**Amycolatopsis sulphurea** as the first reported agent of endophthalmitis in a patient after penetrating eye trauma with intraocular foreign body: A case report

*Berna Yuce, Sila Dogan, Gamze Ture, Nisel Ozkalay*¹

We report an *Amycolatopsis sulphurea* endophthalmitis after the surgical repair of penetrating eye trauma with a metallic intraocular foreign body. A 27-year-old male referred with occupational injury by a nail from his left eye. Endophthalmitis occurred 12 h after the removal of foreign body and repair of the globe. The culture of vitreous samples revealed gram-positive bacillus proliferation, confirming *A. sulphurea*. Endophthalmitis was eradicated successfully with intravitreal, topical, and systemic antibiotics. To the best of our knowledge, this is the first case, reporting *A. sulphurea* endophthalmitis.

**Key words:** *Amycolatopsis sulphurea*, endophthalmitis, intraocular foreign body

Posttraumatic endophthalmitis is a severe vision-threatening condition which occurs in 2.1–17% of open globe injuries.¹² *Bacillus cereus* is the major cause of posttraumatic endophthalmitis, but any microorganism may be the causative agent.¹² Herein, we describe a case of posttraumatic endophthalmitis caused by *Amycolatopsis sulphurea*.

**Case Report**

A 27-year-old male presented with an occupational injury from his left eye. He was a worker in a seafood shop and injured from his left eye while he was trying to open a wooden box containing mussels. A nail which he was trying to pull out from the box was suddenly broken and shot this left eye. His visual acuity (VA) at presentation was 20/20 in the right eye and 20/40 in the left eye. Slit-lamp examination revealed a metallic foreign body (FB) which was partially penetrated the globe 3 mm from the limbus at 9–10 o’clock quadrants [Fig. 1a]. Anterior chamber (AC) depth was normal; no AC reaction was observed. Pupillary irregularity and mild posterior subcapsular lens opacity were detected. Central retina and optic disc were normal; peripheral retina could not be evaluated due to the

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discomfort of patient. Orbital tomography demonstrated a 25 × 2 mm hyperdense FB penetrated to the globe obliquely from the nasal sclera [Fig. 1b]. His systemic evaluation was unremarkable.

Repair of open globe injury with the removal of intraocular FB was performed 6 h after the trauma, as soon as laboratory and systemic evaluations was completed and the interval between the last oral food intake was suitable for general anesthesia, by an experienced surgeon (BY).

Topical vancomycin (50 mg/ml) and ceftazidime (100 mg/ml) fortified drops per hour; prednisolone acetate 1%, 8 times a day; cyclopentolate 1%, 3 times a day; preservative-free artificial tears per hour, and 400 mg/day oral moxifloxacin were administrated postoperatively. Twelve hours after the surgery, the patient suffered from pain in his operated eye. Ocular examination revealed 2 mm hypopyon and pupillary membrane formation with a decrease in VA to the hand movement level [Fig. 1c]. No leakage was observed from the operation area. Hyperecogenic opacities compatible with vitritis were seen on B-mode ultrasonography. The clinical situation was considered as endophthalmitis. Vitreous samples were taken and sent to the laboratory for culture followed by intravitreal vancomycin 1 mg/0.1 ml, ceftazidime 2 mg/0.1 ml, and dexamethasone 0.4 mg/0.1 ml injections. On the first day after intravitreal injections, ocular pain resolved, hypopyon regressed to 0.5 mm, and VA increased to counting fingers. Fundus examination revealed white discoloration of the retina, intravitreal hemorrhage, and membrane formation. Two days later intravitreal vancomycin, ceftazidime, and dexamethasone injections were repeated. Topical and systemic medications were continued as the same regimen.

On the third day of vitreous samples culture, bacterial growth was detected. Gram staining of the colonies showed gram-positive bacillus. The identification of the colonies was determined in MALDI-TOF MS (Bruker Daltonik GmbH, Bremen, Germany) and it was identified as A. sulphurea with a score of >2.

VA increased to 20/32 in the left eye and intravitreal hemorrhage resolved 10 days after the trauma. Since the clinical findings improved, repetition of intravitreal injections or vitrectomy was not needed. Topical medication had been discontinued gradually within 1 month and oral antibiotic had been discontinued 10 days after the trauma.

