditis. Ocular prognosis in endophthalmitis and retinal arterial occlusion is poor. Ocular involvement was independently associated with death in infective endocarditis.

Keywords: endocarditis, eye, endophthalmitis, retinal arterial occlusion

1. Introduction

Ocular manifestations of endocarditis are nonspecific, caused by septic embolism and in rare cases by aseptic embolism. Ocular manifestations could reveal this disease. Routine ophthalmic examination should be considered for patients with infective endocarditis.

2. Epidemiology

There are no data presenting the epidemiology of ocular manifestations of endocarditis. However, many case reports reveal that ocular manifestations are common and could be the first manifestation of the disease. Roth dots are the most commonly seen in endocarditis. Other findings are described in case reports and include focal retinitis, embolic retinopathy, subretinal abscesses, choroidal septic metastasis, choroiditis, endophthalmitis, papillitis, and optic neuritis [1].

3. Physiopathology

Infective endocarditis, especially when associated with prosthetic cardiac valves, carries a very high complication rate. Among the most dreaded complications are perivalvular abscesses, intracardiac fistulae, acute heart failure (typically from acute aortic insufficiency—a very poorly tolerated physiologic condition), complete heart block, septic emboli, and pseudoaneurysms. In fact, embolic events occur in as many as 50% of all patients with infectious endocarditis. Specific organs and/or systems involved, from most to least common, include (A) central nervous system, 65%; (B) spleen, 20%; (C) hepatic, 14%; (D) renal, 14%; (E) musculoskeletal, 11%; and (F) mesenteric, 3% [1, 2].

4. Microbiology

Streptococcus is seen in over 58% of cases of infectious endocarditis. The most common germs seen in endophthalmitis and chorioretinitis are *Staphylococcus aureus*, *Staphylococcus epidermidis*, and *Streptococcus viridians*. *S. aureus* can lead to ocular complications in over 56% [3, 4]. Fungal endocarditis affects intravenous drug users and severe immunodeficiency patients (onco-hematology) [5]. *Candida* is the most common seen in fungal endocarditis.

5. Ocular clinical findings

5.1. Roth dots

A Roth dot is a cluster of superficial retinal hemorrhages ovally shaped, with pale center (**Figure 1**). It is commonly seen near the optic disk.

In endocarditis, this cluster represents red blood cells which surround inflammatory cells that have collected in the area in response to a septic embolism from valvular vegetations [1].

5.2. Retinal arterial occlusion

Retinal arterial occlusion occurs as a complication of septic or aseptic embolism. Clinical manifestations depend on the localization of occlusion. We distinguish the following.

5.2.1. Central retinal arterial occlusion

Patient, if conscious, presents sudden, complete, and painless loss of vision in one eye. Fundoscopy shows pale edema of the retina, particularly in the posterior pole where the nerve fiber and ganglion cell layers are thickest. The orange reflex of the foveola with intact choroidal vasculature contrasts with the surrounding opaque neural retina, producing the cherry red spot. Central retinal arterial occlusion (CRAO) has a poor prognosis. If not treated in the first hour, it can lead to permanent loss of vision and other ocular complications [6].

