

Research Article

Risk Factors and Outcome of Uremic Pericarditis in Patients with Chronic Kidney Failure at Donka University Hospital

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Abstract

Introduction: Uremic pericarditis is a late complication of chronic kidney disease (CKD), often latently detected by echocardiography or clinically revealed by chest pain and a pericardial rub. The objective of our study was to describe the risk factors and outcome of uremic pericarditis in patients with chronic kidney failure at the Donka University Hospital. **Methods:** This was a cross-sectional, descriptive and analytical study conducted over a 7-month period from August 10 to March 10, 2022. All patients with a GFR ≤ 60 ml/min were included. The parameters studied were: epidemiological, clinical, and ultrasound. The Chi-square test was used for statistical analysis. **Results:** In 182 chronic uremic patients, uremic pericarditis was 12.63%. Pericardial friction rub was present to varying degrees in 91.30% of cases; the average clearance was 4.39. Pericarditis was observed on ultrasound in 82.60% of cases. The risk factors identified were: young age and terminal stage. All of our patients received extrarenal replacement therapy (ERP) and NSAIDs. Intensified EER resulted in complete resolution of pericarditis in 56.5%; surgical drainage in 4.4%, and 39.1% died. **Conclusion:** The prevalence of uremic pericarditis is relatively high. Early diagnosis and management could improve life expectancy.

Keywords

Risk Factors, Outcome, Uremic Pericarditis, Donka University Hospital

1. Introduction

Uremic pericarditis is a major complication of kidney disease occurring in patients with chronic kidney failure, either before or during dialysis treatment. It is the result of several factors, including poor vascular access and insufficient dialysis dose [1, 2].

A real public health problem, uremic pericarditis remains one of the major complications of end-stage kidney disease

(ESKD) linked to insufficient extrarenal replacement therapy [3].

Very few studies on uremic pericarditis have been published in recent years. As a result, the true incidence of uremic pericarditis is difficult to establish and relies on the diagnostic criteria used, namely clinical symptoms and echocardiography.

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Received: 11 January 2026; **Accepted:** 26 January 2026; **Published:** 11 February 2026



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In France, pericarditis in ESRD patients accounted for 5% of all dialysis patients in 1980 [4].

In Africa, in Morocco in 2017, a study conducted on 9 patients at the Mohamed VI University Hospital showed that the outcome of uremic pericarditis was favorable in 7 cases (77.7%), and deaths were observed in 2 cases (22.2%) [3].

In Cameroon, the frequency of uremic pericarditis represented 62.9% in patients suffering from severe chronic kidney failure [5].

In a study conducted in Morocco, 13 cases of pericarditis were observed (28.2%) after a follow-up of 14.7 months (1–27 months). The circumstances of discovery were clinical in 5 cases, based on electrocardiographic data in 3 cases. The discovery was incidental in 3 cases. [6].

In Burkina Faso, a study conducted in the Internal Medicine Department of the Yalgado-Ouédraogo National Hospital in Ouagadougou found an incidence of 31.6% in patients with end-stage renal disease [6].

The frequency of uremic pericarditis has decreased thanks to the hemodialysis techniques used today. However, it still remains considerable in patients with end-stage renal disease.

Given the high frequency of uremic pericarditis in patients with chronic kidney failure;

- 1) The lack of previous studies on uremic pericarditis in chronic hemodialysis patients in Guinea;
- 2) The multiplicity of predictive factors for uremic pericarditis;

We deemed it appropriate to initiate this work to update data from the literature. The objective of our study was to describe the risk factors and outcome of uremic pericarditis in patients with chronic kidney failure at Donka University Hospital.

2. Patients and Methods

2.1. Study Type and Duration

We conducted a seven-month descriptive and analytical cross-sectional study, from August 10, 2019, to March 10, 2020.

2.2. Target Population

This study targeted all chronic hemodialysis patients monitored at the Donka National Hemodialysis Center during the study period.

2.3. Study Population

Our study focused on chronic hemodialysis patients with uremic pericarditis.

2.4. Selection Criteria

2.4.1. Inclusion Criteria

Our study included all patients with end-stage renal failure, whether on or off dialysis, aged 13 years and older, followed at the Donka National Hemodialysis Center, in whom uremic pericarditis was diagnosed clinically or by ultrasound.

