Caesarean section in a patient with Cushing's syndrome

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Pregnancy is rarely associated with Cushing's syndrome. This case report describes the successful management of a Caesarean section under epidural anaesthesia in a patient with Cushing's syndrome. Maternal and fetal complications are reviewed from an anaesthetic perspective and alternative anaesthetic techniques discussed.

Key words
SURGERY: Caesarean section; ANAESTHESIA: epidural; CUSHING'S SYNDROME.

There are fewer than thirty reported cases of pregnancy associated with Cushing's Syndrome;[1] the hyperadrenocortical state is accompanied by a high incidence of disturbed menstrual and ovulatory function with infertility.[2] Increased incidence of foetal wastage is also described,[6] particularly in those patients with hypertension and glucose intolerance. the present report is believed to be the first documentation of an anaesthetic technique for Caesarean section in such a patient.

Case report

A 30-year-old G_1P_0 presented at 36 weeks gestation for elective Caesarean section. She had been under the care of an obstetrician since the third month of pregnancy. An endocrinologic consultation at that time suggested probable pituitary dependant Cushing's syndrome. The endocrinologist felt that definitive treatment of the Cushing's syndrome should be deferred until the postpartum period when a CT scan of the pituitary could be safely done without exposing the foetus to any radiation hazard.

The patient's glucose metabolism and hypertension were followed closely on an outpatient basis until admission for elective Caesarean section. Metoprolol 150 mg p.o. OD was continued for blood pressure control, up to and including the morning dose on the day of the surgery. Amniocentesis in the eighth gestational month showed normal foetal-placental function: positive Shake test, L/S ratio > 2/1, phosphoglycerol present.

The authors saw the patient in consultation. Physical examination revealed a 68.1 kg hirsute lady with rounded "moon" facies, a malar flush, acneiform lesions, purplish striae over her breasts and abdomen, and thin hair. There was marked truncal obesity with thin extremities and a dorsal neck "hump." A series of old photographs seemed to indicate that these Cushingoid changes began about eight years previously. Blood pressure at the time of examination was 21.3/13.3 kPa (160/100 mmHg), heart rate 90 beats/min. The remainder of the physical examination was unremarkable and, in particular, her thoraco-lumbar spine felt normal, with easily palpable intervertebral spaces. Laboratory data was as follows: haemoglobin 122 g/l, haematocrit 0.38, glucose 4.8 mmol/l, sodium 136 mmol/l, potassium 4.4 mmol/l, chloride 103 mmol/l, CO_2 24 mmol/l, BUN 6.07 mmol/l, PT 12/12 secs, PTT 35/36 secs, urinalysis normal. After discussion with the patient, epidural anaesthesia was chosen.

On the day of surgery no premedication other than 30 ml sodium citrate one hour preoperatively, was given. She also received her normal dose of metoprolol 150 mg. The patient was brought to the operating theatre; a large bore peripheral intravenous line, an arterial ine and a right internal jugular

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central venous pressure cannula (CVP) (placed using the Seldinger technique) were inserted without difficulty. A blood pressure cuff and ECG monitor were attached and the patient given oxygen by mask. The initial CVP was 13 cm H_2O and 1,000 ml of lactated Ringer's solution was infused over 30 minutes. With the patient in the right lateral position, an epidural catheter was easily placed, through a 17 gauge Tuohy needle at the L3-4 interspace. A test dose of 1.5 ml of two per cent CO_2 lidocaine was administered uneventfully; the patient was then placed in the supine position with a wedge under her right hip for lateral tilt. Over the next 20 minutes a mixture of 15 ml of 0.75 per cent bupivacaine and five of ml CO_2 lidocaine was titrated into the epidural space, during which time the CVP and BP were continuously monitored. Satisfactory analgesia (by needle prick) to T_6 was obtained and surgery began 30 minutes after epidural insertion. A further 200 ml of lactated Ringer's solution was infused up to the time of delivery. Approximately nine minutes after the skin incision, a 2490 gram male infant was delivered. Apgar scores were eight at one minute and nine at five minutes. The infant was then taken to the intensive care nursery (ICN) for further observation and ongoing care by the paediatricians.

