

Acute Renal Failure in Pregnancy, its Causes and Outcome, 1 Year Study at Shaikh Zayed Hospital Lahore

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Abstract

Objective: The objective of this study was to determine the frequency, etiology, clinical course and outcome of pregnancy related acute renal failure.

Type of Study: Observational and prospective hospital based study.

Place of Study: Department of Nephrology, Shaikh Zayed Hospital Lahore.

Duration of Study: One year from November 2010 – October 2011.

Patients and Methods: Total 210 patients of Acute renal failure (ARF) were admitted with 92 (44%) males and 118 (56%) females during this period of which 40 (19%) females were pregnancy related ARF that were included in this study. A Pre-designed proforma was used. The clinical history and physical examination was carried out. Relevant laboratory tests were performed. Renal biopsy was done in few cases. The final outcome was recorded. Twenty four (24) patients were from rural community of Punjab province and remaining (16) were from urban areas.

Results: Pregnancy related ARF occurred in forty (40) patients. Twenty two (55%) were multi-para and 18 (45%) were primigravida. Their age was between 29 ± 4.5 years. Majority 32 (80%) patients had not received any antenatal care as compared to 8 (20%) patients who had adequate antenatal care. Twelve cases (15%) presented in their first and second trimester of pregnancy while 28 (70%) patients developed ARF in their third trimester or the puerperium. Twenty four (60%) patients were anuric. Antepartum hemorraghe (APH) in 2 (5%) cases, postpartum hemorraghe (PPH) in 6 (15%) cases, Septic abortion in 6 (15%), puerperal sepsis in 8 (20%) and DIC in 4 (10%) cases, Intra-uterine fetal death (IUD) in 12 (30%) and HELLPs in 2 (5%) cases. Sepsis was the commonest cause of ARF. Thirty four (85%) patients received hemodialysis and 6 (15%) did not require any dialysis. Commonest clinical diagnosis was acute tubular necrosis (ATN). Complete recovery was seen in 8 (20%) cases. Acute renal cortical necrosis was seen in 14 (35%) cases and 18 (45%) patients had patchy cortical necrosis. Overall mortality was 30%.

Conclusion: Pregnancy related acute renal failure has high mortality and morbidity. In addition to acute tubular necrosis (ATN) as a leading cause with reversible ARF, cortical necrosis contributes significantly to the permanent loss of kidney functions. It is a major health problem especially in the villages of Punjab province. Major identified issues are lack of poor healthcare facilities, fewer numbers of antenatal clinics and lack of prompt management of potentially reversible ARF.

Key Words: Acute renal failure, Pregnancy.

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Introduction

Acute renal failure in pregnancy is largely a preventable problem usually resulting from obstetric complications and not intrinsic renal disease.^{1,2} Pregnancy related acute renal failure (ARF) may compromise up to 25% of developing countries and is associated with high risk of maternal morbidity and mortality. ARF that is severe enough to require dialysis is quite rare in developed nations, its incidence is 1:20000 or less of all gestations.²

In pregnancy, ARF occurs with a bimodal distribution. A peak in early pregnancy is associated with infection, particularly septic abortion, while a third trimester peak is associated with late obstetric complications such as preeclampsia, abruption placenta, post partum hemorrhage, and retained dead fetus.^{2,3} In developing countries, obstetric ARF remains a serious problem. With improvement in prenatal care, the proportion of obstetric acute renal failure secondary to septic abortion decreased from 65% to 19%.² Acute renal failure can occur in the setting of sepsis from any organism following abortion, but is most common and dramatic with infection by *Clostridium Welchii* because of its production of a toxin which causes hemolysis and renal failure.

