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RESEARCH ARTICLE

Complication Profiles of Nephrotic Syndrome in Senegal: A Retrospective Study over 10 Years

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Abstract

Introduction: Complications of nephrotic syndrome (NS) are in many cases serious, as they affect the patient's prognosis. This study was conducted to assessing the prevalence of SNcomplications andidentify complications of nephrotic syndrome and its treatment.

Patients and methods: This was a retrospective descriptive study conducted in the nephrology department of Aristide Le Dantec Hospital in Dakar over 10 years from 1 January 2009 to 31 December 2018. All patients with nephrotic syndrome who had at least one complication of NS were included. Epidemiological, clinical, paraclinical, therapeutic and evolutionary parameters were studied.

Results: Out of six hundred and four (604) patients with NS, four hundred and twenty-nine (429) had at least one complication of NS, i.e., a hospital prevalence of 71.02%. The mean age was 40.54±12 years with a sex ratio (M/F) of 1.6. Segmental and focal hyalinosis was the main primary lesion found in 146 patients (50.8%). One hundred and forty-two patients (33.1%) had a secondary cause, including 99 (69.8%) with diabetic nephropathy. Infectious complications were present in 160 patients (37.3%), and thromboembolic complications in 33 patients (7.71%). Ninety patients (36.3%) had hyponatremia. One hundred and sixty-seven patients (39%) had acute renal failure. Hypercholesterolemia was present in 54 patients (12.6%). Hypertriglyceridemia was noted in 35 patients (8.1%). One case of haemorrhagic cystitis was noted in 14 patients treated with cyclophosphamide. Three cases of anaemia and one case of leukopenia were noted in the 4 patients treated with mycophenolate mofetil. Among the 264 patients taking diuretics, hyperuricemia was present in 22.4% and hyponatremia in 21.5%. Seven cases of haemorrhagic syndrome were recorded in the 34 patients treated with anticoagulants. No complications related to blockers of the renin-angiotensin-aldosterone system were noted.

Conclusion: From this study, we can say that complications of NS are frequent in our context and are dominated by infectious and thrombo-embolic causes. These complications can be life-threatening, hence the importance of early detection and appropriate management.

Keywords: Nephrotic Syndrome, Complications, Venous thrombosis, Infections, Hyperlipidemia.

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1. Introduction

Nephrotic syndrome is characterised by excessive leakage of proteins, mainly albumin, through the glomerular capillaries. The clinical consequences of urinary protein leakage are manifold but are dominated by the formation of oedema linked to renal sodium retention, which is dependent on primary activation of the sodium pump in the cortical collecting tube, and on changes in capillary permeability, which promotes trans-capillary flow of fluid into the interstitial sector. Other complications of nephrotic syndrome include an increased risk of thromboembolism and infection, and dyslipidaemia [1].

Complications can be classified as acute or chronic. In the acute phase, complications may include acute renal failure, arterial and venous vascular thrombosis, and infection. In the chronic phase, complications include hyperlipidaemia, arterial hypertension, chronic renal failure, undernutrition and growth disorders, and drug overload [2].

The nephrotic syndrome affects around ten new patients per 100,000 population every year. Nephrotic syndrome is the most common clinical presentation of chronic glomerulopathy [3].

These glomerular nephropathies are five to ten times more common in Africa than in Europe and are responsible for almost half of the chronic kidney disease observed in the United States, Europe, and black Africa [4].

In a previous study of nephrotic syndrome in the Nephrology Department of Aristide Le Dantec Hospital in Senegal, complications accounted for 49.5% [5]. These complications can be life-threatening, hence the importance of proper diagnosis and management. We therefore conducted this study to:

-Assessing the prevalence of SN complications

-Identify complications of nephrotic syndrome and its treatment

2. Patients and Methods

This retrospective studywas conducted in the nephrology department of Aristide Le Dantec Hospital in Dakar over 10 years from 1 January 2009 to 31 December 2018. All patients with nephrotic syndrome followed in the department during the study period and those who had at least one complication of NS were included. Data were collected based on a survey form containing various parameters concerning the selected cases. Epidemiological, clinical, paraclinical, therapeutic and evolutionary parameters were studied. The various complications were listed. The data collected was entered and analysed using Spinx Plus version 5 software.The local ethics committee approved the study.

