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Glomerulopathies in locked-up persons. Histopathologic and clinic study

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Abstract

The diseases of the urinary apparatus are frequently-enough inside the locked-up spaces of the penitentiaries. Among them, glomerulonephritis and pyelonephritis take a special place, by their late diagnosis and their lasting evolution. The authors clinically and paraclinically investigated a number of 214 locked-up male persons aged between 18–57 years, presenting various clinical forms of glomerulonephritis. Histopathological exams performed in 51 patients confirmed the diagnosis.

***Keywords*:** locked-up space, glomerular nephropathies, pyelonephritis.

Background

Locked-up space of a prison is a particular area disturbing the individual's equilibrium, a penitentiary therefore representing a pathogenic institution, which can produce the individual to be locked of personality, and makes him/her to devaluate both the world and him/her. As a prisoner is for many times confronted with an over crowd space, a scarce food and a poor hygiene of the penitentiaries, it gives birth to favorable fields for some tegumentary diseases or pathologic conditions preliminary for glomerular nephropathies.

The patient of the penitentiary may be defined as a person having a modified physical and psychiatric capacity and increased social and economic implications. For many times, the patient does not want to be cured, he/she uses to require his/her disease were confirmed, therefore it may exist the tendency of both an overestimation or a refusal to co-operate to the doctor which does not predict the disease that the patient has pretended to suffer from.

Started from those data, the authors suggested to study the clinical and histopathological aspects of the glomerulopathies appeared in the patients imprisoned.

Patients and methods

Our study was performed on 214 humans, males between 18 and 57-years, being imprisoned in penitentiaries of Romania during 1997–2006.

A number of 18 patients presented renal diseases even when hospitalized and the rest of them, a number of 196 patients were diagnosed as having glomerulopathies during their stage inside the penitentiaries.

Out of that latter group, a number of 117 patients became ill after a 2–3 year of imprisonment period, 58 patients, after 4–5 years of imprisonment, and 21 patients after a period longer than 7–8 years.

Out of the entire number of patients considered for our study, we registered a number of 13 demises, one of them by an acute renal failure and another 12 patients by chronic renal failures.

The histopathologic exam was achieved on 51 cases, namely on 38 renal bioptic punctures, and 13 necroptic pieces. This investigation was especially necessary where the clinic and paraclinic diagnosis revealed some particularities and the evolution of the patient under a right applied treatment was not a favorable one.

In order to perform the histological study, we used to classic histological method of wax embedding and Hematoxylin–Eosin stains, trichromic with green light (Goldner–Szeckelly techniques) and the Congo red stain.

Results

The clinical study revealed that the age most affected by glomerulopathies inside the penitentiaries was the youth. Therefore, from the total number of 214 patients with glomerulopathies, 207 of them (96.73%) were between 21 and 30 years; five patients were 31–40 years and two of the patients were under 20 and 40-years respectively (Figure 1).

Another special aspect of the group of patients studied by us was observed as concerning the place of living where each patient came from. Thus, we noticed that a number of 201 patients (93.93%) originated from the rural places and only 13 (6.07%) patients came from the urban places, meaning that the patients belonging to the rural were more predisposed to the aggressivity of the penitentiary mediums (Figure 2).

By trying to colligate the nephropathy frequency to the degree of the crowd inside the penitentiary rooms, we established that most of the glomerulopathies (121) appeared into the most populated rooms, where the living space is very restricted and the prisoners must sleep in over strayed beds. We consider that the poor hygiene conditions, with very bad airways and much cigarette smoke, all were meant to favor the appearance and development of the renal disease. Clinical manifestations were polymorphous: hematuria, tegumentary lesions, oliguria, palpebral edemas, fever, astenia, diffuse lumbago.

The dominant clinical symptom drawing patients, attention for many times was macroscopic hematuria. Clinical symptomatology often started insidiously, that determines some patients to relatively late seeing the doctor of the penitentiary; therefore, hospitalizations into the penitentiary units or the civil ones were necessary. Renal bioptic punctions were necessary in 38 patients to make a precise clinical diagnosis, the disease stage and especially to make a correct differential diagnosis.