Surgery was uneventful apart from one episode of slight nausea approximately ten minutes after delivery during lysis of some adhesions. This discomfort abated quickly after a further 3 ml of two per cent CO_2 lidocaine via the epidural catheter and fentanyl 25 μg and Innovar® 0.2 ml intravenously.

After delivery, 900 ml of five per cent dextrose and lactated Ringer's solution were infused during the remainder of the procedure to maintain CVP at 3–10 cm H_2O. Blood pressure ranged from 16/10.6 kPa (120/80 mmHg) to 18.6/10.6 kPa (140/80 mmHg) during the procedure and 900 ml of urine were produced.

In the postanaesthetic recovery room vital signs were: blood pressure 14.6/8 kPa (110/60 mmHg), heart rate 84 beats/min, respiration 12 breaths/min, CVP 5 cm H_2O. The intravenous infusion was continued at 100 ml/hour. One and a half hours after surgery, 10 ml of 0.125 per cent bupivacaine was given into the epidural space for ongoing analgesia and the epidural catheter removed. At that time, vital signs were: blood pressure 18.6/12 kPa (140/90 mmHg), CVP 6 cm H_2O; the postoperative fasting blood glucose was 4.94 mmol/l. Recovery from the Caesarean section was uneventful.

A post partum CT scan revealed a pituitary adenoma. This tumour was removed by transsphenoidal hypophysectomy and the patient had a smooth postoperative course; she is now asymptomatic on replacement steroids.

The infant was followed in the ICN where two problems were noted:

(1) hypoglycemia: blood glucose was 1.16 mmol/l at one hour and 1.39 mmol/l at three hours; this responded to glucose and oral feeds.

(2) hyperbilirubinemia: thought to be secondary to an ABO incompatability (mother O+, baby B+). This responded to phototherapy. The child's serum cortisol levels were normal.

Discussion

Cushing's disease in pregnancy presents a variety of maternal and foetal problems which must be considered by the anaesthetist (Table). The anaesthetic complications of Cushing's disease are well known.[3,8,9,11] However, there is not a description in the literature of the anaesthetic management of Caesarean section of a Cushingoid patient.

Cushing's disease presents a variety of clinical and technical difficulties for the anaesthetist. Firstly, the airway must be carefully assessed. Centripetal obesity with a buffalo hump and increased fatty tissue in the neck and sternal areas may limit neck movement making intubation difficult. This aggravates the already high risk of aspiration during induction of anaesthesia in any pregnant patient. Also, the Cushingoid patient is at risk for postoperative respiratory insufficiency because of diminished respiratory muscle mass, hypokalemia and obesity.

Secondly, these patients are frequently hypertensive and blood pressure problems may be anticipated during anaesthetic induction. Thirdly, altered potassium metabolism may result in either a relative hypokalemia or the hypercortisolemia may cause a hyperkalemic metabolic alkalosis with increased total body sodium. Efforts should be made to control hypertension and electrolyte abnormalities before elective Caesarean section.

Fourthly, hyperglycaemia is common and insulin therapy may be required during pregnancy. In this case, diabetic control should be assessed preoperatively and a plan of intraoperative management

TABLE Problems associated with anaesthesia for Caesarean section in the Cushingoid patient

Maternal
Airway
limited neck movement
regurgitation
Respiratory
diminished respiratory muscle mass
muscle weakness associated with hypokalemia
Cardiovascular
hypertension
hypervolemia
Fluid and electrolytes
hypokalemia metabolic alkalosis
hyperglycaemia and diabetes
Mechanical difficulties
fragile skin and veins
compression fractures in lumbar region
obesity
Foetal
Increased foetal wastage
Macrosomia and neonatal hypoglycaemia
Maternally administered drug complications (e.g., beta blockers)

discussed with the consulting endocrinologist. Steroid coverage may be necessary in cases where adrenal surgery has been carried out earlier in pregnancy.

