VAGINAL DELIVERY IN A PATIENT WITH A PHAEOCHROMOCYTOMA

A case report

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SUMMARY

In pregnancy complicated by phaeochromocytoma, successful management has usually entailed elective Caesarean section followed by removal of the tumour. We report a successful vaginal delivery, undertaken under extradural blockade, in a patient with proven phaeochromocytoma.

CASE REPORT

The patient presented initially at the age of 8 yr with idiopathic polycythaemia and was treated by venesection at regular intervals. At the age of 20 yr she was found to be hypertensive and at 22 yr became pregnant for the first time. Arterial pressure on her first antenatal visit (gestation 12 weeks) was 160/110 mm Hg. She remained hypertensive throughout her pregnancy, with a diastolic pressure varying between 95 and 120 mm Hg in spite of treatment with methyldopa and bendrofluazide by mouth. There was no proteinuria and no clinical evidence of heart failure. At 33 weeks gestation accidental haemorrhage occurred secondary to hypertension and the patient went into labour. At full dilatation of the cervix the arterial pressure was 220/150 mm Hg. Wrigley’s forceps were used to deliver the infant under extradural analgesia. The infant was a fresh stillbirth weighing 2080 g. Haemorrhage of 800 ml occurred after delivery and was treated with blood transfusion and oxytocin i.v.

A few months later, the patient was referred for investigation of her hypertensive disease, and her hypertension was controlled with propranolol 80 mg three times daily, phenoxybenzamine 10 mg twice daily and bendrofluazide 10 mg daily. Investigations at this time revealed a strongly positive 24-h urinary VMA estimation and a persistently increased plasma catecholamine concentration. The renal arteriogram showed no stenosis of the renal artery, but a possible tumour blush lying below the left renal artery in the substance of the kidney. The CT scan showed a mass lying below the pelvis of the left kidney, and venous sampling from the left renal vein confirmed that the mass was a phaeochromocytoma. The administration of the ganglion blocking drug pentolinium decreased the blood concentration of adrenaline, but not that of noradrenaline, thus indicating an extra-adrenal tumour producing mainly noradrenaline. The plasma renin activity was increased, consistent with a decrease in plasma volume. The secretion of renin from both kidneys was similar and was further evidence against unilateral renal artery stenosis.

At operation two masses were found: one lying behind the left renal vein; the other presenting more medially and overlying the aorta. These were removed, together with a shrunken, non-functioning left kidney. The adrenal glands were not removed. Sodium nitroprusside was used to control arterial pressure during the operation. However, postoperative follow-up showed persistent increases in arterial pressure which were treated with hydralazine 50 mg and propranolol 40 mg twice daily. The patient was also given diazepam 5 mg three times daily, since it was felt that anxiety aggravated her hypertensive state. Over the next 12 months, arterial pressure was labile and a soft mid-systolic murmur could be heard at the left sternal edge. Grade one hypertensive retinopathy was present. A series of investigations was performed which showed an increased 24-h urinary VMA, and an increased plasma adrenaline concentration. The serum calcitonin concentration was four times normal. However, the 24-h urine creatinine clearance, and the serum prolactin, serum thyroxine, plasma cortisol, plasma
noradrenaline, plasma parathormone and growth hormone concentrations were normal. Antinuclear factor was not demonstrated in the serum, and a thyroid scan showed a normal size and shape of the gland.

The possible diagnoses were:

1. A recurrence of the tumour.
2. Damage to the remaining kidney resulting in renal hypertension.
3. Another phaeochromocytoma present along with a medullary cell carcinoma of the thyroid as a part of Type II multiple endocrine adenomatosis (Sipple's syndrome). This was considered because of the considerable increase in the serum calcitonin concentration, despite a normal thyroid scan and ultrasound examination of the neck.

However, during these investigations, and in spite of advice to the contrary, the patient became pregnant again. She was found to be 14 weeks pregnant and further increases in the urinary VMA and catecholamine concentrations were demonstrated. Her arterial pressure was controlled by hydralazine 50 mg per day and oxprenolol 160 mg three times daily, but she complained of occasional headaches and night sweats and had occasional acute increases in arterial pressure. The fetus showed normal growth by standard investigation. Attempts to ascertain the exact site of the tumour by invasive methods were not made as these would have posed a threat to the fetus.

At 37 weeks gestation, with normal fetal growth and a "favourable" cervix it was decided to deliver the infant per vaginum. An extradural catheter was inserted and continuous direct arterial pressure measurement established. The membranes were ruptured artificially and syntocinon infused i.v. The mother's ECG and the fetal heart rate were monitored continuously. A five-and-a-half hour labour ensued. Intermittent doses of 0.25% bupivacaine via the extradural catheter provided complete analgesia; a total dose of 50 ml was required for the whole duration of labour and arterial pressure was controlled satisfactorily within normal limits (120/60–130/80 mm Hg). The oral antihypertensive therapy was continued in the usual dosage during labour. At full dilatation of the cervix, the patient was prepared for an elective forceps delivery.

With the patient in the lithotomy position the arterial pressure increased to 220/130 mm Hg, and she complained of a severe throbbing headache. After a bolus dose of hydralazine 15 mg, the arterial pressure decreased to 120/60 mm Hg and the headache disappeared. The forceps delivery was uneventful. The infant (male) weighed 2830 g, had an Apgar score of 8 at 1 min and required no resuscitation apart from mucus extraction. The placenta was delivered by controlled cord traction and the appearance suggested that a small placental abruption had occurred during labour. Ergometrine was not given, to avoid any possible pressor action, and post-partum haemorrhage did not occur. The patient remained in the labour ward for several hours after delivery and arterial pressure remained stable around 120/80 Hg while she continued her oral antihypertensive therapy.

