

Original Research Article

Epidemiological, Clinical, and Prognostic Aspects of Renal Failure in the Emergency Department of the University Hospital “Le Luxembourg” in Bamako

Mahamadoun Coulibaly^{1,2*}, Aminata Dabo¹, Oumoulhairou Mahamadou¹, Siriman A. Koita^{1,2}, Abdoulhamidou Almeimoune^{2,3}, Moustapha I. Mangane^{2,3}, Binta Diallo¹, Salia I. Traore¹, Brehima B. Coulibaly¹, Karamoko Djiguiba⁴, Youssouf Coulibaly^{2,5}

¹Department of Anaesthesia, Intensive Care and Emergency Medicine, University Hospital “LE LUXEMBOURG” Of Bamako

²Faculty of Medicine and Dentistry of Bamako (FMOS/USTTB)

³Department of Anaesthesia, Intensive Care and Emergency Medicine, University Hospital Gabriel Touré of Bamako

⁴Department of Nephrology and Haemodialysis, University Hospital “LE LUXEMBOURG” Of Bamako

⁵Department of Anaesthesia and Intensive Care, University Hospital Point G

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Abstract: Introduction: Renal Failure Represents Approximately 1% Of Emergency Admissions. In Our Setting, The Vast Majority of Chronic Renal Failure Patients Are Under-Dialyzed, And Access to Emergency Extracorporeal Renal Replacement Therapy Is Not Always Available. **Objective:** To Report the Clinical, Therapeutic, And Evolutionary Characteristics of Renal Failure in the Emergency Department of A Tertiary Hospital in Africa. **Patients And Methods:** This was a Cross-Sectional Prospective Study from January to December 2024, Including All Patients Presenting with Renal Failure Either at Admission or During Management of Another Condition in The Emergency Department. **Results:** During The Study Period, 160 Patients Were Diagnosed with Renal Failure, Giving A Prevalence Of 3.55%. The Mean Age Was 50 Years [16,7]. There Was A Male Predominance Of 54.4%. The Main Reasons for Consultation Were: Respiratory Distress 24.38%; Altered Consciousness 23.75%; Infectious Syndrome 12.50%; Arteriovenous Fistula Rupture 5%; Deep Vein Thrombosis 3.13%. A Total Of 33.1% Of Patients Were Known Chronic Renal Failure Patients, and 23% Were on Chronic Dialysis. In Addition, 29.4% Of Patients Were Diabetic, And 59.4% Hypertensive. A History of Nephrotoxic Drug Intake Within the Three Months Prior To Admission Was Found In 30.6% Of Patients. At Admission, 40% Had A GCS < 15; Mean Spo₂ Was 89% [8.4]; Mean MAP Was 102 Mmhg. Mean Hemoglobin Level Was 8 G/Dl [2.5]; Creatinine 627 µmol/L [526]; Sodium 127 Mmol/L [10.46]. Life-Threatening Hyperkalemia Was Present In 8.8% Of Patients. Oxygen Therapy Was Initiated In 55% Of Patients. Ten Percent Were Transfused. Emergency Renal Replacement Therapy Was Performed In 70% Of Cases. Major Complications Included: Infectious Pneumonia 25.6%; Uremic Coma 8.1%; Hemorrhagic Syndrome 5%; Status Epilepticus 2.6%. Mortality Was 31.3%. Mean Length of Stay Was 6 Days [3.5]. **Conclusion:** Under-Dialysis Is Responsible for Decompensations and High Mortality. Mortality Due To Acute Renal Failure Has Decreased in Developed Countries but Remains High in Low-Income Countries Where Access to Emergency And/Or Chronic Dialysis Is Still Limited.

Keywords: Renal Failure, Hemodialysis, Mali, Acute Pulmonary Oedema, Medical Emergencies.

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INTRODUCTION

Renal Failure, Whether Acute (ARF) Or Chronic Decompensated (CRF-D), Is A Common Reason for Emergency Department Visits. It is A Major Cause of Morbidity and Mortality in Resource-Limited

Countries, Where Diagnosis Is Often Delayed and Extrarenal Purification Methods Are Insufficient. In Our Context, The Vast Majority of Patients with Chronic Renal Failure Are on Dialysis, And Access to Emergency Extrarenal Purification Is Not Always

Available. Demographic Changes, The Epidemiological Transition Marked by An Increase in Hypertension and Diabetes, And the High Prevalence of Infectious Diseases Are Contributing to an Increase in the Incidence of Renal Failure in Sub-Saharan Africa.