Laboratory exams revealed the presence of normochrome anemia, normocytary one in 184 (85.98%) patients with hemoglobin values varying between 10.5 and 12.5 mg% and hypochrome anemia in nine (4.21%) patients. VSH increase appeared in all the patients, but more increased VSH values (more than 100 mm/1 hr.) were registered in 58 patients. Fibrinogen presented increased values in 58 patients representing 27.10% of the group of study, and C-reactive protein was positive in the 58 patients, too. If VSH has not great diagnosis value for the glomerular nephropathies, fibrinogen and especially C-reactive protein can be considered as essential biochemical elements to the positive diagnosis of the glomerular nephropathies (Figure 3).

Urea and creatinin constantly had more than normal values in 140 patients, representing 65.41% of all the patients considered for our study. By examining the variations of the sanguine electrolytes, the fact has been remarked that more than 2/3 of the patients presented a hyponatriemia of dilution and a hyperchloremia, responsible for a hyperkaliemia by tubular renal acidosis of type IV (Figure 4).

Other serologic exams showed a moderate increase of ICC (immuno-circulant complexes in all the patients and the decrease of the serum complement especially of C3 fraction in 212 patients). ASLO titer presented increased values in 48 patients. Urine exam permitted hematic and hematic and leukocyte cylinders were revealed in all the patients of the group and also unselective proteinuria in 203 patients (94.86%) and selective proteinuria in 11 patients (5.14%).

Simple renal radiography did not reveal any significant pathologic changes in any of the patients. Instead, renal echography revealed more pathologic aspects. In 21 patients with acute chronic disease we remarked an increase of the renal seizes and the parenchymatous index, with the delete of the cortical–medullar limits, while, in the 30 patients the echography showed less seize kidneys with a cortical parenchyma slightly hyperecogenous which is characteristic for a glomerular chronic disease.

Histopathologic exam was performed in 51 patients. Renal biopsy punction was made in 38 cases in order to confirm and complete the clinical diagnosis; histopathologic exam was also made in 13 cases because of a patient death into the locked-up space.

In 15 patients with chronic glomerulonephritis, with an unfavorable evolution under treatment, renal bioptic punction revealed the presence of some crescent or extracapillary glomerulonephritis lesions, characterized by the presence of some epithelial crescent disposed as a ring around the glomerular ball, lesions responsible for the unfavorable evolution of the disease. Among the patients diagnosed with chronic glomerulonephritis and unfavorable evolution to renal failure, all of them died, four patients had renal amiloidosis, which explained the total unfavorable evolution of the patients under the treatment and their subsequent death.

In other 19 patients clinically diagnosed with chronic renal failure, where the histopathologic exam was necessary, it was revealed the presence of some lesions of unspecific chronic glomerulonephritis with tubular and glomerular advanced lesions.

A patient being known as having SIDA stage IV under the specific treatment died and the histopathologic exam revealed the presence of some lesions of active chronic glomerulonephritis.

Other seven patients clinically diagnosed with CGN with unfavorable evolution died inside the locked-up space; at the histopathologic exam, CGN lesions associated to advanced lesions of pyelonephritis were revealed and that explained the seven patient deaths (Figures 5–8).

Discussions

Paraclinic and clinical studies colligated to the results from the histological and immunohistochemical studies allowed us to remark many particularities of the glomerulopathies we studied in the locked-up patients. Those particularities are generated by the locked-up spaces themselves. As other authors held (Florian Gh, 2002) the conditions, inside penitentiaries were not to be envied [1]. It might also be added the oppression air where the prisoner lived and the permanent stress that contributed to a general atmosphere finally determining affection upon the locked-up bodies. Over crowd spaces specific for the entire Romanian locked-up rooms can cause the appearance of some pathologic states such as glomerulopathies besides psychic affection and hygienic comfort. One of the particularities of the cases studied by us is given by the relatively younger ages when glomerulopathies appeared.

