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ORIGINAL ARTICLE

Frequency of Pregnancy Linked Acute Kidney Damage a Single-Center Study

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ABSTRACT

Background: Acute kidney damage in pregnancy is an unusual but serious complication of pregnancy. Among developed countries, PR-AKI has decreased from 4% to 4.4%. PR-AKI is quite widespread in underdeveloped countries. In impoverished nations like Pakistan, the actual incidence of obstetrics-related AKI and its change are unknown. This research aims to measure acute kidney damage during pregnancy in our setting.

Objective: Acute kidney injury (AKI) caused by pregnancy is often documented. To diagnose pregnancy-related AKI.

Methods: the study was conducted in the Department of Obstetrics and Gynecology Bacha khan medical college sawabi from 24 June to 24 June 2020. Eighty-seven samples size were included in the study using sequential sample after the areas and (OPD) through A single center study design. The serum creatinine levels were used to diagnose acute renal damage during pregnancy. SPSS version 2.2 for the purpose of data analysis. A mean and standard deviation were determined. for continuous variables such as gestational period, age, and birth weight. Variables like AKI had their frequencies and percentages assessed. The results were then broken down by factors like gestational age and length of pregnancy to determine whether there were any impact modifiers. The significance level was set at P 0.05.

Results: The average age of the investigated population was 24 years 2. years old. The pregnancy lastedan average of 3 months, with a standard deviation of 5.112. Acute kidney damage (AKI) was found in only4% of the 87 individuals investigated, compared to 93% of the patients without AKI.

Conclusion: Pregnancy-related acute renal damage was shown to be 7 percent common in our setting, according tothe results of our research.

Keywords: Creatinine Levels, Pregnancy, Acute Kidney Injury

INTRODUCTION

Acute kidney damage caused by pregnancy (PR-AKI) is an uncommon but significant pregnancy complication. Pregnancy might trigger Renal Failure, Acute Despite the fact that the mother may have had a perfectly functioning kidney before, Because of the various underlying causes, it's a very diverse group of diseases. Pregnancycomplications such as placental abruption are dangerous for both mother and baby.1

This is a dramatic drop in the global incidence of pregnancy-related acute kidney damage over the last 50 years. Legalizing abortion and improvements in prenatal and obstetric care have contributed to this reduction2. According to the latest statistics, fewer than 1% to 2.8% of people in wealthy nations are nowaffected by PR-AKI. Eliminating septic abortion and improved postnatal care have made it an uncommonpregnancy complication3. PR-AKI, contrast with the rareness of and yet in rising nations, with a prevalence of 4.2%–15%. . In developing nations like Pakistan, the actual incidence of obstetrics-related AKI and the adjustment in frequency well recognized, and no comparable native statistics accessible in the past. Pregnancy-related acute renal failure (ARF) is prevalent in Pakistan, according to a small number of published studies. 4

Literature uses a wide range of definitions for PR-AKI, ranging after a increase in serum creatinine to a condition that requires dialysis for treatment5. The glomerular filtration rate rises by 40% to 50% during a typical pregnancy due to hemodynamic and vascular alterations. Pregnancy-related changes in renal function may be detected even in women whose blood creatinine levels are within the normal range. Increased synthesis of nitric oxide and relaxin in the first trimester of pregnancy causes peripheral vasodilation, which lowers systemic vascular resistance6. Blood pressure is reduced by 40 to 50 percent as a result of an increase in cardiac output and vasodilatation. In the second trimester, fluid retention causes a slight rise in blood pressure. Still, it never rises over the pre-pregnancy norm because of the body's natural tendency to maintain a steady pressure throughout pregnancy7. The osmotic alterations are influenced by a variety of different processes, including thirst stimulation and the release of vasopressin. As the

volume increases, so does the osmolality and salt content in the bloodstream. Progesterone may also cause hyperventilation by affecting the respiratory center. To make up for the bicarbonate loss as a consequence of this hyperventilation, the body might experience respiratory alkalosis. Pre-eclampsia, eclampsia, and HELLP syndrome are all possible complications of pregnancy8.