Acute tubular necrosis (ATN) is the most common pathological lesion and has good prognosis as compared to other pathological lesions associated with disseminated intravascular coagulation (DIC), hemolytic uremic syndrome (HUS), severe eclampsia, and HELLP syndrome in which glomerular involvement is predominant.^{2,4-6} It is postulated that all these diseases are manifestations of thrombotic micro-angiopathy caused by endothelial injury, due to deficiency of NO dependant endothelial relaxing factors. The prognosis of pregnancy induced HUS, HELLP syndrome (hemolysis, elevated liver enzymes, and low platelets) and severe form of eclampsia is not good, most of these patients require chronic dialysis or survival with markedly reduced renal functions.^{2,5,7} Another bad prognostic lesion seen in obstetric induced ARF is acute bilateral renal cortical necrosis (ABCN).^{8,9} It is rarely seen in industrialized nations. The incidence of cortical necrosis is still very high in developing countries, in India it is about 24% as reported by Parkash et al and 13% reported in Pakistan by Ramzan et al.^{1,9} There is also incomplete (patchy) cortical necrosis followed by a variable improvement of renal function and a stable period of moderate renal insufficiency over a

few years, but in some cases it may progress to end stage renal failure few years later.^{2,4,5,7}

Objective

The objective of this study was to determine the frequency, etiology, clinical course and outcome of pregnancy related acute renal failure.

Material and Methods

This was an observation based study, conducted in the Department of Nephrology, Sheikh Zayed Hospital Lahore from November 2010 – October 2011. During this period 40 patients suffering from acute renal failure with pregnancy were admitted in nephrology ward which were referred from different hospitals of urban and rural areas. All these women were previously healthy and were shifted to nephrology ward when they developed deranged renal functions. All patients suffering from pregnancy related ARF were enrolled in the study. Problems specifically related to pregnancy as cause of ARF were taken as etiology and entered in predesigned proforma. Their clinical history, physical examination and intake / urine output was recorded. Specific inquiry was made as to mode of delivery, need for blood transfusions, operating intervention and fetal outcome. Records were maintained as patient specific sheets and completed. Routine laboratory investigations were done related to each case and specialized investigations like renal and pelvic ultrasonography and renal biopsies were performed in selected cases where recovery was delayed for more than three months. Conservative treatment included all therapeutic modalities available as management of fluids, electrolytes, blood transfusions and antibiotics. Hemodialysis was done as a part of treatment when indicated after acute vascular access was obtained either subclavian or internal jugular vein route. Recovery from ARF was declared when renal functions returned to normal range. Partial recovery due to patchy cortical necrosis was suspected when renal functions showed improvement but did not return to normal even after 12 weeks. Cortical necrosis was diagnosed when patient remained anuric for > 3 weeks, renal ultrasound showed bilateral increased echogenicity with small size kidneys and scattered cortical calcification and the patient remained dialysis dependent.

Results

Demographic data as shown in Table 1 is total number of patients admitted during this period with ARF having different etiologies were 210. Ninety two (44%) were male and 118 (56%) were female. Out of these 210 patients, 40 (19%) patients with mean age 29 ± 4.5 years were pregnancy related ARF. Twenty two (55%) patients multi-para and 18 (45%) were primi-gravida. Six (15%) patients presented in 1st trimester, 6 (15%) in 2nd trimester and rest of 28 (70%) patients presented in 3rd trimester. Majority 32 (80%) patients had not received any antenatal care of which 24 (75%) deliveries were carried out at homes handed by Dai. Eight (20%) cases were residents of Lahore city and the remaining 32 (80%) were from Punjab village areas. Anuria was observed in 24 (60%) cases at the time of presentation and remaining cases had oliguria. Etiology and outcome of renal failure is shown in table 2 and 3 respectively. Septicemia was the commonest cause of acute renal failure in this study. Two cases of HELLP (hemolysis, elevated liver enzymes, and low platelets) were also seen. Thirty four (85%) patients received hemodialysis as part of treatment of acute renal failure. Complete recovery was occurred in 8 (20%) patients with normalization of renal functions, 18 (45%) has partial recovery whereas 14 (35%) patients did not show any recovery and developed acute cortical necrosis and remained on hemodialysis. Renal biopsy was performed in 10 cases. Overall 12 (30%) patients died.

