ELEMENTS OF KIDNEY AFFECTION IN PATIENTS WITH ACUTE TONSIL, SINUS AND OTIC INFECTION FOCI - PRELIMINARY STUDY

SUMMARY:
Kidneys may be affected in infectious microbial, viral, parasitic processes. It is useful to know that purulent tonsillitis, a streptococcal infection, can produce in certain situations glomerular affection. It is especially important for medical practitioners to know about kidney affection produced during streptococcal infections with locations different from pharyngeal ones, so that they could identify them and prevent alterations of the kidney function.

Identification of a chronic kidney disease in its initial stages can prevent the progress of the decline of the kidney function.

We studied 455 patients with acute oropharyngeal infections hospitalised in the ORL section of a general surgery department, as well as a control group, consisting of 500 apparently healthy people.

We found urinary anomalies in 107 (24%) of the patients under study.

We found RFG < 60 ml/min in 11 (2%) of the patients under study.

CKD stage 2 was found in 387 (85%) patients.

Comparing the prevalence of urinary anomalies in patients hospitalised with acute oropharyngeal infectious with the prevalence of urinary anomalies in patients without oropharyngeal infectious we found a significant difference between the two groups (p < 0.05).

The urinary anomalies identified in patients with acute oropharyngeal infectious draw the attention to the existence of kidney affection in oropharyngeal infections as well as to the necessity of monitoring of these patients from a renal point of view.

Keywords: oropharyngeal acute infections, proteinuria, haematuria, glomerulonephritis.

Rezumat: Rinichiul poate fi afectat în procesele infecțioase microbine, virale, parazitare. Este bine cunoscut faptul că amigdalita pultacee, infecție streptococică, poate determina în anumite situații afectare glomerulară. Cunoașterea afectării renale din cursul infectiilor streptococice cu altă localizare decât cea faringiană are o importanță deosebită pentru medicul practician pentru decizarea acestora și prevenirea alterării funcției renale.

Boala cronica de rinichi decelată în stadiile inițiale poate preveni progresia declinului funcției renale. Am studiat un număr de 455 pacienți cu cu infecții acute orofaringiene internați în compartimentul ORL al secției de chirurgie generală, precum și un lot control de 500 persoane aparent sănătoase.

Anomalii urinare am descoperit la 107(24%) dintre pacienții studiați.

RFG < 60 ml/min am descoperit la 11 (2%) dintre pacienții studiați.

BCR stadiu 2 am descoperit în 387 (85%) dintre pacienții studiați.

Compararea prevalenței anomalilor urinare la pacienții cu focar infecțios acut orofaringian internați cu prevalența anomalilor urinare la pacienții fără focar infecțios orofaringian a evidențiat o diferență semnificativă între cele 2 loturi, p < 0.05.

Anomalii urinare decelate la pacienții cu focar infecțios acut orofaringian acut atrag atenția asupra afectării renale în infecțiile orofaringiene acute precum și necesitatea monitorizării din punct de vedere renal al acestor pacienți.

Cuvinte cheie: infecții acute oroaringiene, proteinurie, hematurie, glomerulonefrită.

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BACKGROUND

Acute infections located in the oto-rhino-pharyngolaryngeal area are represented by acute pharyngitis, acute tonsillitis, acute sinusitis, acute otitis and mastoiditis. They are caused by microbes, mainly the ã haemolytic streptococcus, a germ also involved in producing acute and chronic glomerular nephropathies. It is also incriminated in producing some acute interstitial nephropathies.

Streptococcal infections located at the level of the pharynx are incriminated in producing acute glomerulonephritis, being considered one of its main causes. The ã haemolytic streptococcus is incriminated in the aetiology of acute pharyngitis in 15-30% cases, in children, and in 5-10% cases in adults. [1] On the other hand, according to Zward, the ã haemolytic streptococcus was present in 80% patients and (ã haemolytic streptococcus group A 46% and non group A 20%) [2]. Together with staphylococcus aureus it is involved in the aetiology of cellulitis. Some ã haemolytic streptococcus strains have tropism only for the respiratory tract. In general, isolated streptococci at the level of the respiratory tract do not determine cutaneous infections. The Beta-haemolytic streptococcus group C (S. milleri, S. equisimilis, S. zooepidemicus), group G, haemophilus influenzae and parainfluenzae, moraxella catarrhalis are also involved in the aetiology of cellulitis. Some ã haemolytic streptococcus strains have tropism only for the respiratory tract. [4]

