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RESEARCH ARTICLE

Collapsing Focal Segmental Glomerulosclerosis in Dakar: Epidemiological, Clinic-biological, Histological and Therapeutic Aspects

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Abstract

Introduction: Collapsing Focal Segmental Glomerulosclerosis (FSGS) is a specific histological lesion of FSGS, characterized by the retraction of the glomerular tuft towards the hilum. Clinically, it leads to rapidly progressive renal failure, often requiring extra-renal purification. Available data on collapsing FSGS remain limited, prompting this study aimed at determining its prevalence compared to other types of FSGS and describing its clinical-biological presentation, etiological aspects, therapeutic approaches, and outcomes.

Patients and Methods: This is a descriptive retrospective study over 10 years, from January 1rst 2014, to January 1rst, 2024. All patients biopsied during this period with a histological report concluding a collapsing FSGS were included. Data were collected after patient consent from medical records. Data processing was performed using SPSS version 30.0.0 and Excel 2021.

Results: Twenty-eight patients with collapsing FSGS were included out of a population of 373 patients with FSGS, representing a prevalence of 7.5%. The mean age of patients was 28 years ±11.4, with a male predominance (sex ratio of 1.8). The nephrotic syndrome was noted in 16 patients (57.1%). The mean 24-hour proteinuria was 6.3±4.0g, and the mean albuminemia was 19.8mg/l. The nephrotic syndrome was noted in 14 patients (50%). End-stage renal failure was noted in 14 patients (50%) with a mean creatinemia of 48.1±1.9 mg/l. The aetiologies were dominated by HIV (14.3%). Angiotensin-converting enzyme inhibitors (ACEIs) were used in 18 patients (64.3%). For specific treatment, 4 patients were on antiretrovirals, 4 on corticosteroids, and 1 on rituximab. Regarding outcomes, 6 deaths were noted, and 11 patients were lost to follow-up. Among the 11 followed in consultation, 3 are currently on chronic dialysis, and 6 are between stages 4 and 5 of chronic kidney disease.

Conclusion: This study, despite its limitations, provided valuable insight into the epidemiological, diagnostic, and therapeutic aspects of collapsing FSGS, a rare but potentially severe lesion in young adults.

Keywords: Nephrotic Syndrome, Kidney Biopsy, HIV, Chronic Kidney Failure.

1. Introduction

Focal segmental glomerulosclerosis (FSGS) is a renal histological lesion indicating a podocyte disease (podocytopathy). It is characterized by hypertrophied podocytes with a vesicular nucleus and swollen, vacuolated cytoplasm. They can appear cuboidal, organize into a crown shape, and detach from the glomerular capillary wall, forming the characteristic clear halo image. Podocyte hyperplasia can sometimes lead to the formation of a lesion resembling a cellular crescent with the involvement of parietal epithelial

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cells [1]. Five histological variants of FSGS have been described according to the Columbia classification: perihilar FSGS, cellular FSGS, tip lesion FSGS, collapsing FSGS, and NOS lesion for "not otherwise specified"[2]. Collapsing FSGS is a pattern of kidney injury characterized by segmentally or globally collapsed and sclerotic glomerular capillaries, with hyperplasia and hypertrophy of overlying glomerular epithelial cells and clinically by rapidly progressive renal failure often requiring extracorporeal purification, leading to a poorer prognosis compared to other histological types of FSGS [3]. Recent studies conducted in sub-Saharan Africa between January 2015 and December 2019 revealed that FSGS is the most frequently observed nephropathy, representing 34.6% of the 179 renal biopsies performed [4]. A study conducted in Dakar (Senegal) in 2018 involving 368 patients followed for primary glomerulopathy revealed a prevalence of FSGS reaching 48.7% [5]. Regarding the collapsing form of FSGS, a study conducted in Dakar (Senegal) over a 21-year period from January 1, 1994, to December 31, 2014, found a prevalence of 10% [6]. However, it is important to note that the available data on FSGS, particularly its collapsing form, remain limited. This highlights the need for further research in this area. Therefore, we conducted this study with the objectives of determining the prevalence of collapsing FSGS compared to other types and describing the clinical-biological presentation, as well as the etiological, therapeutic, and evolutionary aspects of this lesion.