2.4.2. Exclusion Criteria

This study excluded chronic hemodialysis patients not followed at the Donka National Hemodialysis Center and those receiving hemodialysis for acute renal failure.

2.5. Recruitment Method

We conducted an exhaustive recruitment of all patients meeting our selection criteria.

2.6. Study Variables

Our variables were quantitative and qualitative, categorized into epidemiological, clinical, and paraclinical data.

2.6.1. Qualitative Variables

The variables studied concerned socio-demographic aspects, clinical and paraclinical data.

(i). Sociodemographic Data

The variables studied were socio-demographic, gender, and socio-professional categories.

(ii). Clinical Data

We looked for functional signs such as dyspnoea and chest pain, specifying the semiological characteristics of the latter. Physical signs such as pericardial friction were also examined. Certain dialysis parameters were studied, such as interdialytic weight gain, vascular access and dialysis dose.

(iii). Paraclinical Data

1) Imaging:

Cardiac Doppler ultrasound: This is the key examination for assessing pericardial effusion and assessing its hemodynamic impact. Demonstrating an echo-free space between the two pericardial layers confirms its existence.

Assesses the abundance of the effusion: moderate if $d \leq 10$ mm, moderate if $d \in [11, 19]$ mm, and very abundant if $d \geq 20$ mm.

Looks for the presence or absence of a fibrin network.

Looks for compression of the cardiac chambers (Right +++++).

2) Chest X-ray:

This shows:

A distortion of the heart's silhouette with a triangular shape

(teapot or carafe).

An overall increase in the cardiac shadow with a vascular pedicle that appears shortened.

Blurring of the cardiophrenic connection angles.

The cardiac silhouette will not be altered if the amount of fluid is less than 250 ml in adults and 125 ml in children.

A small, unilateral or bilateral pleural effusion may often be present.

(iv). Prognostic Data

1) Dialysis initiation

- a) Early;
- b) Late.

2) Morbidity and mortality

2.6.2. Quantitative Variables

We expressed the frequency as a percentage and divided the patients into age groups according to 10-year intervals.

We then calculated the median age and gave the extreme ages.

2.7. Data Analysis

Our data were collected manually on data sheets and analyzed using SPSS software version 21.

2.8. Analysis Plan

The descriptive study was conducted by calculating frequencies and proportions for qualitative variables, and by calculating means for quantitative variables.

The analytical study was conducted using cross-tabulations; comparisons were performed using the Chi-square test or the Fisher test when the calculated sample size was lower. The difference was considered statistically significant when the $P < 0.05$.

2.9. Ethical Considerations

During this study, free consent was obtained from the patient, and the anonymity of the individuals surveyed and data confidentiality were respected.

3. Results

Table 1. Distribution of patients by sociodemographic characteristics.

Variables	Number	%
Sex		
Male	14	60.87

Variables	Number	%
Female	9	39.13
Years		
10-19	3	13.04
20-29	5	21.74
30-39	5	21.74
40-49	4	17.40
50-59	3	13.04
≥60	3	13.04
Total	23	100

Average age = 37.30 ± 15.15 Sex ratio M/F: 0.64

In this table, the male sex was 60.87% and patients aged 20 to 39 years represented 43%.

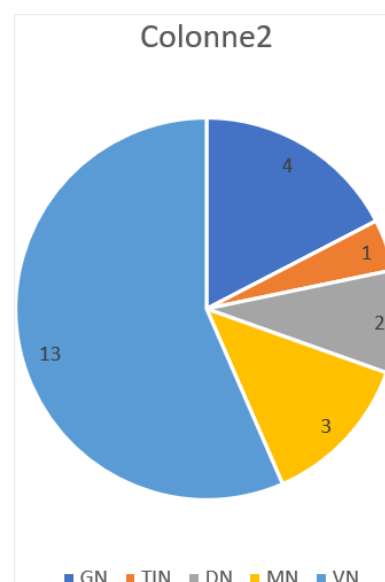


Figure 1. Distribution of patients according to initial nephropathy.

This figure shows a frequency of 56.52% of cases of vascular nephropathy and 17% of cases of glomerular nephropathy.