Common causes of PR-AKI include septic abortion during early pregnancy, toxaemia throughout pregnancy, haemorrhages at any point during pregnancy, and acute tubular necrosis during late pregnancy. Aseptic encephalomyelitis is seldom brought on by acute fatty liver disease. It usually takes place sometime after the end of the third trimester of pregnancy. Patients in the postnatal period are at risk for thrombotic microangiopathy and postpartum sepsis. Acute tubular necrosis (ATN) is the most common illness with a positive prognosis, topping conditions including severe eclampsia, HELLP syndrome, and disseminated intravascular coagulation9.

Because acute renal damage is a significant cause of hospitalization and is linked with high morbidity and mortality in underdeveloped countries, this research aims to investigate the extent of acute kidney injury in pregnant women in our setting. Despite renal replacement therapy, in-hospital mortality rates are still high even in industrialized nations. Therefore, early diagnosis and immediate care can help reduce these problems. We'll compare our findings to those from other countries and make some recommendations for further research10.

MATERIAL AND METHOD

Before beginning the study, the hospital's institutional research and ethics board approved. Exploratory study existed undertaken at the Department of Gynecology Bacha khan medical college sawabi from 24 June to 24 June 2020. There were 87 participants in the study, and the sample size was estimated using WHO software for sample size determination13 at a 15 percent acute renal injury percentage, a ninty- percent confidence equal, and a five percent

margin of error.Samples were collected using a non-probability sequential sampling method. All pregnant women who were at least 20 years old, diagnosed with acute renal failure, and willing to participate in the trial were included. Patients with infected abortion, hyperemesis gravid arum, antepartum hemorrhage, pre-eclampsia, eclampsia a, pre-existing renal illness, and patients were hesitant to participate in the research were excluded.

Participants who met the inclusion criteria signed a written permission form. Prospective participants fully knew the study's objectives, scope, and methods.

Medical history, clinical examination, and abdomen ultrasound scans were made on all patients recruited in the study by a consultant fellow gynecologist.

A professional phlebotomist drew three milliliters of venous blood and stored it in an EDTA tube. The Micro lab Leitch 300 was used to assess the urea and creatinine levels in this sample's blood. Participants' sociodemographic and clinical data, such as age, gravidity, parity, blood pressure, frequency, and urine volume, were entered into a proforma.

The serum creatinine levels were used to diagnose acute renal damage during pregnancy. A rise in blood creatinine concentration higher than 86 ml/l (>1 (mg)/dl) or a increase of 42 ml/l (0.5mg/dl) in the preceding 24 hours above baseline.

SPSS version 22 was used to analyze the data. Pregnancy and childbirth length are continuous variables that may be analyzed using mean and standard deviation (SSD). Variables like AKI had their frequencies and percentages assessed. The results were then broken down by factorslike gestational age and length of pregnancy to determine whether there were any impact modifiers. An analysis of variance (ANOVA) was performed after stratification. The significance level was set at P 0.05. Tables were used to display the results.

RESULTS

The incidence of acute renal damage in pregnant women was evaluated by monitoring 87 patients. The investigated population had a mean age of 24.33.23. Out of a total of 87 patients, 36% were between the ages of 20 and 27, 34% were between the ages of 28 and 34, and 31% were between the ages of 31 and 40. As shown in (Table No. 1)

Table 1: Patients' demographics and medical conditions (n = 87)

Variables	No	Percentage	Mean
Age groups			
20-27	26	36%	
28-34	31	34%	
31-40	30	30%	27±3.23
Duration of pregnancy			
≤ 4 month	96	55%	
>3 months	78	45%	4± 5.313
Severe kidney injury			
Yes	12	4%	
No	162	93%	-

Table 2: Acute kidney damage stratification giving to age and measurement of pregnancy (n=87)

Acute renal injury stratification is based on the distribution of patients' ages				
AKI	20-27 years	28-34 years	31-40 years	Total
Yes	4	6	5	12
No	26	31	30	87
Total	30	37	35	100%
(A Chi-square test)was applied in which the P value was 0.8316				
The caste system of acute renal damage w.r.t length of pregnancy				
AKI		≤ 3 month	>3 month	Total
Yes		3	2	15
No		45	42	87
Total		48	46	100%