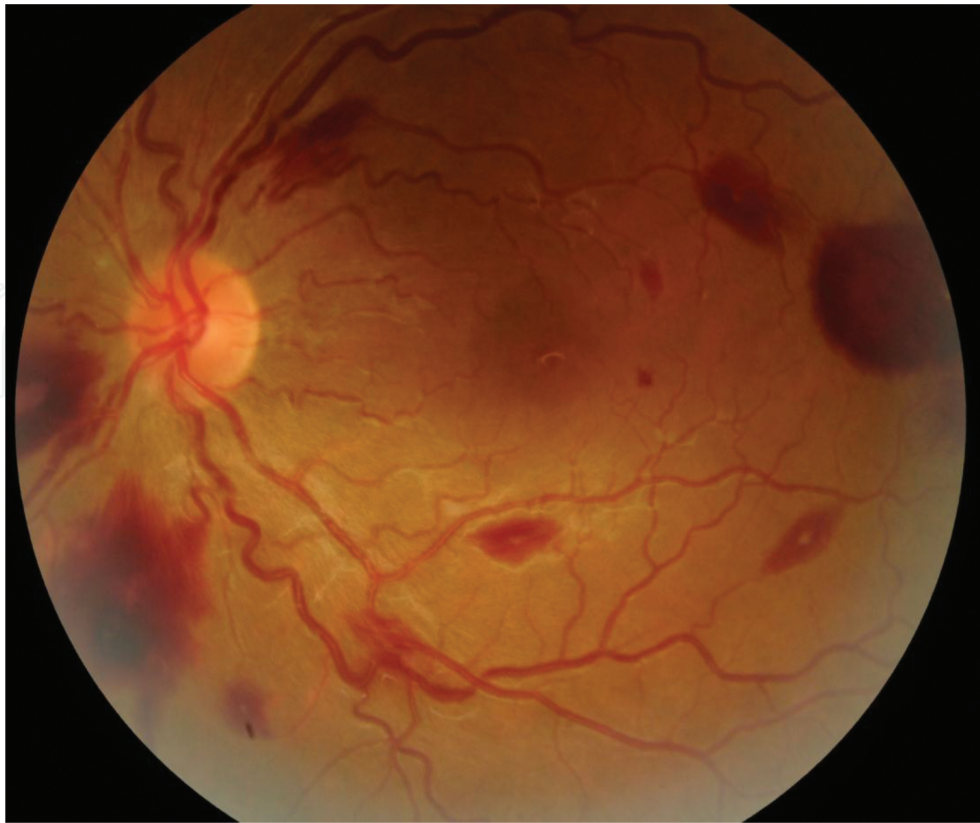


Figure 1. Fundoscopy of the left eye showing multiple Roth dots.

5.2.2. Branch retinal arterial occlusion

Branch retinal arterial occlusion (BRAO) may be clinically asymptomatic. If symptomatic, patient may report a loss of vision or visual field amputation. Fundoscopy shows a pale edema due to infarction of the inner retina in the distribution of the affected vessel. With time, the occluded vessel recanalizes, perfusion returns, and the edema resolves; however, a permanent field defect remains.

5.2.3. Ophthalmic arterial occlusion

This event is responsible for an interruption of both retinal and posterior ciliary circulations. The visual prognosis, in this entity, is usually worse. If conscious, patient presents pain, sudden and complete loss of vision. Ophthalmic examination revealed no light perception, ophthalmoplegia (**Figure 2**), and nonreactive mydriasis. Fundoscopy showed remarkable edema of the entire retina, resulting from inner and outer retinal ischemia and whitened retinal vessels (**Figure 3**). The cherry-red spot is not noted in this case because of choroidal compromise and probable retinal pigment epithelial or choroidal opacification, or both, in about 40% of eyes. Fluorescein angiography revealed impairment of retinal vascular and choroidal flows (**Figure 4**). A cherry-red spot may be initially absent, but then appear over a several-day period as choroid perfusion improves [7].

