Acute Renal Failure (ARF) in Thailand Retrospective Analysis in a Medical Center

SUCHATI INDRAPRASIT, M.D.*,
AMPHORN SAKULSAENGPRAPHA, M.D.

Abstract

The changing trend of today's ARF in Thailand had led to requirement of epidemiologic data for management and planning. Retrospective review of adult inpatient records for 5 years of Ramathibodi Hospital was performed. Normal initial serum creatinine rising to double its value within one week and/or oliguria were the inclusion criteria. Data from another 3 university hospitals were used for comparison. AFR is the second most common renal disease at Ramathibodi Hospital with sepsis as the major underlying etiology. Among 396 cases of ARF, 194 were non-oliguric, 150 oliguric and 52 anuric. Non-oliguric cases needed lesser dialysis and had lower mortality. The number of AFR patients from 4 university hospitals varied from 0.14 to 0.18 per cent of hospital admission. If we consider the incidence of AFR in general hospital admission to be 0.1 per cent and the average hospital admission/year of Thailand was 3.25 million, there will be 3,250 cases/year or 55 cases/million/population year. If 4 dialyses/case was considered, 220 dialyses/year/million population was required. We suggested that the hospitals of the province with population above 1 million should have a hemodialysis unit for both their local service and referral cases and all provincial hospitals should develop at least a peritoneal dialysis facility for increasing cases in ARF.

The changing trend of renal diseases in Thailand has led to requirement of epidemiology data for management planning. The evidence of increasing prevalence of renal diseases was the national mortality report in 1991-1992 showing that renal disease had become the eighth common cause of death although it has never appeared in the top ten list before[1]. Statistical data from Ramathibodi Hospital also had renal disease as the sixth cause of death and ARF was the second common renal disease admitted to the hospital. In tropical countries, although intravascular hemolysis from mismatched blood transfusion has decreased because of better blood bank facilities, infectious diseases such as malaria, leptospirosis still cause ARF, whereas, nephrotoxic agents, e.g. aminoglycoside, nonsteroidal antiinflammatory drugs and radio contrast media have played a leading role in medical cases and ARF as part of multiple organ failure seems to be common in western tertiary care medical centers[2]. The only report of ARF in Thailand from Chulalongkorn Hospital in 1975 showed the percentage of medical, obstretric and surgical cases[3]. Since ARF is a treatable condi-

* Department of Medicine, Faculty of Medicine, Thammasat University, Pathum Thani 12121, Thailand.

tion provided that the primary precipitating cause can be eliminated, national statistics on ARF are urgently needed and analysed cases at medical centers may be used to speculate the trend of the country. This report was a retrospective review of 5 year ARF patients at Ramathibodi Hospital showing clinical characteristics and management results. Comparison of data from other medical centers in Thailand for prediction of the national ARF incidence and dialysis work load was also performed.

MATERIAL AND METHOD

A retrospective review of adult (age>14) inpatient records for 5 years (1989-1993) at Ramathibodi Hospital was performed. ICD_9 Code 584 (ARF) and Code 586 (renal failure, unspecified) were used for retrieving the records. 495 from 558 medical records (89%) were available for review. Normal initial serum creatinine (<1.5 mg/dl) rising to double value within a week and/or oliguria (<400 ml/day) was the inclusion criteria. 99 records were excluded and 396 were tabulated for age, sex, type of ARF (prerenal, acute tubular necrosis (ATN) ischemic, ATN nephrotoxic, acute interstitial nephritis, glomerulonephritis and obstruction), main underlying diseases, urinary output (anuria, oliguria, non-oliguria), duration of ARF management (conservative or dialysis) and outcome. Data from Siriraj, Chiang Mai and Srinakarin Hospitals were kindly supplied for comparison of the incidence of ARF.

