

Acute renal failure in pregnancy: One year observational study at Liaquat University Hospital, Hyderabad

Muhammad Rafique Ansari, Muhammad Shahzad Laghari, Karim Bux Solangi
Department of Nephro-Urology, Liaquat University of Medical and Health Sciences Jamshoro/Hyderabad.

Abstract

Objective: To determine the incidence of pregnancy related acute renal failure (ARF), clinical spectrum, morbidity and mortality of this preventable complication of pregnancy.

Methods: An observational and prospective hospital based study was conducted at a tertiary care hospital in Hyderabad for one year from Nov.2004-Oct.2005. Total 116 patients of ARF were admitted in Nephro-Urology ward during this period of whom 42 were of obstetric related ARF and they were included in the study. A pre-designed proforma was used. The clinical history was noted and all underwent a physical examination. Urine output was recorded. Routine laboratory tests were performed and specialized tests as DTPA scan was done in some cases. The final outcome was recorded. The majority i.e. 31 patients were from village community of interior Sindh province and the remaining 11 were from Hyderabad city area.

Results: Pregnancy related ARF numbered 42 (36%) of which 28 (67%) were multipara and 14 (33%) were primigravida. Their ages were between 20 to 41 years. Majority 24 (57%) patients had not received any antenatal care and there was a history of traditional birth attendants TBA (Dai) assisted home delivery as compared to 6 (14%) cases with adequate antenatal care. Six (14%) cases presented in their first trimester of pregnancy while 36(86%) patients developed ARF in their 3rd. trimester or in the puerperium and 19 (45%) were anuric. Blood loss causing hypotension due to APH and PPH was the common cause of ARF. Clinical spectrum of pregnancy related ARF showed APH in 6 (14%) cases, PPH in 9 (24%) cases, septic abortion and puerperal sepsis and DIC in 13 (31%) cases, IUD in 6 (14%) and preeclampsia / eclampsia in 5 (12%) cases. Thirty (71%) patients received haemodialysis and 12 (29%) did not require dialysis. Commonest clinical diagnosis was ATN in 23 (55%) cases with complete recovery. Acute bilateral renal cortical necrosis was seen in 9 (21%) cases and 2 (5%) patients had patchy cortical necrosis. Overall morbidity was 19% and mortality 26%.

Conclusion: Pregnancy related acute renal failure is a major health problem especially in the villages of Sindh provinces and carries very high mortality and morbidity. Poor healthcare facilities and lack of antenatal healthcare clinics are major identified causes (JPMA 58:61;2008).

Introduction

Acute Renal Failure (ARF) may be defined as a sudden decrease in renal function which is usually reversible, over a period of several hours to days sufficient enough to result in retention of nitrogenous waste products (e.g. blood urea nitrogen [BUN] and creatinine) in the body. In pregnancy it can occur during antenatal or postnatal periods. Over last six decades several important causes of pregnancy induced ARF and its pathophysiological mechanisms have been described. The important causes of obstetric ARF are divided into (i) causes in early pregnancy which include septic abortion leading to septic shock and acute renal failure, the mortality is high if the causative organism was clostridium¹ (ii) Causes in late pregnancy i.e. after 34 weeks of gestation and immediate puerperium are Ante-partum haemorrhage (abruptio-placentae) (APH), postpartum haemorrhage (PPH), pre-eclampsia/eclampsia, haemolytic uraemic syndrome (HUS), puerperal sepsis and haemolysis, elevated liver enzymes, low platelets (HELLP

syndrome).¹⁻³ 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, HUS, severe eclampsia, and HELLP syndrome in which glomerular involvement is predominant.^{1,3} It is postulated that all these diseases are manifestations of thrombotic microangiopathy caused by endothelial injury, due to deficiency of NO-dependant endothelial relaxing factors.⁴ The prognosis of pregnancy induced HUS, HELLP syndrome and severe form of eclampsia is not good, most of the patients require chronic dialysis or survive with markedly reduced renal functions.^{1,3} Another bad prognostic lesion seen in obstetric induced ARF is acute bilateral renal cortical necrosis ABCN. It is rarely seen in industrialized nations.⁵ The incidence of cortical necrosis is still very high in developing countries, in India it is about 24% as reported by Parkash et.al⁶ and 13% reported in Pakistan by Ramzan et.al.⁷ It is frequently seen after ante-partum haemorrhage and prolonged retention of dead foetus.^{1,2,8} 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, and in some cases it may progress to end stage renal failure few years later.⁵ Acute renal failure is one of the most serious complications of pregnancy. ARF that is severe enough to require dialysis is quite rare in industrialized nations, its incidence is 1:20000 or less of all gestations.^{1,3} These statistics show significant improvement as compared to the situation in 1950s and 1960s when as many as 22% of all cases of acute renal failure were of obstetrical origin with mortality rate ranging from 20% to 48%.⁹ This achievement in industrialized nations is most likely due to liberalization of abortion laws, improved pre-natal care and better management of maternal complications potentially leading to ARF.² The incidence of obstetrics related ARF in developing countries like Pakistan has not changed significantly. There is no such local data available in the past to compare with. Only few scanty available articles which showed pregnancy related ARF 7-10%.¹⁰ Mortality in Obstetric ARF depends on underlying renal lesion and associated complications. It is high when associated with HELLP syndrome, severe PET, acute fatty liver of pregnancy, HUS, sepsis, DIC and cortical necrosis. Recovery from ATN is good. The overall mortality is between 18-23%.^{5,6}