Further investigations carried out after her discharge from the maternity unit showed evidence of a recurrence of the phaeochromocytoma at the left renal hilum and a further tumour inferior to the pancreas. Urinary VMA and plasma catecholamine concentrations remained above their physiological values. Twelve months after delivery a further laparotomy was carried out to remove these tumours.

DISCUSSION

The available case reports suggest that an undiagnosed phaeochromocytoma in pregnancy is associated with a maternal mortality of 58% and a fetal mortality of 55%. Antenatal diagnosis with pharmacological control of the arterial pressure decreases these risks to 18% and 50% respectively (Shenker and Chowers, 1971). Alpha blocking drugs with or without β-blocking drugs are advocated as the drugs of choice (Ross et al., 1967). These facts are borne out by this case history where, in the first pregnancy, the diagnosis was not made ante-partum, and although the hypertension was treated (with methyldopa and diuretics) the outcome was unfavourable, whereas in her second pregnancy a correct antenatal diagnosis and appropriate pharmacological control of the hypertension resulted in a successful outcome. The intermittent changes in the arterial pressure, especially during a crisis, may cause spasm of the placental blood vessels and fetal death (Pestelek and Kapor, 1963). This was thought to be the mechanism by which the abruptio placentae developed in her first pregnancy.

Specific recommendations have been made regarding the management of a pregnant patient with a phaeochromocytoma (Shenker and Chowers, 1971; Fudge, McKinnon and Geary, 1980). In early and mid-pregnancy, urgent tumour removal is recommended, but this increases the risk of abortion.
In late pregnancy, pharmacological control with alpha blocking drugs is suggested, to allow maturation of the fetus, and a combined laparotomy is recommended for delivery of the baby and removal of the tumour. Vaginal delivery is specifically discouraged as it is thought to impose an overwhelming degree of autonomic stress on the patient (Griffith et al., 1974).

In the patient described it was considered that Caesarean section with exploration of the abdomen for recurrent tumour would be ill advised as the precise location of the tumour was unknown, and that exploratory activities carried the risk of producing serious fluctuations in arterial pressure. As the patient had already had a vaginal delivery it was considered that delivery per vaginum would provide a greater chance of a successful outcome.

Extradural analgesia was considered to be an advantage during vaginal delivery, providing an entirely pain-free labour and thus reducing markedly the catecholamine response. The technique also contributes to cardiovascular stability by deafferenation of the reproductive tract and local sympathetic blockade. The systemic effects of the local anaesthetic drug following vascular absorption have also been considered to contribute to this effect (Bromage and Millar, 1958). However, catecholamine release by tumour manipulation during the delivery cannot be blocked by extradural blockade (Cousins and Rubin, 1974).

A long-standing phaeochromocytoma causes chronic vasoconstriction and a marked decrease in blood volume (Brunjes, Johns and Crane, 1960) and extradural analgesia may have serious consequences in such a patient. Sympathetic blockade leads to dilatation of both resistance and capacitance vessels, with a consequent decrease in peripheral vascular resistance (Wylie and Churchill Davidson, 1978). Where there is a decrease in circulating blood volume, profound hypotension can occur (Bonica, Kennedy and Akamatsu, 1972). To avoid such a problem Brunjes, Johns and Crane (1960) advocated the administration of alpha-blocking drugs for a sufficient length of time before operation with a concomitant restoration of the blood volume to normal. Even then, care should be taken with the rate of injection of the local anaesthetic (Johns and Brunjes, 1962). In this case, medical treatment including hydralazine and oxprenolol was carried out for a sufficient time to restore the blood volume to normal.

Ergometrine was not used at delivery because of its hypertensive effect (Fox, Grandi and Johnson, 1969) — an effect thought to be particularly dangerous in the presence of increases in the circulating catecholamine concentrations (Davies and Robertson, 1980).

During this patient’s second pregnancy, persistent hypertension posed a threat to the fetus. Fetal growth was monitored by ultrasound estimations of abdominal circumference and bi-parietal diameter, and by serial recordings of serum oestriol concentration. Unfortunately, further invasive investigations to confirm a recurrent phaeochromocytoma and to determine its exact site could not be carried out because of the pregnancy.

We recommend that all female patients of child-bearing age who have had surgical treatment for a phaeochromocytoma should be advised on contraception until they are shown to be free of tumour. Also, future pregnancies should be monitored carefully, as recurrences are known to occur after a long interval of time. Symptoms such as throbbing headaches, visual complaints and convulsions are useful warning signs as these are more frequent in patients with phaeochromocytoma than in unselected patients (Graham, 1951).

If a tumour cannot be located during operation, then delivery, followed by later resection of the tumour, does not carry an increased maternal mortality as long as the patient receives alpha adrenergic blockade (Burgess, 1979). In this case the patient was successfully managed with oxprenolol and hydralazine to control the arterial pressure and a healthy infant was delivered. Medical management was used to permit the maturation of the fetus as well as to control the patient’s symptoms (Editor’s Notes, 1977).

Burgess (1979) reported that there have been no abnormalities in children born to mothers receiving alpha-blockade. In this case the mother was treated with hydralazine and oxprenolol throughout pregnancy. As these drugs are lipid-soluble and relatively un-ionized, they cross the placental barrier. The immature drug-metabolizing systems of the newborn allow concentrations of the drugs to build up in the circulation. Hence, haemodynamic as well as hypoglycaemic crises were anticipated in the neonate. The baby, which had a good Apgar score at birth, was transferred to the Special Care Baby Unit for monitoring of heart rate and blood glucose concentration. No neonatal problems arose as a result of either maternal drugs or the effects of the phaeochromocytoma.
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REFERENCES


