Anaesthetic management for Caesarean section in a patient with Kawasaki disease

Shamsul Alam MBBS, Shinichi Sakura MD,
Yoshihiro Kosaka MD

Kawasaki disease (KD) or mucocutaneous lymph node syndrome is an acute febrile illness affecting mainly children under four years of age. The most important clinical feature of this disease is coronary arteritis associated with aneurysms and thrombotic occlusions, which may lead to ischaemic heart disease or sudden death. It has now been more than 20 yr since its first description, and a number of survivors of childhood KD have reached child-bearing age. Despite the possible fatal outcome of this disease in adult patients with coronary artery manifestations, no information is available regarding the obstetrical anaesthetic management of patients with a history of KD. The purpose of this report is to describe the successful use of epidural anaesthesia in a patient with a history of KD undergoing Caesarean section and to discuss the anaesthetic considerations that should be given to adult survivors of childhood KD.

La maladie de Kawasaki (MK) ou syndrome ganglionnaire mucocutané est une maladie fébrile aiguë qui affecte principalement les enfants âgés de moins de quatre ans. L'artérite coronaire représente la caractéristique la plus grave de cette maladie. L'artérite est souvent associée à des anévrismes et à des occlusions thrombotiques qui peuvent conduire à l'ischémie myocardique et à la mort subite. Vingt années se sont écoulées depuis la description initiale et un certain nombre de survivantes ont atteint l'âge de la grossesse. Malgré l'issue fatale potentielle de cette maladie chez les adultes qui présentent une atteinte coronaire, la lumière n'a jamais été faite sur la gestion anes-

thésique obstétricale des porteuses de MK. Le but de cette observation est de décrire l'utilisation heureuse de l'anesthésie épidurale chez une porteuse de MK soumise à une césarienne et de discuter des considérations anesthésiques pertinentes aux survivants de la MK contractée pendant l'enfance.

Kawasaki disease (KD) is an acute febrile illness that affects primarily infants and young children. It is often associated with a prominent necrotizing vasculitis component with aneurysms of the coronary arteries and peripheral arteries, which may lead to ischaemic heart disease or sudden death. It has been more than 20 yr since this disease was first reported¹ and the patients have now entered adulthood and reached child-bearing age. However, there has been no reported case of pregnancy in a patient with a history of KD. Nor has the optimal anaesthetic management for Caesarean section in these patients been discussed.

We report the successful use of epidural anaesthesia in the management of a term parturient with a history of KD undergoing Caesarean section.

Case report

A 24-yr-old primipara (gestation 40 wk, weight 73.5 kg) presented for elective Caesarean section because of cephalopelvic disproportion (CPD). She had a history of KD, which had been diagnosed at the age of two years with a couple of weeks of fever, exanthema, and swelling of cervical, axillary, and femoral lymph nodes. Echocardiography and coronary angiography, both performed at the age of 13 yr, had revealed a giant aneurysm of the left coronary artery and complete occlusion of the right coronary artery with evidence of collateral circulation. These findings were reevaluated by echocardiography performed at the age of 16 yr. Exercise stress thallium myocardial scintigram showed a defect in the left ventricular posterior wall. Although ECG, chest x-ray and the wall motion of the left ventricle at rest were normal, strenuous work had been causing palpitation and sometimes syncope attacks. She had not been followed up since then

Key words

ANAESTHESIA: obstetric;
ANAESTHETIC TECHNIQUES: epidural;
COMPLICATIONS: Kawasaki disease.

From the Department of Anesthesiology, Shimane Medical University, Izumo, 693 Japan.

Address correspondence to: Dr. S. Sakura, Instructor, Department of Anesthesiology, 89-1, Izumo, 693 Japan.

Accepted for publication 30th June, 1995.

until this pregnancy despite palpitation and shortness of breath on exertion.

On physical examination, before Caesarean section, heart rate and arterial blood pressure were 85 bpm and 118/85 mmHg, respectively. The ECG and chest x-ray were normal, but obesity prohibited evaluation with echocardiography. The fetus was active with a heart rate of 132 bpm, and no abnormalities were seen on fetal sonography. The patient was cooperative.