A Chi-square test was applied in which the P value was 0.8195

Pregnancy lasted an average of four months, with a standard deviation of 4.313 days. As shown in (Table No. 1) In a study involving 87 individuals, researchers found that 48 (or 60%) had pregnancies that lasted more than three Pregnancy lasted more than three months in 39 (40%) of cases. As shown in (Table No. 1) Acute renal damage was found in 14 (or 15%) of the 87 individuals investigated, whereas the remaining 73 (or 85%) did not. As shown in (Table No. 1)Acute kidney damage is more prevalent among pregnant women aged 20–30, and in those whose pregnancies have lasted less than three months, which supports the hypothesis that the most common causes of AKI in our setting has to do with the fetus's development. (See Table No.2)

DISCUSSION

In the case of acute kidney injury (AKI), the GFR drops rapidly enough to reduce the kidney's ability to remove nitrogenous waste products (urea and creatinine) and other uremic toxins11. The situation becomes more complicated when pregnant women have acute renal failure. Among adults' most prevalent causes of hospitalization, acute kidney injury (AKI) has been linked to significant morbidity and death, particularly in underdeveloped countries. Acute kidney injury (AKI) during pregnancy may be a life-threatening condition requiring immediate medical attention. Approximately 24% of the population has access to it. According to Rizwan N16, the percentage in Pakistan is 13%. Pregnancy-related AKI is bimodally distributed, peaking in the first and third trimesters12. Our research found that the mean age of the participants was 29 years, and the mean length of pregnancy was three months, with a standard deviation of 5.313. Patients with acute renal damage constituted 4% of the total, while patients without acute kidney injury constituted 93%. The patients' ages varied from 15 to 45 years, and Saleem Najar17 found that out of 569 occurrences of AKI, 40 (7.02 percent) were linked to pregnancy issues13. The most prevalent cause of PRAKI was septic abortion, which was responsible for 20 (50%) of the cases, 15 (75%) of which happened in the first trimester and five (25%) in the second. Toxemia during pregnancy, severe gastroenteritis, postpartum hemorrhage, acute pyelonephritis, and postpartum acute kidney damage was also contributing factors in six (15%) of the cases, as was antepartum hemorrhage in two (5%)14. (2.5 percent). Sixty percent of the patients required dialysis, and 20 percent died. PkR-AKI remains to be a severe issue in culture, resulting in a high maternal death rate. A significant source of PRAKI in our culture is septic abortion, which has all but gone in affluent nations. As a result, there is a pressing need to stop illegal abortions and enhance prenatal care. As a result of the legalization of abortion and better prenatal and obstetric care, the global incidence of PR-AKI has decreased significantly over the last 50 years, from twenty-% to forty-% in 1962 to 10% in extra recent studies. In two recent investigations, no cases of PRAKI were found in a total of 12000 and 20000 live deliveries, respectively. The incidence of PRAKI in India has decreased from 14.5 percent in 1987 to 4.3 percent in 2005, according to recent epidemiological research. Legalizing abortion and providing better prenatal care have also contributed to this. In the Kashmir Valley, there is little research that deals with PR-AKI15. In the (Kashmir Valley), Pandith et al. 21 reported a PR-AKI incidence of 6% (unpublished data), while our research found a PR-AKI frequency of 4%. Our study performed 20 (50%) septic abortion cases primarily performed by untrained individuals (midwives and stage). Eight outflow cases (20%) and six toxemia cases (15%) also occurred. Even though PRAKI has decreased significantly on a global and national scale, it has largely remained unchanged in the (Kashmir Valley), owing to a negligible decrease in septic abortion. As a result, there is a pressing need for prenatal and postnatal care education and enhancement, particularly in rural regions, and an urgent need to end the practice of illegal abortions performed by untrained professionals. As of 2005, the death rate for PRAKI in Europe and North America has reduced to less than 10%, but in India the reported death rate has dropped from 56% to 24%. 15.

CONCLUSION

Our findings indicate that acute kidney impairment is associated with pregnancy in around 7% of cases in our population.

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