

# Irreversible bilateral amaurosis after heart surgery

## *Amaurose bilateral irreversível pós-cirurgia cardíaca*

Valdir Cesarino de SOUZA<sup>1</sup>, Alex BARBOSA<sup>1</sup>, Basílio Serrano de SOUSA FILHO<sup>1</sup>, Kleber Oliveira de SOUZA<sup>2</sup>

RBCCV 44205-701

### *Abstract*

A 16-year-old female patient, with a congenital heart defect (interatrial communication) underwent heart surgery. She evolved with complications in the immediate postoperative period with sudden hemorrhagic hypotension and progressive loss of sight in both eyes. In the postoperative period there was a high intraocular pressure and optic disk edema. Optic atrophy and irreversible bilateral blindness was confirmed 21 days after heart surgery despite treatment. In two years of follow-up, the patient is completely blind with irreversible optic atrophy.

**Descriptors:** Amaurosis. Blindness. Cardiac surgical procedures, adverse effects. Postoperative complications. Optic nerve diseases, etiology.

### *Resumo*

Paciente do sexo feminino, 16 anos, portadora de cardiopatia congênita, tipo comunicação interatrial. Submetida a correção cirúrgica, evoluiu nas primeiras horas com sangramento e instabilidade do quadro hemodinâmico. Corrigidas tais complicações, evoluiu com perda progressiva e bilateral da visão. Após as primeiras horas de pós-operatório, apresentava acentuado edema de papilas ópticas, além de hipertensão intra-ocular. No transcorrer de 21 dias, evidenciavam-se sinais de atrofia dos nervos ópticos com instalação, bilateral e irreversível, de amaurose, apesar das condutas terapêuticas instituídas. No seguimento de dois anos, a paciente evoluiu com cegueira bilateral e lesão óptica irreversível.

**Descritores:** Amaurose. Cegueira. Procedimentos cirúrgicos cardíacos, efeitos adversos. Complicações pós-operatórias. Doenças do nervo óptico, etiologia.

Work performed in the Cardiovascular Surgery Institute, Paraíba (ICCP)  
Rua Siqueira Campos, 543 - CEP 58108-540 - Campina Grande, PB, Brazil  
And Medicine School, Federal University of Campina Grande (UFCG)

1 - Professors Medicine School, UFCG, Cardiovascular Surgeons, ICCP.  
2 - Academic Medicine School, UFCG

Correspondence address: Valdir Cesarino de Souza. Rua Siqueira Campos, 543 - CEP 58.108-540 - Campina Grande, PB, Brazil -  
Phone: (83) 3413640. Fax: (83) 3414132.  
E-mail: valdir.souza@sbccv.org.br

Article received on February, 2004  
Article accepted on July, 2004

## INTRODUCTION

Because total and partial loss of eyesight in the postoperative period of on-pump heart defect surgery is rare, it is not well elucidated. Its incidence varies from 0.1% to 1% [1-4]. However, the probability of this complication becoming irreversible is even rarer at 0.04% [2]. Although alterations in eyesight are a result of several factors, they are frequently associated to bleeding during surgery with a significant drop of the systemic blood pressure, prolonged cardiopulmonary bypass (CPB) times, microembolism, etc. [4,5]. The treatment is very controversial according to the literature. However, the speed of diagnosing this complication is essential for a good prognosis [4].

The objective of this study is to report on a case of bilateral, irreversible loss of eyesight as a postoperative complication of congenital heart disease surgery.

## CASE REPORT

A 16-year-old girl, from non-sanguineous parents, was referred to the cardiology center with complaints of frequent palpitations and tiredness on moderate effort, which progressively worsened, principally during the months prior to the consultation.

The physical examination showed her to be in a regular general state, without fever or cyanosis but slightly dyspneic. On heart auscultation, an irregular cardiac rhythm was evidenced, with a split S2, with a frequency of 92 beats per minute and a slight systolic murmur with a pulmonary focus. The arterial pressure was 110 x 70 mmHg. The rest of the symptomatic evaluation was normal.

A radiological examination showed a slight increase in heart area affecting the right ventricle, whilst an electrocardiogram demonstrated a sinus rhythm with some supraventricular extrasystoles, as well as a conduction disorder of the right arterial branch.

The patient was sent for further echocardiographic and hemodynamic examinations which confirmed a serious acyanotic cardiac formation, with high pulmonary blood flow, a 2.5-cm interatrial-type shunt (IAS) located at the *fossa ovalis* with slightly increased pressures in the right chambers. After analysis of the data, surgical treatment was recommended.

A median transsternal thoracotomy was performed under general anesthesia. After establishing CPB, right atriotomy was performed. The interatrial-type shunt was visualized as had been indicated by the examinations and was occluded using a bovine pericardium patch. The atrium was sutured, the CPB suspended and the rest of the operation was performed as normal. Both the operation and anesthesia were event free. The CPB time was 32 minutes and anoxia time was 26 minutes.