On the day of surgery, the patient was premedicated with famotidine 20 mg *im* one hour before entering the operating room. Warmed acetated Ringer's solution, 500 ml, was infused over 20 min preoperatively. With the patient in the left lateral decubitus position, a lumbar epidural injection was performed without difficulty at the L_{1/2} interspace using 12 ml mepivacaine 2% through a 17-gauge Touhy needle, and an epidural catheter was inserted. A caudal injection of 10 ml mepivacaine 1% was added, as routinely practised in this institution. The catheter was taped in place, the patient was turned supine, and 3 L · min⁻¹ oxygen were given via an aerosol face mask. Monitoring included pulse-oximetry, non-invasive blood pressure, ECG, and heart rate. Caesarean section started 20 min after the injection when sensory level was extended to T₈ bilaterally. The patient was fully alert and haemodynamically stable during the procedure. A healthy, 3226-g baby girl was delivered with Apgar scores of 8 and 9 at 1 min and 5 min, respectively. After delivery, no uterine contracting drugs but intramyometrial oxytocin 5 *iu* were administered. Blood loss and amniotic fluid were estimated to be 670 ml and the intraoperative fluid infused was 1000 ml acetated Ringer's solution over 50 min. The remainder of the surgery was uneventful, and the patient received an additional epidural injection of 8 ml mepivacaine 2%. The patient was then transferred to the recovery room, where postoperative analgesia was provided by a continuous epidural infusion of bupivacaine 0.125% and buprenorphine 10 µg · ml⁻¹ at a rate of 3 ml · hr⁻¹ for the next 24 hr. The recovery period was uneventful, and the patient was discharged 12 days after delivery.

Discussion

Kawasaki disease, first described in Japan in 1967,¹ is a form of vasculitis of unknown origin characterized by mucosal inflammation, indurative oedema of the hands and feet, skin rash and cervical lymphadenopathy. Although most prominent in Orientals, it occurs in all races and in virtually all geographic areas.² Among the diverse inflammatory manifestations, cardiovascular involvement is most important and causes the 1–2% mortality rate associated with the disease.³ Coronary aneurysms de-

velop in about 19% of patients, and a giant coronary aneurysm (diameter >8 mm) is seen in about 5%.⁴ Post-mortem studies have revealed that rupture of aneurysms or myocardial infarction due to sudden complete thrombotic occlusion of a major coronary artery at the site of aneurysms is the frequent cause of death in these patients.⁵

Although a serial angiographic follow-up study of patients with KD has revealed that coronary aneurysms may regress in one or two years in about half of the paediatric patients, the remaining patients are at risk of ischaemic heart disease.⁶ According to a survey of adult survivors of childhood KD who had coronary artery disease secondary to KD,⁷ coronary artery sequelae of KD may become an important cause of coronary artery disease in young adults and should be included in the category of adult ischaemic heart disease. Recent case reports^{8,9} regarding myocardial infarction which occurred in young adults due to KD have supported the above suggestions.

The anaesthetic considerations for Caesarean section in a patient with a history of KD relate primarily to the associated cardiac manifestations. The preanaesthetic evaluation should focus on signs and symptoms of residual coronary artery disease. A giant aneurysm, as seen in the present patient, is more likely to persist as a large lesion and to produce massive thrombus formation and develop into ischaemic heart disease.⁴ However, she had not received any follow-up examinations for eight years until the midst of this pregnancy. In addition, we could not evaluate her coronary artery just before surgery. Although two-dimensional echocardiography is believed to be the most useful non-invasive method to evaluate coronary aneurysms,⁴ obesity prohibited coronary artery evaluation before surgery. Her symptoms such as frequent palpitation and shortness of breath on exertion, which were indicative of coronary artery involvements, were not considered to justify invasive examinations such as coronary angiography or stress test during pregnancy.

Anaesthetic management of these patients during surgery should aim to maintain a careful balance between myocardial oxygen demand and myocardial oxygen supply. Factors that could increase stress should be avoided as much as possible. Caesarean section causes acute haemodynamic stress. Cardiac output abruptly increases by 50% above predelivery values.¹⁰ Normal human coronary arteries can increase blood flow as much as two-fold to three-fold in response to stress.¹¹ In contrast, a question remains as to the functional capacity of collateral arteries and coronary arteries with an aneurysm (i.e., to what extent can these arteries meet the increased myocardial metabolic demands during exercise and stress). The

choice of anaesthesia should be made carefully, and the use of other drugs which allow manipulation of heart rate, myocardial contractility, and peripheral vascular resistance is important. It is essential that vasoactive and antiarrhythmic drugs are readily available. Monitoring should allow early detection of myocardial ischaemia and include ECG and blood pressure. In addition, direct blood pressure monitoring, central venous pressure, and pulmonary artery pressure monitoring may be indicated.