ARF Is Defined by A Rapid Rise in Serum Creatinine, A Reduction in Urine Output, Or Both. Its Prognosis Depends on The Speed of Diagnosis, Treatment of The Underlying Causes,

And Management of Metabolic Complications Such as Hyperkalemia or Acute Pulmonary Edema. CRF-D Occurs When Pre-Existing Chronic Renal Failure Is Exacerbated, Often in The Context of Dehydration, Infection, Or the Use of Nephrotoxic Products.

In Mali, And Particularly at The Luxembourg University Hospital in Bamako, Few Studies Have Described in Detail the Profile of Patients with Renal Failure Admitted to The Emergency Department. This Study Aims to Fill This Knowledge Gap in Order to Improve Diagnostic and Therapeutic Strategies.

OBJECTIVE:

To Report the Clinical, Therapeutic, And Evolutionary Characteristics of Renal Failure in The Emergency Department of a Tertiary Referral Hospital in Africa.

PATIENTS AND METHODS

This Is A Prospective Cross-Sectional Study Conducted from January 1 to December 31, 2024, In the Emergency Department of the Luxembourg University Hospital in Bamako. All Patients with Acute or Chronic Decompensated Renal Failure, Either at Admission or Occurring During the Management of Another Condition, Were Included. The Variables Collected Included: Sociodemographic Characteristics, Medical History, Clinical Signs, Vital Signs, Biological Data, Treatment Modalities, Complications, And Hospital

Progress. The Data Were Analyzed Descriptively. Proportions Are Presented as Percentages, And Continuous Variables as Means or Medians Depending on Their Distribution.

RESULTS

During The Period, 160 Patients Were Diagnosed with Renal Failure, Representing A Prevalence Of 3.55% Of All Admissions to The Department During the Period.

The Average Age Was 50, With Extremes Of 16- And 18-Years Old. The Most Represented Age Group Was Patients Over 60 Years Old, Who Accounted For 29.4% Of the Population.

There Was A Male Predominance Of 54.4%. The Main Reasons for Consultation Were: Respiratory Distress 24.38%; Altered Consciousness 23.75%; Infectious Syndrome 12.50%; Arteriovenous Fistula Rupture 5%; Deep Vein Thrombosis 3.13%.

33.1% Of Patients Were Known to Have Chronic Renal Failure And 23% Were on Chronic Dialysis. 29.4% Of Our Patients Were Diabetic And 59.4% Were Hypertensive. The Use of Nephrotoxic Drugs in the 3 Months Prior To Admission Was Found In 30.6% Of Patients.

During Our Study, Renal Failure Was Diagnosed on Admission or Within 48 Hours In 51.9% Of Patients, Between 48 Hours And 5 Days In 10% Of Patients, And More Than 5 Days After Admission In 38.1% Of Patients.

On Admission, 40% Of Patients Had A Glasgow Coma Scale (GCS) Score < 15; The Mean SPO2 Was 89%; The Mean MAP Was 102 Mmhg. **Table I** Shows the Distribution According to The Presence of a Life-Threatening Emergency: 35.6% Had Acute Pulmonary Edema.

Table I: Distribution of Patients Based on Life Emergency

Vital Emergency	Staff	Percentage
No Vital Emergency	100	62,5
Hypertensive Emergency	1	0,6
Acute Pulmonary Oedema	57	35,6
Uremic Encephalopathy	2	1,3
Total	160	100,0

Biologically, The Average Hemoglobin Level Was 8g/Dl [± 2.5]. **Table II** Shows the Distribution According to Creatinine Levels, As Well As the Main

Ionic Disorders in Our Patients. There Was Life-Threatening Hyperkalemia In 8.8% Of Patients

Table II: Distribution of Patients According to the Rate of Creatinine, Serum Potassium and Sodium

Creatinine Rate (Mmol/L)	Frequency	Percentage (%)
120 - 300	56	35,00%
301 - 600	52	32,5
> 600	52	32,5
Total	160	100
Kalemia	Frequency	Percentage (%)
Hypokalemia	19	11,9
Normale	70	43,7
Hyperkalemia	71	44,4
Total	160	100
Natrémie	Frequency	Percentage (%)
Hyponatremia	121	75,6
Normale	23	14,4
Hypernatremia	16	10
Total	160	100