RESULTS

ARF is the second most common renal disease at Ramathibodi Hospital (18% *vs* chronic renal failure 39%). 396 ARF analysed weres 219 males and 177 females with the average age of 50.6 years. Types of ARF based on clinical findings are shown in Table 1. The majority of ARF was ATN (79%) followed by obstruction group which consisted mainly of malignancy (carcinoma of the cervix 25, carcinoma of the bladder, prostate and colon 10) and mechanical obstruction (stone 8 others 2). Glomerular lesions, mainly rapidly progressive glomerulonephrits from systemic lupus erythematosus were confirmed by renal biopsy. Underlying diseases causing prerenal included volume depletion 5 cases, associated with malignancy 4 cases, sepsis 3 cases, heart failure 1 case and other diseases 3 cases. Acute interstitial nephritis was diagnosed by exclusion of causes of ARF together with underlying diseases which were previously reported to be assoclated with this lesion (leptospirosis in 5, systemic infection in 2, tuberculosis in 1 and 1 case of non-steroidal antiinflammatory drug). Underlying etiology of ATN is demonstrated in Table 2. Sepsis, diagnosed according to the American College of Chest Physicians/ Society of Critical Care Medicine Concensus Conference criteria[4], was the most common etiology (52%) followed by volume depletion, hepato-renal and decreased cardiac output. These 4 etiologies sometimes happened together but only predominate etiology was counted.

Table 1. Type of ARF at Ramathibodi Hospital.

	N	%
Pre-renal	16	4
ATN - ischemic	289	73
- Nephrotoxic	23	6
Interstitial nephritis	9	2
Glomerulonephritis	19	5
Obstruction	40	10
	396	100

Table 2. Underlying condition of ATN.

	N	%
Volume depletion	42	13.5
Decreased cardiac output	20	6.4
Sepsis	165	52.8
Hepato-renal	24	7.7
Multiple myeloma	5	1.6
Drug	10	3.2
Toxin	5	1.6
Miscellaneous	41	13.1
	312	100

Table 3. Dialysis requirement and mortality of ARF in relation to urinary output.

	N (%)	Dialysis (%)	Mortality (%)
Non-oliguria	194 (49)	29	52
Oliguria	150 (38)	55	83
Anuria	52 (13)	61	71
Total	396 (100)	43	66

Table 4. Correlation between age and mortality in ARF.

Hospital		Age (years) 5-24	25-34	35-44	45-54	> 55
Siriraj	N	35	47	62	64	132
	Mortality (%)	29	26	47	47	70
Ramathibodi	N	47	53	41	69	186
	Mortality (%)	43	64	59	65	74

Table 5. ARF from 4 University Hospitals.

	Cases/year	Hospital admission (%)	Mortaltiy (%)
Siriraj	79	0.14	68
Ramathibodi	79	0.18	66
Srinakarin	44	0.14	25
Chiang Mai	60	-	-

Of 396 cases, 194 were nonoliguric, 150 oliguric and 52 anuric. Non-oliguria were common in nephrotoxic ATN and acute interstitial nephritis, whereas, anuria was relatively frequent in obstruction and ischemic ATN. Urine output was also correlated with dialysis requirement and mortality. Non-oliguric cases needed less dialysis and had low mortality, whereas, oliguric and anuric patients ran the opposite pattern (Table 3). Mortality also depended on type of ARF with ischemic ATN carrying the highest mortality (72%) followed by prerenal (37%) and obstruction (24%). 47 per cent of patients were older than 55 years of age and the mortality rate increased along with age (Table 4). Duration of ARF was longest in glomerulonephritis (18.3 days) and shortest in prerenal 3 days) with an average of 11.2 days for the whole group.

The number of acute renal failure patients from 4 university hospitals is shown in Table 5. Data from Siriraj was also from the medical record department and only ICD_9 Code 584 was collected. 44 cases from the Srinakarin Hospital, Khon Kaen included patients with acute on top of chronic renal diseases and the data was recorded by the Renal Division, Department of Medicine. Cases from Chiang Mai Hospital were from the hemodialysis unit. Percentage of hospital admissions and mortality rate were given for comparision.