Discussion

This is the first study from our province to highlight nephrological related acute obstetrical complication. The data presented in this study on pregnancy related ARF (19%) in one year period, is alarmingly high. Obstetrical ARF is now a very rare entity in the developed countries. Its incidence is less than 1:20000 of all gestations.² Stratta et al quoted the incidence of obstetrical ARF to decrease 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

Table 1: Demographic Data.

Sr. No.	Characteristics	Total (% age)
1.	Total No. of ARF cases	210
2.	Total No. of obstetrical ARF cases	40 (19%)
3.	Multipara	22 (55%)
4.	Primigravida	18 (45%)
5.	Mean age (year)	29 ± 4.5
6.	Received antenatal care	Yes 8 (20%) No 32 (80%)
7.	Presentation in 1 st trimester	6 (15%)
8.	Presentation in 2 nd trimester	6 (15%)
9.	Presentation in 3 rd trimester or in puerpeurem	28 (70%)

Table 2: Etiology of Pregnancy related Acute Renal failure.

Sr. No.	Causes	Total (% age)
1.	Ante partum hemorrhage (APH)	2 (5%)
2.	Postpartum hemorrhage (PPH)	6 (15%)
3.	Septic abortion	6 (15%)
4.	Puerperal sepsis	8 (20%)
5.	DIC	4 (10%)
6.	Intrauterine fetal death (IUD)	12 (30%)
7.	HELLPS	2 (5%)

Table 3: Outcome of Pregnancy related Acute Renal failure.

Sr. No.	Outcome	Total (% age)
1.	Complete recovery	8 (20%)
2.	Acute renal cortical necrosis (no recovery)	14 (35%)
3.	Patchy cortical necrosis (partial recovery)	18 (45%)
4.	Discharge from hospital	28(70%)
5.	Expired	12(30%)

was observed in last seven years.^{5,7} Situation in some of the developing countries like South Africa, India, and Turkey has shown improvement. In South Africa incidence of pregnancy induced ARF has declined from 25% in 1978 to less than 16% in 1992.²

One important feature of this study indicates that the pregnancy related ARF is more commonly seen in

patients who had not received any kind of antenatal care and their deliveries were carried out at home assisted by Dai without aseptic measure. Septicemia caused by septic abortion, puerperal sepsis was the major cause of ARF in our study, which was the leading cause of ARF in 3rd world country.^{2,3,9} It is rarely seen in industrialized nations. The incidence of septicemia is still very high in developing countries, in India it is about 61% as reported by Goplani et.al and 31% and 24% reported in Pakistan by Rafique et al and Akhtar et al respectively.^{2,3,10}

Data from Pakistan on pregnancy related ARF is limited, although this is a very big health related problem. There is no such data available from interior Punjab province to compare on this issue. This study reported 19% pregnancy related ARF with 30% mortality. In 1994 Naqvi et al reported 18% obstetrical ARF from Karachi city with 23% mortality and 26% morbidity which has the maximum healthcare facilities compare to the rest of the country.⁴ In Northern areas, obstetrical ARF was reported to be 7 – 10% of total ARF cases and mortality was 18%.³ These figures indicate very high incidence of pregnancy related ARF in Pakistan. If we compare our data with rest of the country it indicates an alarmingly high frequency of obstetrical ARF in Punjab Province. This indicates the failure of healthcare facilities especially antenatal care in the interior of Punjab province.

Conclusion

Acute renal failure is fairly common condition. Acute obstetrical renal failure represents 19% of our total ARF. Condition is very serious and carries a high mortality and morbidity if not treated in time. This indicates the importance of antenatal care in the prevention of pregnancy related ARF. The Industrialised Nations and some of the developing countries have achieved

these goals by liberalization of abortion laws, improved healthcare facilities and more effective measures of careful prevention.

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