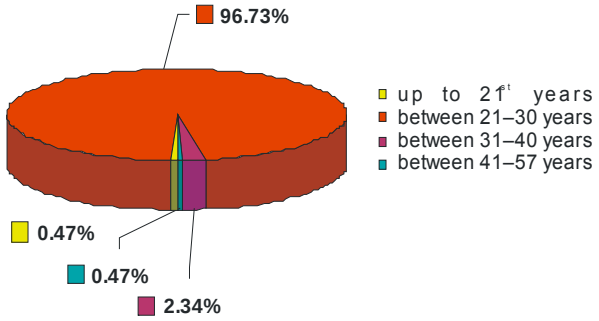

Figure 1 – ***The distribution of the glomerulonephritis cases according to the patient ages***

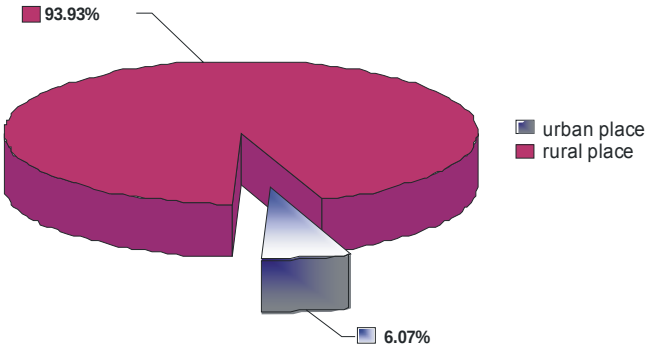

Figure 2 – ***The distribution of the cases according to the place of the patients origin***

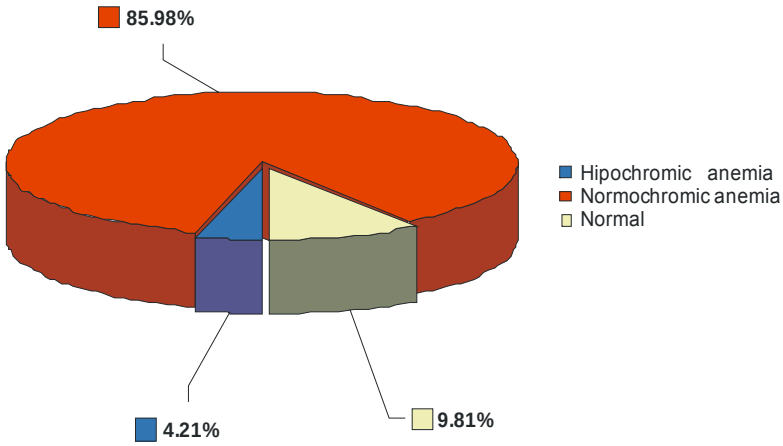

Figure 3 – ***Anemia in glomerular nephropathies***

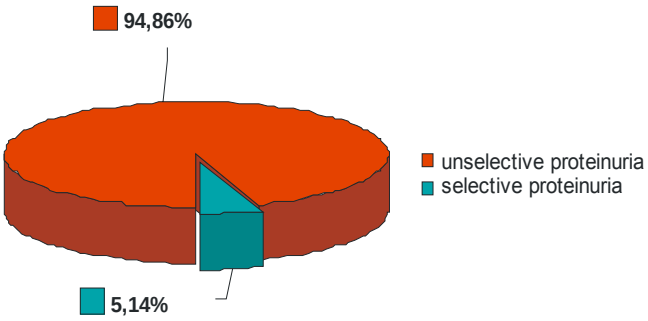

Figure 4 – ***Proteinuria in glomerular nephropathies inside the locked-up spaces***

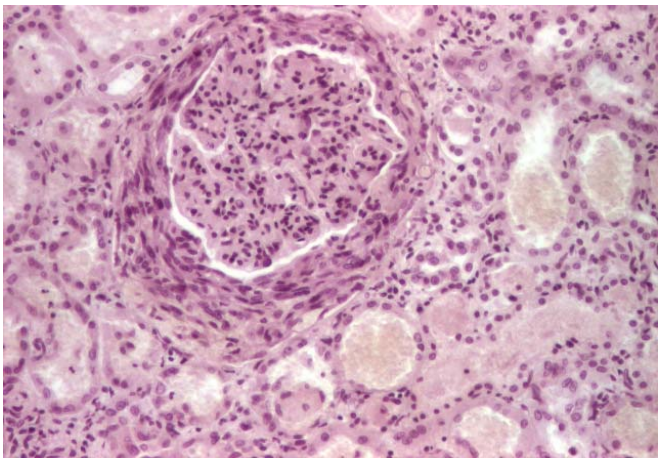

Figure 5 – ***Image of a fibrocellular crescent chronic glomerulonephritis, similar to the previous one, coming from another patient, where besides the cell proliferation of Bowmann capsule epithelium can be also noticed the mesangial proliferation with the reduction of the glomerular capillary lumen. The presence of the hematic cylinders can be observed into the uriniferous tubes (Hematoxylin–Eosin staining, ×100)***