DISCUSSION

Type of ARF at Ramathibodi Hospital, showed a comparable percentage as in the textbook[5]. The diagnosis was mostly based on clinical data and renal biopsy was performed only for prognostic purposes especially in lupus nephritis with rapidly progressive change. The low percentage of prerenal causes may be due to the referring pattern of admission at Ramathibodi Hospital as a tertiary care medical center. The high incidence of obstructive etiology especially from carcinoma of the cervix reflects poor health preventive education. For the most common cause of ATN, sepsis played a major role (52%) as an underlying disease (Table 2). This together with the average age of 50.6 years reflects the target group of ATN comprising of a compromised host from old age, degenerative and low resistance physically, mentally and immunologically. When the other three causes (volume depletion, decreased cardiac output and hepato-renal) were added, 80 per cent of ATN were included. As mentioned in the textbook[2], ATN usually has multiple etiologies. An elderly patient with compromised cardiac function, for example, may develop infection and become volume depletion from low intake and aggravated fluid loss by nausea vomiting and insensible loss. He will be a candidate for septic shock and ATN is unavoidable. These are the typical patients in intensive care units where supporting facilities including renal replacement therapy are needed. However, despite aggressive management with multiple organ failure in intensive care patients the mortality rate was almost 100 per cent[2]. The 72 per cent mortality of ischemic ATN in this report showed the same tendency.

The presentation of oliguria usually alerts clinicians to recognition of ARF but non-oliguric pattern was far more common[6]. In this series,

only 49 per cent were non-oliguric which might reflect the pattern of the referring center. The diagnosis of non-oliguric ARF is quite important since this type of renal failure carries good prognosis and simpler management. The low mortality of the non-oliguric group in Ramathibodi Hospital (Table 3) was in agreement with other series in the literature[7]. The percentage of non-oliguric patients in general service hospitals may be even higher, so clinicians should be aware of the situation which will lead to acute renal failure and blood urea nitrogen and creatinine should be monitoring. On the other hand, the presentation of anuria of 52 cases was more common. When 12 cases of obstruction were excluded, the remaining anuric patients were mostly ATN caused by severe underlying diseases such as sepsis associated with other organ failure (cardiac, hepatic), malaria, paraquat poisoning. Nowadays, the anuric pattern is not solely obstructive although the investigation for this diagnosis should be performed since the line of management is quite different.

With the complement of other university hospitals, the incidence of ARF was compared (Table 5). The varying figure of ARF per year depended on the source of data. Comparable figures from Siriraj and Ramathibodi Hospitals may be due to data collection from hospital medical records, whereas, low figures from Srinakarin and Chiang Mai Hospitals were from their own renal units. Supporting the above speculation was the mortality which showed low percentage from patients from renal units reflecting uncomplicated cases which might have only one organ failure (renal) compared with the high mortality of cases from hospital medical records consisting of multiple organ involvement. In addition, the equal ARF cases of Siriraj Hospital compared to Ramathibodi Hospital with a lower number of hospital beds may be due to cases at Siriraj being retrieved from only ICD_9 Code 584.

Percentage of ARF cases to hospital admissions in Table 5 can be extrapolated for incidence of acute renal failure of the whole country, whose average yearly hospital admissions for the year 1992 to 1993 reported by the Thai Ministry of Public Health was 3.25 million. If we consider the incidence of ARF in general hospital admissions to be 0.1 per cent, there will be 3,250 cases per year or 55 cases per million per year. According to Table 3, 43 per cent of cases with acute renal failure needed dialysis, the figure will be 23.8 cases per million per year which is comparable to the number of 28.9 in the report from the European Dialysis and Transplantation Association[8]. Planning for management of acute renal failure will depend on the amount of dialysis needed per case. At Ramathibodi Hospital, 515 hemodialysis and 220 peritoneal dialysis were performed for acute renal failure in 1994 or 9.3 dialyses per case. Estimation in the literature considered 4 dialyses per case[9] reflecting less severe patients. So 100 to 200 dialyses per year per million population of Thailand was required. We suggest that hospitals in the provinces with a population above 1 million (17 provinces) should have a hemodialysis units for both their local service and referring cases and all other provincial hospitals should have at least a peritoneal dialysis facilities for the growing number of acute renal failure.