The aim of this study was to highlight the magnitude of the problem leading to high mortality and morbidity. Pregnancy related acute renal failure is a challenging health problem of Pakistani women especially of rural areas. Therefore effective measures are needed to prevent this preventable complication of pregnancy.

Patients and Methods

It was an observation based study, conducted in the Department of Nephro-Urology, Liaquat Medical University Hospital Hyderabad from November 2004-October 2005. During this period 116 patients suffering from acute renal failure were admitted in Nephro-Urology ward. Out of these, 42 patients were pregnancy induced ARF and were referred from obstetrical ward of the hospital. All these women were previously healthy and were shifted to nephrology ward when they developed deranged renal functions. Some of the patients were referred from other hospitals of interior Sindh province and Hyderabad city. All patients suffering from pregnancy related ARF were enrolled in the study. Their clinical history, physical examination and intake/ urine output was recorded in a separate sketched Performa. Routine laboratory investigations were done related to each case and specialized investigations like DTPA renal scan, renal ultrasonography and renal biopsies were performed in

selected cases where recovery was delayed for more than 3 weeks. Conservative treatment included all therapeutics modalities available as management of fluids, electrolytes, blood transfusion and antibiotics. Haemodialysis was done as a part treatment when indicated. Recovery from ARF was declared when renal function 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 and DTPA renal scan showed very poor bilateral renal perfusion, renal ultrasound showed bilateral increased echogenicity with small size kidneys and scattered renal cortical calcification and the patient remained dialysis dependent. Renal angiography, a gold standard technique for diagnosis of cortical necrosis, could not be done due to lack of facility.

Results

During the period November 2004 till October 2005 total 116 cases of acute renal failure with different etiologies were admitted in LUMHS. The ages of the patients were between 20 and 41 years with a median of age 28 years. Out of these 116 patients 42 (36%) were of Obstetric related ARF, 24 (57%) multipara and 18 (43%) were primigravida. Acute renal failure occurred in 6 (14%) cases in early part of their pregnancy (1st trimester) where as in 36 (86%) cases in later period of pregnancy i.e. 3rd trimester and puerperium. There were 12 (29%) patients who had undergone major surgical procedures like C-section or Caesarian hysterectomy whereas 30 (71%) had vaginal deliveries. Majority 24 (57%) patients had not received any antenatal care at any stage of their pregnancy and had undergone traditional birth attendant (Dai) assisted home delivery, 12 (28%) patients had delivered in the hospitals but without antenatal care and 6 (14%) patients received some sort of antenatal care and their deliveries were carried out in the hospitals (figure1). Eleven (26%) cases were

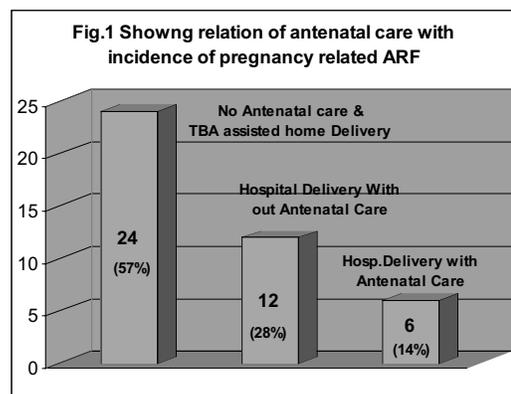


Figure 1. Showing relation of antenatal care with incidence of pregnancy related ARF.