Otitis media is determined by viruses in 8-25% cases (the respiratory syncytial virus, rhino viruses, the influenza virus, adenoviruses [5]. Especially involved in otitis externa are staphylococcus aureus and pseudomonas aeruginosa. Candida albicans or anaerobic germs are less frequently involved. [6; 7]

Sinusitis is the most frequent complication of respiratory infections. Haemophilus influenzae, S. pneumoniae, pyogenes streptococcus and moraxella catarrhalis are involved in the aetiology of sinusitis [8; 9; 10; 11]. Anaerobic germs are involved in sinusites determined by odontogenic infections [10] Sometimes, infections are poly-microbial [12].

There are descriptions of acute hypo-complementemnic glomerulonephritis with nephrotic proteinuria after pan-sinusitis determined by the negative coagulazo staphylococcus [13]. There are also descriptions of nephropathy with minimal lesions and glomerulonephritis with mesangial deposits of IgA after an infection of the rhinosinusual focus [14]. In a study on a group of 816 children with pharyngeal and skin streptococcal infections Tewodrosa a identified in 5.4% patients the presence of acute glomerulonephritis [15]. Smith analysed 240 persons belonging to the military staff and found at bioptic examination, the presence of acute hypo-complementemnic glomerulonephritis with lesions of focal or diffuse mesangial proliferation and deposits of C3, after non-streptococcal pharyngeal infections (adenovirus, influenza A or influenza B) in 9 (3.75%) persons.[16] Analysing a group of 86 adult patients with post-infectious acute glomerulonephritis he found that a localisation of the infection at the level of the respiratory tract was present in 23.3% patients, and the ã haemolytic streptococcus was involved in28% patients and the staphylococcus aureus in 24.4% patients [17]. Similar results were obtained by Montseny [18]. Post-infectious glomerulonephritis with IRA in adults, was analysed by Wen in a study on 20 patients and he found that staphylococcus aetiolo gy was involved in 60% patients. 65% patients needed substitution of the kidney function and histological alterations were represented by diffuse endocapillary proliferation in 65% patients and focal mesangial proliferation with deposits of IgA in 35% patients [19].

Macroscopic or microscopic haematuria after non-streptococcal infections of the respiratory tract has also been described. Prospective studies identified a presence of asymptomatic haematuria of 3.8% after non-streptococcal infections and of 8% after ã haemolytic streptococcus group B infections [20; 21]. Mesangial proliferative glomerulonephritis after active chronic infection with Epstein Barr virus has also been described [22; 23].

Although streptococcal infections were considered a cause of post-infectious acute glomerulonephritis, there are neither other data in specialised literature regarding kidney affection, but for acute glomerulonephritis and kidney insufficiency nor data about acute glomerulonephritis becoming chronic. Specialised literature does not contain data about kidney affection determined by acute oto-rhino-laryngeal infections. These regard poststreptococcal tonsil infections.

OBJECTIVE

This fact determined us to study patients with acute infections in the ORL area, hospitalised in the ORL compartment, of the general surgery department of the Municipal Hospital in Brad. We assessed the kidney
function by GFR calculation and proteinuria and haematuria by dipstick.

**MATERIAL AND METHOD**

We studied a number of 455 patients with pathology in the ORL area, with an average age of 52 ± 16 years, hospitalised in the ORL compartment of the general surgery department of the Municipal Hospital in Brad, between 2008-2010. Of these, 253 were males (56%) and 202 (44%) were females.

The control group was represented by 500 apparently healthy persons.

We considered a value of GFR < 60 ml/minute [KDIGO Guidelines, 2005] as kidney insufficiency. The CKD stages were established according the KDIGO Guidelines 2005 MDRD4; According to Taal and Brenner, the risk factors for initiation of CKD are: hypertension, proteinuria, anaemia, obesity, dislipidaemia, coronary disease, diabetes mellitus, smoking, markers of inflammation (fibrinogen, reactive protein C), kidney lithiasis, and recurrent urinary infections.

Proteinuria and haematuria were determined with urine bandelettes and dipstick.

**RESULTS**

Of the 455 patients under study, 107 (24%) patients presented urinary anomalies.