The hypercortisol state may be detrimental to the foetus. Grimes *et al.*[6] describe markedly increased foetal wastage and a theoretical risk of congenital anomalies. Although theoretically possible, foetal adrenal insufficiency is not frequently observed.[7] Diabetes in the mother frequently results in macrosomia and neonatal hypoglycaemia. Maternal drug ingestion may have significant foetal effects. Beta blockers used for control of hypertension may result in neonatal bradycardia, hypoglycaemia and respiratory depression.[5]

The choice of anaesthesia for Caesarean section depends upon patient expectation and an assessment of the complications of the disease. Venepuncture is complicated by skin and blood vessel fragility. Osteoporosis, vertebral compression fractures, and centripetal obesity may hinder performance of regional anaesthesia. Fragility of skin and bone necessitates utmost care in positioning the anaesthetized patient. Monitoring including an arterial and central pressure lines should be used in both general and regional anaesthesia.

If general anaesthesia is elected, consideration must be given to the need for rapid tracheal intubation and the need to abolish the sympatho-adrenal reflexive responses to intubation. Severe hypertension may lead to pulmonary oedema, cardiac dysrhythmias or cerebral haemorrhage. Consideration should be given to awake intubation if there is suspicion of airway compromise.

The side effects of spinal anaesthesia may be magnified in the Cushingoid patient. Blood pressure may fall rapidly to unacceptable levels, the level of the block cannot easily be controlled and once established cannot be changed. Postoperative headaches can be problematic.

Epidural anaesthesia, on the other hand, is a simple controllable technique in experienced hands and avoids the potential problems of general anaesthesia, although anatomic changes occurring secondary to the disease state may make epidural insertion difficult. However, with appropriate preoperative preparation, adequate monitoring and careful fluid preloading, hypotension can be avoided and satisfactory anaesthesia achieved.

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References

1 *Blumsohn D, Munyadziwa EH, Dajie SK, Sher RC, Prajapat DK.* Cushing's Syndrome and pregnancy: A case report. S Afr Med J 1978; 53: 338–40.

2 *Keegan GT, Grabavits F, Roland AS.* Pregnancy complicated by Cushing's Syndrome. South Med J 1976; 69: 1207–9.

3 *Vandam LD, Moore FD.* Adrenocortical mechanisms related to anaesthesia. Anesthesiology 1960; 21: 531–52.

4 *Nishoika K, Levy AA, Dobban AB.* Effect of halothane and methoxyflurane anaesthesia on plasma corticol concentration in relation to major surgery. Can Anaesth Soc J 1968; 15: 441–57.

5 *Tunstall ME.* The effect of propanolol on the onset of breathing at birth. Br J Anaesth 1969; 41: 792.

6 *Grimes E, Grimes EM, Fayes JA, Miller GL.* Cushing's Syndrome and pregnancy. Obstet Gynecol 1973; 42: 550–8.

7 *Check JH, Caro JF, Kendall B, Peris LA, Wellenbach BL.* Cushing's Syndrome in pregnancy: Effect

of associated diabetes on fetal and neonatal complications. Am J Obstet Gynecol 1979; 133: 846–7.
8 *Stephen CR*. Anaesthesia for adrenal surgery. Urologic Clinics of North America 1977; 4: 319–26.
9 *Reschini E, Giustina G, Crosignani PG, D'Alberton A*. Spontaneous remission of Cushing's Syndrome after termination of pregnancy. Obstet Gynecol 1978; 51: 598–601.
10 *James III FM, Wheeler AS*. Obstetric Anaesthesia: The Complicated Patient. F.A. Davis Company 1982; 144–5.
11 *Dluhy RG, Williams GH*. Cushing's Syndrome and the changing times. Ann Int Med 1982; 97: 131–3.

Résumé

La grossesse est rarement associée au syndrome de Cushing. On rapporte ici la conduite réussie d'une césarienne sous anesthésie épidurale chez une patiente avec maladie de Cushing. Les complications foetales et maternelles sont revues dans une perspective anesthésique et on discute des autres techniques anesthésiques qui auraient pu être employées.