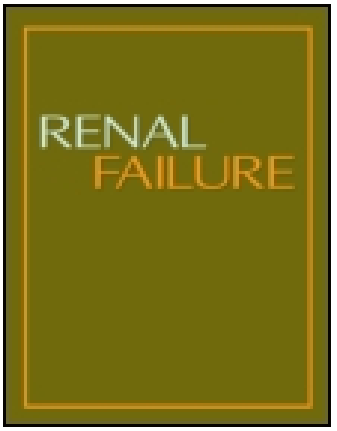

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Hemodialysis in the Treatment of Acute Renal Failure in Tropical Africa: A 20-Year Review at the Korle Bu Teaching Hospital, Accra

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Hemodialysis in the Treatment of Acute Renal Failure in Tropical Africa: A 20-Year Review at the Korle Bu Teaching Hospital, Accra

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ABSTRACT

From 1972 to 1992, 170 patients with acute renal failure (87 M, 83 F; mean age 32.51 ± SE 0.945) underwent hemodialysis at the renal unit of the Korle Bu Teaching Hospital, Accra. Vascular access was established initially by arteriovenous shunt (133 cases), femoral venous cannulation (10 cases), and subclavian vein cannulation (27 cases). The overall mortality for acute renal failure (ARF) was 31.8% (54/170). The mortality for obstetric cases was 43.7% (14/32); for surgical cases, 33.3% (6/18); medical cases, 28.3% (13/32); and gynecologic (posthysterectomy) cases, 28.3% (2/7). The most important causes of death in ARF were pulmonary edema (42%), sepsis (20%), and cardiac tamponade (10.4%). Hemodialysis is now established as a form of treatment for ARF and a overall survival rate of 68.2% justifies the development of our program. With improvement of economies of developing countries and health insurance schemes, this form of treatment should be available in all developing countries.

INTRODUCTION

Hutt et al. (1) commented in their paper on renal failure in the tropics that recent advances in the treatment of renal failure have highlighted the gulf between what is scientifically possible and what is economically practicable in developing countries. In

Tropical Africa it seems reasonable that scarce skills and resources in this field should be directed to the treatment of acute reversible renal failure. Nevertheless, the availability of dialysis makes it increasingly difficult to avoid involvement in the care of patients suffering from end-stage renal disease (ESRD). In Ghana a hemodialysis program was established in 1972 with the aim of improving the treatment of renal failure (2). We review our experience of the management of acute renal failure in our hemodialysis unit.

MATERIALS AND METHODS

The clinical records—including laboratory and dialysis data and operating notes, and postmorten reports—of all cases of ARF treated by hemodialysis between April 1972 and March 1992 were reviewed. The causes of acute renal failure were established by the history, physical examination, radiographic and ultrasonographic examinations, and laboratory data. Acute tubular necrosis was diagnosed by history of presence of progressive uremia, usually but not always with oliguria or anuria, and a failure to respond to rehydration plus mannitol when given (3). The detection of anuria in a gynecologic setting following abdominal hysterectomy suggested acute renal failure (ARF) due to obstructive uropathy. The detection of proteinuria, hematuria, and urinary casts suggested glomerulonephritis. Renal size and anatomy, and the presence of obstruction were defined initially by intravenous urography and subsequently by ultrasonography.

Hemodialysis was performed using a Travenol RSP machine with UF100 coils initially, and later on we used the Asahi hollow-fiber filter. Vascular access for ARF was initially by a Quinton–Scribner shunt, in either the nondominant hand or leg (4), and later by a double lumen catheter via the subclavian or femoral vein.

Table 1

Age and Sex Distribution of Dialysed Patients with Acute Renal Failure

	Sex			
Age (years)	Male	Female	Total	%
0–9	—	—	—	—
10–19	10 (43.5)	13 (56.5)	23	13.5
20–29	21 (42.9)	28 (57.1)	49	28.8
30–39	30 (50.00)	30 (50.00)	60	35.3
40–49	11 (57.9)	8 (42.1)	19	11.2
50–59	10 (76.9)	3 (23.1)	13	7.6
60–69	5 (83.3)	1 (16.7)	6	3.5
70–79	1	—	1	0.6
Total	87	83	170	—

Table 2

Causes of Acute Renal Failure: 1972–1992

Initiating Disorder	Number	Mean Age
Medical causes	113	38.468
Obstetric causes	32	27.92
Surgical causes	18	47.5
Gynecologic causes	7	38.5
Total number of cases	170	

RESULTS

In the period of study from April 1972 to March 1992, 170 patients (87 males, 83 female; mean age 32.51 ± SE 0.945) with severe acute renal failure were referred to our unit. The age distribution in these patients is summarized in Table 1. The majority of patients, 109 (64.1%) were aged between 20 and 40 years. The causes of ARF are shown in Table 2. Of the 170 ARF patients, 113 (66.47%) were due to medical conditions, 32 (18.8%) had ARF associated with obstetric complications, 7 cases (4.11%) were due to gynecologic complications, and 18 (10.58%) were due to surgical conditions.