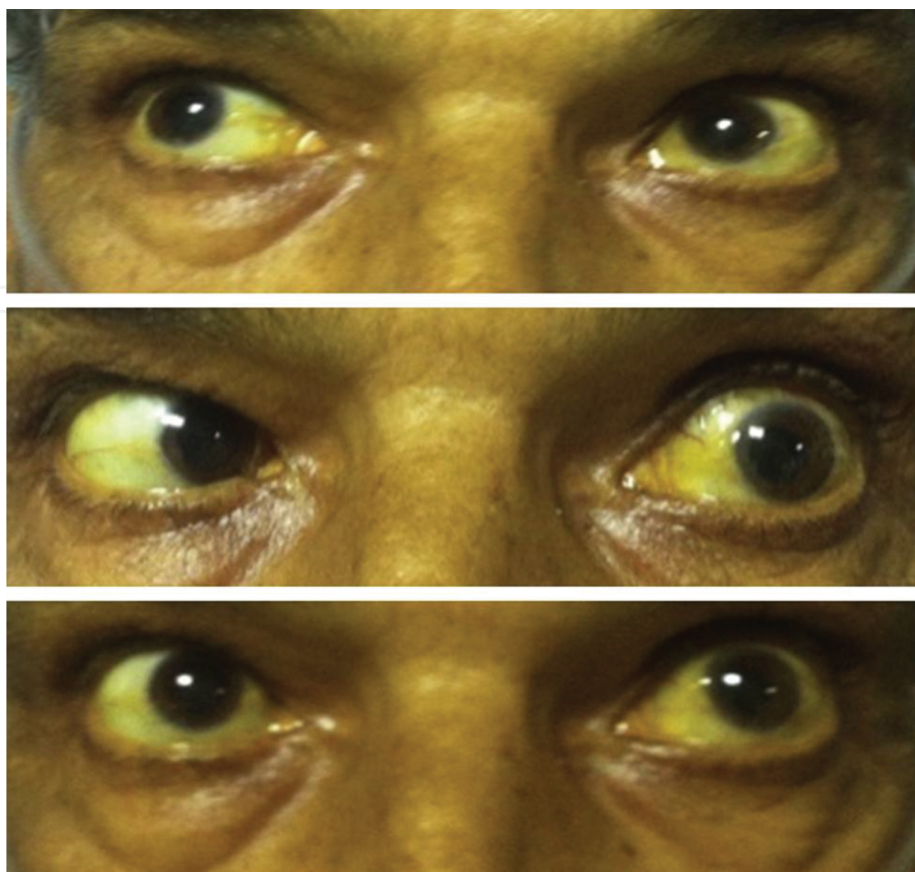


Figure 2. Ophthalmoplegia of the left eye.

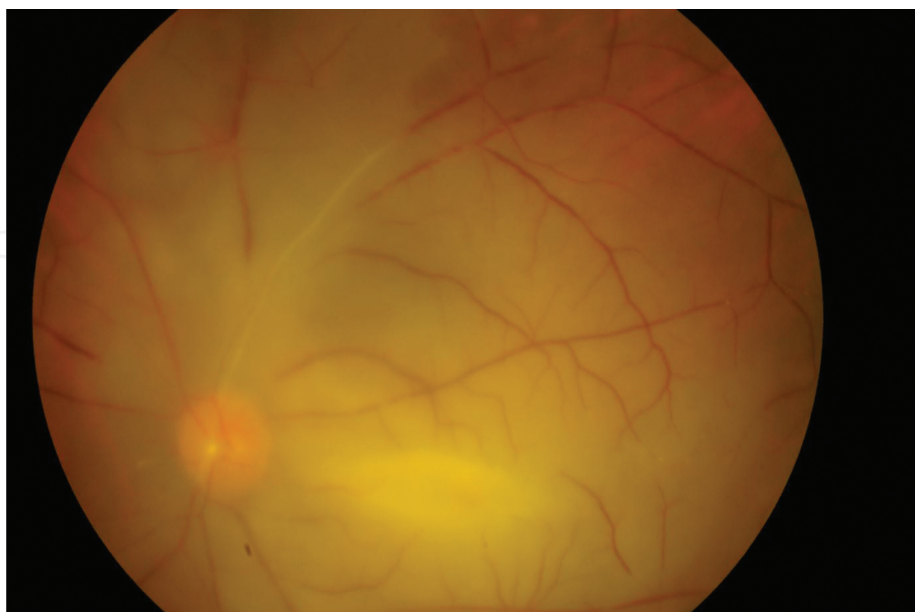


Figure 3. Fundus photograph showing edema of the entire left retina and whitened retinal vessels without cherry-red spot.