Table 2. Distribution of patients according to observed clinical signs.

Clinical signs	Variables	Number	%
Functional	Dyspnea	18	78.26
	Chest pain	20	86.95
	Cough	11	47.8
	Hiccups	4	17.4
Physical	Pericardial friction	21	91.30

Clinical signs	Variables	Number	%
	rub		
	Ascites	7	30.43
	Hepatjugular reflux	2	8.7
	Pleurisy	5	21.73
	Hypotension	2	8.7
	Systolic murmur	6	26.1
	Hepatomegaly	3	13
	Jugular vein turgor	7	30.43
	Edema in the lower limbs	16	69.6

This table shows the main functional signs, which were chest pain and dyspnea, with pericardial friction rub representing the most dominant physical sign in 91% of cases.

Table 3. Distribution of patients according to electrocardiogram data.

Variables	Number	%
Electrocardiogram		
Left ventricular hypertrophy	4	17.39
Hypertensive heart disease	2	8.69
Microvoltage and/or repolarization disorder, tachycardia, ST segment elevation	8	34.78
Not performed	9	39.14
Cardiac ultrasound		
Tamponade	2	8.69
Fluid pericarditis	12	52.17
Dry pericarditis (thickening, calcification)	5	21.74
Not performed	4	17.4
Chest X-ray		
Normal X-ray	1	4.35
Pleural effusion	5	21.74
Not performed	5	21.74

Table 4. Distribution according to associated factors.

Evolution				
Risk factors	Improved	Died	Total	p-value
Male gender	8	6	14	0.000

Evolution				
Risk factors	Improved	Died	Total	p-value
Young age	4	6	10	0.000
Insufficient dialysis dose	2	8	10	0.001
Late onset of dialysis	2	6	8	0.000
Uremia	14	7	21	0.000
End-stage CKD	13	9	22	0.59
IWG>4	1	3	4	0.000
Use of femoral catheter	1	8	9	0.000
Total	45	53	98	

4. Discussion

The modest sample size, the insufficient technical capacity, and the low socioeconomic status of the patients were limitations of this study.

Despite these shortcomings, the results obtained allowed us to achieve our objectives.

Very few studies on uremic pericarditis have been published in recent years, and the majority of them do not address prognostic factors.

In our series, we recorded 23 chronic hemodialysis patients diagnosed with pericarditis out of a total of 182 chronic hemodialysis patients surveyed, representing a prevalence of 12.63%.

Our results are higher than those of Aloui A. et al in Tunisia, Ezziiani M. et al in Morocco and Masson JF. et al. in France who found a respective prevalence of 7.9%, 6% and 9.25% [7-9]. This high prevalence in our series is undoubtedly linked to irregular patient follow-up or late nephrological management, insufficient weekly hemodialysis duration (less than 12 hours), reasons for vascular access dysfunction and significant interdialytic weight gain.

1) The mean age of our patients was 37.30 ± 15.15 years with extremes of 13 years and 65 years. Patients with uremic pericarditis were more represented in the 20-39 age group (10 patients or 43.48%) followed by the 40-49 age group (4 patients or 17.40%). This was therefore a relatively young population, similar to the data of Boukari Bako Bibata in Mali [2]. In the United States, Srikanth Yandrapalli et al found an average age of 55 years for patients [10]. The average age of our patients was lower than those observed in the West; this could be explained by a much younger population in Guinea. The increase in life expectancy of hemodialysis patients in the West could explain this age difference. In our study there was a male predominance with a sex ratio of 0.64,

which is consistent with the data of A. Aliou et al in Tunisia [6]. This result is contrary to that of Aneediya Bederji of London where the female sex was predominant (60% versus 40% male) [11]. This male predominance could be explained by the fact that men are more exposed to other risk factors than women such as smoking, stress, alcoholism which can lead them to high blood pressure in the long term, which is one of the causes of renal failure.

- 2) Vascular nephropathy represented the most frequent initial nephropathy in our series 56.52%. This result is contrary to that reported by Y. Lazreg in Rabat and S. Amor in Tunisia where the initial nephropathy was dominated by glomerular and interstitial nephropathy [3, 12]. This difference could also probably be explained by the absence of early and regular management of hypertension and the higher frequency of hypertensive disease in black African subjects.

