CASE REPORT

Identifying atypical preeclampsia: A diagnostic challenge

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Abstract

Preeclampsia is a multi-systemic syndrome of variable severity, pregnancy specific, consequence of an abnormal vascular response to placentation, with increase in peripheral vascular resistance and endothelial dysfunction. In the majority of cases, it will present with gestational hypertension and proteinuria, after 20 weeks. Nevertheless, in other cases, it has presented as an atypical form (with absence of hypertension and/or proteinuria) behaving like preeclampsia with severe features. We present a 35 year old G3P2002 at 36 weeks 3 days gestation, with normotensive to mild range blood pressures, absent proteinuria, and acute kidney injury (AKI). We will discuss her management with a trial of furosemide and subsequent delivery based upon the current criteria for diagnosis and management of preeclampsia.

Keywords

Preeclampsia, Oliguria, Acute kidney injury, Furosemide

1 Introduction

Preeclampsia is a disorder unique to pregnancy caused by severe vascular endothelial dysfunction. It starts with placental hypoxia and may progress to maternal multi-organ dysfunction. Although renal involvement in the form of hypertension (HTN) and proteinuria are commonly seen, there are atypical cases where these may be absent. Mild oliguria is common and usually resolves following delivery or gentle hydration. What remains challenging is the management of severe oliguria in the volume overloaded patient with severe renal impairment, where strategies like dialysis and even emergent delivery could carry significant risks. Review of the current literature identifies one study which has investigated the efficacy of continuous furosemide infusion in preeclampsia-related oliguria in the immediate peri-partum period. Herein we present an additional case and review of the relevant literature.

2 Case presentation

A 35 year old G3P2002 at 36 weeks 3 days gestation, presented to our hospital as a transfer of care with a working diagnosis of cellulitis. On admission, she endorsed bilateral lower extremity pain, with erythema and 3+ pitting edema. Admission blood pressure was 131/92 and fetal heart rate of 120 bpm. Throughout her hospital course, her blood pressures

remained in the normotensive to mild range (>140/90 but less than 160/110). She never required IV antihypertensive rescue. Additionally, new onset elevation of her creatinine from 0.8 to 1.1 was identified. The complete blood count was within normal limits. Complete metabolic panel was significant for hypoalbuminemia (2.9 g/dL), and elevated transaminases (AST 45 U/L and ALT 38 U/L). Given the clinical manifestations of gestational HTN with concern for preeclampsia, a protein creatinine ratio, 24 hour urine protein, lactate dehydrogenase (LD), and uric acid were obtained. All were found to be within normal limits. Within 6 hours of admission, the patient developed oliguric AKI (urine output 13 ml/hr and creatinine 2.4 mg/dL) and hypervolemic hyponatreamia (Na 123 mmol/L, albumin 2.7 g/dL). A renal ultrasound revealed mild right pelvicaliectasis, which in this case was believed to be a normal variant of pregnancy. Nephrology was consulted. Given recent exposure to antibiotics for a presumed infection, an extensive work up including a bland urine microscopy (no eosinophils or casts), renal Doppler (no evidence of renal vein thrombosis), complement level (normal), and serologic work up for ANA, DS anti DNA, and ANCA panel (negative) were completed. Given her unremarkable lab evaluation, differential diagnoses for acute interstitial nephritis, post infectious glomerulonephritis, ischemic acute tubular necrosis, vasculitis or autoimmune disorders and even renal vein thrombosis were excluded.

A diagnosis of atypical preeclampsia was made based upon both HTN and oliguric AKI despite the lack of proteinuria (see Table 1).

Table 1. Previous Diagnostic Criteria for Severe Preeclampsia.

Blood pressure	≥ 160/110
Proteinuria	≥ Proteinuria ≥ 5g on a 24 hour urine collection even if BP is in the mild range. Persistent urine dipstick ≥3+ also qualifies OR Signs, symptoms or lab values of preeclampsia with severe features with any elevated BP. Oliguria with 24 hour urine output <500 mL. Cerebral or visual disturbances including altered consciousness, persistent headache, scotomata, or blurred vision Pulmonary edema Epigastric or right upper quadrant pain or elevated serum liver transaminases without a known cause. Thrombocytopenia with platelet count ≤100,000 Microangiopathic hemolytic anemia with abnormal findings on peripheral smear, increased serum bilirubin, elevated serum lactate dehydrogenase (LDH), or decreased serum haptoglobin. Intrauterine growth restriction.