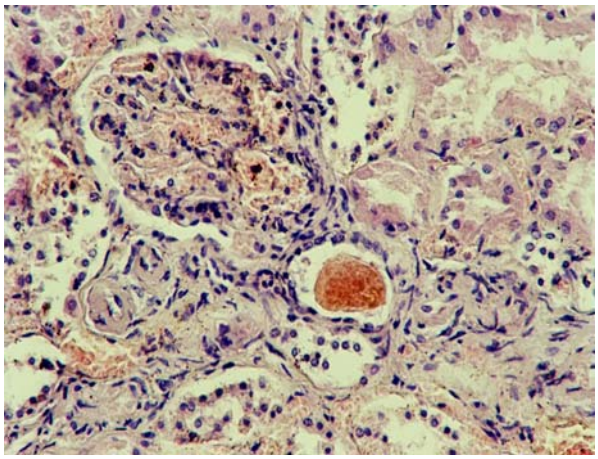

Figure 6 – ***Chronic glomerulonephritis associated to interstitial and glomerular sclerohyalinosis, tubular epithelium hypotrophy, uriniferous tubes lumen distention and the presence of the hematic and hyalinic cylinders in lumen (Hematoxylin–Eosin staining, ×200)***

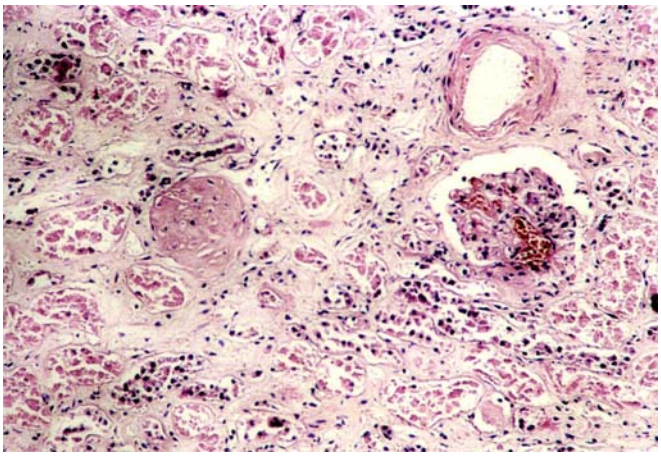

Figure 7 – ***Microscopic aspect of glomerulonephritis associated to interstitial and glomerular sclerohyalinosis. Uriniferous tubes present lesions of necrosis and a moderate inflammatory lymphocyte infiltrate can be observed (Hematoxylin–Eosin staining, ×100)***

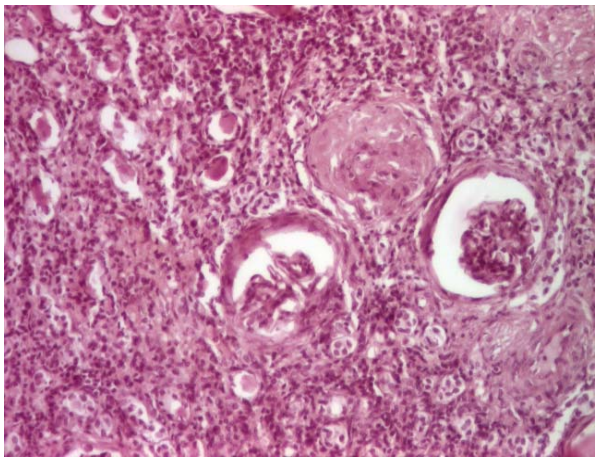

Figure 8 – ***Microscopic image of chronic glomerulonephritis associated to pyelonephritis. The presence of three renal glomerules in different stages of involution up to sclerohyalinosis. Uriniferous tubes are collapsed, with reduced lumen and there is a chronic inflammatory infiltrate prevalently formed by lymphocytes and plasmocytes, into the interstitium (Hematoxylin–Eosin staining, ×100)***

The clinical aspect can be explained, an one hand, by an increased number of offences by young people, therefore the locked-up persons were prevalently young ones and, on the other hand, the prisoners lack of hygiene, most of them were persons having a reduced medical education [2].

