Original Articles

Pregnancy Related Acute Renal Failure in a Tertiary Care Hospital in Bangladesh

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Abstract:

Background: Pregnancy related acute renal (PRARF)failure is more commom in deverloping countries than developed country. Improved antenatal care and obstretic care reduce PRARF in developed country. In Bangladesh maternal mortality rate is 3.8/1000 population of which 25% account foracute renal failure. We try to find out cause, risk factor and out come of pregnancy related acute renal failure.

Materials and Methods: A prospective obsevational study was done to observe the status of ARF in pregnancy inNephrology Department of Dhaka Medical College during 2007-2008. All patients were undergone detail histoty, clinical examination and investigation and follow up during hospital stay. Data recorded in predesigned case record form., Statistical analysis was done with SPSS soft ware 12.5 pakage. All data presented as mean or percentage. The Chi square test or Fisher's exact test was used to compare differences in the frequency of clinical manifestations among cases. P value <0.05 count as significant.

Results: Among 57 women, the mean age was 27±6.6 years range from 17-43 years.Sixty seven percent were multrigravidae, 51%(29) was on irregular antenatal care, and 67% below primary level of education. Renal failure occur mainly in 3rd trimester of pregnancy (31.4±7.4 weeks). Common presentation is with generalized swelling (51%)and oligouria (52%) with reduce haemoglobin and leucocytosis. The mean creatinine was 6.7±3mg/dl in this series. Lower uterine caeserian section (LUCS) done in 23% cases. 56.1% had severe renal failure and 47% patients required dialysis. Complete recovery was seen in 63%cases while, 31% died and 6% patient have incomplete recovery with persistent dialysis dependent status. Septicaemia (43%) and eclampsia (19%) were the main cause of PRARF, others causes were PPH, APH, ruptured ectopic pregnancy. In 3% patients, actual cause was not identified. Poor antenatal care(p-0.027), severity of renal failure(p-0.066), patient requiring dialysis(p-0.025), LUCS(0.028), septicaemia(p-0.026) and low level of education(0.036) have significant effect on outcome.

Conclusion: Pregnancy related acute renal failure is common with inceased mortality in our study due to poor antenatal care, low level of education and multiple pregnancy. Improve obstretical care and Nephrological care may reduce Pregnancy related acute renal failure and mortality.

Introduction:

Pregnancy related acute renal failure is the important cause of maternal mortality. In developing country it is more common than developed countries as a result of improved antenatal care and obstetric practice.[1] In Bangladesh maternal mortality rate is about 3.8/1000 population.[2] of which 25% is account for acute renal failure[3]. In healthy pregnancy marked changes occurs in physiology and anatomy of renal system. Renal blood flow increases upto 70%,GFR increases 50%, blood pressure and creatinine fall.[4,5] More over pregnancy related hypertension, eclampsia are important complicating factors during pregnancy. Even normal level of creatinine is regarded as renal failure during pregnancy. Pregnancy related acute renal failure is about 20% of totalAcute Renal failure(ARF) with 50% mortality in india. [6] Pre-eclampsia and eclampsia is the most common cause(14.5-23%) of of ARF related to pregnancy.[6] Other causes are septic abortion, antepartum and postpartum haemorrhage, ischemic acute tubular necrosis, acute fatty liver of pregnancy, puerperal sepsis and thrombotic microangiopathies and pyelonephritis.[7] Improved antenatal care and obstetric practices in developed countries markedly

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reduced pregnancy related acute renal failure in last 50 years.[3] Acute renal failure related to pregnancy is about 5% and 1/ 10000 of all pregnancy in developed countries.[3] Although in Bangladesh as well as in other developing country it is declining but still it remains high and leading to increase maternal mortality. Data from eastern India, 11.6% of acute renal failure patient recurring dialysis were due to pregnancyrelated. [8] This increased in acute renal failure is due to poor antenatal, postnatal and obstetrical care. Proper identification of causes and risk factors of pregnancy related acute renal failure may help to prevent pregnancy related ARF and thus reduce maternal mortality.

Materials and Methods:

This was a Prospective observational study done in Nephrology department of Dhaka medical college during 2007-2008. Study population included all pregnancy related acute renal failure patients admitted or consulted by Nephrology department after excluding chronic kidney disease or pre-existing renal disease and SLE. Informed written consent was taken from enrolled patients. Patients were carefully observed and pertinent clinical and laboratory data recorded daily on a standard form. All patients underwent detailed history and examination and laboratory investigations of routine urine examination, blood urea, seum creatinine, ultrasonography, complete blood count, liver function test was done. All patients was followed up daily during hospital stay and every fifteen day intervail for at lest three months who fail to recover completely. All test were done in Dhaka Medical College laboratory and ultrsonography was done in radiology department. Creatinine reacts with Alkaline picrate proceding an orange red complex. The speed of absorbence change is proportional to the creatinine concentration. This test were done by Hitachi 912 (Germany) and reagents were also supplied by Hitachi.