It was noted by the Nephrologists, that her declining eGFR could have also masked the degree of proteinuria as GFR is necessary to filtrate protein in the glomerulus.

A furosemide drip and albumin drip for worsening renal function (creatinine 2.4 mg/dL) were started along with strict inputs and outputs, fluid restriction, avoidance of nephrotoxins, and continued monitoring aiming for a mean arterial pressure (MAP) > 65 to avoid renal and placental hypoperfusion. Recommendations for expedited delivery, with consideration of a cesarean section as prolonged induction of labor could worsen the overall prognosis and outcome for mother and baby, were made. Urine output improved to 45-120 ml/hr. Dialysis was avoided prior to delivery given risks for low placental perfusion and renal perfusion mostly in the view of decreased effective intravascular volume. Given worsening renal function, the decision was made to proceed with induction of labor with prostaglandins and cook catheter. Magnesium sulfate was not given for seizure prophylaxis because of the concern for worsening renal function in the setting of AKI. After placement of epidural for anesthesia, a phenylephrine drip was started for significant hypotension (80/50's). Ultimately, the patient had a primary low transverse cesarean section secondary to arrest of dilation and descent on hospital day four. A live male neonate weighing 3754g with APGARS of 7 & 9 was delivered. Immediately postpartum, the patients urine output continued to improve to 100-300 ml/hr, blood pressure and renal function normalized

to creatinine of 0.9 mg/dL. The Furosemide and phenylephrine drips were successfully discontinued. She was discharged home in stable condition on post-operative day four.

3 Discussion

Preeclampsia rarely causes acute renal failure severe enough to require dialysis. In a cohort of South African women with preeclampsia with severe features and renal impairment, 7 of 72 (10%) required temporary dialysis, and none developed chronic renal failure. Preeclampsia causing mild transient renal impairment (creatinine up to 1.4 mg/dL) is common, but with appropriate management, there should be complete recovery of renal function [2]. Conversely, 2% to 5% of women with preeclampsia are later found to have underlying renal disease, but if given diagnosis of preeclampsia with severe features, up to 20% of women will have chronic kidney disease (CKD) [3]. Women with preeclampsia with severe features and renal impairment (serum creatinine ≥ 1.36 mg/dL) should have their fluid balance guided by a central venous pressure catheter or, when available, a pulmonary artery flotation catheter on a high dependency unit familiar with this equipment [4].

Low dose "renal" dopamine infusion (3ug/kg/min) was previously used to increase renal blood flow in patients with acute renal failure, but it is now known to increase mortality and cardiac arrhythmias. Review of the current literature reveals one study investigating the efficacy of furosemide in preeclamptic patients with oligura. Keiseb et al, recommended that once hypovolemia has been corrected, as judged by the central venous pressure or pulmonary wedge pressure, preeclamptic women with oliguria (< 200 ml/12hr) and a serum creatinine level higher than (5.56 mg/dL) may benefit from a furosemide infusion (5 mg/hr) in an effort to prevent fluid overload and hemodialysis [5]. After acute tubular necrosis is established with oliguria and rising serum creatinine level despite adequate intravascular volume and blood pressure, fluid intake should be restricted to avoid fluid overload. In these circumstances, dialysis is indicated.

In the current case, a trial of albumin and furosemide resulted in improvement in urine output (45-120 ml/hr) and avoidance of hemodialysis. Also, the diagnosis of preeclampsia was delayed based on the absence of proteinuria. Given her low GFR (23 ml/hr), the lack of proteinuria could have been a false negative given the kidneys inability to excrete protein. The traditional criterion to confirm a diagnosis of preeclampsia is the presence of proteinuric hypertension. However, recent data suggest that, in some women, preeclampsia and even eclampsia may develop in the absence of either hypertension or proteinuria. Nevertheless, women with uncontrolled severe gestational hypertension or women with signs and symptoms of end organ disease with any hypertension should be treated as if they had preeclampsia with severe features [7]. In recognition of the syndromic nature of preeclampsia, the American College of Obstetrics and Gynecology Task Force (November 2013) has eliminated the dependence of the diagnosis of preeclampsia on proteinuria. In the absence of proteinuria, preeclampsia is diagnosed as HTN in association with a number of disturbances (see Table 2).