2. Patients and Methods

This is a retrospective descriptive study over 10 years from January 1, 2014, to January 1, 2024. All patients biopsied during this period with a histological report concluding collapsing FSGS were included. Nephrotic syndrome was defined as 24-hour proteinuria ≥ 3g/24h associated with hypoalbuminemia < 30g/l. Complete remission (CR), partial remission (PR), corticosteroid dependence, relapse, and corticosteroid resistance were defined according to KDIGO 2021. Clinical, biological, histological, and evolutionary parameters were collected with patient consent from medical records using a survey form established with the Kobotoolbox software. Data processing was done with SPSS version 30.0.0 and Excel 2021. Quantitative data are presented as means and standard deviations, and qualitative data as numbers and percentages.

3. Results

During the study period, we collected 28 cases of collapsing FSGS out of 373 FSGS lesions, representing a hospital prevalence of 7.5%. The mean age of patients was 28 years (±11.4 years) with a sex ratio of 1.8. Half of the patients resided in the urban area of Dakar (n=14; 50%). The professional level was dominated by informal sector workers (n=9; 32.1%), followed by unemployed individuals (n=8; 28.6%). Renal-type oedematous syndrome was noted in 16 patients (57.1%), with two (2) having anasarca and eight (8) patients having isolated morning puffiness. Other signs were dominated by digestive disorders (diarrhoea and vomiting) noted in 10.3% of patients. The mean 24-hour proteinuria was 6.3±2.8 g, while the mean albuminemia was 19.8±3.2 mg/l. Nephrotic syndrome was noted in 14 patients (50%). The mean creatininemia was 48.1±1.9 mg/l. The mean haemoglobin level was 10.08±5.4 g/dl. HIV serology was performed in only 9 patients, with 4 testing positive (figure1), while HCV serology performed in 6 patients was all negative. No patient had CMV, EBV, or parvovirus B9 serologies. Associated tubular lesions were dominated by tubular atrophy noted in 14 patients (50%), followed by tubular necrosis found in 5 patients (17.9%), with 6 patients (21.4%) presenting both lesions. Interstitial lesions were dominated by lymphocytic infiltrate noted in 9 patients (32.1%), followed by fibrosis found in 8 patients (28.6%). Vascular lesions were dominated by fibrous endarteritis noted in 3 patients.

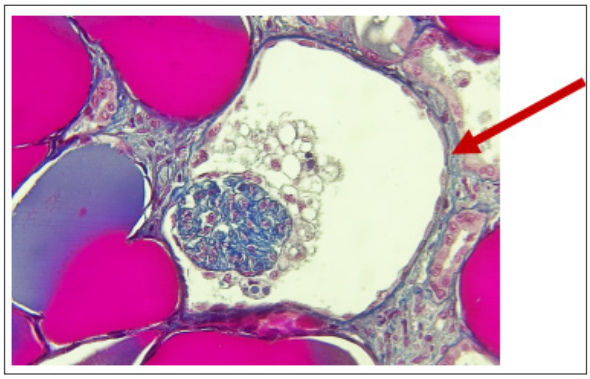

Figure 1. *collapsing FSGS lesion in kidney biopsy of a 54-year patient with HIV infection (red arow) (Masson trichrome X 400). Laboratoire d'anatomopathologie-HOGIP*

Therapeutically, angiotensin-converting enzyme inhibitors (ACEIs) were used in 18 patients (64.3%), while one patient was on angiotensin II receptor antagonists (ARBs). Loop diuretics were used in more than half of the patients (53.6%). Anticoagulants were prescribed in 7 patients (25%). Regarding specific treatment, the 4 HIV-positive patients were all on antiretrovirals; we also noted 4 patients on corticosteroids and one on rituximab before being lost to follow-up.

4. Discussion

Our results show that collapsing FSGS is relatively rare in our context and is mainly a disease of young males, often living in urban areas with informal professional activities. These results are quite like those already published in the literature in Africa (Table 1).

