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AETIOLOGY IN PREGNANCIES COMPLICATED BY ACUTE KIDNEY INJURY

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ABSTRACT

Introduction: Acute kidney injury in pregnancy (P-AKI) usually occurs due to obstetrical complications such as septic abortion, abruptio placentae, uterine hemorrhage, intrauterine fetal death (IUD), and puerperal sepsis in women with previous healthy kidneys. Therefore, the main objective of the study is to access the aetiology in pregnancies complicated by acute kidney injury. **Material and Methods:** This descriptive observational study was conducted in Doctors Hospital and Research Center, Lahore during January 2020 till June 2020. The data was collected from 50 pregnant women who visited the OPD of the hospital regularly. **Results:** The data was collected from 50 pregnant women. The mean age was 26±6 years. Twenty-eight patients were multigravida, and twenty two were primigravida. Thirty patients did not receive any antenatal care, thirteen (31%) were visited by a traditional birth attendant, and only seven had adequate antenatal care by a gynecologist. Out of 50 patients with obstetric AKI, sixteen patients presented before while 34 presented after 28 weeks of gestation. **Conclusion:** It is concluded that management of P-AKI is a major clinical challenge because it poses a risk to two lives (mother and fetus). It is largely due to preventable obstetrical complications but can be caused by certain pregnancy-specific diseases.

KEYWORDS: Acute, Pregnancy, Outcomes, Maternal.

INTRODUCTION

Acute kidney injury in pregnancy (P-AKI) usually occurs due to obstetrical complications such as septic abortion, abruptio placentae, uterine hemorrhage, intrauterine fetal death (IUD), and puerperal sepsis in women with previous healthy kidneys. However, there are still huge differences in the epidemiological characteristic of P-AKI with respect to incidence, causes, and outcome between developing and developed countries.[1]

These differences are due to environmental, socioeconomic, and different health delivery systems. P-AKI has decreased to 1/15,000–1/20,000 in the recent year from 1/3000 in 1960, with respect to the total number of pregnancies in developed countries.[2] Similarly, the incidence of P-AKI has declined to 0%–1% in the last decade from 20% to 40% in the 1960s of total AKI cases. The current incidence of P-AKI in developing countries has a declining trend.[3]

Acute kidney injury during pregnancy (PR-AKI) is associated with rates of maternal mortality and fetal loss that range from 30 to 60%, making it a life-threatening event. PR-AKI was until recently believed to be a relatively rare and declining complication of pregnancy that was primarily associated with sepsis, complicated pregnancy terminations and residence in low-income countries.[4]

The lack of uniform diagnostic criteria limits the ability to accurately determine the incidence of PR-AKI and to quantify its influence on morbidity and mortality. However, recent data suggests that the incidence of AKI is increasing. PR-AKI is associated with an increased risk of chronic kidney disease (CKD), hypertension and cardiovascular disease.[5] There are considerable changes that occur in the urinary tract system during normal pregnancy: kidneys increase in size by about 1–1.5 cm due to renal vascular and interstitial space volume expansion. The physiological hydronephrosis of pregnancy characterized by a dilation of the calyces, renal pelvis, and ureter occurs in over 90% of pregnant women.[6] This anatomical abnormality may be present until the 16th postpartum week and promotes urinary stasis in the ureter, leading to the development of urinary tract infection. The dilatation of the urinary system is due to the hormonal effects of progesterone, external compression by the gravid uterus, and morphological changes in the ureteral wall.[7]

Therefore, the main objective of the study is to access the aetiology in pregnancies complicated by acute kidney injury.

MATERIAL AND METHODS

This descriptive observational study was conducted in Doctors Hospital and Research Center, Lahore during January 2020 till June 2020. The data was collected from 50 pregnant women who visited the OPD of the hospital regularly.

Inclusion criteria

Pregnant Women with normal renal profile at the time of enrolment in the study and no previous history of kidney disease or renal procedure in the recent past (at least 3 months) before conception were included.

Data collection

Baseline demographic profile and clinical data, including age, educational status, parity, gestational age, mode of delivery, antenatal care, pre-eclampsia, eclampsia, abruptio placentae, placenta previa, antepartum or postpartum hemorrhage, symptoms of infection and urine output were recorded using a self-administered questionnaire. Moreover, data about blood transfusions, the time duration from the onset of AKI to the referral and initiation of dialysis, number of dialyses, urinalysis, biochemical and hematological tests, length of hospitalization, and changes in the maternal renal functions at the time of discharge were also recorded in a predesigned data record form.

Diagnosis of AKI

All participants had serum creatinine tested at enrolment and were inquired specifically about any history of renal disease or any renal procedure in the recent past (at least 3 months). Those mothers who developed creatinine above the normal range (> 110 umol/L) during the study period or decreased urine output underwent serial assessment and evaluation in addition to investigations for determining aetiology of kidney injury. AKI was diagnosed and staged by Kidney Disease Improving Global Outcomes (KDIGO) criteria.