Etiologic Factors of ARF

The major causes of obstetric ARF were septic abortion 7.6% (13/170) and toxemia of pregnancy 5.9% (10/170) (Table 3). Seven patients developed ARF following a hysterectomy. The major medical causes of ARF were hemolysis and infection in 41 patients (24.1%); septicemia in 17 patients (10%), and intravascular hemolysis and malaria falciparum in 15 patients (8.8%) (Table 4, A and B). In 11 cases (6.5%) the cause of ARF was obscure. In surgical patients the main causes of ARF were obstructive uropathy in 8 patients (4.7%) and hemorrhage following road traffic accidents in 7 patients (4.1%) (Table 5).

Table 3

Acute Renal Failure in Obstetric and Gynecological Patients, N = 32 (18.8%)

Disorder	Number
Septic abortion	13
Toxemia of pregnancy	10
Postpartum hemorrhage	5
Antepartum hemorrhage	2
Postcesarian section hemorrhage	2
Ligated ureters following total abdominal hysterectomy	7

Table 4

Acute Renal Failure in 113 Medical Patients

Disorder	Number
A. Medical Causes	
Hemolysis	64
Septicemia	17
Obscure	11
Proven typhoid fever	7
Acute glomerulonephritis	5
Diabetes mellitus	2
Mismatched transfusion	2
Acute intermittent porphra	1
Bilateral pyelonephritis	1
Cholera related	1
Lysol ingestion	1
Myeloma kidney	1
B. Hemolytic Causes	
Hemolysis and infection	41
Hemolysis and malaria falciparum	15
Hemolysis due to naphthalene balls	5
Hemolysis due to herbs	3
Total hemolytic causes	64

Table 5

Acute Renal Failure in Surgical Patients, N = 18 (10.6%)

Disorder	Number
Obstructive uropathy, including 1 carcinoma prostate and 2 cases of schistosomal ureteric obstruction	8
Hemorrhage from road traffic accident	7
Acute pancreatitis	1
Peritonitis	1
Postappendicectomy	1

Table 6

Outcome of Patients with Acute Renal Failure: 1972–1992

Initiating Disorder	Number	Mortality (%)
Medical causes	113	32 (28.3)
Obstetric causes	32	14 (43.75)
Surgical causes	18	6 (33.3)
Gynecologic causes	7	2 (28.3)
Total number of cases	170	

Mortality

The overall mortality was 31.8%. Table 6 shows the mortality by cause of ARF. The patients with medical and gynecologic causes of ARF had the best survival rates, 71.7% (81/113) and 71.7% (5/7), respectively, while the obstetric cases had the worse survival rate, 56.3% (18/32), followed by the surgical cases, 66.7% (12/18).

Postmortem Findings

Autopsies were performed in 48% of cases and the findings are shown in Table 7. The commonest finding at autopsy was pulmonary edema, in 20 cases (41/66%). Cardiac tamponade was found in 5 cases (10.41%) and pneumonia in 10 cases (20.83%).

Table 7

Postmortem Findings in 48 Patients

Disorder	Number	Percentage
Pulmonary edema	20	41.66
Pneumonia	10	20.83
Cardiac tamponade	5	10.41
Hemorrhage	5	10.41
Carcinoma prostate	2	4.16
Ligated ureters	2	4.16
Carcinoma stomach	1	2.08
Gangrenous bowel	1	2.08
Perforated bowel	1	2.08
Splenic abscess	1	2.08

DISCUSSION

In 1976 Adu et al. (2), in this unit, commented on the high incidence of massive intravascular hemolysis as the commonest cause of acute renal failure in this country. Almost 20 years later massive intravascular hemolysis continues to contribute as the commonest cause of ARF in medical conditions in this country. In this study 41 out of 113 (i.e., 36.28%) medical causes of AFR were due to hemolysis and infection, and 15 out of 113 (i.e., 13.27%) medical causes were due to proven falciparum malaria and hemolysis. Seven of these proven malaria cases occurred in Europeans who had recently become residents in the tropical environment and had not been on antimalarial prophylaxis (this is being reported elsewhere). The need for expatriates to take antimalarial prophylaxis has been stressed in the above report. The role of glucose-6-phosphate dehydrogenase deficiency has already been highlighted in previous reports (5,6). The role of bilateral ureteric ligation in causation of acute anuric renal failure in Ghana has also been reported elsewhere (7). In a review of 577 cases of ARF in India, 63% were secondary to medical diseases, mostly gastrointestinal infections, 23% complicated obstetric gynecological disorders, and only 14% followed surgery (8–10). In reports from Asia, Africa, and other parts of India, the findings were similar and markedly different from those published from North America and Europe, where surgical complications were causative factors in 50% of cases that needed dialysis (11–13).

