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Original article

PEDOLOGIC SOIL CONTENT IN THE LOCALITIES OF ENDEMIC NEPHROPATHY IN THE MIDLAND BOSNIAN POSAVINA

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Abstract

Introduction. Area of Midland Bosnian Posavina belongs streamwater of rivers Sava and Bosna. The soil composed of aluvial and diluvial segments, specially carbonated composition. The soil is good drenaged and belongs walley soil group.

Epidemiologically, that soil belongs to areas with endemic locality.

Aim. The aim was to investigate dependence of soil and incidence of endemic nephropathy.

Methods. For pedologic work of soil were used pedological charts section Vinkovci 3 and 4, Slavonska Požega 1 and 2, Bosanski Brod 3 and 4 and Tuzla 1 and 2, working maps and aerophotopictures and pedological parameters: profile and type of soil, drenage of soil and water solution pH value. A systematic examination of population was executed (aged 6-66) as «screening» tests: a) uroprotcins b) urinary sediment. Perlustrated population is divided into 3 groups: 1) healthy 2) exactly ill 3) endemic nephropathy suspected. At last two groups were done additional laboratory investigations: CBC, urineculture and antibiogram, BUN and creatinine, electrophoresis of concentrated urine proteins and ß-2 microglobulin. Student t-test is used for statistical analysis of given results.

Results. The land of both side of river-bed Bosna make iAK, LP^b and PDg soil. Turning from river-bed pedological characteristics of soil were changed. Average water solution pH value of 7,39 in iAk soil dropped on 5,49 in PDg soil; natural drenage of easily drenaged iAK soil to badly drenaged PDg soil dropped. The gretest incidence of endemic nephropathy is on LP^b soil (5,28%), 2,3% on PDg soil and 1,54% on iAK soil.

Conclusion. The soil content of both side of river-bed Bosna is the same. The coast is iAK soil, than LP^b soil and most far is PDg soil. The greatest incidence of endemic nephropathy is

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on LP^b soil, less on PDg and iAK soil. It refers on direct dependence of soil and this disease. Our aim is to continues to investigate in the same way.
Key words: *pedological investigation, soil content, endemic nephropathy.*

Introduction

Problem of endemic nephropathy is actual and present more than 50 years. This disease is not enough known etiologically that's why is still in center of occupation our and worldwide experts in area of nephrology.

Our study represent analysis results given from unfinished investigation during 1990 till 1993. Results given than are great value till today.

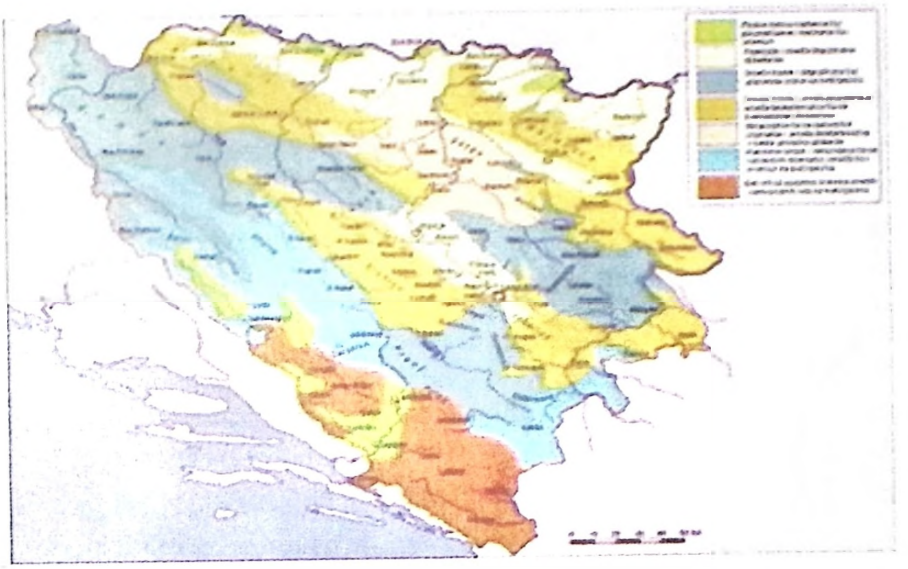
All previous studies lead to on existence of direct dependence of endemic nephropathy and enviroment, respectively presence of causes of this hard renal disease in the soil and in drinking water (4,7,8). On acceptability this way of thinking refere localities of area Midland Bosnian Posavina, where river Sava flow through northern part and the midlle part river Bosna. Geological substrate of this area is made of aluvial and diluvial sediments, especially carbonated composition. The soil is good natural drenage and belongs walley soil group.This soil has large amount of accumulated subterranean water, which is its bigger part infiltrated from river-bed, and its less part from supply superficial waters from badly drenaged soil area (5,6). Epidemiologically, that soil belongs to areas with endemic localities (1).

Aim of study

Aim of stuy was pedologic work of soil in endemic localities and perlustration of population accord to valid criteria and on given results basis to estimate dependence of soil and incidence of this etiologically still unkonown kidney disease.