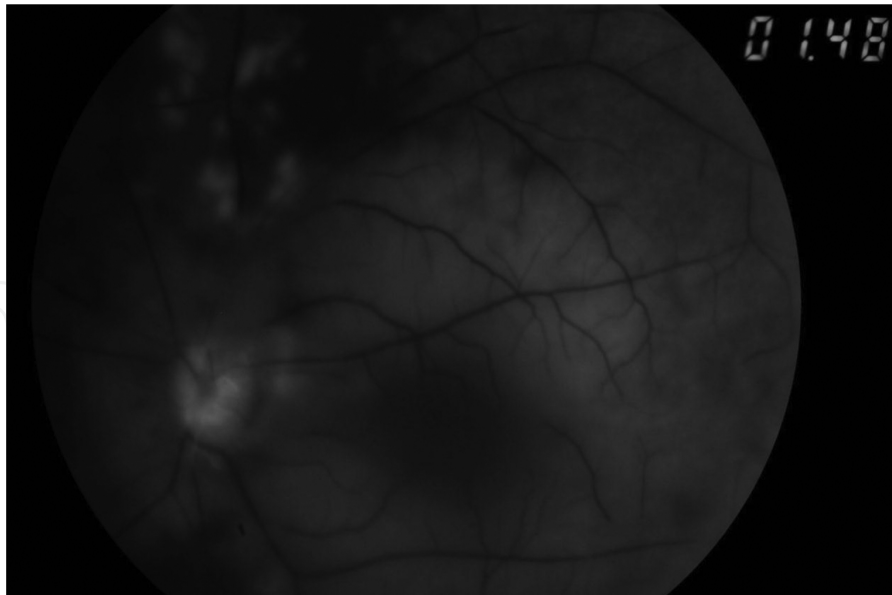


Figure 4. Fluorescein angiography showing late onset of choroidal perfusion and nonopacification of both retinal artery and vein.

5.3. Retinal and vitreal infiltration

Septic embolism can lead to posterior uveitis (retinitis, chorioretinitis, choroiditis, and vitreal infiltration). In most cases, posterior uveitis is misdiagnosed and is complicated by endophthalmitis (**Figure 5**).

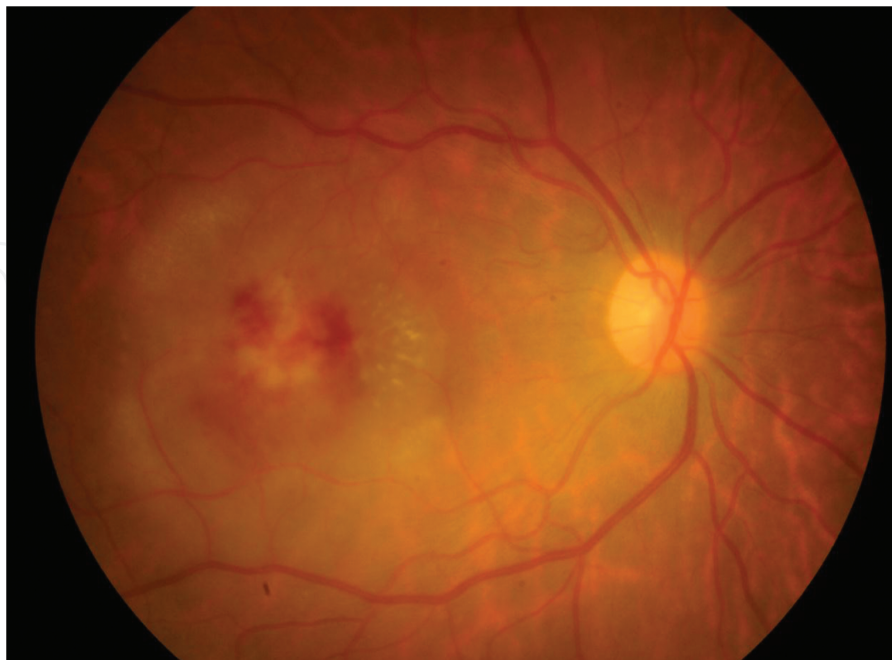


Figure 5. Fundoscopy showing retinal and vitreous infiltrations in bacterial endocarditis.

5.4. Endophthalmitis

Endophthalmitis is a condition when all the internal structures of the eye are invaded with replicating microorganisms and associated with an important inflammatory response.

