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(CASE REPORT)

Management of a rare case of acute renal failure in a pregnant woman during the last trimester of pregnancy: A case report

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Abstract

This case report is about the successful treatment of a patient with acute kidney injury during pregnancy. Primigravida at 37 weeks gestational age presented at the emergency department of our hospital with tonic – clonic muscle spasms. After performing immediate clinical examination and the appropriate lab investigation we reached to the diagnosis of HELLP syndrome and performed an emergency cesarean section, due to eclampsia during HELLP syndrome. Right after surgery, kidney dysfunction and rising creatinine levels led nephrologists to start dialysis sessions, because of the acute kidney injury. Postoperative period was without complications. On the sixth postoperative day the patient's clinical status was significantly improved, thus she got discharged from the clinic. It was considered necessary by the nephrologists to continue the dialysis sessions until full rehabilitation of the renal function is succeeded. In this paper, apart from the presentation of the case, a literature review is attempted of the acute kidney injury during pregnancy, in relation to current available therapeutic options, which performed in – time contributes to the best possible prognostic outcome.

Keywords: Acute kidney injury; Pregnancy; Management; Prognosis

1. Introduction

It is generally known that physiological, biochemical and anatomical changes occur during pregnancy, both systematically and locally. Normal adaptation to pregnancy includes a complex of changes that mainly concern the circulatory, hormonal and immunobiological systems that aim on the one hand to ensure a stable and ideal environment for the development of pregnancy and on the other hand, to effectively protect the mother. Knowledge of physiological changes during pregnancy is essential for understanding the morbid conditions that may occur in it.

Acute renal failure is a pathological condition, the main feature of which is the sudden decline or cessation of renal function.As the kidney plays an important role in maintaining the balance of the extracellular environment, acute impairment of renal function can affect most organic systems [1].Acute renal failure is rare in pregnancy.In general, the incidence of the disease is estimated to be less than one case per 20.000 pregnancies [2,3].In 2014, Jonard et al. analyzing the results of their research showed that in the first trimester of pregnancy the disease is mainly associated with infection and septic abortion, while acute renal failure manifested in the last trimester is associated with preeclampsia, a syndromeHELLP (our case), acute fatty liver of pregnancy and postpartum hemorrhage [4].Liu et al.has been growing significantly in recent years.More specifically, from 1.6 cases per 10000 pregnancies in the year 2003, in 2007 it is estimated that it amounts to 2.3 cases per 10000 pregnancies [5].Similar are the results of a recent study published by Callaghan et al. in the United States in 2012. According to this study, the incidence of acute renal failure from 2.3 cases per 10.000 pregnancies in 1998 increased to 4.5 in 2008cases per 10000 pregnancies[6].

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In the present work, after the description of the case, based on the systematic citation of the literature, a brief review of acute renal failure in pregnancy is attempted, regarding the modern treatment options available, the correct knowledge of which can contribute to ensuring better health formother and the best perinatal outcome.

2. Case presentation

A 19-year-old pregnant woman in her 37th week of pregnancy was brought to our hospital with convulsions. A history of generalized tonic-clonic seizures was reported from her environment, with the first episode concerning the home and the second episode during her transport by ambulance to the emergency department of our hospital. During the clinical examination the patient was in post-eclampsia phase, was restless, had a jaundiced complexion and had edema that extended beyond the knees. The pulse was 134/min and the blood pressure was 150/100 mmHg. The cardiac examination was without pathological findings. The other systematic examination was normal. Magnesium sulfate was immediately administered at a dose of 5 grams intravenously, followed by intramuscular administration. From the emergency laboratory it was found: Hb 10.3 g%, white blood cells 17.840/mm^3, platelets 50.000/mm^3, urea 93 mg%, creatinine 1.96 mg%, total cholyrethrin 1.91 mg%, direct cholyrethrin 1.06 mg%, prothrombin time IN 2 (International Normalized Ratio) 1.41, aspartate aminotransferase 121 IU/L, alanine aminotransferase 113 IU/L, alkaline phosphatase 191 IU/L, lactic dehydrogenase 1497 IU/L, total albumin 4.30 g%, albumin 2.31. Urine test showed proteinuria. Hepatitis rates were negative. Abdominal ultrasound did not reveal any pathological findings from the liver and spleen. The kidneys were imaged with increased echogenicity. Obstetric ultrasound revealed a single pregnancy with normal fetal development and a normal amount of amniotic fluid.

The diagnosis of HELLP syndrome was made and it was decided to perform an emergency caesarean section, due to eclampsia with complication of HELLP syndrome. Preoperatively, prophylactic aspiration was performed and magnesium sulfate and nifedipine were administered intramuscularly orally. The caesarean section was completed smoothly with normal blood loss. The newborn was transported for follow-up to a neonatal intensive care unit. Postoperative administration of nifedipine and magnesium sulfate was considered necessary. Diuretic control showed borderline oliguria (450 ml/24 hours) and urine test showed proteinuria. Urea and creatinine levels were elevated in the first two postoperative days (urea 105 mg%, creatinine 2.01 mg %). Examination by a nephrologist diagnosed acute renal failure and dialysis was recommended, as an increased tendency to creatinine was found. On the sixth postoperative day, the patient left our clinic in a significantly improved condition. Convulsions did not occur during hospitalization. The dialysis was maintained by the nephrologists until complete restoration of renal function.