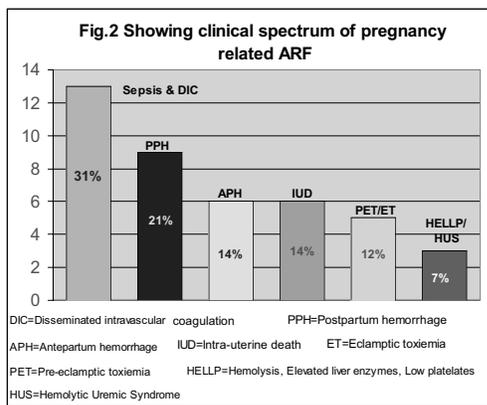


Figure 2. Clinical spectrum of pregnancy related ARF.

Table. Outcome of pregnancy related Acute Renal Failure (n=42).

Complete Recovery of renal functions (ATN & pre-renal azotemia)	23 (55%)
Partial Recovery of renal functions (Mild to Moderate Renal Insufficiency)	03 (7%)
No Recovery (Irreversible Bilateral Cortical Necrosis)	06 (14%)
Total No. of patients died	10 (24%)

residents of Hyderabad city and the remaining 31 (74%) were from interior of Sindh province (village community). Anuria was observed in 19 (45%) cases, remaining 23 (55%) cases presented with decreased urinary volume or oliguria. The spectrum of pregnancy related acute renal failure is shown in Figure 2. Blood loss due to PPH and APH causing hypotension was the commonest cause of acute renal failure in this study. Septicaemia and disseminated intravascular coagulation, intrauterine foetal death (IUD), Preeclampsia/ eclampsia were also the common causes in order of frequency. Two cases of HELLP (haemolysis, elevated liver enzymes, and low platelets) complicating severe form of eclampsia were also seen. One case of postpartum haemolytic syndrome (HUS) was also diagnosed. The commonest clinical diagnosis was acute tubular necrosis (ATN) in 23 (55%) cases. Haemodialysis was done in 30 (71%) patients as a part of treatment for acute renal failure. Out of 42 patients, 12 (29%) were not dialysed and 7 recovered normal renal function with conservative treatment, five of them were in shock or the family refused dialysis. Complete recovery was observed in 23 (55%) patients of the 42 pregnancy related ARF, 11 (26%) developed irreversible renal failure, whereas 9 (24%) developed bilateral cortical necrosis due to APH, sepsis and DIC. Percutaneous kidney biopsy was done in 4 cases which showed diffuse glomerular capillary necrosis and tubular necrotic changes in 3 specimens (acute cortical necrosis) and one biopsy report showed patchy cortical

necrosis. Five of them are now on maintenance haemodialysis, 3 died and one patient received a live unrelated renal transplant. Two patients developed chronic kidney disease and were on conservative treatment with creatinine clearance between 18-35ml/min. Overall 10 (24%) patients died (Table). Septicaemia with multi-organ failure, pulmonary oedema and hyperkalaemia were the common causes of mortality.

Discussion

The data presented in this study on pregnancy related ARF (36%) 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.^{1,3} 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 was observed in last seven years.¹¹ The reported data from various studies of the country showed very high incidence of mortality (18% to 23%) and morbidity (13% to 26%) related to obstetrical ARF.^{10,15} 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 1992.¹² Chugh et al from India also reported a declining incidence from 22% in 1965-1974 to 9% in 1981-1986.¹³ In Turkey the situation has also improved at a slower pace from 17% in early 80s to 13% in 1997.¹⁴ One striking feature of this study indicated 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 by TBA without aseptic measures. Also in women delivered in hospitals not having received antenatal care were more prone to develop ARF (14%). This indicates the importance of antenatal care in the prevention of pregnancy related ARF. The Industrialized 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.

Data from Pakistan on pregnancy related ARF is scanty, although this is a very big health related problem. There is no such data available from interior Sindh province region to compare on this issue. In 1994 Naqvi et al reported 18% obstetrical ARF from Karachi city with 23% mortality and 26% morbidity¹⁶ which has the maximum healthcare facilities compared to the rest of the country. In Northern areas, obstetrical ARF was reported to be 7-10% of total ARF cases and mortality was 18%.¹⁰ 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 Sindh

province. This indicates the failure of healthcare facilities especially antenatal care in the interior of Sindh province.

Conclusion

Our study shows that pregnancy related ARF is one of the most common causes of ARF, which is now a rare entity in developed countries. It is a dangerous complication of pregnancy which carries very high mortality and morbidity. This calls for an improvement in the existing healthcare facilities and public awareness programmes and better care in the public sector hospitals.

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