During the first three hours of the postoperative period, the patient presented with insidious bleeding (approximately 6 mL/kg of body weight). Initially, correction of coagulation disorders pertinent to the surgery was attempted, as well as volumetric replacement and the use of vasopressor agents. As the bleeding persisted, instability of the hemodynamic state with accentuated hypotension and hypovolemic shock developed. Faced with this situation, the patient was re-operated for homeostatic revision and a confluent of the left brachycephalic vein was sutured; this procedure occurred without significant alterations.

After stabilizing the surgical state by correction of the bleeding, the patient returned to the intensive care unit hemodynamically stable and without the necessity of new transfusions or vasoactive drugs.

A few hours after extubation, the patient reported bilateral blurred vision with progressive loss of eyesight and a strong pain in both eyeballs. A specialist was consulted, who performed bilateral fundoscopy demonstrating severe edema of the optical disks and tonometry which evidenced an increase of the intraocular pressure.

Corticoid and osmotic diuretic (mannitol) treatment was initiated and even so progressive loss of eyesight occurred.

Additional to the routine ophthalmological examinations, computerized tomography, magnetic resonance and ocular ultrasonography were performed. The diagnosis 21 days after congenital heart disease surgery was irreversible bilateral atrophy of both optic nerves as a result of ischemia.

Two years after surgery, new examinations were performed confirming atrophy of both optic nerves and definitive bilateral amaurosis.

## COMMENTS

Despite of being rare, the loss of eyesight after cardiac surgery is well documented and its incidence ranges from 0.1% to 1% [1-4]. However, published data conclude that the incidence of definitive bilateral amaurosis is approximately 0.04% [2].

Vascularization of the optic nerve differs according to its location: the anterior portion is basically irrigated by the distal branches of the posterior ciliary arteries and the posterior portion, where the optic nerve is more vulnerable to ischemia, by the central retinal artery. This region is, thus, the most frequently affected by ischemia, in particular in patients who develop post-surgical hypotension associated with bleeding. Consequently, amaurosis which results from ischemia of the optic nerve varies according to the genesis of the injury and can be classified as either posterior or anterior neuropathy [4].

Some of the cases reported in the literature about sight loss after heart surgery include: anterior or posterior ischemia

of the optic nerve, cortical injuries and arterial or retinal vein thrombosis [4,5].

The principal risk factors for the development of optic neuropathy after heart surgery are: glaucoma or other ophthalmological diseases, prolonged CPB, excessive hemodilution, prolonged systemic hypothermia, high postoperative blood loss and the necessity of vasoconstrictor agents, which predispose the optic nerve to injury [3,6].

Some authors highlight the fact that ischemia is mainly caused by arterial hypotension, prolonged systemic hypothermia and activation of certain compounds during CPB, such as angiotensin and serotonin [2,5].

The suspicion of ischemia of the optic nerve is only when the patient reports total or partial loss of eyesight. Its prognosis depends on the delay of diagnosis, as well as the extent and location of the ischemia [4].

Several examinations are recommended to explain this complication, from a direct ophthalmoscopic examination to magnetic resonance and computerized tomography [4].

There are several divergences among authors about treatment of blindness consequent to heart surgery, while some [4] recommend the use of high doses of steroids, platelet anti-aggregates, carbonic anhydrase inhibitors and surgery to reduce the pressure on the optic nerve; others [6] concluded that none of these procedures have been proved efficient in the treatment of this complication, over all, in respect to fenestration of the optic nerve [3,6]. However, these can be considered preventive measures which must be taken to avoid ischemia and irreversible injury of the optic nerve [6].

## CONCLUSION

When heart surgery causes amaurosis the rate of cure is very low, especially if preventive measures and the therapeutic conducts are not observed. Even with these procedures, it is almost impossible for medical teams to predict the development of this feared complication, mainly due to confusion inherent to the surgery and to anatomic variations that exist in the eyeball.

## BIBLIOGRAPHIC REFERENCES

1. Shahian DM, Speert PK. Symptomatic visual deficits after open heart operations. *Ann Thorac Surg* 1989;48:275-9.
2. Sweeney PJ, Breuer AC, Selhorst JB, Waybright EA, Furlan AJ, Lederman RJ et al. Ischemic optic neuropathy: a complication of cardiopulmonary bypass surgery. *Neurology* 1982;32:560-2.
3. Shapira OM, Kimmel WA, Lindsey PS, Shahian DM. Anterior ischemic optic neuropathy after open heart operations. *Ann Thorac Surg* 1996;61:660-6.
4. Williams EI, Hart JrWM, Tempelhoff R. Postoperative ischemic optic neuropathy. *Anesth Analg* 1995;80:1018-29.
5. Roth S, Barach P. Postoperative visual loss: still no answers - yet. *Anesthesiology* 2001;95:575-7.
6. Busch T, Sirbu H, Aleksic I, Stamm C, Zenker D, Dalichau H. Anterior ischemic optic neuropathy: a complication after extracorporeal circulation. *Ann Thorac Cardiovasc Surg* 1998;4:354-8.