The actual incidence of acute renal failure requiring dialysis in Ghana and most parts of West Africa is unknown. Figure 1 shows the number of cases seen over the years in Accra. These figures underestimate the renal numbers as many patients do not have access to medical care or use traditional healers, and severe cases are likely to die. It is also known that for every patient with acute renal failure who requires dialysis, 10–12 patients with milder forms of renal insufficiency are manageable by conservative measures (14). Our patients all presented as severe uremic emergency needing urgent dialysis.

Table 6 illustrates the outcome and mean age of patients with acute renal failure from period 1972–1992. Figure 2 shows the overall mortality. The highest mortality was found in

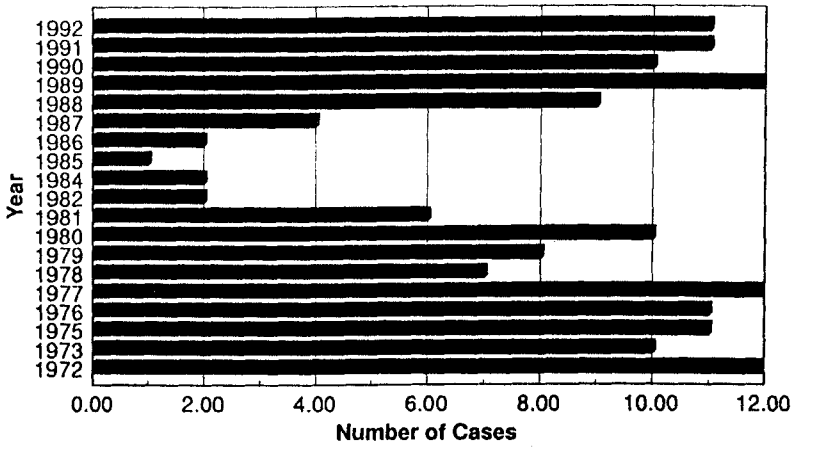

Figure 1. The number of acute renal failure cases requiring dialysis seen over a 20-year period in Accra.

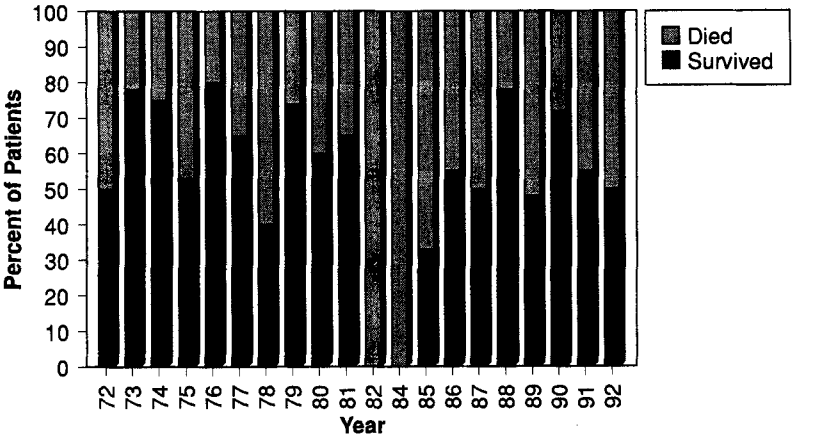

Figure 2. The overall mortality of patients with acute renal failure from 1972 to 1992.

the obstetric group: 43.75%, with a mean age of 27.92 years. This was disturbing since the survival in obstetric ARF has improved in Europe (15,16). This high mortality we attribute to septic abortion and toxemia of pregnancy, and the delay in seeking medical help in this part of the world.

The commonest finding at autopsy was pulmonary edema resulting from cardiac failure followed by pneumonia. In a series of 2000 reported patients dialyzed for acute renal failure, infections were the commonest cause of death in almost all reports (17) and this was complicated by progressive organ failure. Cardiac diseases form the next common cause of death occurring in developed countries, with acute myocardial infarction or irreversible cardiac failure in the old patient with degenerative vascular disease. The cause of high incidence of pulmonary edema in our cases is unknown but may be related to excess fluid administration by referral hospitals or severe septicemia.

Achievements of different countries in treating ESRD and acute renal failure by dialysis are related to their economic productivity. In a World Bank report (18), none of the countries with per capita GNP of $400 or less had facilities for chronic maintenance dialysis. It is also noted that more than half of the world's population lives in countries where economic productivity is below this level and there is every reason to believe that the incidence of both ESRD and, probably, acute renal failure is high. At present it seems unlikely that most countries in the Tropics can afford a comprehensive chronic program. However, the results of our study justify the recommendation that acute dialysis facilities should be developed in Tropical countries since acute renal failure is a common problem in all these countries, with an overall survival rate of 68%.

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