Three months after the ocular injury, VA was 20/25. Scleromalacia in the penetration area of the FB, mild posterior subcapsular lens opacity was seen on slit-lamp examination [Fig. 1d]. Fundus examination revealed hyperpigmented and hypopigmented retinal pigment epithelial changes.

Discussion

Posttraumatic endophthalmitis accounts for 25–30% of all infectious endophthalmitis cases. Retained intraocular foreign body (IOFB), lens rupture, delayed primary repair, age >50 years, female gender, large wounds, ocular tissue prolapse, artificial intraocular lens, and rural area increase the risk for posttraumatic endophthalmitis.[4] In eyes with IOFB, the rate of culture-positive endophthalmitis after initial globe repair was reported as 8.1% versus 1.6% in eyes without IOFB.[5]

Extreme pain despite the repair of globe, hypopyon, decreased vision, red eye, and vitritis in a traumatized eye must be considered as endophthalmitis until proven otherwise.[9] Wound culture, repair of injury, removal of the IOFB, and intravitreal injection of vancomycin hydrochloride (1 mg/0.1 ml) and ceftazidime (2.25 mg/0.1 ml) are recommended for empiric treatment of endophthalmitis.[1,2] Topical vancomycin (50 mg/ml), ceftazidime (50 mg/ml), steroids, and cycloplegics are advised adjunctive to the intravitreal antibiotic therapy.[1,2] Repeated intravitreal injections or vitrectomy may be needed in the irresponsible cases.[1,2]

Many bacteria of the genus Amycolatopsis were initially classified as Streptomyces which then shifted to Nocardia and finally a new genus Amycolatopsis was created that included those species in which mycolic acid was absent in their cell wall. This genus is gram positive, aerobic, nonacid-fast, nonmotile, and catalase positive. The genus Amycolatopsis is of special importance for its capacity to produce several commercially and medicinally important antibiotics as vancomycin and rifamycin, and other bioactive molecules as secondary metabolites.[10] They have been isolated from various environments such as soil, sludge, caves, fresh water, rock, and some clinical sources.[13,4] To the best of our knowledge, this is the first endophthalmitis case with A. sulphurea.

Early repair and appropriate antibiotic therapy reduce the risk for posttraumatic endophthalmitis to <1% level.[2] Despite the early surgical repair and topical and systemic antibiotic treatment, endophthalmitis occurred 18 h after the injury; in our case, this may be related to the contaminated nature of the IOFB. Since we did not observe any clinical sign of endophthalmitis at the time of primary repair and we performed early globe repair, we followed our protocol for endophthalmitis prophylaxis, which consists of oral moxifloxacin and topical fortified vancomycin and ceftazidime in this case. We do not prefer intravitreal antibiotic injections for posttraumatic endophthalmitis prophylaxis, to avoid possible retinal toxicity.

Figure 1: (a) A metallic foreign body penetrated through the sclera. (b) Computed tomography confirming the intraocular foreign body. (c) Slit-lamp biomicroscopy of the left eye, after the onset of endophthalmitis (white arrow: hypopyon). (d) Slit-lamp biomicroscopy 3 months after the primary repair (black arrow: scleromalacia at the injury site)
in traumatized eyes. There is no controlled, randomized study about the preferred route of prophylactic antibiotic administration for posttraumatic endophthalmitis. Systemic antibiotics along with topical antibiotics have been considered as the standard care for these patients.\(^\text{[6]}\) Although there is not a concensus and orally administrated moxifloxacin achieves efficient vitreous concentration, to consider intravitreal antibiotic injections at the time of primary repair might be effective for prophylaxis of posttraumatic endophthalmitis in this case.

Although there is not a confirmed treatment protocol recommended by a multicenter clinical study for posttraumatic endophthalmitis, especially in case of contaminated IOFBs, retinal and vitreous opacities intravitreal antibiotic injections are recommended.\(^\text{[7,8]}\) Empiric treatment has rapid and satisfactory outcomes in posttraumatic endophthalmitis.\(^\text{[7]}\)

**Conclusion**

In this first reported *A. sulphurea* endophthalmitis case, we achieved satisfactory clinical and visual outcomes compatible with the previous reports confirming empiric treatment for endophthalmitis caused by contaminated IOFBs. Appropriate treatment of endophthalmitis may save useful vision in many cases. Multicenter, controlled, randomized studies are needed to constitute a protocol for the prophylaxis of post-traumatic endophthalmitis.

**Declaration of patient consent**

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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**Conflicts of interest**

There are no conflicts of interest.

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