Table 1. *Different studies on FSGS*

Authors	Countries	Year	Number of FSGS	Number of Collapsing FSGS	Prevalence	Gender	Mean age
Our study	Senegal	2025	373	28	07.5	Male	28
Keita [43]	Senegal	2016	51	06	10.00		11
Tondou [94]	Niger	2024	26	08	30.70	Male	32.5
Leclerc [53]	Martinique	2023	87	09	10.00	Male	30.8
Azouaou [10]	Algeria	2015	54		05.90	Male	28
Rahali [73]	Marocco	2023	93		11.20	Male	35

This low prevalence can be explained by the fact that our study, like those referenced in Table 1, are monocentric with retrospective data collection. In the absence of digitization of medical information in our hospital structures, many records may be lost or unusable. This could be the case in our study, where several medical records were lost due to the rather hasty relocation of the nephrology department of Aristide le Dantec Hospital. Additionally, most patients are referred to nephrology quite late, making renal biopsy impossible for histological diagnosis. This means that many nephropathies classified as indeterminate could be unbiopsied collapsing FSGS due to the rapid progression of this lesion to end-stage renal disease. Almost all studies report a male predominance with an onset age in the 3rd decade of life in adults. Thus, environmental factors to which this segment of society is exposed, particularly in their often-informal professional environment, their lifestyle habits such as drug addiction, and certain infections such as HIV, which are particularly frequent, all on a genetically predisposed background, should be a research avenue. The clinical-biological presentation was quite variable. Renal-type oedematous syndrome was noted in 57.1% of our sample. A study conducted in Senegal confirms this observation, identifying oedema in 80.8% of patients in a series of 368 cases [5]. Similarly, a study in Niger reports that 57.69% of patients consulted primarily for oedema [7]. Hypertension, frequently associated with glomerular nephropathies, is relatively low in our series with a prevalence of 7.1%. A study conducted by Lemrabott et al. in Senegal found a frequency of 46% of hypertension in cases of collapsing FSGS [5]. Similarly, a study conducted by Ghali et al. in Tunisia reports a frequency of 41% of hypertension [11]. However, a study in Niger shows a much lower frequency, with only 7.7% of patients having hypertension [7]. Biologically, half of the patients in our series had nephrotic syndrome with a mean proteinuria of 6.3±2.8 g/24h. Our prevalence of nephrotic syndrome is lower than that observed in Niger, where 95.16% of patients had nephrotic syndrome [7]. It is also lower than the results of the study by Keita et al., which reported a prevalence of 76% [6]. Renal function was impaired in half of our patients with a mean creatininemia of 48.1±1.9 mg/l, which is relatively high compared to the literature data. According to Dial [12], 25% of FSGS cases are at the end-stage renal disease at the time of diagnosis. A similar trend was observed in Morocco, where Rahali reported a rate of 25.8% of patients with end-stage renal disease [11]. Collapsing FSGS is most often secondary to certain etiologies, particularly viral infections such as HIV or recently COVID-19. In our study, HIV infection was found in 4 patients, and no patient had documented SARS-CoV2 infection. However, other viruses such as EBV, CMV, and Parvovirus B19 were not investigated. Apart from herbal medicine noted in 21.4% of patients, no exposure to other toxic substances was found. The link between herbal medicine and the disease has not been formally established. The etiological evaluation of this lesion is a real problem in our context due to the inaccessibility of diagnostic means related to the high cost of analyses in most cases due to the absence of health insurance or universal health coverage.

Therapeutically, nephroprotection plays an important role in the management of glomerular nephropathies, particularly in collapsing FSGS characterized by massive proteinuria and rapid progression to end-stage renal disease. Thus, ACEIs and ARBs, due to their action on lowering blood pressure and their antiproteinuric effect, constitute the first-line therapy. However, SGLT2 inhibitors are increasingly prescribed due to their cardiovascular and renal benefits. In our study, more than 60% of our patients were on ACEIs or ARBs. Regarding specific treatment, the 4 HIV-positive patients were all on antiretrovirals; we also noted 4 patients on corticosteroids and one on rituximab before being lost to follow-up. On the evolutionary, we lost track of 11 patients (39.28%), and 6 patients died. Among the 11 followed up in consultation, 3 are currently on chronic dialysis and 6 are between stages 4 and 5 of chronic kidney disease. These results show a tendency towards corticosteroid resistance in patients with collapsing FSGS. Other authors, such as Sabaka et al. [13], have also observed a low remission rate (20 to 30%) after short courses of corticosteroids not exceeding 2 months.

5. Conclusion

Our study, despite its limitations, provided valuable insights into the epidemiological, diagnostic, and therapeutic aspects of collapsing FSGS, which is a lesion that, although rare, can be potentially severe in young adults as it progresses to chronic kidney disease, which is a real health problem in our contexts.

6. References

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