The patients were divided into 2 study groups. Group A was represented by 240 patients with an acute infectious focus at the level of the oropharynx, having an average age of 47.97 ± 15.23 years. Of these, 118 were males (49%) and 122 (51%) were females.

Group B was represented by 215 patients without acute infectious foci, with an average age of 57.25 ± 14.95 years. Of these, 135 were males (63%) and 80 (37%) were females.

In group A, patients with acute infectious focus, we identified asymptomatic urinary anomalies in 93 (39%) patients: isolated albuminuria in 40 (17%) patients, albuminuria associated with haematuria in 8 (3%) patients, isolated haematuria in 45 (19%) patients.

The assessment of RFG identified in 7 (3%) patients GFR # 60 ml/min. The average value of RFG in these patients was 55.75 ± 2.72 ml/min.

In patients with asymptomatic urinary anomalies GFR had an average value of 70.41 ± 10.58 ml/min. In 5 patients with asymptomatic urinary anomalies we identified GFR < 60 ml/min, respectively 54.8 ± 2.3 ml/min.

The evaluation of the renal function by calculating GFR according to MDRD4 showed the following distribution for the stages of CKD: GFR > 90 ml/min 39 (16%) patients; GFR 60-89 ml/min 195 (81%) patients; GFR <60 ml/min 7 (3%) patients.

The evaluation of risk factors for CKD found: hypertension in 26 (11%) patients, DM in 4 (2%) patients, proteinuria in 55 (13%) patients, coronary disease in 4 (2%) patients, obesity in 2 (3%) patients, dislipidaemia in 84 (35%) patients, increased fibrinogen in 115 (27%) patients, reactive protein C increased in 65 (27%) patients, kidney lithiasis in 3 (1%) patients.

The infectious foci located in the ORL area were the following: acute sinusitis: 60 (25%); acute pansinusitis: 40 (16%); acute tonsillitis: 28 (12%); tonsil phlegmon: 35 (14%); acute mastoiditis: 6 (3%); acute otitis 65 (27%); dental abscess: 6 (3%).

In group B, patients without infectious foci, we identified in 14 (7%) patients urinary anomalies: isolated albuminuria in 5 (2%) patients, isolated haematuria in 7 (3%) patients, albuminuria associated with haematuria in 2 (1%) patients.

![Fig. 1. Asymptomatic urinary abnormalities](image-url)
We compared the prevalence of urinary anomalies in patients with infectious foci with the situation of the patients without infectious focus and we found a significant difference between the two groups, p < 0.0001. (Fig. 1)

In 4 (2%) patients we found GFR ≠ 60 ml/min. The average value of GFR in these patients was 57.29 ± 0.89 ml/min.

The evaluation of the renal function by calculating GFR according to MDRD4 showed the following distribution for the stages of CKD: GFR > 90ml/min: 19 (9%) patients; GFR: 60-89ml/min: 192 (89%) patients; GFR < 60ml/min: 4(2%) patients.

In patients with asymptomatic urinary anomalies GFR had an average value of 79.46 ± 11.34ml/min.

In 2 (1%) patients with asymptomatic urinary anomalies we found GFR < 60ml/min, respectively 57.67 ± 1.31ml/min.

The evaluation of risk factors for CKD showed: hypertension in 29 (13%) patients, DM in 3 (1%) patients, proteinuria in 7 (3%) patients, coronary disease in 3 (1%) patients, obesity in 3 (1%) patients, dislipidaemia in 75 (35%) patients, increased PCR in 22 (10%) patients, kidney lithiasis in 2 (1%) patients.

The reasons for hospitalization of the patients were septum deviation: 12 (6%) patients; epistaxis: 56 (26%) patients; haemangioma 4 (2%) patients; epithelioma 4 (2%) patients; neoplasia 12 (6%) patients; trigeminal neuralgia 22 (10%) patients; papilloma 3 (2%) patients; polyposis 23 (10%) patients; rhinitis 36 (17%) patients; traumatism 5 (2%) patients; peripheral vertigo 3 (6%) patients; others 25 (11%) patients.

DISCUSSIONS

As our study evaluated two groups of patients, one with acute oropharyngeal infectious focus and the other without infectious focus, we demonstrated alterations in the relation with urinary pathology, mainly with micro-haematuria and proteinuria. These urinary modifications, proteinuria and, respectively, haematuria, belong to the category of asymptomatic urinary anomalies, a particular form of manifestation of glomerular diseases.