3. Results

Six hundred and four patients were followed in the department over 10 years for nephrotic syndrome and four hundred and twenty-nine (429) had at least one complication, i.e., a hospital prevalence of 71.02% (figure 1).

The mean age of the patients was 40.54 ±12 years. They were predominantly male, with a sex ratio of 1.6. Two hundred and eighty-seven (66.9%) patients had primary glomerulopathy. Segmental and focal hyalinosis was the main primary lesion in 146 patients (50.8%).

One hundred and forty-two patients (33.1%) had a secondary cause, including 99 (69.8%) with diabetic nephropathy (Table 1). Infectious complications were present in 160 patients (37.38%). These were mainly digestive (36.8%), urinary (27.5%) and pulmonary (15.6%) (table 2). Nine cases of tuberculosis were noted, 8 of which were pulmonary and one digestive (peritoneal).

Thromboembolic complications were present in 33 patients (7.71%), including 1 case of massive pulmonary embolism. Ninety patients (36.3%) had hyponatremia. One hundred and sixty-seven patients (39%) had acute renal failure. Hypercholesterolaemia was present in 54 patients (12.6%).

Hypertriglyceridemia was noted in 35 patients (8.1%) (Table 2). Of the 130 patients on corticosteroids, 35 (26.9%) had developed an infection, 8 had hypertension and 1 had corticosteroid-induced diabetes. Anticalcineurins were administered to 3 patients, 1 of whom had acute renal failure. Cyclophosphamide was administered in 14 patients, including 1 with haemorrhagic cystitis. Mycophenolate mofetil was administered to 4 patients, 3 of whom had anaemia and 1 of whom had leukopenia.

Azathioprine was administered to 4 patients, 1 of whom developed leukopenia. Of the 264 patients (61.7%) taking diuretics, hyperuricemia was present in 22.4% and hyponatremia in 21.5%. Antivitamins K were introduced in thirty-four patients (7.9%) and low molecular weight heparin in seventy-eight patients (18.2%). The haemorrhagic syndrome was noted in 7 patients (8.97%) taking anticoagulants (Table 3).

Treatment with converting enzyme inhibitors was initiated in one hundred and thirty-six patients (31.8%), and twenty- seven patients (6.3%) were on angiotensin II receptor blockers. No complications related to blockers of the renin-angiotensin-aldosterone system were noted.

