Case Report

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Low-Dose Dopamine in Treating Acute Renal Failure Caused by Preeclampsia

Key Words
Dosage and administration
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Abstract
Acute renal failure is a serious complication of preeclampsia that usually requires the termination of pregnancy. We present a case of acute renal failure due to severe preeclampsia successfully treated with the infusion of a low dose of dopamine. This 25-year-old Japanese primigravida was admitted at 31 weeks of gestation for the treatment of preeclampsia. Urine output was decreased to 380 ml/day; 24-hour creatinine clearance was decreased to 13.7 liters/day. Blood urea nitogen was elevated to 31.9 mg/dl; serum creatinine was elevated to 3.34 mg/dl. The diagnosis was acute renal failure related to preeclampsia. A low dose of dopamine, 1 μg/kg/min, was infused daily for 7 days at 32 weeks of gestation to maintain urine output. Renal function improved markedly without any adverse effect on the patient's blood pressure which was controlled on hydralazine. Fetal distress developed 4 days later and emergency cesarean section was performed. A healthy female was delivered. The infusion of a low dose of dopamine appeared to be highly effective in managing acute renal failure caused by preeclampsia with no serious side effects.

Introduction

Acute renal failure associated with persistent oliguria is a serious complication of preeclampsia [1]. Fluid challenge and vasodilators are suggested for managing the oliguria. The renal dysfunction and oliguria in these patients may be due in part to renal arterial vasospasm [2]. We report the successful treatment of such a patient with dopamine, a selective renal vasodilator [3].

Case Report

A 25-year-old Japanese primigravida (height 146 cm and weight 57 kg) was admitted with preeclampsia at 31 weeks and 4 days of gestation. Her blood pressure was 170/110 mm Hg. She exhibited severe proteinuria (311 mg/dl) and generalized edema. The blood urea nitogen (BUN) was 14.3 mg/dl and the creatinine (Cr) was 0.67 mg/dl. Anemia (hemoglobin, 10.3 g/dl) and hypoproteinemia (total protein 5.12 g/dl; albumin 2.84 g/dl) were present. Urine output was 700 ml/day, with a specific gravity of 1.013.

Hydralazine (30 mg/day i.v.) and a fluid challenge (lactated Ringer's solution, 1,000–2,100 ml/day and albumin, 50–100 mg/day) were immediately initiated. The systolic blood pressure was maintained between 150 and 130 mm Hg, and the diastolic blood pressure between 90 and 60 mm Hg.

Upon admission, the urine volume was decreased to 380 ml/day and the 24-hour Cr clearance was 13.7 liters/day. BUN was elevated to 31.9 mg/ml and Cr to 3.34 mg/dl. The diagnosis was acute renal failure due to preeclampsia. A low dose of dopamine (1 μg/kg/min) was administered for the oliguria at 32 weeks of gestation, with a marked improvement in renal function. Blood pressure control was not adversely affected (fig. 1).

After 7 days of treatment, a nonstress test revealed fetal distress, and an emergency cesarean section was performed. A female infant weighing 1,340 g with Apgar scores of 8 (1 min) and 9 (5 min) was delivered. The mother recovered uneventfully; the hypertension, proteinuria, and edema disappeared within 2 weeks.

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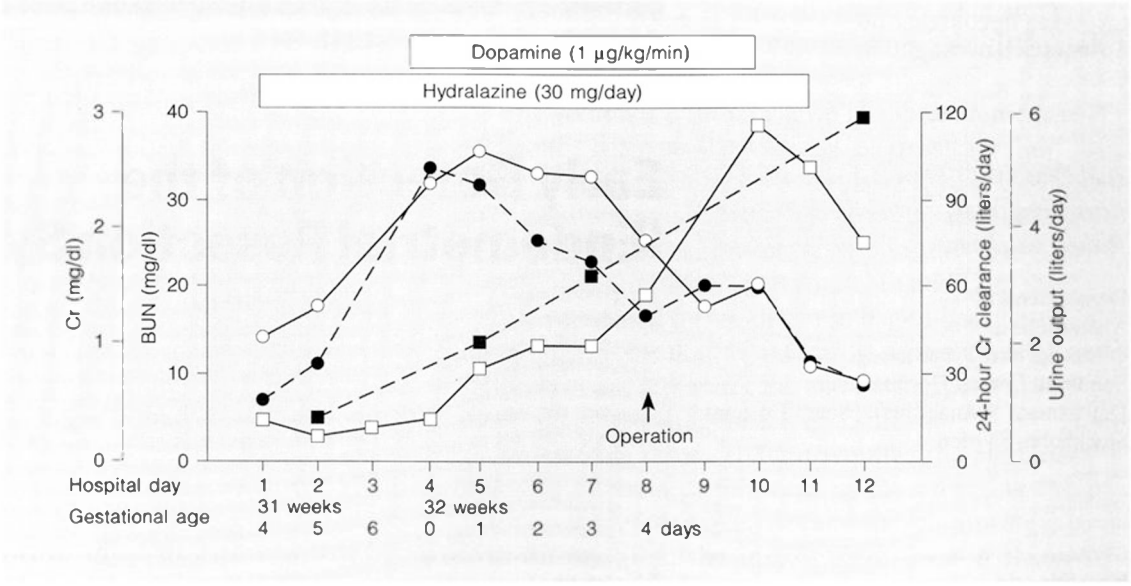

Fig. 1. Laboratory findings and response to treatment before and after cesarean section. The administration of dopamine led to a marked decrease in BUN (○) and CR (●), and a marked increase in 24-hour Cr clearance (■) and urine output (□).

Discussion

Acute renal failure due to acute tubular or cortical necrosis is a rare, but serious, complication of preeclampsia. It may result from a decrease in renal perfusion and an alteration in the coagulation status that impairs glomerular filtration. Emergent treatment measures are required. Pharmacological interventions, such as antihypertensive therapy, are mainly used to prolong gestation and improve fetal maturation when this is feasible without further increasing maternal risk [4].

The infusion of dopamine selectively dilates renal vessels and increases renal blood flow, urinary excretion of sodium, and glomerular filtration rate [3]. Kirshon et al. [2], who reported the effects of administering a low dose of dopamine (1–5 μg/kg/min) to 6 oliguric women with preeclampsia, observed a decrease in systemic vascular resistance with no elevation in blood pressure or fetal distress. They stated that the increase in cardiac output produced by dopamine likely improved renal and placental perfusion.

Leduc et al. [5] reported the successful treatment of a case of maternal pulmonary hypertension with a low dose of intravenous dopamine and intrathecal morphine. As in the present patient, dopamine improved the urine output in the presence of oliguria without affecting the systemic arterial pressure. We thus confirmed that the infusion of a low dose of dopamine markedly improved renal function in a patient with acute renal failure that complicated preeclampsia.

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