Endogenous bacterial endophthalmitis is a rare pathology that affects individuals of any age and represents 2–15% of all cases. Endocarditis is the second more frequent cause of endogenous endophthalmitis after meningitis.

The rate of endophthalmitis can raise 50% with endocarditis to *S. aureus*. The right eye is generally more affected than the left eye.

The onset of the signs and symptoms depends on the pathogenic virulence. Typically, patient presents pain, chemosis, proptosis, hypopyon, and corneal melting.

Blood culture findings are positive in more than 90% of infective endocarditis cases. The most common etiological germ is *Streptococcus* 45.7% and the valvular was affected in 27.2% of the episodes. Systemic therapy may be sufficient when the vitreous cavity is not greatly involved. In the other cases, antibiotic intravitreal injections and vitrectomy are necessary [5, 8–11].

5.5. Choroidal neovascularization

Subretinal neovascularization secondary to choroidal septic metastasis was reported in two cases. Neovascularization occurs in choroidal scars with variable delay (10 months and 5 years) [12].

6. Prognosis

Ocular prognosis depends on the ocular manifestation. Functional prognosis of retinal arterial occlusion and endophthalmitis is bad in most cases. Ocular involvement was independently associated with death in infective endocarditis.

Author details

Cheima Wathek* and Riadh Rannen

*Address all correspondence to: wcheima@yahoo.fr

Military Hospital of Tunis, Ophthalmology Department, Faculty of Medicine of Tunis, Tunis El Manar University, Tunis, Tunisia

References

- [1] Klig JE. Ophthalmologic complications of systemic disease. *Emerg Med Clin N Am* 2008;26:217–31.
- [2] Gergaud JM, Breux JP, Grollier G, Roblot P, Becq-Giraudon B. Current aspects of infectious endocarditis: apropos of 53 cases. *Ann Med Interne* 1994;145(3):163–7.
- [3] Mainardi L. Bactériologie. Masson 2ème Edition 2011:117–18.
- [4] Jung J, Lee J, Yu SN, Kim YK, Lee JY, Sung H et al. Incidence and risk factors of ocular infection caused by *Staphylococcus aureus* bacteremia. *Antimicrob Agents Chemother* 2016;60(4):2012–7.
- [5] Silva-Vergara ML, de Camargo ZP, Silva PF, Abdalla MR, Sgarbieri RN, et al. Case report: disseminated *Sporothrix brasiliensis* infection with endocardial and ocular involvement in an HIV-infected patient. *Am J Trop Med Hyg* 2012;86(3):477–80.
- [6] Liliana M, Pitta ML, Peresa M, Ferreirab V, Pugab MC, Severinoa D, da Silva GF. Retinal artery embolization complicating Libman-Sacks endocarditis in a systemic lupus erythematosus patient. *Rev Port Cardiol* 2013;32(4):345–7.
- [7] Wathek C, Kharrat O, Maalej A, Nafaa MF, Rannen R, Gabsi S. Ophthalmic artery occlusion as a complication of infectious endocarditis. *J Fr Ophthalmol* 2014;37(10):e161–3.
- [8] Zayit-Soudry S, Neudorfer M, Barak A, et al. Endogenous *Phialemonium curvatum* endophthalmitis. *Am J Ophthalmol* 2005;140(4):755–7.
- [9] Arcieri ES, Jorge EF, de Abrea Ferreira L, et al. Bilateral endogenous endophthalmitis associated with infective endocarditis: case report. *Braz J Infect Dis* 2001;5(6):356–9.
- [10] Shmueli H, Kremer I, Sagie A, et al. *Candida tropicalis* multifocal endophthalmitis as the only initial manifestation of pacemaker endocarditis. *Am J Ophthalmol* 1997;123(4):559–60.
- [11] Verweij PE, Rademakers AJ, Koopmans PP, et al. Endophthalmitis as presenting symptoms of group G streptococcal endocarditis. *Infection* 1994;22(1):56–7.
- [12] Munier F, Othenin-Girard P. Subretinal neovascularization secondary to choroidal septic metastasis from acute bacterial endocarditis. *Retina* 1992;12:108–12.