3. Discussion

The basic principles of treatment of acute renal failure in pregnancy include the systematic monitoring of the pregnant woman, the continuous assessment of the condition of the fetus and the administration of etiological treatment, as shown in the table below (Table 1). In general, patients with acute renal failure during pregnancy should be closely monitored by a specialized team of physicians that should include a nephrologist, neonatologist and obstetrician-gynecologist. In any case, continuous and intensive monitoring of the condition of the fetus is required. Ultrasound assessment of fetal growth and amniotic fluid volume at regular intervals, Doppler ultrasound of umbilical cord blood flow, and cardiotocography at rest after 28 weeks of gestation and until termination are essential any patient with the disease pregnant.

In general, the treatment of acute renal failure during pregnancy should follow the same guidelines as for the treatment of non-pregnant patients, and be proportionate to the cause that led to the sudden onset or cessation of renal function. Acute tubular necrosis is the most common cause of acute renal failure in pregnant women. The main obstetric complications that cause it are septic abortion, perinatal infections, severe preeclampsia and eclampsia. The basic principles for treating pregnant women with acute tubular necrosis include hospitalization, bed rest, intravenous fluids, hypertension control, and antibiotics (Table 1). The amount of fluid consumed per day should be equal to the amount of urine excreted, added approximately 500ml. In those cases where uremia is evident and the oliguria persists (our case), dialysis must be decided and performed in order to prevent the extensive destruction of the renal parenchyma. Early application of dialysis helps to increase the rate of recovery of renal function and reduce mortality caused by acute tubular necrosis [7,8].

Table 1 Modern therapeutic approach to acute renal failure in pregnancy

1.	**Systematic monitoring of the pregnant woman**
	blood test
	control of renal function
	liver function test
2.	**Continuous assessment of the condition of the fetus**
	biometrics
	estimate of amniotic fluid volume
	cardiotocographic check at rest
3.	**Conservative treatment**
	hospitalization
	administration of fluids
	treatment of hypertension
	administration of antibiotics
4.	**Invasive treatment**
	dialysis
	therapeutic evacuation of the uterus
	hysterectomy

Antibiotic treatment is indicated when there are signs and symptoms of sepsis in the pregnant woman which can be observed mainly in cases of septic abortion, but also in pyelonephritis, chorioamnionitis and postpartum infection. Acute renal failure due to septic abortion and septic shock may be the result of dehydration and hypotension caused by significant renal ischemia, the result of the production of specific nephrotoxin from the clods, and finally, the result of the hemolytic action of Gram-negatives bacteria [9].In any case, empirical antimicrobial therapy should be started immediately after receiving the cultures from the cervical secretion and should include the administration of a wide range of antimicrobial drugs[10,11]. The surgical treatment, which must consist of emptying the uterus of the products of pregnancy, is of primary importance, as the septic contents of the uterus, despite the administration of antimicrobial agents, maintain and worsen the condition.Hysterectomy seems to be indicated in those cases where small abscesses have formed in the myometrium and the septic condition persists even after the uterus is emptied and appropriate antimicrobial treatment is given [12].

The effect of pregnancy on the disease has not been well documented, due to the limited literature available to us to date. In most cases after treatment of the cause, the disease subsides during the period of labor and renal function is fully restored. The effect of the disease in advanced stages of pregnancy increases the rates of perinatal morbidity and mortality as a result of spontaneous abortions, prematurity, endometrial death and delayed intrauterine development of the fetus. In 2008, Goplani and colleagues reported that acute renal failure in pregnancy was associated with significantly increased maternal and perinatal mortality rates. The analysis of the results of their study showed that maternal mortality accounts for 18.5% of all cases, while the majority of deaths (61.5%) are due to sepsis, with septic abortion being the most common cause [13].

Recently in 2015, Krishna et al. showed that the incidence of acute renal failure in pregnancy is increased in developed countries. Analyzing the results of their research, which included 98 cases of pregnant women with acute renal failure, they found that the most common cause was septic abortion. Of the 98 patients, 18 patients died. Those with oligo-anuria, sepsis and central nervous system complications who also had a higher mortality rate died. The authors also showed that the relative risk of neonatal mortality was lower in full-term pregnancies than in preterm births. Of the 80 surviving pregnant women, 60 (75%) had renal function returned to normal after 3 months. Of the remaining patients, 14 developed acute tubular necrosis histologically confirmed by renal biopsy. The relative risk of non-restoration of

renal function was high in patients who did not recover within 6 weeks. Of the 14 patients with cortical necrosis, 3 (21.4%) became independent of dialysis sessions within 6 months. The authors finally concluded that pregnant women with acute renal failure should be monitored by dialysis for at least 6 months [14].

Finally, Prakash et al. have shown a reduced incidence of cortical necrosis in patients with acute renal failure in recent years which is associated with increased survival rates and better renal prognosis. The improvement in patient survival was mainly attributed to the reduction in the incidence and severity of cortical renal necrosis during pregnancy. Cortical renal necrosis as an obstetric complication was significantly reduced. More specifically, from 4.7% in 1990, in 2000 it drops to 0.5% of all cases of acute renal failure. Similarly, maternal mortality from 72% between 1984 and 1994 between 1995 and 2005 decreased to 19% of all pregnant women with acute renal failure [15].

4. Conclusion

Acute renal failure associated with severe preeclampsia is rare.The systematic monitoring of the pregnant woman, the continuous evaluation of the condition of the fetus and the administration of etiological treatment are the basic principles of treatment of acute renal failure related to the HELPP syndrome.

Compliance with ethical standards

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Disclosure of conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Author Contribution

All authors (M.B., A.T., E.T., and I.T.) participated in conception and design, administrative support, provision of study materials, patient care, collection and assembly of data, manuscript writing and final approval of the manuscript.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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