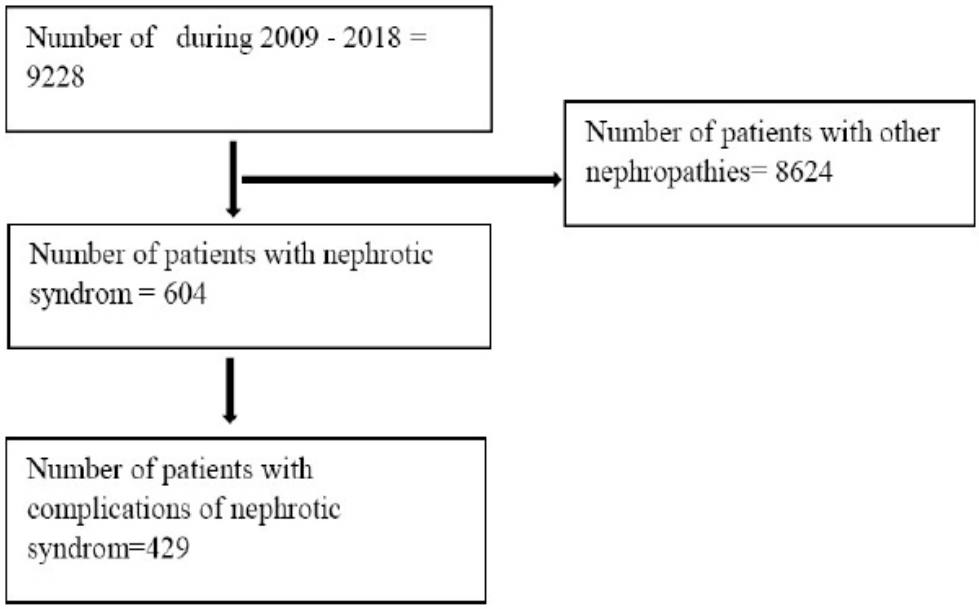

Figure 1. *Diagram of flux*

Table 1. *Epidemiological parameters and causal nephropathies*

Parameters	**Patients**
Prevalence of complications of nephrotic syndrome	71,2%
Meanage	40,54 ±12 years
Gender	
Male	265 (62%)
Female	164 (38%)
Primitive nephropathies	287
Focal and segmental glomerulosclerosis	146 (50%)
Minimal change disease	70 (24,4%)
Membranousnephropathy	48,5 (16,9%)
Membranoproliferativeglomerulonephritis	11 (3,8%)
Secondarynephropathies	142
Diabeticnephropathy	99 (69,8%)
Lupus nephritis	23 (16,2%)
Viral nephropathies	20 (14%)

Table 2. *Complications of nephrotic syndrome*

Complications	Number (%)
Infection	160
Digestive	59 (36,8)
Urinary	44 (27,5)
Pulmonary	25 (15,6)
Skin	23 (14,45)
ORL	5 (3,09)
Gynaecological	4 (2,5)
Thromboembolism	33
Lower limb thrombosis	23 (69,6)
Higher limb thrombosis	6 (18,1)
Pulmonary embolism	1 (3)
Renal vein thrombosis	3 (9)
Electrolytic	
Hyponatremia	90 (21)
Hypokaliemia	68 (15,8)
Dyslipidemia	
High LDL Cholesterol	43 (10)
Hypertriglyceridemia	35 (8,15)

Table 3. *Drug complications*

Drug (patients)	Complication	Number (%)
Corticoids (130)	Infection	35 (27)
	High blood pressure	08 (06)
	Diabetes	01 (0.77)
Anticalcineurins (3)	Acute kidney injury	1 (33,3)
Cyclophosphamide (14)	Hemorrhagic cystitis	1 (07)
Diuretics (264)	Hyponatremia	56 (21)
	Hypokaliemia	53 (20)
	Hyperuricemia	59 (22)
Anticoagulant (112)	Hemorrhage	7 (06,2)

4. Discussion

Of 604 patients presenting with SN, 429 had at least one complication, i.e., a prevalence of 71.02% in our series. A previous study in the same department found a prevalence of 49.5% [5]. Infectious complications were present in 160 patients, i.e., 37.38%. In our series, the location was essentially urinary (27.8%) and pulmonary (15.4%). Several factors may explain the susceptibility to bacterial infections during nephrotic syndrome: a decrease in IgG levels, urinary leakage of factor B, which is the cofactor of C3b in the alternative complement pathway, which plays an important role in the opsonisation of bacteria such as pneumococcus and altered T lymphocyte function [6]. After infections came thromboembolic complications, which were present in 33 patients, representing a prevalence of 7.71% in our study. These

results were in line with those found in a study carried out in the Netherlands, which showed a prevalence of 9.9% for venous thrombosis and 5.5% for arterial thrombosis[7].

Various haemostasis abnormalities have been described during NS and could explain the high incidence of thromboembolic disease. These abnormalities result from an imbalance between pro- and anticoagulant factors. In the SN, there is an increase in hepatic synthesis of procoagulant proteins, linked to hypoalbuminemia, and leakage of anticoagulant proteins through the impaired glomerular filtration barrier.

Fibrinogen, fibronectin, factors V, VIII and XIII are found in high concentrations [8]. Factor XII and antithrombin III were reduced [9]. Hyponatremia was present in 36.3% of cases in our series. In Faye's study, hyponatremia was present in 41% of patients. This hyponatraemia is essentially hypervolaemic due to hydrosodic retention during NS. One hundred and sixty-seven patients (39%) had acute renal failure (ARF) [10]. Acute renal failure in nephrotic syndrome may be functional and related to effective hypovolaemia. It may also be organic, due to intra-tubular agglutination of high molecular weight proteins (non-selective proteinuria).

Intra-renal arteriosclerosis is also responsible for a greater frequency of acute renal failure [11]. AKI may also be related to the cause of the NS. Several treatment-related complications were noted in our series, the most serious being haemorrhagic syndrome on anticoagulants (8.97%) and haemorrhagic cystitis in 1 patient on cyclophosphamide.

5. Conclusion

From this study, we can say that complications of NS are frequent in our context and are dominated by infectious and thrombo-embolic causes. These complications can be life-threatening, hence the importance of early detection and appropriate management.

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