Oxygen Therapy Was Initiated In 55% Of Patients. Non-Invasive Ventilation Was Initiated In 25% Of Patients; The Duration and Number of Sessions Are Reported in **Table III**. Invasive Ventilation Was Necessary In 1.3% Of Patients. Emergency Extra-Renal Purification Was Performed In 70% Of Patients. The

Main Complications During Treatment Were: Infectious Pneumonia In 25.6%; Uremic Coma In 8.1%; Hemorrhagic Syndrome In 5%; And Status Epilepticus In 2.6%. We Recorded A Mortality Rate Of 31.3%. The Average Length of Stay Was 6 Days [3-14].

Table III: Practice Of Non-Invasive Ventilation

Duration In Minutes	Number (N=40)	Percentage
20	3	7,5
30	18	45
40	6	15
60	13	32,5
Number Of Sessions	Number (N=40)	Percentage
2	13	32,5
3	17	42,5
4	5	12,5
5	5	12,5

DISCUSSION

Acute Kidney Injury (AKI) And Decompensated Chronic Kidney Disease Are Major Life-Threatening Emergencies in Hospitals, Particularly in Resource-Limited Countries, Where Late Diagnosis and Structural Barriers Have a Significant Impact on Prognosis.

ARF is a Common Condition in Emergency Departments and Intensive Care Units. It Frequently Affects Elderly Patients with One Or More Risk Factors (Pre-Existing Kidney Disease, Hypovolemia, Shock, Cardiovascular Surgery, Sepsis, Nephrotoxic Drugs) And Most Often Occurs in The Context of Multiple Organ Failure [1]. It Leads to Increased Costs and Length of Stay [2] and Has A Significant Impact on Both Short- and Long-Term Prognosis [2].

In Our Prospective Study Conducted at the Luxembourg University Hospital in Bamako, Renal Failure Accounted For 3.55% Of Emergency Admissions, Reflecting A High Epidemiological Burden

in A Context Where Chronic Noncommunicable Diseases (Hypertension, Diabetes), Severe Infections, Glomerular Nephropathies, And Self-Medication Remain Common.

Epidemiological Profile: A Marked Contrast with Industrialized Countries

The Average Age of Our Patients (50 Years) Is Significantly Lower Than That Reported in Western Cohorts, Where ARF Mainly Affects Individuals Over the Age of 70 [3,4]. This Younger Epidemiological Profile In Sub-Saharan Africa Could Be Explained By: The High Prevalence Of Early-Onset Hypertensive And Diabetic Nephropathies; The Frequency Of Post-Infectious Glomerulonephritis; The Absence Or Rarity Of Nephrological Follow-Up Before The Terminal Stage; The Inappropriate And Uncontrolled Use Of Nsaids, Phytotherapeutic Products, Or Aminoglycosides; And Greater Exposure To Tropical Infections (Severe Malaria, Septicemia, Bilharzia), As Illustrated By The Study By Kunuanunua *et al.*, in Congolese Children [5].

This Situation Contrasts with Industrialized Countries, Where Physiological Aging of The Kidney, Vascular Fragility, And Polymedication Account for the Majority of ARF Cases [3,4].

Clinical Severity on Admission: A Reflection of Systemic Diagnostic Delay

The Major Symptoms Observed: Respiratory Distress, Altered Consciousness, Acute Pulmonary Edema (APE), And Infectious Syndrome—Are Indicative of Severe Forms. In Our Cohort, 35.6% Had APE, A Cardiorespiratory Manifestation Typical of Oligoanuric ARF. International Recommendations (KDIGO, AKIN) Consider These Signs to Be Absolute Indications for Dialysis [6].

Altered Consciousness, Found in Nearly A Quarter of Patients, Suggests Advanced Uremic Encephalopathy, Indicating an Advanced Stage [5]. Hypoxemia (Mean SpO₂ 89%) And the Need for Oxygen Therapy or NIV In 25% of Cases Highlight the Frequent Association Between ARF and Respiratory Failure, Resulting from Volume Overload, APO, or Severe Infection.

This Clinical Severity on Admission Confirms the African Literature, Where Most Patients Seek Medical Attention Late After an Initial Non-Medicalized Therapeutic Course [5].