Another particularity of the glomerular nephropathies, which we observed inside the locked-up spaces of the penitentiaries, is the distribution according to the patient's original places of living.

Most patients (93.93%) came from the rural places; a conclusion might be that they felt the stress of being locked-up more than the others are. Our study also pointed to a more reduced frequently of the glomerular nephropathies in the recidivists compared to those persons being locked-up for the first time.

As concerning the clinical symptomatology the fact is marked that all the patients presented hematuria thus pointing that they asked too late for a doctor [3].

Generally, hematuria is a frequently encountered abnormality in clinical practice. The prevalence of hematuria in the general population is in the range of 1% to 13% and may be due to multiple causes [4]. Depending on the population under investigation, asymptomatic microhematuria is reported in up to 21% of the subjects [5]. We consider that hematuria of ours patients has a renal cause.

In addition, anemia presented in about 90% patients was probably due to subnutrition or event to psychic or physical deterioration, which is produced by the penitentiary medium. Anemia is a frequent complication of chronic kidney disease, primarily due to failure of erythropoietin production to respond to decreased hemoglobin concentration [6].

However, glomerulonephritis ethiopathogeny is for many times unknown, we succeeded to identify, by cultures, two pathogenic agents (β-hemolitic streptococcus and staphylococcus) from tegumentary lesions or pharyngeal exudates therefore being incriminated for the disease releasing.

In some other authors opinion [7] most frequent extracapillary glomerulonephritis can appear because of an acute poststreptococcic unrecovered glomerulonephritis but it can also appear under the circumstances of some systemic immune disease.

The microscopic element characteristic for glomerulonephritis is the forming of the periglomerular cell crescents. Crescent nephritis is a type of glomerular disease characterized by a rapidly progressive course [8].

The appearance of those microscopic formations is a marker of the severity, which affected the capillary ball with, but it did not show the glomerular injury etiogeny or pathogeny [9].

It is considered that any glomerular process that made the capillaries to break, can determine the proinflammatory factors enter the Bowmann space, thus stimulating the crescents forming.

Proliferation of parietal cells of Bowman's capsule and macrophages stimulated by cytokines and growth factors is implicated in the development of cellular crescents that soon become fibrotic and result in irreversible damage [10]. Activation and proliferation of epithelial cells, monocytes, macrophages, fibroblasts, myofibroblasts and mast cells have been implicated in the formation of crescents and their evolution to fibrosis [11].

Although the factors involved in organization of cellular to fibrotic crescents have not been fully elucidated, a ruptured Bowman's capsule facilitates the progressive organization of cellular crescents by permitting the entry of activated periglomerular T-cells and fibroblasts into Bowman's space [12].

It is also known that the migration of interstitial myofibroblasts into the Bowman's space through holes in the Bowman's capsule may also contribute to the pathogenesis of glomerulosclerosis [13]. These cells have been identified within crescents demonstrating features of fibrocellular to fibrous organization [14].

Certain proteoglycans such as versican, biglycan and decorin are also involved in the development of fibrous crescents via activation of myofibroblasts and TGF-β_1 [15].

Connective tissue growth factor (CTGF) has been recently shown to be involved in the extracellular matrix production in parietal epithelial cells via TGF-β pathway promoting the scarring process in glomerular crescents [16].

Fibrinogen and hematic extravasates are most frequently incriminated as being the biochemical elements opinion, fibrinogen and fibrin presented into the spaces among the cells that formed the crescents pointed to a severe injury of the glomerular capillaries [17, 18].

The existence of such mixed lesions of glomerulo- and pyelonephritis in the same patient and also the great number of demises by chronic renal failure drew our attention to that the penitentiary inside atmosphere is of a great risk for prisoners health.

Conclusions

Causes determining glomerular nephropathies inside the locked-up spaces of penitentiaries might be tegumentary lesions (generalized piodermitis cutaneous staphylococci) produced by strepto–staphylococcic mixed infections, penitentiary stress and lack of medical education notions characteristic for the social place of living before imprisonment.

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