The data were collected and analysed using SPP version 19. All the values were expressed in mean and standard deviation.

RESULTS

The data was collected from 50 pregnant women. The mean age was 26±6 years. Twenty-eight patients were multigravida, and twenty two were primigravida. Thirty patients did not receive any antenatal care, thirteen (31%) were visited by a traditional birth attendant, and only seven had adequate antenatal care by a gynecologist. Out of 50 patients with obstetric AKI, sixteen patients presented before while 34 presented after 28 weeks of gestation.

Table 01: Aetiologies of obstetric acute kidney injury among selected participants.

Etiology	Percentage (n)
Sepsis	78% (32)
Intrauterine death	60% (24)
Postpartum hemorrhage	41% (17)
Hemodynamic shock	36% (15)
Pre-eclampsia/eclampsia	17% (7)
Coagulopathy	7% (3)

Pregnancy related kidney problems in Pakistan

Pregnancy results in important alterations in acid-base, electrolyte, and renal function due to pregnancy-associated physiologic changes in renal and systemic hemodynamics. Understanding these changes is essential when evaluating pregnant women with or without renal disease.[7] A pregnant women is at a high risk to develop kidney related complications ranging from simple urinary tract infection to acute Kidney Injury (AKI). AKI may occur due to reasons which are highly specified for pregnancy like pregnancy related hypertension, abruption placentae, acute fatty liver of pregnancy and HELLP syndrome (Hemolysis, Elevated liver enzymes, and low platelets) or it may occur due to blood loss or sepsis during or after the delivery. It must also be remembered that pregnancies in women with underlying chronic kidney disease who require dialysis during pregnancy or who have previously undergone renal transplantation pose unique sets of issues. Successful maternal and fetal outcomes for women with preexisting kidney disease, with kidney transplantation and those with onset of kidney disease during pregnancy, require a close working relationship among all physicians involved in the care of these patients.[8] Obstetrical acute renal failure (ARF) is a rare entity in the developed world. The incidence has decreased from 43% (1956-1967) to 0.5% with respect to total ARF cases (1988-1994) and no case of maternal death or irreversible renal damage has been observed in last seven years in the United States of America. Moreover even this small number of obstetrical AKI in developed world are mostly because of reason like pregnancy related hypertension, abruption placentae, acute fatty liver of pregnancy and HELLP syndrome. On the other hand, unfortunately the developing countries like Pakistan present a different picture and pregnancy related AKI ranges from 4% to 36% and mostly because of sepsis and blood loss during or after delivery.[9] Data from Pakistan is scanty, but various studies showed high incidence of mortality (18% to 23%) and morbidity (13% to 26%) related to obstetrical ARF. One striking feature in studies from the developing nations indicate that the pregnancy related ARF is more commonly seen (86%) in patients who had not received any kind of antenatal care and their deliveries were carried out at home assisted without aseptic measures.[10] Also in women delivered in hospitals not having received antenatal care were more prone to develop ARF (14%). The industrialized nations and even some of the developing countries have achieved these goals by liberalization of abortion laws,

improved healthcare facilities and more effective measures of careful prevention.[8]

DISCUSSION

Maternal mortality is a grave outcome of obstetric AKI. In our study, the overall mortality rate was 24.4% at the end of the three-month follow-up period, while among the participants undergoing hemodialysis, it was 14%. Our results are very close to the results of a few previous studies showing maternal mortality of 18% and 26%. However, a study conducted in South Africa demonstrated the maternal mortality rate as low as 5%.[11] A relatively higher rate of maternal mortality in developing countries like Pakistan is typically associated with the delay on the part of the patients and their attendants. Generally, in far-flung areas of Pakistan, obstetric and gynecological care is not up to the requirement, and it is a common trend among women to consult untrained traditional birth attendants. In the present study population, 19% of patients had regular visits to physicians and/or obstetricians, 31% were visited by traditional birth attendants, and unfortunately, 41% had received no antenatal care.[12]

Fetal mortality rate was also remarkably high in our study. The rate of IUD was 60% owing to maternal etiologies. In developed countries, the fetal mortality secondary to this syndrome is about 44%, which is comparatively lower than our results. This difference is attributed to a relatively better antenatal and perinatal care in those countries. Dialysis dependency in mothers also results in higher incidence of fetal loss that further deteriorates the morbidity and, in turn, increases the risk of maternal mortality.[13]

CONCLUSION

It is concluded that management of P-AKI is a major clinical challenge because it poses a risk to two lives (mother and fetus). It is largely due to preventable obstetrical complications but can be caused by certain pregnancy-specific diseases.

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