

A case of general anesthesia for a dental treatment before double heart-valve replacement



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Introduction

Recently, the oral care for an elimination of infection sources during the perioperative period has been accepted to be an important and recommended.

We report a case of tooth extraction and cystectomy under general anesthesia aiming at an elimination of infection sources in the oral cavity on a patient with a severe cardiovascular disease.

Patient and Background

Patient

The patient was 63-year-old man, with advanced aortic stenosis and moderate mitral stenosis.

Background

Since the patient's heart-valve disease is severe, a double valve replacement was needed and was planned by Department of Cardiovascular Surgery of IMU (Iwate Medical University). The Cardiovascular Surgery asked the oral care from Dental Center of IMU in advance of the surgery. As a result of the oral examination, tooth extraction and cystectomy are needed to eliminate the source of infection prior to the heart surgery. The Oral Surgery requested the general anesthesia from the Dental Anesthesiology.

According to "Guidelines for Evaluation and Management of Cardiac Complications for Non-cardiac Surgery" of the Japanese Circulation Society in 2008, it is recommended that non-cardiac surgery should be conducted after a valve replacement (Fig. 1).

In this case, after consultation among the departments of cardiovascular medicine, oral surgery and dental anesthesiology, oral surgical treatments were conducted prior to cardiovascular surgery, focusing on the importance in the elimination of the infection source.

Previous history

1984 Mitral valve stenosis (MS)
1986 percutaneous transluminal mitral commissurotomy (PTMC)
post PTMC (3–4/year) Ventricular tachycardia (VT) → Defibrillation
1997 VT → Catheter ablation
2013 Respiratory discomfort appearance
Cardiac catheterization enforcement
→ Severe mitral valve stenosis and severe aortic stenosis diagnosis
(Trans-Aortic Valve pressure gradient: peak=75mmHg, mean=41mmHg)

Fig.1 Treatment strategies for noncardiac surgery in patients with aortic stenosis

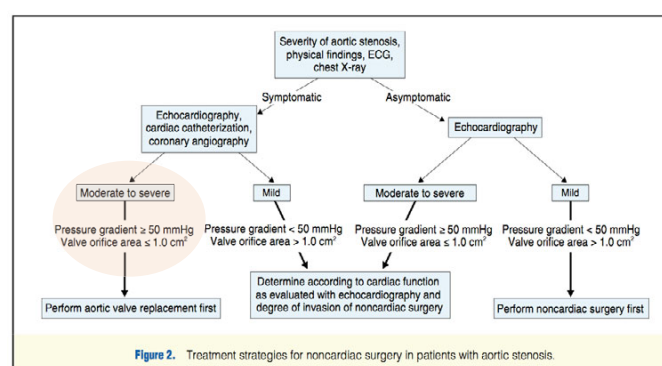


Figure 2. Treatment strategies for noncardiac surgery in patients with aortic stenosis.

Pre-operative Examination

Fig.2 Panorama X-P



Fig.3 ECG

AF, CRBBB, RAD



Fig.4 Chest X-P

CTR=52%
Mild cardiomegaly



Fig.5 UCG

EF=52%, Aortic valve calcification
Valve Area: AV=0.55cm², MV=1.20cm²



Anesthetic Management

Anesthesia was induced with midazolam (1mg iv.), propofol (100mg iv.) and rocuronium (40mg iv.), and maintained with sevoflurane (1-3% inhalation), remifentanyl (0.1-0.3 µg/kg/min, iv.), and used fentanyl (30-50 µg) intermittently. Following endotracheal intubation, patients received mechanical ventilation with IPPV mode [tidal volume (V_t)=10 ml/kg, frequency (F) = 10/min, positive end expiratory pressure (PEEP) = 0, fractional inspired oxygen (FiO_2) = 0.45, oxygen flow = 1.0 L/min, air flow = 2.0 L/min. Bispectral index was monitored with the Aspect2000 Monitor (Aspect Company, USA) ranged from 45 to 55 and used with the FloTrac sensor, the Vigileo monitor measures and displays key flow parameters such as CO, SV, SVV (ranged from 10 to 13). (*)

(*)Stroke Volume Optimization (SV)

Stroke volume measurement with the FloTrac sensor enables an individualized approach for administering fluid until SV reaches a plateau on the Frank-Starling curve, to prevent hypo- and hyper-volemia.

Stroke Volume Variation Optimization (SVV)

For control-ventilated patients, SVV has proved to be a highly sensitive and specific indicator for pre-load responsiveness, serving as an accurate marker of patient status on the Frank-Starling curve.

Oxygen Delivery Optimization (DO₂ with CCO)

Continuous cardiac output (CCO) measured by the FloTrac system can be used (in combination with SaO₂ and hemoglobin) to monitor and optimize DO₂ with fluid (including red blood cells) and inotropic agents.

Conclusion

In future, it is expected that this type of approaches will increase at high-level dental care facilities and also comprehensive approaches will be required in terms of application of oral surgical treatments, and management of systemic conditions including selection of general anesthesia methods.