Pericardial rub, a pathognomonic sign of the condition, was present in 21 patients (91.30%) to varying degrees. Chest pain, the second most common clinical manifestation in our study, was present in 20 patients (86.95%).

This frequency is consistent with that observed in the literature [14, 15]. Pericardial rub and/or chest pain dominate the presentation of pericarditis [2, 13, 15, 16]. It should be noted that pericardial rub is not consistently found in all patients with pericarditis, hence the importance of echocardiography in the diagnosis of pericarditis.

The absence of pericardial rub in 2 patients (8.69%) should be noted, as well as its association with a state of extracellular hyperhydration: lower limb edema (16 cases), ascites (7 cases), and pleurisy (5 cases). Clinical signs of right heart failure were found in some patients, in unequal proportions: hepatomegaly (3 cases), hepatjugular reflux (2 cases), jugular distension (7 cases), systolic murmur (6 cases). Hypotension, a sign of acute decompensation, was found in 2 patients.

Signs of mediastinal distress such as cough and hiccups were found in 11 and 4 patients, respectively. The clinical manifestations in our study are comparable to those reported in the literature [13, 15].

Echocardiography is the diagnostic procedure of choice if acute pericarditis is suspected [14, 17]. Indeed, it allows confirmation and monitoring of the development of pericardial effusion and its impact on cardiac function, sometimes guiding etiological investigations [14]. Pericarditis was observed on ultrasound in our series in 19 patients (82.60%) or 52.17% for pericardial effusions (7 of small abundance, 5 of medium abundance), 21.74% for dry pericarditis and 8.69% for tamponades. Left ventricular hypertrophy is also particularly common. It is thought to be multifactorial: anemia, dialysis, and hypertension.

Of 18 standard chest X-rays performed, 17 patients had abnormalities, 12 of which showed an enlarged cardiac silhouette.

In our study, we did not find a statistically significant link

between end-stage renal disease and uremic pericarditis ($P=0.59$). After cross-referencing risk factors for uremic pericarditis with the progression of our patients' condition, we found statistically significant links ($P=0.000$) between insufficient dialysis dose, use of a femoral catheter, young age, significant inter-dialysis weight gain, male gender, and the occurrence of uremic pericarditis. This could call into question the fact that uremic pericarditis always appears in the end-stage of kidney disease. However, end-stage renal disease remains a classic risk factor for pericarditis in chronic hemodialysis patients. Risk factors vary from one study to another and also depend on the parameters studied. Thus, in the study by Hajji M [2], in multivariate analysis, the parameters identified as independent factors associated with the occurrence of pericarditis were: a percentage reduction in urea $< 40\%$ ($p = 0.004$), the use of femoral silencing ($p = 0.01$), an interdialytic weight gain > 4 kg ($p = 0.003$) and the number of sessions $< 3/\text{week}$ ($p = 0.001$).

5. Conclusion

Despite the hemodialysis techniques used today, the prevalence of uremic pericarditis remains high in our hemodialysis center.

Insufficient dialysis dose, late dialysis, use of a femoral catheter, and end-stage chronic renal failure were the risk factors associated with the occurrence of uremic pericarditis.

A longitudinal study including systematic cardiac ultrasound would allow for early diagnosis of latent forms of uremic pericarditis to ensure appropriate management.

Abbreviations

GN	Glomerular Nephropathy
VN	Vascular Nephropathy
TUN	Tubulointerstitial Nephropathy
DN	Diabetic Nephropathy
MN	Mixed Nephropathy
IWG	Interdialytic Weight Gain

Acknowledgments

The authors thank the cardiologists who performed these examinations.

Author Contributions

Fousseny Diakite: Conceptualization, Data curation, Formal Analysis, Methodology, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing.

Kadiatou Mamadou Bobo Barry: Methodology, Supervision, Validation, Visualization, Writing – original draft.

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Mohamed Lamine Tegui Camara: Validation, Visualization.

Damaris Yawa Leno: Validation, Visualization.

Mohamed Lamine Kaba: investigation.

Conflicts of Interest

The authors declare no conflicts of interest.

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