Administration of general anaesthesia for Caesarean section may entail stress and haemodynamic changes associated with tracheal intubation and surgery. On the other hand, the use of regional anaesthesia can prevent an increase in systemic vascular resistance associated with surgical stress. We chose epidural anaesthesia rather than spinal anaesthesia because the latter has a rapid onset of sympathetic block with potentially severe hypotension and tachycardia. In addition, excessive cephalad spread of epidural anaesthesia was avoided with the use of a relatively small volume of local anaesthetic so that the patient was haemodynamically stable.

Only a small amount of oxytocin was used to aid uterine contraction after delivery. Since there are reports indicating that oxytocin reduces coronary artery flow,¹² it should be given with caution in patients with compromised cardiac function. Prostaglandin $F_{2\alpha}$ may be an alternative, but its administration in large doses may cause acute hypertension by constricting vascular smooth muscle.¹³ Ergot alkaloids were avoided because, apart from their hypertensive properties, they are known to provoke coronary artery spasm in susceptible patients.¹⁴

In conclusion, it is likely that the number of pregnancies in patients who have a history of KD will increase. Those may include patients without careful follow-up despite cardiovascular involvement as this case report shows. It has been said that many cases of KD remain subclinical in the acute phase or may not be recognized because of the nonspecific features. Anaesthetists should consider that a patient with a history of KD may have severe coronary artery disease and be at risk of myocardial infarction during pregnancy, labour, and Caesarean section.

References

- 1 Kawasaki T. Acute febrile mucocutaneous syndrome with lymphoid involvement with specific desquamation of the fingers and toes in children (Japanese). *Arerugi* 1967; 16: 178-222.
- 2 Bell DM, Brink EW, Nitzkin JL, et al. Kawasaki syndrome: description of two outbreaks in the United States. *N Engl J Med* 1981; 304: 1568-75.
- 3 Kawasaki T, Kosaki F, Okawa S, Shigematsu I, Yanagawa H. A new infantile acute febrile mucocutaneous lymph node syndrome (MLNS) prevailing in Japan. *Pediatrics* 1974; 54: 271-6.
- 4 Kato H, Hara T, Inoue O, Sato N, Akagi T, Sugimura T. Current issues in Kawasaki disease. *Acta Paediatr Jpn* 1993; 35: 464-71.
- 5 Fujiwara H, Hamashima Y. Pathology of the heart in Kawasaki disease. *Pediatrics* 1978; 61: 100-7.
- 6 Kato H, Ichinose E, Yoshioka F, et al. Fate of coronary aneurysms in Kawasaki disease: serial coronary angiography and long-term follow-up study. *Am J Cardiol* 1982; 49: 1758-66.
- 7 Kato H, Inoue O, Kawasaki T, Fujiwara H, Watanabe T, Toshima H. Adult coronary artery disease probably due to childhood Kawasaki disease. *Lancet* 1992; 340: 1127-9.
- 8 Morita H, Kinoshita I, Fukita H, Fukumoto H, Nishimoto T, Itoh M. Acute myocardial infarction in a young adult as possible sequela of Kawasaki disease: a case report of successful intracoronary thrombolytic therapy and histological study of an aneurysm. *Jpn Circ J* 1992; 56: 681-6.
- 9 Shaukat N, Ashraf S, Mebewu A, Freemont A, Keenan D. Myocardial infarction in a young adult due to Kawasaki disease. A case report and review of the late cardiologic sequelae of Kawasaki disease. *Int J Cardiol* 1993; 39: 222-6.
- 10 Ueland K, Gills RE, Hansen JM. Maternal cardiovascular dynamics: 1. Cesarean section under subarachoid block anesthesia. *Am J Obstet Gynecol* 1968; 100: 42-54.
- 11 Braunwald E. Control of myocardial oxygen consumption: physiologic and clinical considerations. *Am J Cardiol* 1971; 27: 416-32.
- 12 Reinberger JR, Mackey WF. Cardiovascular reactions to pitocin. *Am J Obstet Gynecol* 1958; 76: 288-91.
- 13 Rall TW. Drugs affecting uterine motility. In: Gilman AG, Rall TW, Nies AS, Taylor P (Eds.). *Pharmacological Basis of Therapeutics*, 8th ed. New York: Pergamon Press, 1990: 933-53.
- 14 Taylor GJ, Cohen B. Ergonovine-induced coronary artery spasm and myocardial infarction after normal delivery. *Obstet Gynecol* 1985; 66: 821-2.