The High Prevalence of Hyperkalemia (44.4%), Including 8.8% Of Life-Threatening Cases, Is A Major Determinant of Mortality. The Pathophysiology Is Based On: A Drastic Decrease in Renal Potassium Excretion; Severe Metabolic Acidosis; Muscle Leakage in The Context of Hypoperfusion; And, In Some Cases, Rhabdomyolysis.

International Literature Classifies Severe Hyperkalemia as an Urgent and Indisputable Indication for EER [6].

Added To This Is Massive Hyponatremia (75.6%), Often Multifactorial: Inappropriate ADH Secretion in The Context of Infection, Severe Renal Failure, Hyperhydration Linked to Decreased GFR, Hypovolemia in Patients with Diarrhea or Fever.

These Electrolyte Disturbances Are Characteristic of Advanced Stages of ARF And Are Evaluation Criteria in the KDIGO, AKIN, And RIFLE Classifications [6].

Extrarenal Purification: Common Indications and Local Constraints

The Very High Proportion of Patients Requiring Extrarenal Purification (ERP) (70%) Reflects the Exceptional Severity of Clinical Presentations in Our Setting. It Far Exceeds the Proportions Observed in Developed Countries (30–50%) [7]. Several Factors Explain This Discrepancy: Late Consultation at the Stage of Anuria, Acute Renal Failure, Or Severe

Hyperkalemia; Lack of Early Screening for ARF In Primary Care; Limited Access to Rapid Biological Tests; And Limited ERP Capacity, Sometimes Leading to Triage of Indications.

International Trials on The Timing of Dialysis: AKIKI, IDEAL-ICU, ELAIN Have Shown That Systematic Early Initiation of ERP Does Not Reduce Short-Term Mortality [7]. However, These Results Cannot Be Extrapolated to Practice in Low-Resource Countries, Where Patients Often Arrive with An Absolute Indication for Dialysis.

The Mortality Observed in Our Cohort (31.3%) Is Comparable or Slightly Lower Than Other African Series (30–60%). The Main Probable Causes Are: Advanced Severity of Symptoms on Admission; Severe Hyperkalemia; Delayed Access to Dialysis; Associated Sepsis; Severe Respiratory Failure; Uncontrolled Comorbidities; Logistical Limitations Related to The Availability of Hemodialysis Stations.

Western Studies Report A Mortality Rate Of 25–45% In Intensive Care According To AKIN/RIFLE Criteria [5], But in Contexts Where Diagnosis and Treatment Are More Rapid.

The Majority of Triggering Factors Identified in Our Population: Dehydration, Infections, Nephrotoxic Drugs, Uncontrolled Hypertension, Or Diabetes Are Potentially Preventable. According To Clec'h Et Al [6], nearly 30% Of ARF Cases Could Be Prevented By: Rigorous Blood Pressure Control, Judicious Use of Nsaids, Prevention of Dehydration, And Early Nephrological Follow-Up.

Spontaneous Recovery After an Episode of ARF Involves Not Only Controlling the Causal Mechanism but Also Activating Mechanisms to Repair Structural Damage. Tubular Cells in Particular Have Significant Regenerative Capacity. In Models of Ischemic Injury in Rats, Regeneration Begins on The Second Day And 50% Of Tubules Have Regenerated After Ten Days [8].

Our Study Highlights an Urgent Need to Improve Early Detection Of ARF, In Particular Through the Systematic Integration of KDIGO Criteria in Emergency Departments, Expanded Access to Rapid Biology Testing, And Enhanced Training for Healthcare Professionals. Prevention Also Plays A Crucial Role, Whether It Be Reducing the Use of Nsaids, Improving the Management of Chronic Conditions, Or Strengthening Health Education [5]. Finally, Our Work Provides a Basis for Multicenter Studies in Mali Aimed at Refining the Predictors of Severity and Optimizing the Organization of EER In Emergency Settings.

CONCLUSION

Renal Failure Remains a Major Cause of Morbidity and Mortality in The Emergency Department of The Luxembourg University Hospital. The Severity of Presentations, The High Use of Extrarenal Purification, And the Metabolic Complications Observed Underscore the Need for Earlier Screening, Expanded Access to Emergency Laboratory Testing, And Better Organization of Pathways To ERF. Strengthening Diagnostic and Therapeutic Capacities, Combined with Preventive Measures Targeting Hypertension, Diabetes, And NSAID Use, Could Contribute to A Significant Reduction in Mortality in Our Context.

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