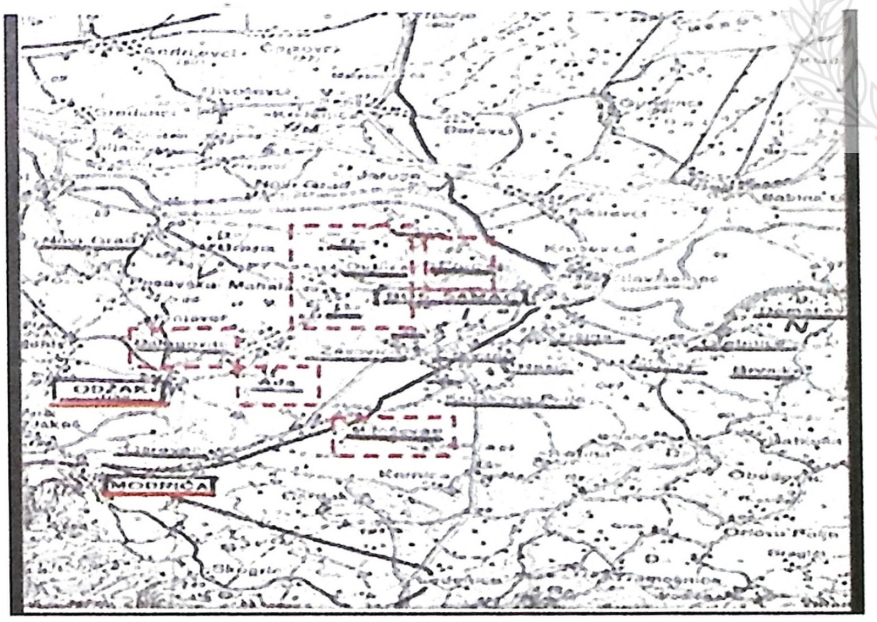
Material and methods

Looking for the soil content, we have done pedologic work of soil in the next willages: Bosanski Miloševac, commune of Modriča on the right and Ada, Novo Selo, Gornja Dubica, Donja Dubica, Prud, commune Odžak on the left side river Bosna (Pictures 1 and 2).



Picture 1: *Pedologic charts of Bosnia and Herzegovina*

Picture 2: *Endemic nephropathy on area Modriča and Odžak (Midland Bosnian Posavina)*



Pedological chards section Vinkovci 3 and 4, Slavonska Požega 1 and 2, Bosanski Brod 3 and 4 and Tuzla 1 and 2 were used through investigation. Terrain work map (1:50000) with all topographic details is used for pedological investigation. In case of walley soil group we

used aerophotopictures (1:35000) what made possible an undisturb working on terrain and properly systematic unit separation. Each systematic or mapped unit had signed by chart which was symbol for type of soil (3,5). As pedologic parameters were used number of profile and pedologic mark of soil, drenage rate and water solution pH value.

Systematic examination of population and laboratory investigations were done by WHO Conference expert recommendation for balkan endemic nephropathy. Conference have been in Dubrovnik, 1964 (2).

According that recommendation we have perlustrated of population (aged 6-66)). For perlustration we used «screening» tests: a) uroproteins b) urinary sediment. Perlustrated population divided into 3 groups: 1) healthy 2) exactly ill 3) endemic nephropathy suspected. An additional laboratory investigation were done in the group 2 and 3: CBC, BUN, creatinine, urineculture and antibiogram, electrophoresis of concentrated urine proteins and β-2 microglobulin.

For statistical analysis of given results we have used: 1) x-median 2) s- standard deviation, 3) sx- standard error and 4) t-test.

Results

Table 1. *shows pedologic characteristics of soil in the endemic localities of Midland Bosnian Posavina area.*

Table 1.: *Pedologic characteristics if soil*

Profile number	Pedologic mark of soil	Sea attitude (m)	Natural drenage	pH reaction in the water
1	2	3	4	5
151	iAK	91	Pd_3	7,50
150	iAK	91	Pd_1	7,40
142	iAK	95	Pd_2	7,28
143	LP^b	95	Pd_3	6,80
144	LP^b	95	Pd_4	6,40
149	LP^b	95	Pd_3	6,35
146	PDg	95	Pd_6	5,35
147	PDg	95	Pd_5	5,49
148	PDg	95	Pd_5	5,45

P<0,001

Profiles No 151, 150 and 142 belong to aluvial soil group with good drenage, which growing up by deepnes and expressive alkaline

reaction, specially in upper levels. That are aluvial carbonated clay soils, marked iAK.

Profiles No 143, 144 and 149 represent graybrown (meadows) non-carbonated soil marked Lp^b. They continuous on the aluvial carbonated soil and stay away from river-bed Bosna. They have an average drenage, in lower levels are softly acid or even neutral pH reaction.

Profiles No 146, 147 and 148 are podzolast pseudoglean soils. Thay spread on walley aluvium and continuous on graybrown non-carbonated soils.They are the most far of river-bed Bosna.They have never been overflowed.They are acid soil marked PDg.