The outcome measurement were seen as Death, complete recovery and incomplete recovery.

ARF was diagnosed on basis of clinical and laboratory findings. Sudden oliguria (urine less than 400 ml in 24 hrs) or anuria or serum creatinine increased above 1.5mg/dl was defined as ARF

Complete recovery was defined as renal function (s. creatinine) returning to normal. Whereas, partial improvement was defined when serum Creatinine decreased below 2 mg/ dl and patient was not dialysis dependent.

Irreversible renal failure was defined when the patient remained dialysis dependent after 3 months of enrollment.

Acute tubular necrosis (ATN) was suspected with history of hypovolemia, APH, PPH, abruption placentae, hypotension and transfusion reaction with increased creatinine value(>2mg/dl).

Sepsis was diagnosed in presence of fever > 38.5 C, respiratory rate >20/min, pulse rate>90/min, WBC counts > 12000 cells/mL ± DIC, positive blood cultures, retained products of conception and/ or organ hypoperfusion.

Preeclampsia was diagnosed if hypertension and proteinuria occurred after 20 weeks of gestation, progressing to eclampsia when seizures occurred.

Indications for dialysis were volume overload, hyperkalemia, metabolic acidosis, uremic encephalopathy, severe uremia.

Data was recorded in predesigned case record form. Data analysis were done using SPSS version 12.5 chicago illianois. All parameter are presented as mean ± SD or percentage. Chi-square test applied for compares between groups and p value <.05 count as significant.

Results:

During the period of 2007-2008, 57 women with pregnancy related acute renal failure were observed with mean age 27±6.6 years and range from 17-43 years. Most of the patient were on irregular antenatal care 51%(29), and 67% were multrigravidae. Acute renal failure occur mainly in 3rd trimester of pregnancy with mean age of gestation was 31.4±7.4 weeks. 67% of patients were below primary level of education. Table-I shows baseline characteristics of population.

**Table-I**
Base line characteristic of study population

		Mean ± SD (range) / percentage(n)
Age (years)		27.6± 6.6 (17-43)
Antenatal care	Regular	23%(13)
	Irregular	51%(29)
	No	26%(15)
Number of pregnancy	Primi	33%(19)
	Multrigravidae	67%(38)
Duration of pregnancy	1st trimester	14%(8)
	2nd trimester	9%(5)
	3rd trimister	77%(44)
	Weeks of pregnancy	31.4±10.3
Education	Below primary	53%(30)
	Below HSC	41%
	Above HSC	6%

51% patient presented with generalized swelling, oligouria 52% with reduce haemoglobin, leucocytosis and mean creatinine was 6.7±3mg/dl. Table-II shows clinical and laboratory report of patients.

Table -II
Clinical and laboratory report of patients

	Mean ± SD / Percentage (n)
Oedema	91%(52)
Oligouria	89% (51)
Jaundice	49%(28)
Anaemia	82%(47)
Shock	26%(15)
Haemoglobin (gm/dl)	7.7±1.5
Thrombocytopenia <150000/cmm	65%(37)
Leucocytosis >11000/cmm	77.2%(44)
Creatinine mg/dl	6.7±3.0
Blood urea mg/dl	155±79.9
Serum bilirubin mg/dl	3.0±3.5
Hyperkalemia	47%(27)
Hyponatremia	26%(15)
Hypokaelemia	19%(11)

Most of the patients delivered by LUCS (23%) with 56.1% had severe renal failure and 47% patients required dialysis, 53% patient treated conservatively. Outcome of the patients were variable with complete recovery in 63% cases and 31% died while 6% patient have incomplete recovery and dialysis dependency. (Fig:1)