Table 2a. Diagnostic Criteria for Preeclampsia- November 2013

Blood Pressure	≥ 140/90 on two occasions at least 4 hours apart after 20 weeks of gestation in a woman with previously normal blood pressure ≥ 160/110; hypertension can be confirmed within a short interval (minutes) to facilitate timely antihypertensive therapy
Proteinuria	≥ 300 mg per 24 hour urine collection Or Protein/creatinine ratio greater than or equal to 0.3 mg/dL Dipstick reading of 1+ (used only if other quantitative methods not available

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Or in the absence of proteinuria, new onset hypertension with new onset of any of the following:

Table 2b. Diagnostic Criteria for Preeclampsia- November 2013

Thrombocytopenia	Platelet count less than 100,000/microliter
Renal Insufficiency	Serum creatinine concentrations greater than 1.1 md/dL or a doubling of the serum creatinine concentration in the absence of other renal disease
Impaired Liver Function Panel	Elevated blood concentrations of liver transaminases to twice normal concentration
Pulmonary Edema **Cerebral Visual or Visual Symptoms**	

Given the new guidelines, our patient would have been diagnosed with preeclampsia with severe features on admission based upon blood pressure criteria and renal insufficiency (creatinine >1.1 mg/dL). For women with preeclampsia with severe features at or beyond 34 0/7 weeks of gestation, and in those with unstable maternal or fetal conditions irrespective of gestational age, delivery soon after maternal stabilization is now recommended. The administration of intrapartum-postpartum magnesium sulfate to prevent eclampsia is also recommended [6]. Magnesium sulfate was not given during this case because of the concern worsening renal function in the setting of AKI.

Although the unique nature of preeclampsia has been well documented for many years, controversies in the therapy persist because of management strategies based on principles used to treat HTN in non-pregnant individuals. In summary, we present an atypical case of preeclampsia with severe features and acute renal failure managed with continuous furosemide. At present, only one reported study is identified comparing the efficacy of continuous furosemide in preeclampsia related oliguria in the postpartum period. We should recognize furosemide as a management option for oliguria and acute renal failure in pregnancy, as it is necessary to begin appropriate treatment in a timely fashion.

References

[1] Confidential Enquiry into Maternal and Child Health (CEMACH). Why Mothers Die 2000-2002. London, UK. RCOG Press at Royal College of Obstetricians and Gynaecologists (UK). 2004 November; 350. Registered Charity No. 213280.

[2] Drakely AJ, Le Roux PA, Anthony J, Penny J. Acute renal failure complicating severe preeclampsia requiring admission to an obstetric intensive care unit. Am J Obstet Gynecol. 2002; 186: 253-256. http://dx.doi.org/10.1067/mob.2002.120279

[3] Murakami S, Saitoh M, Kubo T, et al. Renal disease in women with severe preeclampsia or gestational proteinuria. Obstet Gynecol. 2000; 96: 945-949. http://dx.doi.org/10.1016/S0029-7844(00)01055-3

[4] Gilbert WM, Towner DR, Field NT, Anthony J. The safety and utility of pulmonary artery catherization in severe preeclampsia and eclampsia. Am J Obstet Gynecol. 2000; 182:1397-1403. PMid:10871455 http://dx.doi.org/10.1067/mob.2000.106179

[5] Keiseb J, Moodley J, Connolly CA. Comparison of the efficacy of continuous furosemide and low dose dopamine infusion in preeclamptic/eclamptic related oliguria in the immediate postpartum period. Hypertens Pregnancy. 2002; 21: 225-234. PMid:12517329 http://dx.doi.org/10.1081/PRG-120016787

[6] Executive Summary: Hypertension in Pregnancy. Washington, DC. American College of Obstetricians and Gynecology. 2013 November; 122: 5.

[7] Sibai BM, Stella CL. Diagnosis and management of atypical preeclampsia-eclampsia. Am J Obstet Gynecol. 2009; 200: 481.e1-481.e7.