Using table 1. data analysis we can see the same content of soil on both sides river-bed Bosna. Near coast, 1-1,5 km latitude is iAK soil, 2-5 km is LP^b soil and 5-7 km is PDg soil. As we can staying away from river-bed, pedologic characteristics of soil have changed in the investigation area. Average pH value of 7,39 in the iAK soil dropped on 5,43 in PDg soil, and also natural drenage dropped from easily drenaged iAK soil to badly drenaged PDg soil.

Table 2 shows number of perlustrated persons, soil types and incidence of endemic nephropathy.

Table 2.: *Soil types and incidence of endemic nephropathy*

Number	Pedologic mark of soil	Number of perlustrated persons	Number of illnes	Number of suspected	Sum of illnes and susp.	(6/3)x100
1	2	3	4	5	6	7
1.	iAK	388	2	4	6	1,54%
2.	LP^b	1136	44	16	60	5,28%
3.	PDg	824	4	15	19	2,30%
UKUPNO		2348	50	35	85	3,62%

P<0,001

Using table2 data analysis we can see that 2348 persons with incidence of endemic nephropathy of 3,62% were perlustrated, accordingly with other autors reports (1,7,8). The greatest incidence of endemic nephropathy is 5,28% on LP^b soil (2-5 km distance of river-bed Bosna), incidence of 2,30% on PDg soil (5-7, rarely 10 km distance of river-bed Bosna) and incidence of 1,54% on iAK soil (near coast 1-1,5 km).

Discussion

From acid unpassed diluvial origin stratum soil (PDg) superficial waters flow and stay in lower levels and progressive filtrate to old aluvial soil marked LP^b. Infiltrated waters from river-bed Bosna and superficial waters from unpassed soil is place for collision (5,6). We can expect that in this area named "contact zone" happened sedimentation of define substance suitable oxidative and/or reductive processes where appeard determinated nephrotoxic substances (5,6). Entering that substances into human body during long time (10-15 age) using water and food become renal tubular damage and endemic nephropathy progress.

Conclusion

The soil content of both side of river-bed Bosna is the same. The coast is iAK soil than LP^b soil and the most far is PDg soil. The area of «contact zone» respond to LP^b soil. That's the greatest incidence of 5,28% for difference of 2,30% for PDg soil and 1,54% for iAK soil. It seems that there is direct connection between soil and incidence of etiologically unknown renal disease till now.

It is the same or similar soil content in another endemic localities it's still unknown but our aim is to continues to investigate in the same way.

Apstrakt

Uvod. Područije srednje bosanske Posavine pripada vodotocima rijeke Save i rijeke Bosne. Tlo se sastoji od aluvijalnih i diluvijalnih segmenata, prvenstveno karbonatnog sastava.

Zemljište je dobro drenirano i pripada grupi dolinskog tla. Epidemiološki, pripada područijima sa endemskim lokalitetima.

Cilj rada. Cilj rada je bio ispitati zavisnost tla i učestalost endemske nefropatije.

Metodi. Za pedološku obradu zemljišta korišćene su pedološe karte sekcija Vinkovci 3 i 4, Slavonska Požega 1 i 2, Bosanski Brod 3 i 4 i Tuzla 1 i 2, te radne karte i aerofotosnimci, a od pedoloških parametara profil i tip tla, dreniranost i pH vrijednost vodenog rastvora. Sproveden je sistematski pregled stanovništva u dobi od 6 do 66 godina, te "screening" testovi: a) bjelančevina u urinu i b) sediment urina. Perlustrirano stanovništvo je razvrstano u 3 skupine: 1) zdravi, 2) sigurno bolesni i 3) suspektni na endemsku nefropatiju. U posljednje dvije skupine učinjene su i dodatne laboratorijske pretrage: KKS, Kultura urina i ABG, Urea i Kreatinin u krvi, Elektroforeza bjelančevina koncentrovanog urina i β-2 mikroglubulin. Statistička obrada dobivenih rezultata je učinjena t-testom za razliku aritimetičkih sredina.

Rezultati. Zemljišta sa obje strane korita rijeke Bosne čine tla iAK, LP^b i PDg. Sa udaljavanjem od riječnog korita mjenjaju se i pedološke karakteristike. Opada prosječna pH vrijednost vodenog rastvora od 7,39 u zemljištu iAK na 5,49 u zemljištu PDg, opada i prirodna dreniranost od lako dreniranog iAK do veoma slabo propusnog PDg. Najveća učestalost endemske nefropatije je 5,28% na zemljištu LP^b, nešto manja 2,30% na zemljištu PDg, a najmanja 1,54% na zemljištu iAK.
Zaključak. Isti je sastav tla sa desne i lijeve strane korita rijeke Bosne. Priobalno je iAK, slijedi a najudaljenije zemljište je PDg. Najveća učestalost endemske nefropatije je na zemljištu, a nešto manja na PDg i iAK, što upućuje na direktnu zavisnost tla i ovog oboljenja. Naš je zadatak nastaviti sa daljnim istraživanjima, upravo, u ovom pravcu.
Ključne riječi. *Pedološko istraživanje, sastav tla, endemska nefropatija.*

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