☐ Complete recovery
☐ Incomplete reocvery
☐ Death
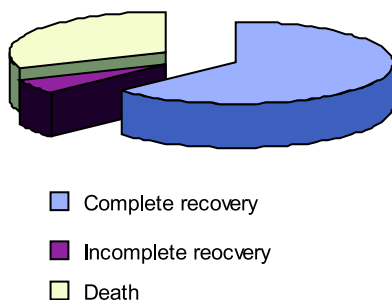
Fig.-1: *Pie chart outcome of pregnancy related Acute renal failure*
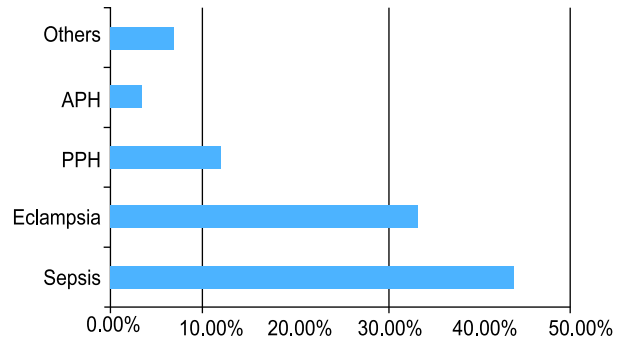
Fig.-2: *Bar diagram of aetiology of pregnancy related acute renal failure*

Among causes of pregnancy related acute renal failure, septicaemia (43%) and eclampsia (19%) were most common. others causes are PPH, APH, rupture ectopic pregnancy. In 3% patients despite all attempt aetiology could not be identified. (Fig -2).

Table III
Outcome of PARF

	Test value	Significant
Irregular or no antenatal care	9.283	0.027
Severe renal failure Creatinine >6gm/dl	3.156	0.066
Sepsis	4.985	0.026
LUCS	9.208	0.028
Dialysis	4.967	0.025
Below primary education	5.065	0.036

Inappropriate antenatal care(p-0.027), severity of renal failure(p-0.066), patient requiring dialysis(p-0.025), LUCS(0.028), septicaemia(p-0.026) and low level of education(0.036) have significant effect on poor outcome. (Table-III)

Discussions:

During the period 2007-2008 in nephrology department, Dhaka medical college, 57 pregnancies related acute renal failure were observed out of 265 acute renal failures. This 21.6% of PR-ARF was strikingly high with 31% mortality in compared to developed countries where PR-ARF is about 1-2.8% up to 10% with less than 5% mortality.[9,10,11] The review identified that PR-ARF in developing country is higher than developed countries. PR-ARF in India is 4.3% - 9.06% with mortality of 18.5-24% and in Pakistan, pregnancy related acute renal failure is 14-36% and mortality20- 48%.[9,10,12,13,14] Our finding of PR-ARF and mortality is consistent with the findings in Pakistan and India.

Mean age in this study were 27.6±6.6 years who develop PRARF. Others studies also observed mean age of PRARF about 28 years. [10,14] Most of the ARF occur during 3rd trimester (77%) with mean gestational age 31.4 ±10.3 weeks. Multipara women were more prone to develop ARF (67%) than primigravida (33%). This findings are also similar to other studies. [10] indicating homogenisity of observation. Most common presentation of PR-ARF is oliguria (51%) and oedema(52%). Other presentation was shock, anaemia, respiratory distress, nausea and vomiting. Mean Haemoglobin level were 7.7 ±1.5 gm/dl and Creatinine level was 6.7±3 gm/dl. One Study by Qurban Ali et all showed most common presentation was nausea, vomiting, oligourea or anuria, oedema and respiratory distress.[14] Sepsis(43.9%) is the most common cause of acute renal failure next to Eclampsia(33.3%), Other causes are PPH, APH and others. Studies done in India and Pakistan showed sepsis is the most common causewhile rest were haemorrhage, Eclampsis and others.[10,14]

In this study 63% recovered completely, 5% had incomplete recovery and 31% died. Naureen et al found in their study 33.3% died, 49% complete recovery and 3.9% partial recovery which is similar to present study.[13] This high mortality is probably due to poor antenatal care, low level of education, severity of renal failure and others. Outcome of PRARF depend upon several risk factors. Among the risk factors for poor outcome inappropriate antenatal care(p-0.027), severity of renal failure(p-0.066), patient requiring dialysis(p-0.025), LUCS(0.028), septicaemia(p-0.026) and low level of education(0.036) have significant effect. Other studies also showed poor ante- natal care, severity of renal failure, LUCS, infection is responsible for poor maternal outcome(14,15). Improvement of pregnancy care, legalisation of abortion, appropriate medical and Nephrological care can significantly reduce pregnancy related acute renal failure and mortality.

Conclusion:
Pregnancy related acute renal failure is high in our study with high mortality while in developed countries it is very low PRARF and mortality. Improvement of pregnancy care, increase education level and early and appropriate Nephrological care may reduce PRARF and mortality.

Conflict of Interest: None

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