In conclusion, 396 ARF patients were retrospectively reviewed. ATN was the most common type of ARF with sepsis as a major underlying condition. Non-oliguria was a frequent presentation and carried better prognosis. Anuria that strongly suggested of obstruction, in the past, has become less diagnostic since severe ATN may also have no urine. Extrapolating incidence of ARF in the country from data in university hospitals has lead to the suggestion of planning of dialysis facilities in provincial hospitals.

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ไตวายเฉียบพลันในประเทศไทย : การศึกษาย้อนหลังในโรงเรียนแพทย์

สุชาติ อินทรประสิทธิ์, พ.บ., อัมพร สกุลแสงประภา, พ.บ.*

การศึกษาประวัติผู้ป่วยไตวายเฉียบพลันที่รับไว้ในโรงพยาบาลรามาธิบดี จำนวน 5 ปี (พ.ศ. 2532-2536) โดยใช้เกณฑ์การวินิจฉัยจากผู้ป่วยที่มีระดับซีรัมครีเอตินปกติแล้ว มีการเพิ่มเป็นสองเท่าภายใน 1 สัปดาห์ และ/หรือมีปัสสาวะน้อยกว่า 400 มล.ต่อวัน ในบรรดา 396 ราย ของไตวายเฉียบพลันพบว่า กลุ่มที่มีการตายของเซลล์ท่อไตอย่างเฉียบพลันพบบ่อยที่สุด โดยมีสาเหตุมาจากการติดเชื้อเป็นส่วนใหญ่ ไตวายเฉียบพลันชนิดที่ปัสสาวะไม่น้อยพบบ่อย และมีการทำนายโรคที่ดี การพบไตวายเฉียบพลันที่มีปัสสาวะน้อยมากในปัจจุบัน ไม่ได้ชี้บ่งถึงการวินิจฉัยของการอุดตันของทางเดินปัสสาวะเสมอไปเพราะอาจพบในกลุ่มที่ไตวายเฉียบพลันที่เกิดจากเลือดไปเลี้ยงไตน้อยได้บ่อยขึ้น เมื่อเปรียบเทียบกับสถิติไตวายเฉียบพลันจากโรงพยาบาลของโรงเรียนแพทย์ที่ศิริราช, เชียงใหม่ และขอนแก่น พบว่า ไตวายเฉียบพลันพบเป็น 0.14 ถึง 0.18 เปอร์เซ็นของการับผู้ป่วยเข้าไว้ในโรงพยาบาลทั้งหมด หากใช้ตัวเลข 0.1 เปอร์เซ็นสำหรับโรงพยาบาลฝ่ายบริการทั่วไปจะสามารถคำนวณว่าประมาณการเกิดไตวายเฉียบพลันจะเป็น 55 รายต่อประชากร 1 ล้านคน อุบัติการนี้นำไปสู่ข้อเสนอแนะให้มีหน่วยไตเทียมในโรงพยาบาลในจังหวัดที่มีประชากรมากกว่า 1 ล้านคน และมีความสามารถในการทำการล้างไตทางช่องท้อง สำหรับผู้ป่วยไตวายเฉียบพลันในโรงพยาบาลประจำจังหวัดทุกแห่ง

* ภาควิชาอายุรศาสตร์, คณะแพทยศาสตร์ มหาวิทยาลัยธรรมศาสตร์, ปทุมธานี 12121