They have been mostly represented by haematuria in 62 (14%) patients and proteinuria in 55 (12%) patients, in the global group.

Thus, we have identified asymptomatic urinary anomalies in the group with infectious focus in 93 (39%) patients and in 14 (7%) patients in the group without infectious focus. Our observations highlight the fact that asymptomatic urinary anomalies are frequent in patients with acute oropharyngeal infectious foci as compared to a group of patients without infectious focus.

Besides the group A â haemolytic streptococcus, other strains of â haemolytic streptococcus, as well as other germs, like staphylococcus aureus, haemophilus influenzae, the Epstein Barr virus, are also involved in the aetiology of oropharyngeal infectious foci.

Within the past 10 years, studies on adults showed that the staphylococcus aureus is especially involved in the aetiology of acute post infectious glomerulonephrites. [24; 25]. In the study conducted by Wen, staphylococcus aureus was identified in 60% cases, and the histopathological aspect was represented by an atypical pattern, respectively by focal mesangial proliferation. [26]. Nasr isolated the staphylococcus aureus in 46% of the patients with postinfectious glomerulonephrites of the elderly [25]. They find that the localisation of infectious processes at oropharyngeal level was met in 23.3% cases. These data plead for the fact that an infectious aetiology can be involved in the aetiology of acute glomerulonephrites.

There exist descriptions of epidemics of postinfectious acute glomerulonephrites in children in Armenia, 51% of which were determined by oropharyngeal infections [27] and in Lithuania, 24% were determined by oropharyngeal infections [28].

In our study, the highest prevalence was represented by acute sinusitis, in 42% patients, followed by acute otitis, in 27% patients. Acute multaceous tonsillitis was identified in 12% patients and tonsil phlegmon was found in 14% patients.

Specialised literature also describes cases of acute glomerulonephritis after acute sinus infections. Thus, Patel has described acute hypocomplementemic glomerulonephritis with nephrotic proteinuria after pansinusitis, determined by the negative coagulazo staphylococcus. [13].

We have not had at our disposal an evidentiation of the pathogenic agent. It is a known fact that asymptomatic urinary anomalies may represent a form of manifestation of poststreptococcal glomerular affection. Studies in specialised literature have in view mainly acute glomerulonephritis determined by the â haemolytic streptococcus in acute tonsillitis in general. Specialised literature frequently quotes the â haemolytic streptococcus and staphylococcus aureus as being involved in producing glomerular lesions, and much less often infections with other germs.
Another strain is represented by group C streptococci. Other germs are also involved in the aetiology of infections of the respiratory tract, as well as streptococci in groups B, C, G; a great variety of other bacteria can also generate these infections.

We insist to mention a peculiarity, the fact that associations with HTA and oedema are very infrequent, nephritic syndromes being thus very rarely found. We have found no case of nephrotic syndrome.

Another peculiarity was the appearance of urinary anomalies relatively soon after the debut of the oropharyngeal infection. In oropharyngeal non-streptococcal infections acute glomerulonephritis appears concomitantly with or several days after the debut of the infection.

The patients with infections of the respiratory tract were hospitalised in the specialised department because of infectious symptomatology (high fever), at a time when this was evident. We have met no cases of IRA in the patients hospitalised in that department.

Functional affection was found in 11(2%) of the patients under study, they had respectively GFR < 60ml/min. This being a cross-sectional study, there were no available data about previous kidney affection or 3-month monitorisation of the kidney function to use pentru classification in stage 1 of CKD, according to the KDIGO Guidelines 2005 MDRD4, of classifying the stages of the chronic kidney disease. We identified BCR stage 2 in 387 (85%) patients under study. We have found no patients in CKD stages 4 and 5.

Urinary anomalies were more frequent in patients in group A (patients with acute infectious focus) as compared to group B (patients without acute infectious focus); the same was true for alterations of GFR.

Our findings regarding the crossectional study indicate the presence of relatively frequent and precocious, but mild, kidney affection in the initial stages of the disease. It may develop as a chronic kidney disease to CRF. The urinary anomalies identified in patients with acute oropharyngeal focus draw attention to the existence of kidney affection in acute oropharyngeal infectious foci, as well as to the necessity of monitoring from a renal point of view of these patients.

References:
References (continued):


